AIR POLLUTION SERVICES

St Dunstans House, Bedminster Down Road, Bristol, BS13 7AB
Tel: 01179 112434. Email: contact@airpollutionservices.co.uk

Ince Parish

Air Quality Baseline Report

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Quality Assurance

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Contact Details

Contact Name:	Dr Austin Cogan
Tel:	01179 112434
Email:	contact@airpollutionservices.co.uk

AIR POLLUTION SERVICES

Experts in Air Quality, Odour and Climate Change








1 Introduction

1.1 Air Pollution Services (APS) has been commissioned by Ince Parish Council to review baseline air quality in the Parish to support the development of a Neighbourhood Plan for Ince Parish. Neighbourhood planning gives communities direct power to develop a shared vision for their neighbourhood and shape the development and growth of their local area. Air pollution can be an important consideration for neighbourhoods when developing their policies for the plan, especially where there is a risk of poor air quality in the local area. The Parish location is shown in Figure 1.

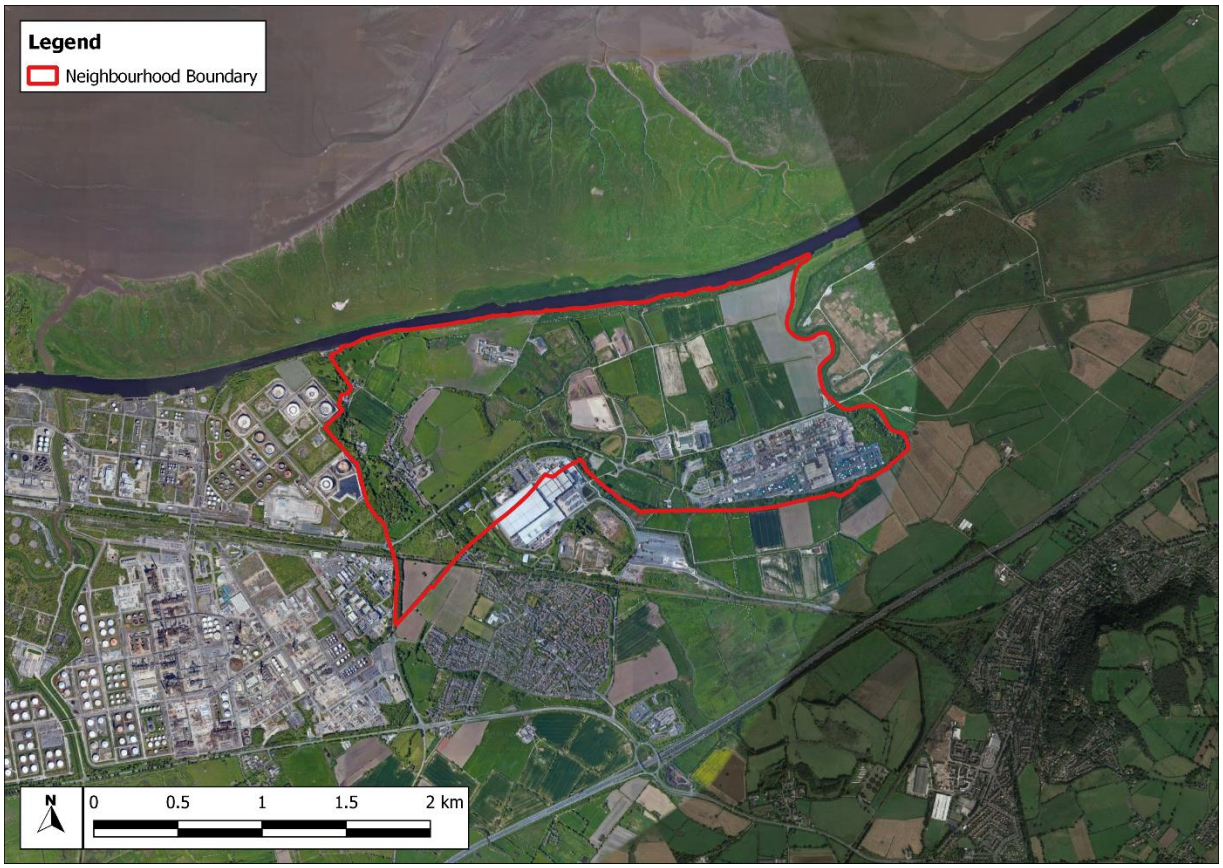

Figure 1: Parish Boundary

1.2 The Parish comprises mainly agricultural land with a small village and some large industrial facilities. Surrounding the Parish is mainly industrial and agricultural land, with the River Mersey to the north and the villages of Elton and Helsby to the south.

1.3 This report sets out a comprehensive review of relevant air quality legislation and policy documents and baseline air quality conditions in the Parish, to help aid the development of a neighbourhood plan.

2 Legislation and Policy Documents

2.1 This section sets out the air quality related planning policy which is a material consideration in determining planning applications, air quality legislation and other sources of useful information.

Planning Policy

National Planning Policies

National Planning Policy Framework

2.2 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, 2019a) sets out planning policy for England. It includes advice on when air quality should be a material consideration in development control decisions. Relevant sections are set out below:

Paragraph 170: *"Planning policies and decisions should contribute to and enhance the natural and local environment by: preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality"*

Paragraph 180: "*Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development".*

Paragraph 181: *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*

Paragraph 183: *"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development,*

the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

Paragraph 54: *"Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."*

Planning Practice Guidance

2.3 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019b). The PPG on air quality published in November 2019 states:

Paragraph: 001 Reference ID: 32-001-20191101*: "The Department for Environment, Food and Rural Affairs carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified."*

Paragraph: 002 Reference ID: 32-002-20191101: *"It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality".*

Paragraph: 005 Reference ID: 32-005-20191101: *"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.*

Where air quality is a relevant consideration the local planning authority may need to establish:

- *the 'baseline' local air quality, including what would happen to air quality in the absence of the development;*
- *whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and*

- *whether occupiers or users of the development could experience poor living conditions or health due to poor air quality".*

Paragraph: 007 Reference ID: 32-007-20191101: *"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific".*

Paragraph: 008 Reference ID: 32-008-20191101: *"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented".*

Clean Air Strategy

2.4 Defra published the Clean Air Strategy in January 2019 (Defra, 2019a). The strategy focuses on exposure to toxic pollutants like nitrogen oxides, ammonia, particulate matter, non-methane volatile organic compounds and sulphur dioxide. The strategy aims to reduce emissions of pollutants including the aim to reduce particulate matter emissions by 30% by 2020, and by 46% by 2030.

2.5 This strategy sets out the aim for new enforcement powers at a national and local level, across all sectors of society and sets out the comprehensive action that is required from government and society to meet these targets. The strategy includes actions to reduce emissions from transport (including road, maritime, rail, aviation and NRMM), homes, farming and industry.

2.6 The strategy states that:

"New legislation will create a stronger and more coherent framework for action to tackle air pollution. This will be underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to take action in areas with an air pollution problem."

The Industrial Strategy

2.7 The Government has published a white paper that sets out a long-term 'Industrial Strategy' for the UK (HM Government, 2017). It includes a key policy to "*support electric vehicles through a £400m charging infrastructure investment and an extra £100m to extend the plug-in car grant*" and states *"the UK's road and rail network could dramatically reduce carbon emissions and other pollutants".* Unlike their fossil fuel counterparts, electric vehicles do not release nitrogen oxides (NOx) emissions; if the strategy is fulfilled then NOx emissions will reduce significantly over the coming decades.

The Clean Growth Strategy

2.8 An ambitious blueprint for Britain's low carbon future was set out by the Government in a Policy paper (HM Government, 2018) in April 2018. Although this strategy focuses on reducing the UK's carbon footprint, it contains several policies and proposals that relate to air quality, including:

22. *"End the sale of new conventional petrol and diesel cars and vans by 2040*

23. *Spend £1 billion supporting the take-up of ultra low emission vehicles (ULEV), including helping consumers to overcome the upfront cost of an electric car*

24. *Develop one of the best electric vehicle charging networks in the world by:*

    - *Investing an additional £80 million, alongside £15 million from Highways England, to support charging infrastructure deployment*
    - *Taking new powers under the Automated and Electric Vehicles Bill, allowing the Government to set requirements for the provision of charging points*

25. *Accelerate the uptake of low emission taxis and buses by:*

    - *Providing £50 million for the Plug-in Taxi programme, which gives taxi drivers up to £7,500 off the purchase price of a new ULEV taxi, alongside £14 million to support 10 local areas to deliver dedicated charge points for taxis*
    - *Providing £100 million for a national programme of support for retrofitting and new low emission buses in England and Wales*

26. *Work with industry as they develop an Automotive Sector Deal to accelerate the transition to zero emission vehicles*

27. *Announce plans for the public sector to lead the way in transitioning to zero emissions vehicles*

28. *Invest £1.2 billion to make cycling and walking the natural choice for shorter journeys*

29. *Work to enable cost-effective options for shifting more freight from road to rail, including using low emission rail freight for deliveries into urban areas, with zero emission last mile deliveries*

30. *Position the UK at the forefront of research, development and demonstration of Connected and Autonomous Vehicle technologies, including through the establishment of the Centre for Connected and Autonomous Vehicles and investment of over £250 million, matched by industry The Clean Growth Strategy 15*

31. *Innovation: Invest around £841 million of public funds in innovation in low carbon transport technology and fuels including:*

    - *Ensuring the UK builds on its strengths and leads the world in the design, development and manufacture of electric batteries through investment of up to £246 million in the Faraday Challenge*
    - *Delivering trials of Heavy Goods Vehicle (HGV) platoons, which could deliver significant fuel and emissions savings".*

The 25 Year Environment Plan

2.9 The Government has published a Policy paper called the '25 Year Environment Plan' (HM Government, 2019) which set out what the government will do to improve the environment within a generation. This includes the first goal 'Clean air' where the government states *"we will achieve clean air by:*

- *Meeting legally binding targets to reduce emissions of five damaging air pollutants. This should halve the effects of air pollution on health by 2030.*
- *Ending the sale of new conventional petrol and diesel cars and vans by 2040.*
- *Maintaining the continuous improvement in industrial emissions by building on existing good practice and the successful regulatory framework".*

Road to Zero

2.10 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition.

2.11 This paper confirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by 2040, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

2.12 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades.

Air Quality Plan

2.13 Defra has produced an Air Quality Plan to tackle roadside NO_2 concentrations in the UK (Defra, 2017b). Alongside a package of national measures, the Plan requires those English Local Authorities (or the GLA in the case of London Authorities) that are predicted to have exceedances of the limit values beyond 2020 to produce local plans by December 2018. These plans are undertaken in stages and must have measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a charging Clean Air Zone (CAZ).

Local Planning Policies

Local Plan

2.14 Cheshire West and Chester Council's (CW&CC's) Local Plan (2015), adopted in 2015, comprises two parts. Part One on Strategic Policies includes three policies which refer to air quality. Policy STRAT 1 on 'Sustainable development' states:

"The Local Plan seeks to enable development that improves and meets the economic, social and environmental objectives of the borough in line with the presumption in favour of sustainable development".

2.15 Policy SOC 5 on 'Health and well-being' states:

"In order to meet the health and well-being needs of our residents proposals will be supported that…promote safe and accessible environments and developments with good access by walking, cycling and public transport…Development that gives rise to significant adverse impacts on health and quality of life (e.g. soil, noise, water, air or light pollution, and land instability, etc) including residential amenity, will not be allowed".

2.16 Policy ENV 4 on 'Biodiversity and geodiversity' states:

"The Local Plan will safeguard and enhance biodiversity and geodiversity through the identification and protection of sites and/or features of international, national and local importance.

Sites will be protected from loss or damage taking account of:

- *The hierarchy of designations of international, national and local importance'*
- *The irreplaceability of habitats, sites and/or features and contribution to the borough's ecological network of sites and features*
- *Impact on priority habitats and protected/priority species*

Development should not result in any net loss of natural assets, and should seek to provide net gains. Where there is unavoidable loss or damage to habitats, sites or features because of exceptional overriding circumstances, mitigation and compensation will be required to ensure there is no net loss of environmental value".

2.17 Part Two of the Local Plan (CW&CC, 2019) on land allocations and detailed policies, adopted in 2019, includes Policy EP 1 on 'Ellesmere Port settlement area' which states:

"Within the defined settlement boundary of Ellesmere Port as identified on the policies map, development proposals will be supported which are in line with the relevant development plan policies and are consistent with the following principles, where relevant, aimed at delivering the Local Plan (Part One) policy STRAT 4…do not give rise to significant adverse impact on air quality in line with Local Plan (Part Two) policy DM 31".

2.18 Policy DM 29 on 'health impacts of new development' states:

"Development proposals should take every reasonable opportunity to promote and positively contribute to the health of the borough in line with Local Plan (Part One) policy SOC 5. A statement considering the health implications of new build commercial and residential development should be submitted, with mitigation of negative impacts made proportionate to the scheme.

Where development is likely to have a significant impact, including any cumulative impacts on public health, it must be demonstrated how health and wellbeing has been taken into account through an assessment. Such applications must make a positive contribution to health and wellbeing and any negative impacts adequately mitigated.

Development that would give rise to significant adverse effects on health and wellbeing will not be supported".

Policy DM 31 on 'air quality' states:

"In line with Local Plan (Part One) policy SOC 5, development must not give rise to significant adverse impacts on health and quality of life, from air pollution. In particular, development proposals within or adjacent to an Air Quality Management Area will be expected to be designed to mitigate the impact of poor air quality on future occupiers.

An air quality assessment will be required for development proposals that have the potential for significant air quality impacts, including those which:

1. are classed as major development and have the potential, either individually or cumulatively, for significant emissions; or

2. are likely to result in an increase in pollution levels in an Air Quality Management Area (AQMA); or

3. are likely to expose people to existing sources of air pollutants.

Where an air quality assessment identifies an unacceptable impact on or from air quality, an appropriate scheme of mitigation must be submitted, which may take the form of on-site measures or, where appropriate, a financial contribution to off-site measures.

Applicants must demonstrate that appropriate mitigation will be provided to ensure that the new development is appropriate for its location and unacceptable risks are avoided.

Development that is likely to produce an odour should demonstrate that there is no negative impact on residential amenity, in line with Local Plan (Part One) policy SOC 5 and Local Plan (Part Two) policy DM 2".

2.19 For proposals involving energy generation, storage or district heat networks, Policy DM 52 states that *"proposals for biomass installations will not be permitted within or adjacent to Air Quality Management Areas" and "there must be no unacceptable impact on air quality arising from the emissions of the proposed development, as follows:*

i. Proposals for natural gas-fired CHP plants must meet a minimum standard of:

a. spark ignition engine: 250 mgNOx/Nm^3

b. compression ignition engine: 400 mgNOx/Nm^3

c. gas turbine: 50 mgNOx/Nm^3

ii. Proposals for biomass installations must meet a minimum standard of 275 mgNOx/Nm^3 and 25 mgPM/Nm^3 (Solid biomass boiler)".

2.20 Policy DM 54 relates to waste management facilities and states *"proposals must demonstrate how they minimise potential adverse impacts on human health, air quality and the ecology of the area. Opportunities to enhance biodiversity and green infrastructure and improve air quality through use of clean technologies, should be considered and included within schemes wherever possible".*

2.21 Regarding proposals for exploration, appraisal or production of hydrocarbons, Policy M4 states:

"In line with Local Plan (Part One) policy ENV 7, proposals for all stages of oil and gas development (exploration, appraisal and production) will be supported where:

1. it can be ensured that any odour, dust or particle emissions are controlled, mitigated or removed at source and will not have a significant detrimental impact on residential amenity or human health, in line with Local Plan (Part One) policy SOC 5;

2. gas emissions from exploration, appraisal or production operations and from associated transport methods are controlled and minimised using the best available technology. Gas emissions must not have a significant detrimental impact on air quality, residential amenity or the environment, in line with Local Plan (Part One) policy SOC 5…

6. environmentally preferable alternatives to road travel (including pipelines) are considered and used, where appropriate, to transport materials to and from the site, in line with Local Plan (Part One) policy STRAT 10;

7. anticipated levels of traffic resulting from the proposal will not result in a significant detrimental impact on residential amenity;

8. the cumulative impact on local communities and the environment with existing or proposed development of a similar kind in the same or adjoining areas is considered acceptable…

Exploration

Proposals for exploration of hydrocarbons will be supported where exploration is for an agreed length of time, and…above ground activity has been directed to the least sensitive location within the site and above ground structures and facilities are grouped where possible. This is in order to reduce impacts on local residents and the environment, whilst still enabling exploration of the resource…

Appraisal

Proposals for appraisal of hydrocarbons will be supported where…above ground activity has been directed to the least sensitive location within the site and above ground structures are grouped where possible. This is in order to reduce impacts on local residents and the environment, whilst still enabling appraisal of the resource…

Production

Proposals for the production of hydrocarbons will be supported where…above ground activity has been directed to the least sensitive location within the site and above ground structures are grouped where possible. This is in order to reduce impacts on local residents and the environment, whilst still allowing production of the resource".

Local Transport Plan

2.22 The Integrated Transport Strategy 2011 – 2026 (CW&CC, 2011) includes the objective to *"contribute to safer and secure transport in Cheshire and to promote types of transport that are beneficial to health"* and policy objective stating *"The Council will…work to reduce transport related air quality problems in the Borough".* This has since been updated by the Integrated Transport Strategy 2017 – 2030 (CW&CC, 2018) which retains the same objectives.

Cycling Strategy

2.23 CW&CC has produced a cycling strategy (2013) for the borough to help promote healthy lifestyles and reduce impacts on the environment, including air quality. This sets out a strategy to build new and improved cycling infrastructure, raise awareness of the benefits of cycling, improve cycle safety and security through training and enthuse people to cycle.

Low Emission Strategy

2.24 The CW&CC Low Emission Strategy (CW&CC, 2018) seeks to reduce the health impacts associated with air quality by targeting the reduction of pollution emissions from vehicles. It puts forward the key principles to shift transport practices from cars to public transport, cycling and walking, reduce distances driven, avoid emissions from stationary vehicles, chimneys and construction, and improve vehicle technology to achieve low emission vehicles.

Health and Wellbeing Strategy

2.25 CW&CC has produced a strategy on health and wellbeing (CW&CC, 2016). This sets out four priorities, with Priority 2: Living Well including air quality as an indicator of whether people have healthy lifestyles. The strategy sets out CW&CC's ambition to deliver real improvements to health and wellbeing and to reduce health inequalities across the borough.

Ellesmere Port Vision and Strategic Regeneration Framework

2.26 CW&CC has taken the initiative to bring together key organisations and individuals with an interest in and passion for Ellesmere Port (across public, private, voluntary and community sectors) to form a new strategic regeneration and investment partnership for the Town - the Ellesmere Port Development Board (EPDB). The EPDB have produced a 'Vision and Strategic Regeneration Framework (SRF)' (EPDB, 2011) to focus on the aspirations for the area over the next 10 to 15 years, which is supported by CW&CC. The vision is that *"Ellesmere Port will be a place of choice for businesses seeking profitable opportunities in Cheshire and the North West and for families and individuals looking for great value homes and lifestyles*". This promotes parts of Ince as a key employment zones, as shown in Figure 2.

Figure 2: EPDB's Strategic Framework for the Town

Image sourced from the Ellesmere Port Vision and Strategic Regeneration Framework (EPDB, 2011).

Helsby Neighbourhood Planning Policies

2.27 The neighbouring Parish of Helsby, southeast of Ince Parish, has adopted a neighbourhood plan (Helsby Parish Council, 2016) which sets out the vision for Helsby, the key issues, core objectives and neighbourhood plan policies. One of the key issues is the community's opposition to existing and planned industrial and energy related developments which are close to the Parish but have environmental impacts on the village, including air pollution. It sets out the objective *"To protect and enhance Helsby's environment, including its natural and heritage assets, so as to retain the character of the village, and hand it on to future generations in a better state than it is now"* and presents a clear message regarding the existing impacts and that *"the community would object to any proposal adding significantly to this impact".* The plan also includes Policy HNP ENV7 – Natural Assets which states:

"Development should safeguard or enhance natural assets in Helsby and adjoining areas, including Local Wildlife Sites, Local Nature Reserves, and Regionally Important Geological Sites. Development should not result in the net loss of natural assets or adverse impact on priority habitats or protected/priority species, and should seek to provide gains. Where there is unavoidable loss or damage to habitats, sites or features because of exceptional overriding circumstances, mitigation and compensation will be required to ensure there is no net loss of environmental value".

Local Air Quality Action Plan

2.28 CW&CC has investigated air quality within the district as part of their local air quality management (LAQM) duties and it and its predecessors have declared four Air Quality Management Areas (AQMAs) covering Whitby Road/Station Road in Ellesmere Port, Fluin Lane in Fordsham, Thornton le Moors and Chester City Centre. The Council has since published an Air Quality Action Plan (AQAP) that includes measures to improve local air quality. The latest AQAP published (CW&CC, 2017) sets out the actions for 2017 to 2022. These include measures to manage local air quality, in particular sulphur dioxide concentrations due to local emissions from industry.

2.29 The AQAP highlights that there have been high levels of sulphur dioxide concentrations in Thornton le Moors due to emissions from the nearby Essar Oil (UK) Ltd refinery. These emissions have been assessed by CW&CC using data provided by Essar. The resulting area of potential impacts from the twelve sources of sulphur dioxide within the refinery is presented in Figure 3. Although the contours extend to within Ince, it should be noted that up to 35 exceedences per year are allowed under current legislations; there are therefore no predicted exceedences of the 15-minute mean sulphur dioxide objective within Ince.

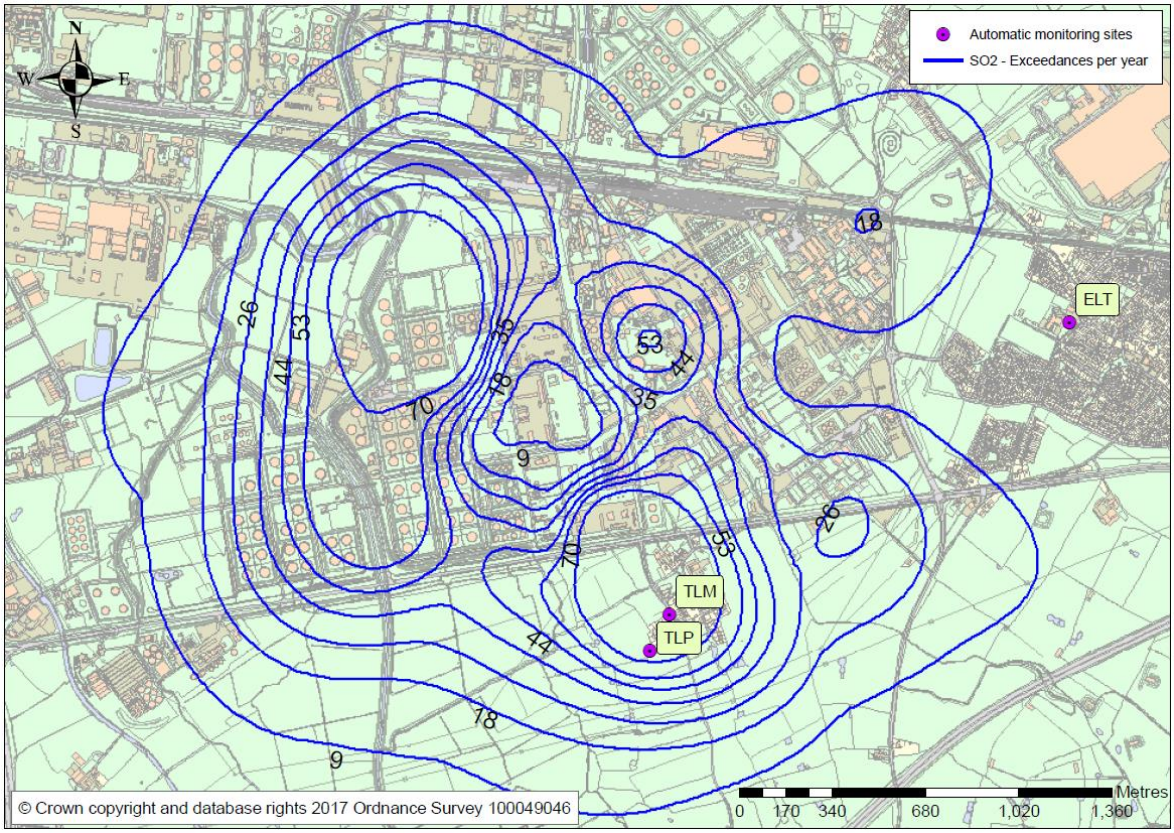

Figure 3: Map showing modelled contours of the likely number of exceedences of the sulphur dioxide 15-minute mean air quality objective, based on the maximum modelled concentrations between 2013 and 2015

Information obtained from CW&CC's Thornton le Moors Air Quality Action Plan, 2017.

Air Quality Standards, Critical Levels/Loads, Limit Values and Air Quality Objectives

2.30 The Environment Act 1995 (HMSO, 1995) sets out the requirements of the Local Air Quality Management (LAQM) regime and the requirement for the Government to produce an Air Quality Strategy including standards and objectives.

2.31 The latest Air Quality Strategy was published in 2007 (Defra, 2007) and sets out the Air Quality Standards (AQS), which consider the effects on human health and ecosystems, and the National Air Quality Objectives (AQOs), which are policy targets for ambient pollution. The AQOs, for use by local authorities when considering human health were incorporated into UK legislation within the Air Quality (England) Regulations, 2000, Statutory Instrument 928 (2000) and the Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (2002). In addition to the AQO for protection of human health set out in the Air Quality Regulations, both critical levels and critical loads are defined for protection of ecosystems. These critical levels and critical loads also form part of the AQOs in the strategy.

2.32 The Strategy explains that the AQSs for the protection of human health are defined as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The AQS are set for individual pollutants and are made up of a concentration value and an averaging time over which it is to be measured. In terms of ecosystems the AQS are based on the critical levels and critical loads, which are derived for habitats and exceedence of these values are used as an indication of the potential for harmful effects to systems at steady state thus giving an indication of risk to the system. Critical loads are values of pollutants deposited below which significant effects do not occur. Critical levels the concentrations of pollutants above which direct adverse effects on vegetation or ecosystems may occur.

2.33 The AQO's set out the extent to which the Government expects the AQS to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and possible timescales. AQO are policy targets often expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedences, within a specified timescale. An exceedence is a breach of the threshold for the concentration for the specific averaging period. The LAQM regime, introduced by the Environment Act 1995, requires local authorities to review air quality within their boundary and work towards achieving and maintaining the AQO.

2.34 The Strategy describes the Local Air Quality Management (LAQM) regime that has been established by Part IV of the Environment Act 1995, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA) and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives. The strategy also provides the policy framework for air quality management and assessment in the UK.

2.35 In additional to the AQOs set within the Air Quality Strategy and relevant regulations, the European Union (EU) has also set limit values and target values for the protection of human health and critical levels for the protection of ecosystems. These were transposed into the Air Quality Standards Regulations (HMSO, 2010), which sets out the UK limit values, target values and critical levels for specific pollutants. Like the AQO, the limit values, target values and critical levels are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedences allowed per year (if any) and a date by which it must be achieved. Some pollutants have more than one value covering different dates or averaging times. While the AQO are policy targets, the government has the duty to ensure compliance with the legally binding limit values which is a national obligation rather than a local one.

2.36 The relevant air quality assessment levels (AQAL) are set out in Table 1 and specify the levels to not be exceeded. The AQALs consist of the national air objectives (AQO), limit values and Environment

Agency's Environmental Assessment Levels (EALs). Where no EAL is quoted by the Environment Agency guidance, one has been provided from the Health and Safety Executive's Workplace Exposure Limits (WELs). The list includes far more pollutants than just the AQOs and limit values for which the CW&CC have a duty to manage, since the neighbourhood is located within an industrial region.

Table 1: Air Quality Assessment Levels (AQOs, Limit Values)

Pollutant	Time Period	Source of AQAL [a]	Concentration, and the number of exceedences allowed per year (if any)	Date AQO / Limit Value to be Achieved From and Maintained After
Human-Health				
Nitrogen dioxide (NO_2)	1-hour Mean	AQO / Limit Value	200 µg/m³ not to be exceeded more than 18 times a year	31st December 2005 / 1st January 2010
	Annual Mean	AQO / Limit Value	40 µg/m³	31st December 2005 / 1st January 2010
Fine particulate matter (PM_{10})	24-hour Mean	AQO / Limit Value	50 µg/m³ not to be exceeded more than 35 times a year	31st December 2004 / 1st January 2005
	Annual Mean	AQO / Limit Value	40 µg/m³	31st December 2004 / 1st January 2005
Very fine particulate matter ($PM_{2.5}$)	Annual Mean	AQO / Target Value	25 µg/m³	2020 / 2010
Sulphur dioxide (SO_2)	15-minute Mean	AQO	266 µg/m³ not to be exceeded more than 35 times a year	31st December 2005
	1-hour Mean	AQO / Limit Value	350 µg/m³ not to be exceeded more than 24 times a year	31st December 2004 / 1st January 2005
	24-hour Mean	AQO / Limit Value	125 µg/m³ not to be exceeded more than 3 times a year	31st December 2004 / 1st January 2005
Carbon monoxide (CO)	Maximum daily 8-hour mean	AQO / Limit Value	10 mg/m³	31st December 2003 / 1st January 2005
Benzene (C_6H_6) [b]	Annual Mean	AQO / Limit Value	5 µg/m³	31st December 2010 / 1st January 2010
	Running Annual Mean	AQO	16.25 µg/m³	31st December 2003
1,3-butadiene [b]	Annual Mean	AQO	2.25 µg/m³	31st December 2003

Pollutant	Time Period	Source of AQAL [a]	Concentration, and the number of exceedences allowed per year (if any)	Date AQO / Limit Value to be Achieved From and Maintained After
Dimethyl sulphate [c]	Annual Mean	AQO	2.25 µg/m³	31st December 2003
Hydrogen Fluoride (HF)	1-hour Mean	EA EAL	160 µg/m³	-
	Annual Mean	EA EAL	16 µg/m³	-
Hydrochloric acid (HCl)	1-hour Mean	EA EAL	750 µg/m³	-
	Annual Mean	EA EAL	20 µg/m³ [a]	-
Ammonia (NH_3)	Annual Mean	EA EAL	180 µg/m³	-
	1-hour Mean	EA EAL	2500 µg/m³	-
Benzo(a)pyrene [c]	Annual Mean	AQO / Target Value	0.25 ng/m³ B(a)P / 1 ng/m3 B(a)P	31st December 2010 / 31st December 2012
Dioxins and -furans (PCCD/F) [d]	Annual Mean	WHO	0.3 pg/m³	-
Polychlorinated biphenyls (PCBs)	1-hour Mean	EA EAL	6 µg/m³	-
Antimony	1-hour Mean	EA EAL	150 µg/m³	-
	Annual Mean	EA EAL	5 µg/m³	-
Arsenic (As)	Annual Mean	Target Value / EA EAL	0.006 µg/m³/ 0.003 µg/m³	31st December 2012 / -
Cadmium (Cd)	Annual Mean	Target Value / EA EAL	0.005 µg/m³	31st December 2012
Chromium III (Cr)	1-hour Mean	EA EAL	150 µg/m³	-
	Annual Mean	EA EAL	5 µg/m³	-
Chromium IV (Cr)	1-hour Mean	EA EAL [e]	15 µg/m³	-
	Annual Mean	EA EAL	0.0002 µg/m³	-
Cobalt (Co)	1-hour Mean	EA EAL [e]	30 µg/m³	-
	Annual Mean	EA EAL [e]	1 µg/m³	-

Pollutant	Time Period	Source of AQAL [a]	Concentration, and the number of exceedences allowed per year (if any)	Date AQO / Limit Value to be Achieved From and Maintained After
Copper (Cu)	1-hour Mean	EA EAL	200 µg/m³	-
	Annual Mean	EA EAL	10 µg/m³	-
Lead (Pb)	Annual Mean	AQO / Limit Value	0.25 µg/m³/ 0.5 µg/m³	31st December 2008 / 1st January 2005
Manganese (Mg)	1-hour Mean	EA EAL	1500 µg/m³	-
	Annual Mean	EA EAL	0.15 µg/m³	-
Mercury (Hg)	1-hour Mean	EA EAL	7.5 µg/m³	-
	Annual Mean	EA EAL	0.25 µg/m³	-
Nickel (Ni)	Annual Mean	Target Value	0.02 µg/m³	31st December 2012
Thallium (Tl)	1-hour Mean	EA EAL [e]	30 µg/m³	-
	Annual Mean	EA EAL [e]	1 µg/m³	-
Vanadium (V)	1-hour Mean	EA EAL	5 µg/m³	-
	Annual Mean	EA EAL	1 µg/m³	-
	Annual Mean	EA EAL	0.2 µg/m³	-
Ecological				
Nitrogen oxides (NOx)	24-hour Mean	EA EAL / Proxy Critical level [f]	75 / 200 [g] µg/m³	-
	Annual Mean	AQO / Critical Level	30 µg/m³	31st December 2000 / 19th July 2001
Sulphur dioxide (SO_2)	Winter Mean	AQO / Critical Level	20 µg/m³	31st December 2000 / 19th July 2001
	Annual Mean	AQO / Critical Level	20 µg/m³	31st December 2000 / 19th July 2001
	Annual Mean	EA EAL	10 µg/m³ where lichens or bryophytes are present	-

Pollutant	Time Period	Source of AQAL [a]	Concentration, and the number of exceedences allowed per year (if any)	Date AQO / Limit Value to be Achieved From and Maintained After
Ozone (O_3)	5-year Mean	AQO / Target Level	18,000 µg/m^3 as an average of 1-hour Means between May-July	1st January 2010 / 1st January 2010
Ammonia (NH_3)	Annual Mean	EA EAL	1 µg/m^3 where lichens or bryophytes (including mosses, landworts and hornwarts) are present 3 µg/m^3 where they're not present	-
Hydrogen Fluoride (HF)	Weekly Mean	EA EAL	0.5 µg/m^3	-

[a] Air Quality Objectives (AQOs) from the Air Quality Regulations; limit values, target values and critical levels from the Air Quality Standards Regulations; and EA EALs from the Environmental Agency Air emissions risk assessment for your environmental permit guidance.

[b] Emissions of TOCs are assessed against the EALs for benzene, 1,3-butadiene and dimethyl sulphate, since these are the most stringent EALs for any VOCs.

[c] Dioxins and furans are a group of organic compounds with similar structures, which are formed as a result of combustion in the presence of chlorine. There are no assessment criteria for dioxins and furans. The World Health Organisation (WHO) provides an indicator of the air concentrations above which it considers it necessary to identify and control local emission sources; this value is 0.3 pg/m^3 (300 fg/m^3). In the absence of suitable criteria, the WHO indicator concentration for which it is considered necessary to identify and control emission sources has been used.

[d] PAHs are members of a large group of organic compounds widely distributed in the atmosphere. The best known PAH is benzo[a]pyrene (B[a]P). For the purpose of this assessment, Emissions of PAH have been assessed against the AQAL set for benzo(a)pyrene as this is the only PAH which an AQAL has been set.

[e] Long- and short-term EALs for thallium and cobalt, the long-term EAL for HCl and the short-term EAL for chromium(VI) has been calculated from the exposure limits in EH40/2005, and converted to the respective EAL.

[f] While there is not a short-term critical level in the Air Quality Regulations, research has demonstrated exposure to very high concentrations of NOx for short periods (hours/days) may also have an adverse effect under certain conditions even if the long-term concentrations are below the limit value.

[g] The Institute of Air Quality Management (IAQM) guidance explains that a critical level for short-term NOx has been defined by the World Health Organization and is dependent on the O_3 and SO_2 concentrations. The WHO explain that: *"Experimental evidence exists that the CLE [critical level] decreases from around 200 µg/m^3 to 75 µg/m^3 when in combination with O_3 or SO_2 at or above their critical levels. In the knowledge that short-term episodes of elevated NOx concentrations are generally combined with elevated concentrations of O_3 or SO_2, 75 µg/m^3 is proposed for the 24 h mean*". Based on this, where O_3 and SO_2 are not elevated above their critical levels, a value of 200 µg/m^3 is recommended for assessments.

Relevant exposure

AQO Receptors

2.37 The annual mean AQO applies at locations where members of the public might be regularly exposed, such as building façades of residential properties, schools, hospitals and care homes.

2.38 The 8-hour and 24-hour mean AQOs applies at the annual mean locations of exposure and at hotels, residential gardens and any location where members of the public might reasonably be expected to spend 24-hours or longer.

2.39 The 1-hour mean and 15-minute AQOs apply at the annual mean, 8-hour mean and 24-hour mean locations of exposure and any outdoor location where members of the public might reasonably be expected to spend one hour/15-minutes or longer, such as busy pavements, outdoor bus stations, locations with outdoor seating and children's play areas.

2.40 Places of work like factories or offices are not considered places where members of the public might be regularly exposed and therefore the AQO's do not apply at these locations.

Limit Value Receptors

2.41 Article 2(1), Annex III, Part A, paragraph 2 of Directive 2008/50/EC details locations where compliance with the limit values does not need to be assessed:

"Compliance with the limit values directed at the protection of human health shall not be assessed at the following locations:

a) Any locations situated within areas where members of the public do not have access and there is no fixed habitation;

b) In accordance with Article 2(1), on factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply; and

c) On the carriageway of roads; and on the central reservation of roads except where there is normally pedestrian access to the central reservation."

2.42 The government models compliance with the Directive at locations 4 m from the kerbside, 2 m high, more than 25 m from major road junctions and adjacent to at least 100 m of road length where the limit value applies.

3 Baseline Air Quality Considerations

AQMAs and Air Quality Emission Zones

3.1 Local authorities have a responsibility to investigate air quality within their boundary as part of the Local Air Quality Management (LAQM) regime. Where there is an exceedance of an AQO, the local authority must declare an Air Quality Management Area (AQMA). The local authority is required to work towards improving conditions in these areas. The Ince Parish border is approximately 50 m from the nearest AQMA, which is declared for exceedences of SO_2, and there is another AQMA within 1.5 km , see Figure 4.

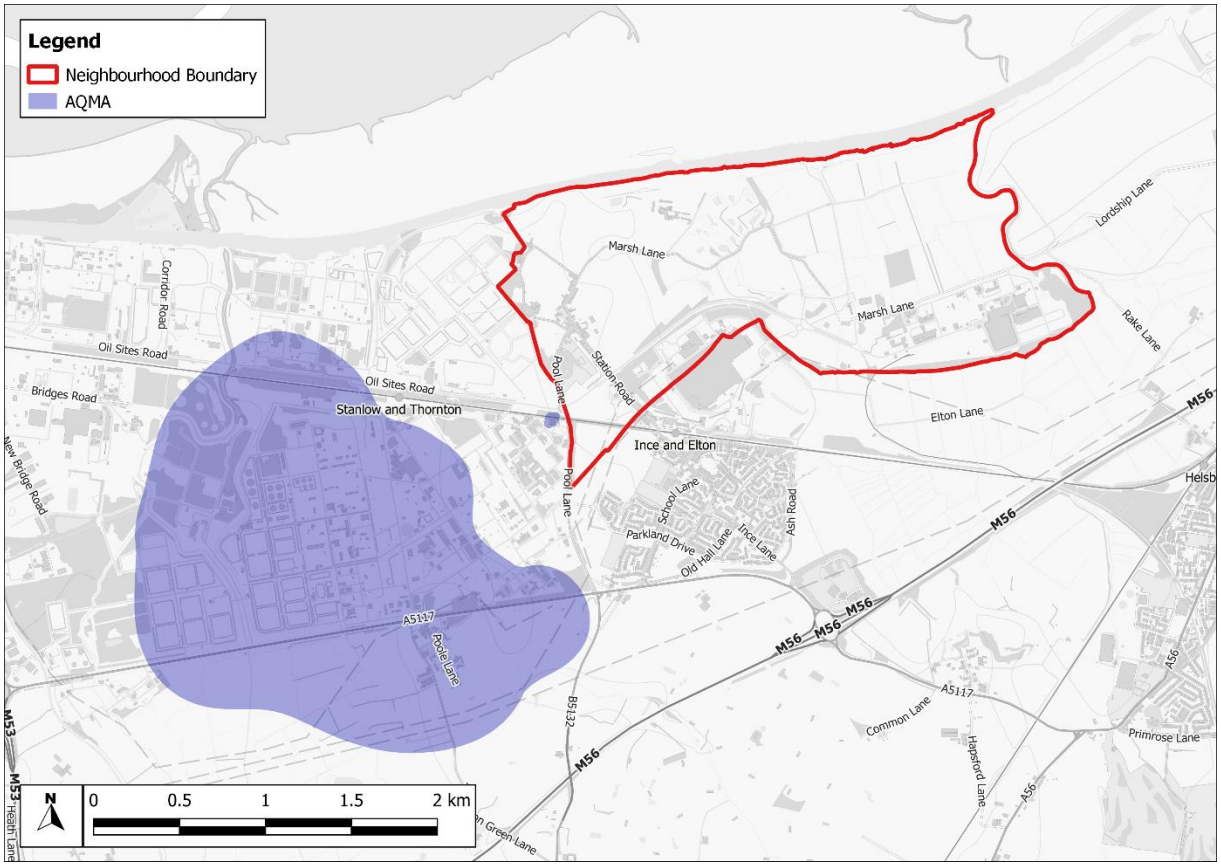

Figure 4: Neighbourhood Location and AQMA

Ecological Sites

3.2 Designated ecological sites local to the Parish are shown in Figure 5. Adjacent to the Parish is the Mersey Estuary which is a nationally designated Site of Special Scientific Interest (SSSI) and an internationally designated Special Protection Area (SPA) and Ramsar site. There are no ancient

woodlands, local nature reserves, national nature reserves or Special Areas of Conservation (SAC) within 2 km of the Parish.

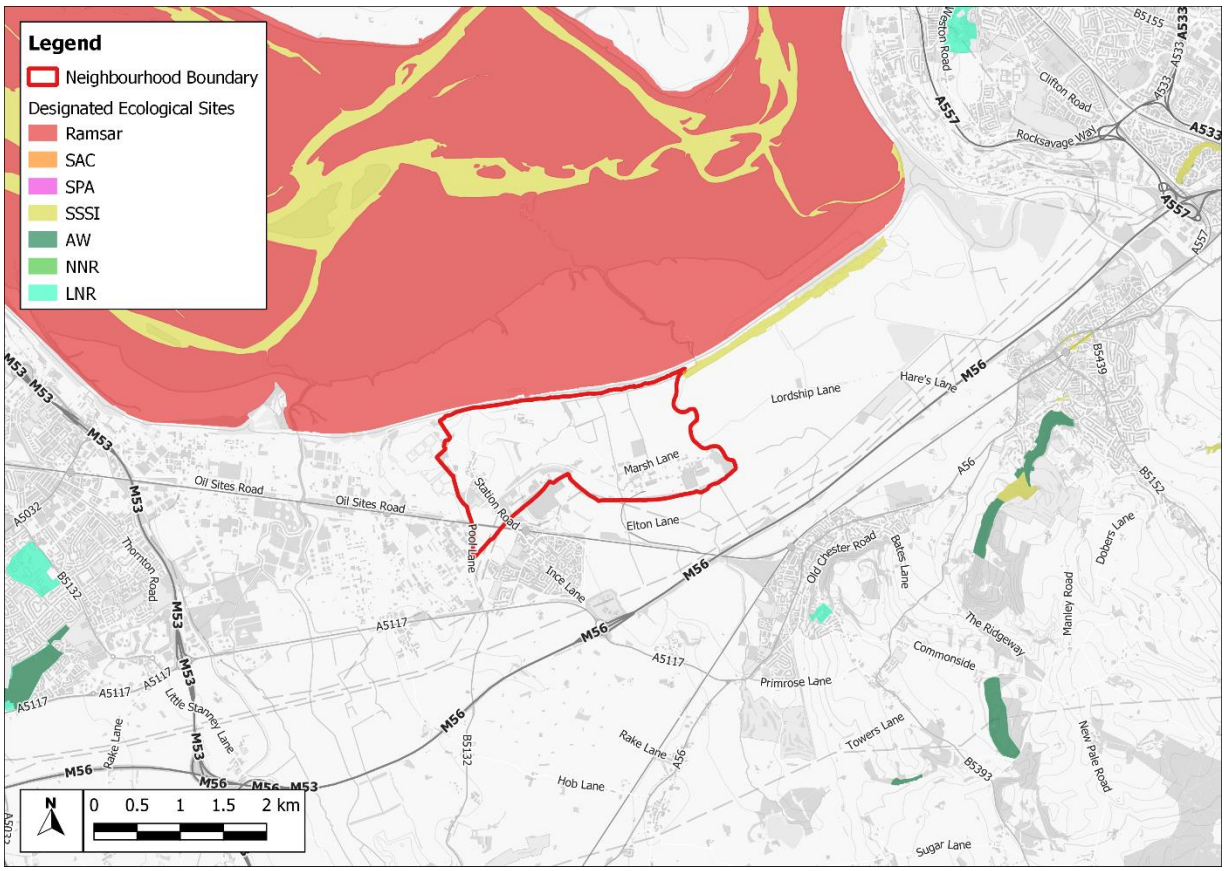

Figure 5: Neighbourhood Location and Designated Ecological Sites

Permitted sites and other point sources

Environment Agency Permitted Sites

3.3 The Environment Agency (EA) regulates industrial sites which are at risk of contributing significantly to pollutant concentrations. The 2017 database (last updated on 1st April 2019) identifies many regulated sites in the region with three being within 2 km of the Parish.

3.4 Consultation has also been carried out with the EA to identify whether there are any other permitted facilities close to the Parish. The EA has identified 19 regulated sites within 5 km of the Parish, which includes two additional sites within 2 km.

3.5 The locations of the identified sites are presented in Figure 6 and details of the sites are given in Table 2.

3.6 There is also the potential for other industrial facilities which are currently going through the permitting process that are not on this list.

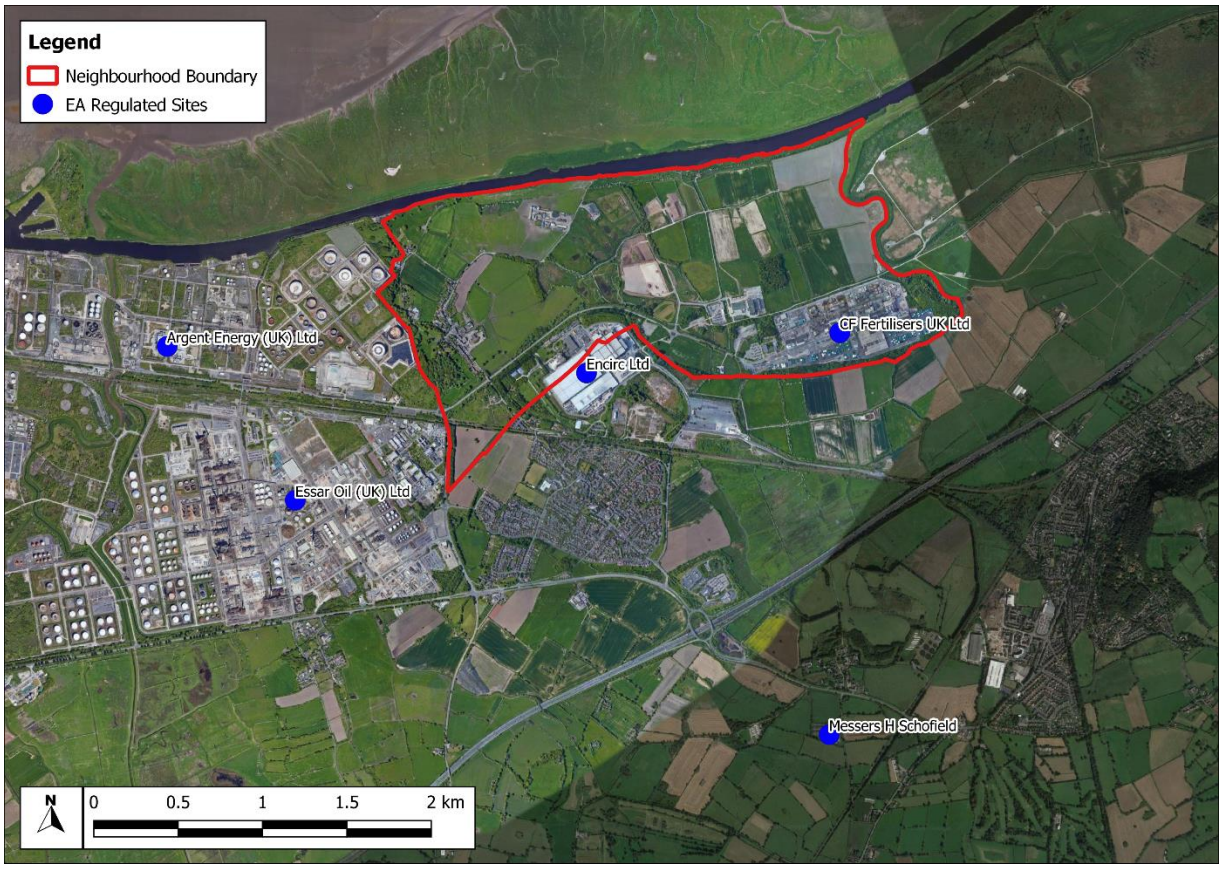

Figure 6: Neighbourhood Location and Environment Agency Regulated Sites

Table 2: Environment Agency Permitted Sites within 2 km of the Parish

Operator	Description	2017 Pollutant Releases	
Argent Energy (UK) Limited	Argent Biodiesel Stanlow Plant. Permitted for organic chemicals and oxygen containing compounds and the disposal of hazardous waste.	NOx – Below regulated limits N_2O – Below regulated limits SOx – Below regulated limits CO – Below regulated limits CO_2 – Below regulated limits	
CF Fertilisers UK Limited	Ince Fertiliser Manufacturing Site. Permitted for chemical fertilisers, including phosphorous, nitrogen or potassium based fertilisers.	NH_3 – Above regulated limits NOx – Above regulated limits N_2O – Above regulated limits CO – Above regulated limits CO_2 – Above regulated limits	CH_4 – Above regulated limits PM - Above regulated limits SOx – Below regulated limits NMVOCs [a] – Below regulated limits PER [b] – Below regulated limits
Encirc Limited	Brewery, involving glass bottle manufacture and filling.	No regulated limits	
Essar Oil (UK) Limited	Stanlow Manufacturing Complex. Permitted for the manufacture of refined petroleum products.	C_6H_6 – Above regulated limits CO_2 – Above regulated limits CO – Above regulated limits HCFCs – Above regulated limits CH_4 – Above regulated limits	Ni – Above regulated limits NOx – Above regulated limits NMVOCs [a] – Above regulated limits PM - Above regulated limits SOx – Above regulated limits
Messers H Schofield	Manor Farm Poultry Unit. Permitted for intensive farming of more than 40,000 poultry.	NH_3 – Above regulated limits PM – Above regulated limits CH_4 – Below regulated limits NOx – Below regulated limits	

a Non-Methane Volatile Organic Compounds (NMVOCs)

b Tetrachloroethylene (PER)

3.7 Further details of each of these sites are set out below.

Argent Energy (UK) Limited

3.8 The Argent Biodiesel Stanlow Plant specializes in the production and supply of biodiesel, which are produced from waste fats, oils and greases. Up to 164,750 tonnes of waste may be utilised each year. The production process involves the screening, separating and filtering of the waste to remove solids and water, before being esterified with methanol. As part of the filtration process wood flour (saw dust) is used as a filtration medium, which may be a potential source of dust. Through various treatment processes fractions of oil are produced, which are then treated under high temperature to reduce the free fatty acid content. Further distillation and glycerolysis treatment is then undertaken to produce an oil product suitable to be a feedstock (glycerised oil) for biodiesel production. This is then treated to produce biodiesel through trans-esterification, separation and settlement. The esterification process includes a vent which releases pollutant emissions. Waste solids are recovered where possible and are

otherwise disposed off-site to landfill and incineration. An overview of the process is shown in Figure 7 and the site plan is presented in Figure 8.

3.9 The facility includes odour control measures which include a wet scrubber and bio-filter; this also helps to minimise emissions. The process requires steam and heat, which are provided by a 9.4MW steam boiler and a 3.8MW thermal oil unit. The resulting combustion gases are released to air via a single tall stack.

3.10 No emission limits are set within the environmental permit and emission quantities were recorded in 2016 to 2018. Emissions were below the typical reporting thresholds for the pollutants.

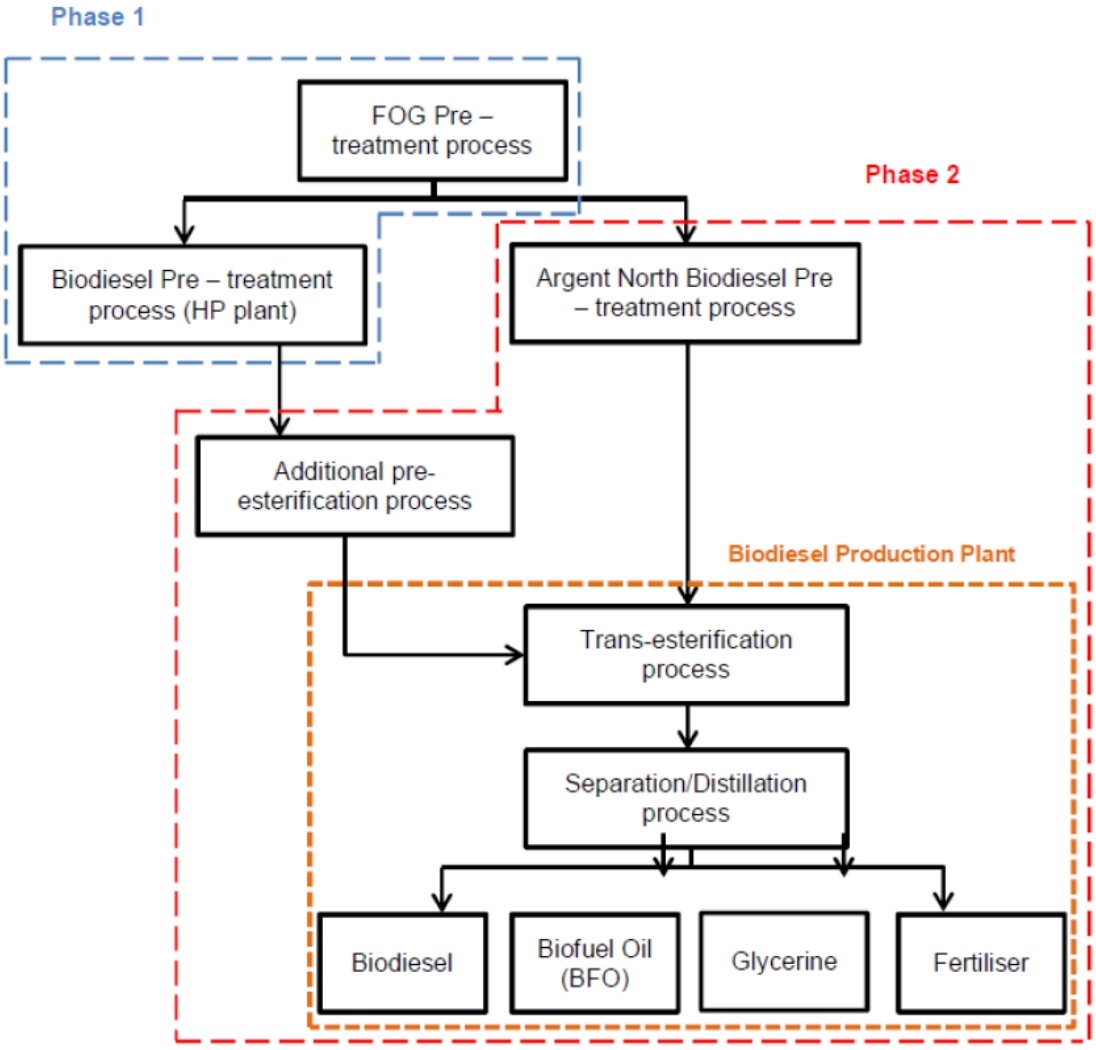

Figure 7: Overview of the Argent Biodiesel Stanlow Plant Production Process

Information obtained from Argent Energy (UK) Ltd's permit application, permit number EPR/LP3233DK.

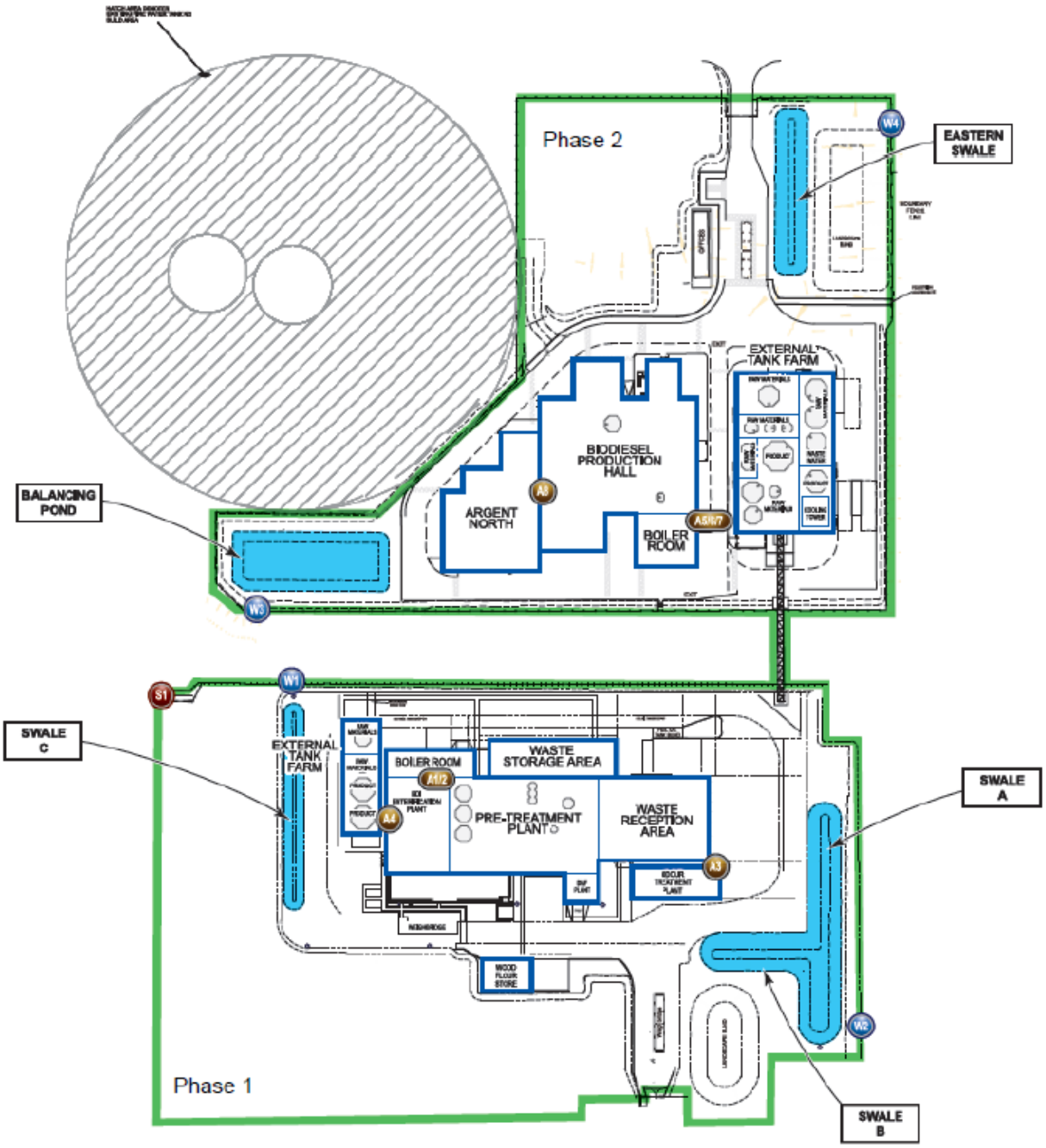

Figure 8: Argent Biodiesel Stanlow Plant Site Plan

Information obtained from Argent Energy (UK) Ltd's permit application, permit number EPR/LP3233DK.

CF Fertilisers UK Limited

3.11 CF Fertilisers UK Limited operate a fertiliser manufacturing facility in Ince. An image of the facility is shown in Figure 9. The facility involves an ammonium nitrate prilling plant, whereby raw ammonia is reacted with nitric acid to produce ammonium nitrate for use in fertilisers. The process includes heating and cooling processes, involving the use of three natural gas fired boilers with a thermal inputs of 39.0MW, 43.7MW and 49.7MW. These boilers may use gas oil (diesel) during periods of gas interruptions. Pollutant emissions may be generated from the combustion of the natural gas (and diesel) in the boilers (e.g. NOx, CO, CO_2 and PM).

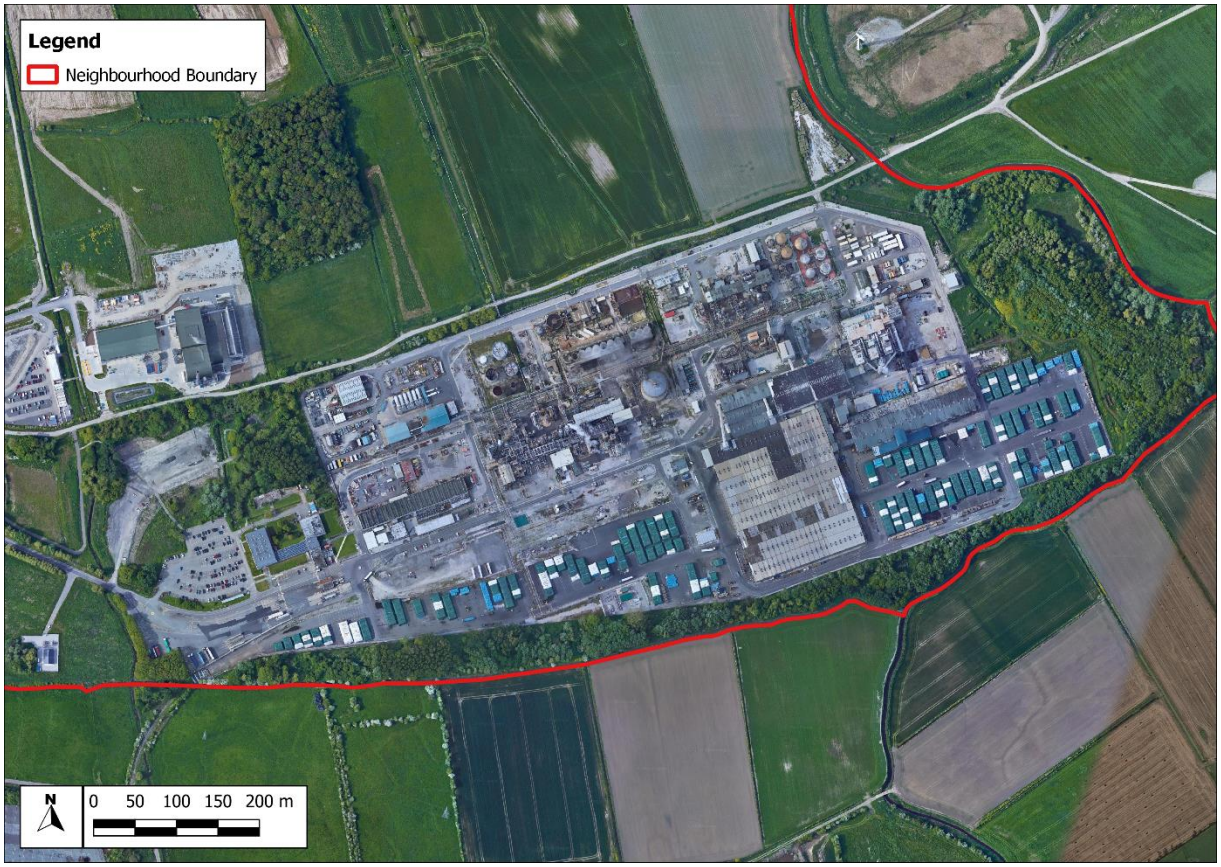

Figure 9: Image of the CF Fertilisers UK Limited facility and Parish Boundary

3.12 Details of the manufacturing process could not be obtained. However, in general, the process is likely to involve mixing nitrogen from the air with hydrogen from natural gas at high temperatures to create ammonia. This can be used to make nitric acid, with which the ammonia is mixed to produce ammonium nitrate. N_2O is produced as a byproduct of the reaction.. Throughout the process CO_2 and hydrocarbons (i.e. CH_4 and NMVOCs) may be released. There may also be emissions of ammonia.

3.13 The facility also produces magnesium nitrate, which may be created through the reaction of magnesium and sulphuric acid, and involves processing with nitric acid. This may cause emissions of sulphur oxides (SOx), carbon dioxide (CO_2) and other pollutants which are also released during the production of ammonium nitrate.

3.14 The facility includes multiple emission sources, representing various stages of the manufacturing process, with most of the emissions being released via tall stacks to aid initial dispersion of the pollution.

3.15 The facility operates under an environmental permit, which sets emission limits on the facility for a variety of pollutants. Table 3 sets out the reporting limits and emission quantities for the years where the facility has released more emissions than the limits.

Table 3: Pollutant Releases to Air from CF Fertilisers UK Limited, where regulated emission limits have been breached (tonnes/annum) [a]

Pollutant	Limit	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
NH_3	1	1,340	1,730	1,760	1,530	752	959	616	839	1,030	680
NOx	100	343	589	434	549	422	506	530	560	503	633
N_2O	10	50	77	70	66	50	30	34.7	28	39	28
CO	100	725	824	756	765	-	699	-	-	868	-
CO_2 [b]	100k	539k	659k	551k	626k	412k	598k	546k	502k	610k	565k
CH_4	10	2,340	2,720	2,410	1,830	2,190	2,310	1,790	2,270	1,620	1,080
PM	10	-	-	-	-	-	-	-	-	-	-
SOx	100	-	-	-	-	-	-	-	-	-	-
NMVOCs	10	-	-	-	-	-	-	-	-	-	-
PER	0.1	-	-	-	-	-	-	-	-	-	-

[a] Where emission quantities were below the limits no values are presented.

[b] The quantities include 'k' which represents a factor of 1000.

Encirc Limited

3.16 Encirc Limited (formerly Quinn Glass) operate a brewery that includes the manufacture of glass bottles. It pasturises the bottles and fills them. Some of the bottles are pumped with carbon dioxide or nitrogen before capping to give the liquids fizziness. Emissions may arise from the combustion of natural-gas within three steam-raising boilers. Each boiler has a rated thermal input of 6MW, with two boilers being operational and one a backup. The facility also includes an ammonia and glycol cooling system. Emissions of NOx, SOx and CO are released from a single 22 m tall stack without any prior abatement. The environmental permit does not set any limits for the operator to adhere to, however the theoretical maximum NOx emission is stated to be 21 tonnes per annum, corresponding to an emission rate is 0.665 g/s. The location of the stack is shown in Figure 10.

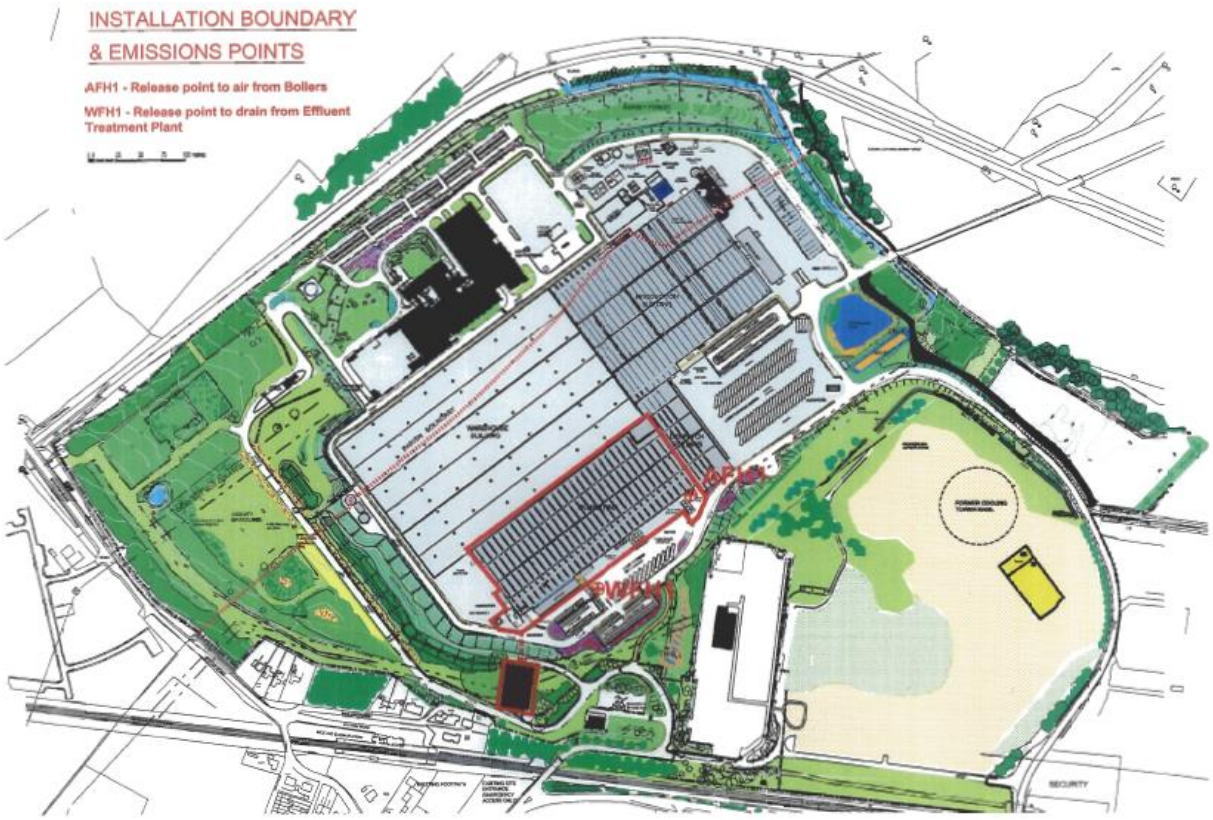

Figure 10: Image of Encirc Limited facility

Information obtained from Quinn Glass Limited's IPPC Application, Reference UP3935LR, 2006.

3.17 As part of the environmental permit application the operator undertook an air quality assessment to support the application. This included dispersion modelling of the pollutants released from the facility in the local area. The maximum ground level annual mean NO_2 concentration within Ince was predicted to be 0.1 µg/m^3. Contours of the process contributions are presented in Figure 11.

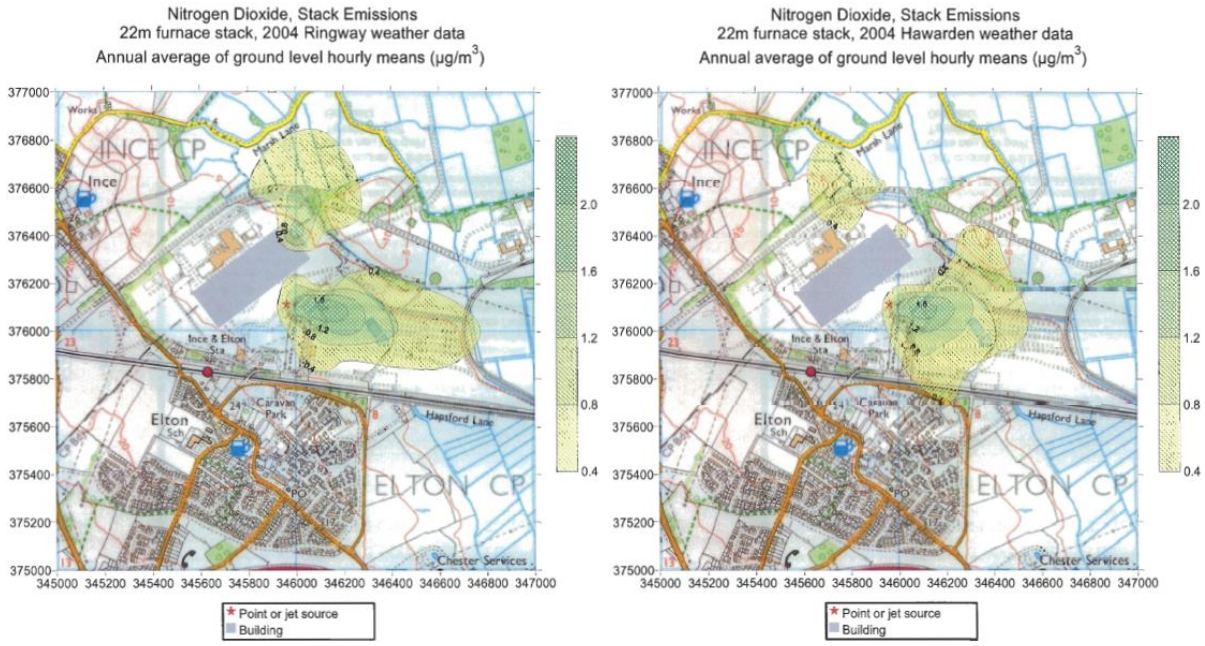

Figure 11: Predicted annual mean NO_2 concentrations based on two different meteorological stations

Information obtained from Quinn Glass Limited's IPPC Application, Reference UP3935LR, 2006.

Essar Oil (UK) Ltd

3.18 The Stanlow Manufacturing Complex, shown in Figure 12, involves the manufacture of refined petroleum products. The installation processes crude oil using a variety of techniques including distillation units, a fluid catalytic cracker, alkylation unit, platformer and hydrodesulphurisation plant. It separates crude oil into fuel gas, liquified petroleum gases (LPGs), naphtha, kerosene, gas oil and a residue for further processing. The naphtha (gasoline) is fed into the platformer where it is reformed into high octane motor gasoline. The residual products are then fed into the aromatics plant to produce aromatic hydrocarbons, such as benzene, toluene and xylene. Process wastes are disposed of by incineration. The complex thus comprises multiple plant which release pollutant emissions to air. These include:

- Crude Distillation Unit 3 – three plant (27.9MW, 33.2MW and 37.7MW) operating on both gaseous and liquid fuels, with emissions venting via a single stack;
- Crude Distillation Unit 4 – five plant (2.4MW, 49.0MW, 53.3MW, and two 58.9MW) operating on gaseous fuels (liquid fuels during abnormal operation), with emissions venting via a single stack;
- Ethyl benzene production unit – single 9.45MW plant;
- Low Sulphur Mogas Units – single 7MW plant;

- High Pressure Boiler House – six 104MW plant operating on both gaseous and liquid fuels, with emissions venting via three stacks;
- Platformer 3 and HDT3 – five plant (two 16.8MW, 28.8MW, 30.4MW and 42.4MW) operating on gaseous fuels, with emissions venting via a single stack;
- Secondary Processes – four plant (5.6MW and three 44.5MW) operating on both gaseous and liquid fuels, with emissions venting via a single stack;
- SHOP – three plant (two 1.5MW and 64MW) operating on both gaseous and liquid fuels, with emissions venting via a single stack;
- Aromatics Production – two 63.1MW plant;
- Hydrotreater – two 17.4MW plant;
- Hydrodesulphurisation Process Heater – single 18.3MW plant; and
- Syngas Production – four plant (2.3MW, two 5.2MW and 26MW).

3.19 The installation releases a wide range of pollutants to air, such as SOx, NOx, PM and volatile organic compounds (VOCs), which are produced from the processes described above and also from burning of sour and sweet gases using flares. Emissions are required to meet the Industrial Emission Directive (IED) emission limits, apart from SO_2 for which an emission limit value is separately specified in the permit. Table 3 sets out the reporting limits and emission quantities for the years where the facility has released more emissions than the limits.

Table 4: Pollutant Releases to Air from Essar Oil (UK) Ltd, where regulated emission limits have been breached (tonnes/annum) [a]

Pollutant	Limit	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
C_6H_6	1	68	47.4	42.9	41	38.5	39.7	40.1	40.2	34.2	32.9
CO_2 [b]	10k	2850k	2730k	3310k	3150k	2350k	2460k	2330k	2010k	2140k	1890k
CO	100	2820	1200	1060	657	1020	1980	3340	2440	2160	1980
HCl	10	-	-	-	-	-	-	-	-	-	10.2
Cr	0.010	-	0.105	-	0.104	-	-	-	-	-	-
Cu	0.010	0.132	0.157	0.15	0.156	-	-	-	-	-	0.338
HFCs	0.1	-	0.215	-	-	0.568	-	-	-	-	-
HCFCs	0.001	0.036	0.011	0.056	0.053	0.007	0.008	-	-	0.018	0.002
Pb	0.1	-	0.214	0.202	0.21	-	-	-	-	-	-
Hg	0.001	0.041	0.274	0.025	0.012	0.056	-	-	-	-	0.015
CH_4	10	105	-	103	-	110	100	-	102	195	140
Ni	0.01	1.48	1.19	1.17	1.3	0.791	0.601	0.581	0.652	0.728	0.646
NOx	100	4780	4140	4440	4210	3310	3380	3550	3300	3520	2400
N_2O	10	54	48.4	57.3	56.2	43.8	50.8	53.1	-	-	-
NMVOCs	10	3860	2610	3210	2860	2800	2390	2700	2570	7050	2440
PM	1	200	65.6	74.5	91.9	94.7	95.7	75.9	93.4	128	105
SOx	100	11800	12500	13900	11100	6220	6900	7560	6980	7050	5560

[a] Where emission quantities were below the limits no values are presented.

[b] The quantities include 'k' which represents a factor of 1000.

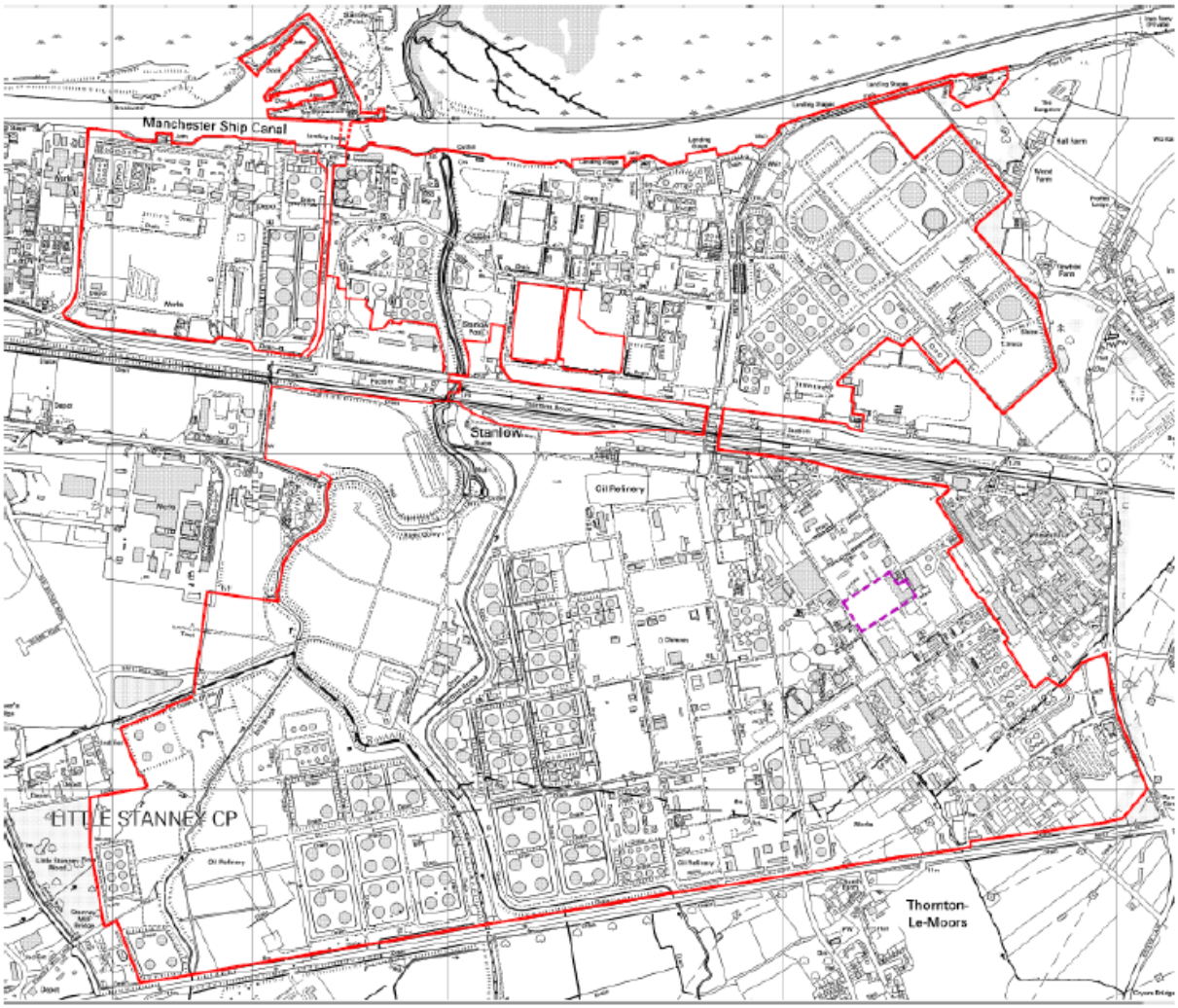

Figure 12: Image of the Essar Oil (UK) Ltd complex boundary

Information obtained from the Environment Agency's Notice of variation and consolidation with introductory note, Variation application number EPR/FP3139FN/V009.

Messers H Schofield

3.20 The Manor Farm Poultry Unit comprises four broiler houses for chickens, permitted to process up to 140,000 chickens per year. Dust (PM) and ammonia will be generated from the broiler houses and will be extracted via fans, which release these pollutants to the atmosphere. Broiler houses 1 and 2 include roof fan outlets, discharging the emissions vertically upwards. Broiler houses 3 and 4 have gable end fan outlets, blowing the emissions out of the western ends of these houses. The design of the houses was in line with best available techniques when the permit was granted.

3.21 The facility also includes two biomass boilers with a combined thermal input of approximately 0.4MW, which are used to heat the broiler houses. These biomass boilers may burn chips or pellets comprising

virgin timber, straw or miscanthus, or a combination of these. It is not permitted to burn waste or animal carcasses. In addition, the facility includes an liquified petroleum gas (LPG) generator which is used as backup.

3.22 When granting the permit, the EA qualitatively reviewed the likely air quality impacts associated with the facility and determined it was unlikely to cause significant effects in the local area and thus did not set any specific emission limits within the permit. Emission quantities were recorded in 2017 and it has been identified that emissions of ammonia and PM were 4,293 kg/annum and 4,166 kg/annum, respectively, above the typical reporting threshold of 1,000 kg/annum.

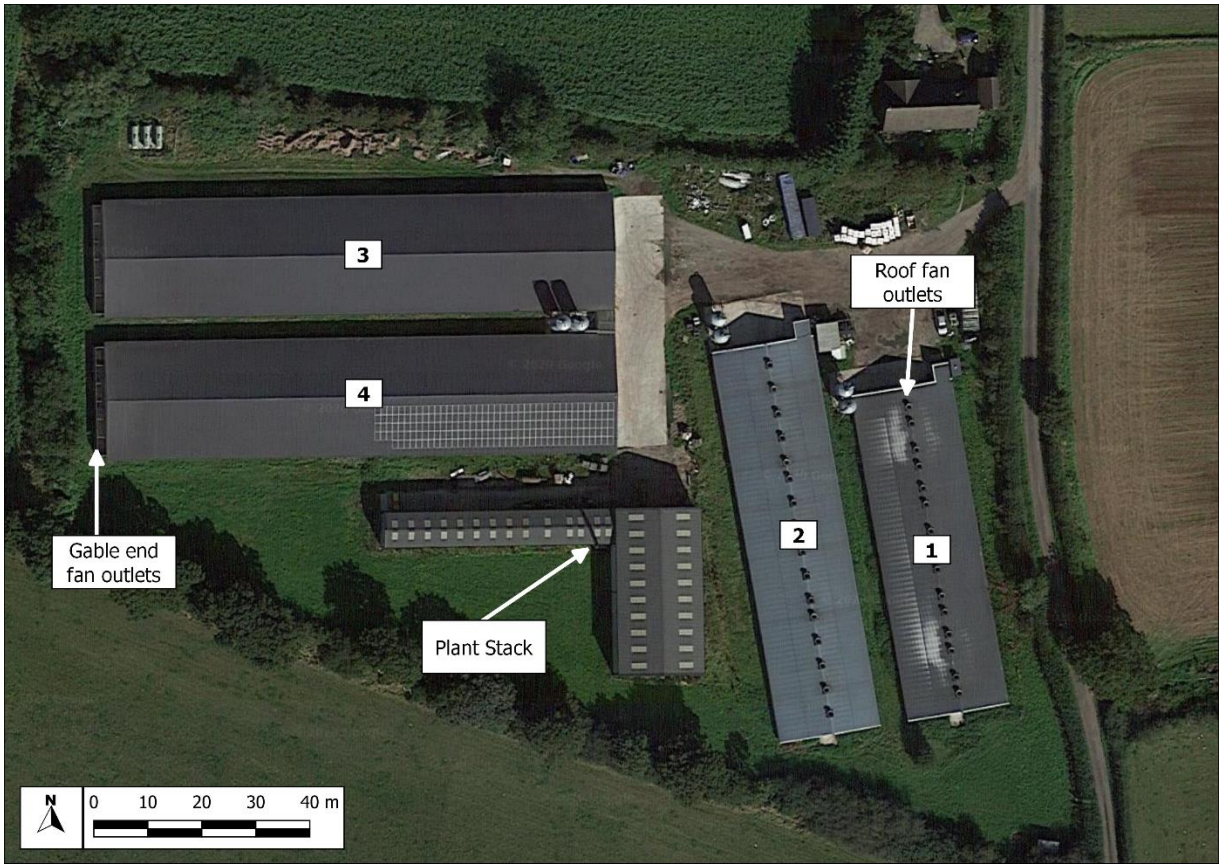

Figure 13: Image of the Messers H Schofield facility

Local Authority Permitted Sites

3.23 CW&CC also regulates sites which are at risk of contributing significantly to pollutant concentrations, which typically do not require a permit from the Environment Agency. Information of these sites are provided on CW&CC's website. A review of the website has identified many regulated sites in the region with five being within 2 km of the neighbourhood. The locations of the identified sites are presented in

Figure 14 and details of the sites are given in Table 5. There is also the potential for other sites which are going through CW&CC's permitting process in the local area which are not on this list.

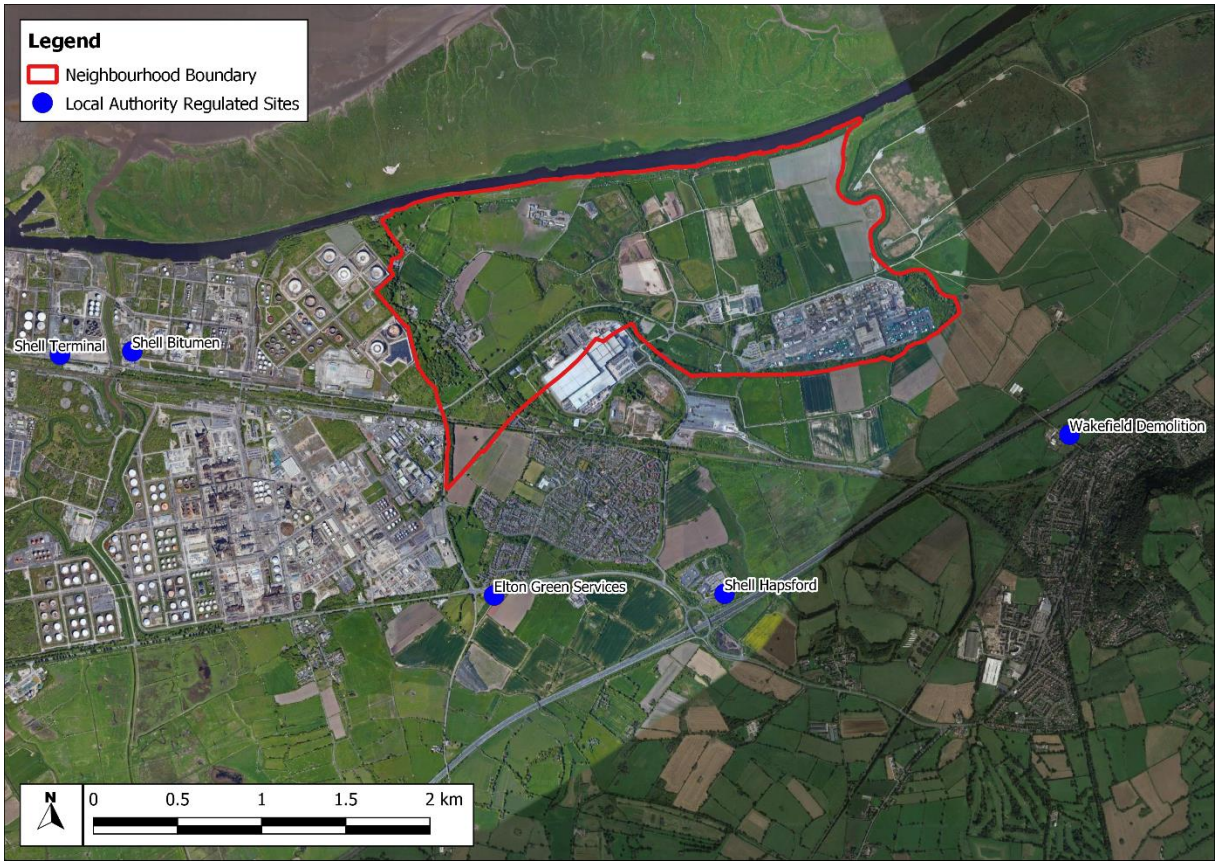

Figure 14: Parish Boundary and Local Authority Permitted Sites

Table 5: Local Authority Permitted Sites within 2 km of the Parish

Operator	Description
Shell Terminal	Stanlow Terminal. Storage, unloading and loading petrol at terminals.
Shell Bitumen	Stanlow Refinery. Bitumen and tar processes.
Elton Green Services	Petrol station. Unloading of petrol into storage.
Shell Hapsford	Petrol station. Unloading of petrol into storage.
Wakefield Demolition	Mobile crushing and screening

Additional Potential Sources

3.24 Searches of local maps and plans have identified additional sites that have the potential to be local sources of pollutant emissions. Details of the identified sites within 2 km of the neighbourhood are presented below.

Ince Bio Park

3.25 The Ince Bio Park was recently constructed. This is a 21.5MW biomass plant, burning recovered waste wood to produce electricity.

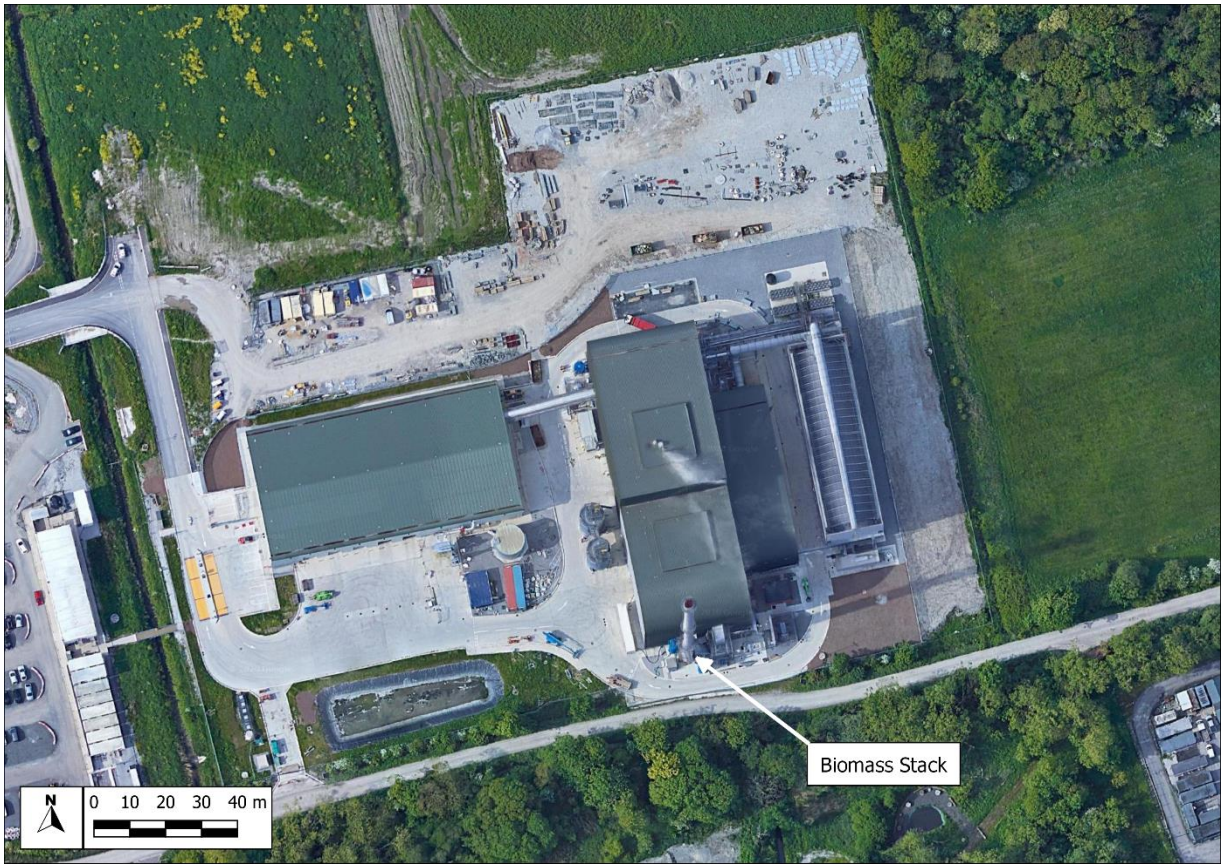

Figure 15: Image of Ince Bio Park and the main stack location

3.26 The air quality impacts of this facility have been predicted and submitted as part of the planning application. The resulting NO_2 and SO_2 process contributions from the biomass plant upon the local area are presented in Figure 16, Figure 17 and Figure 18.

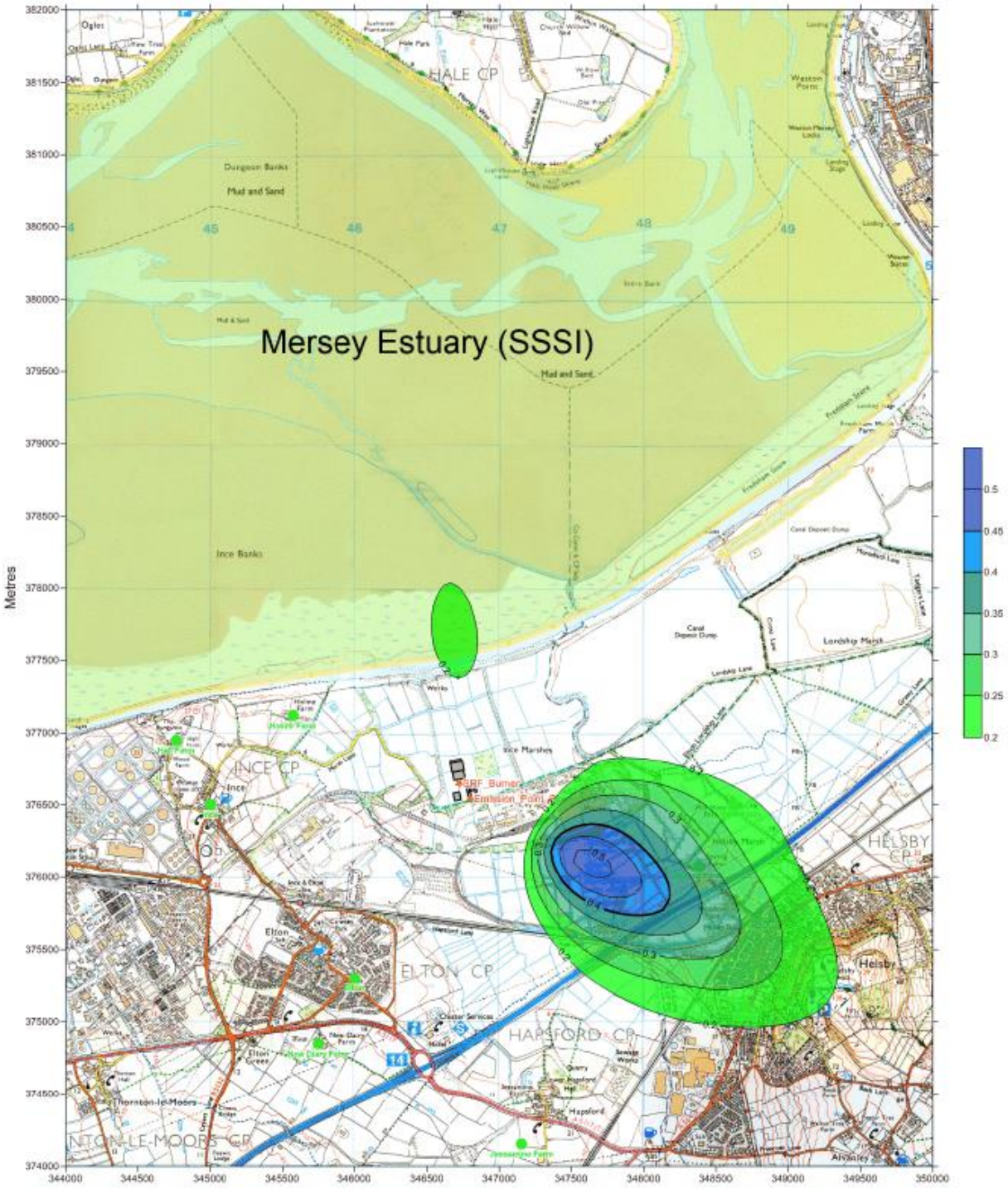

Figure 16: Annual Mean NO_2 Process Contributions from Ince Bio Park

Information obtained from Peel Environmental Ince Ltd's Ince Resource Recovery Park Environmental Statement.

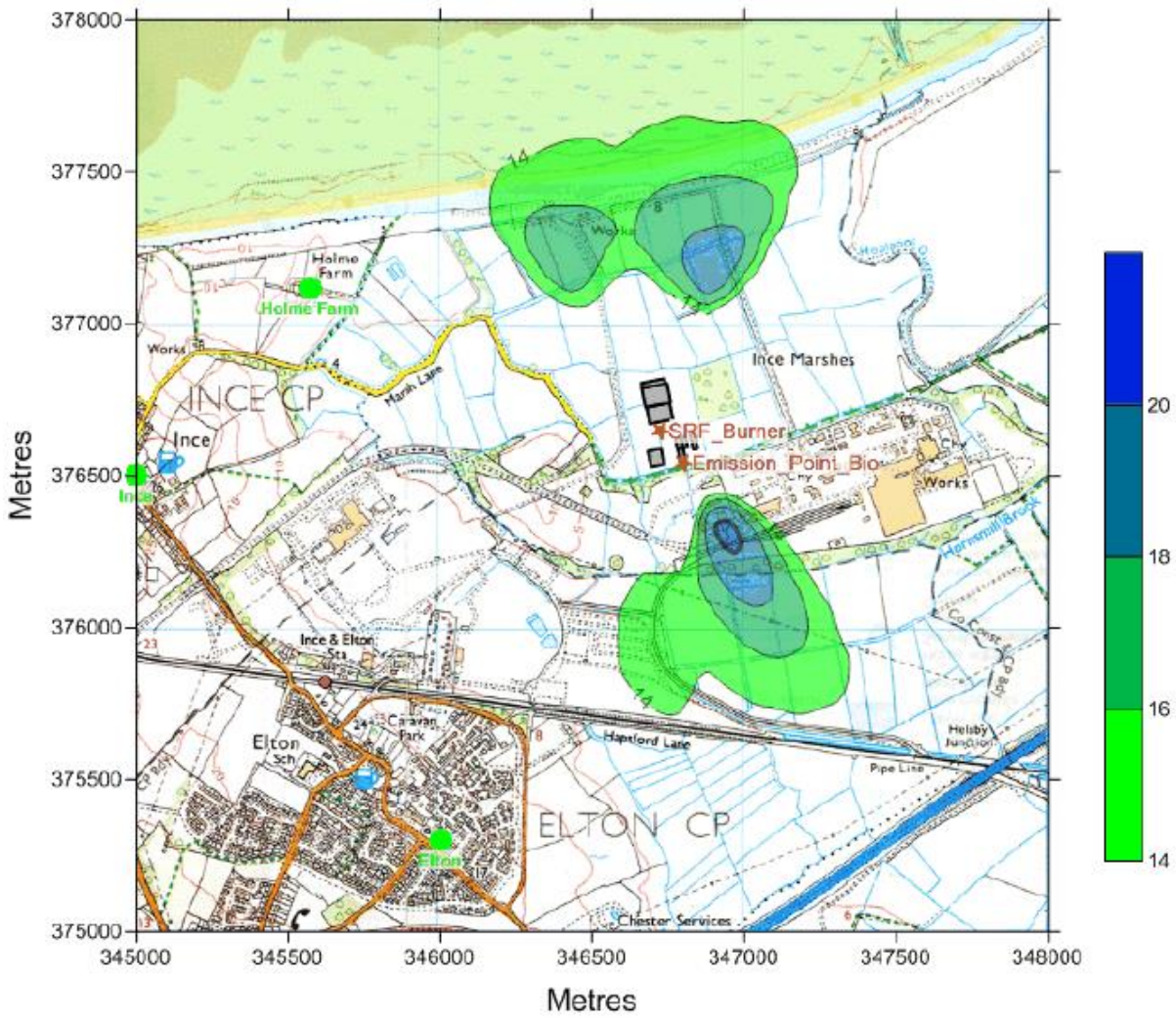

Figure 17: Short-term NO_2 Process Contributions from Ince Bio Park

Information obtained from Peel Environmental Ince Ltd's Ince Resource Recovery Park Environmental Statement.

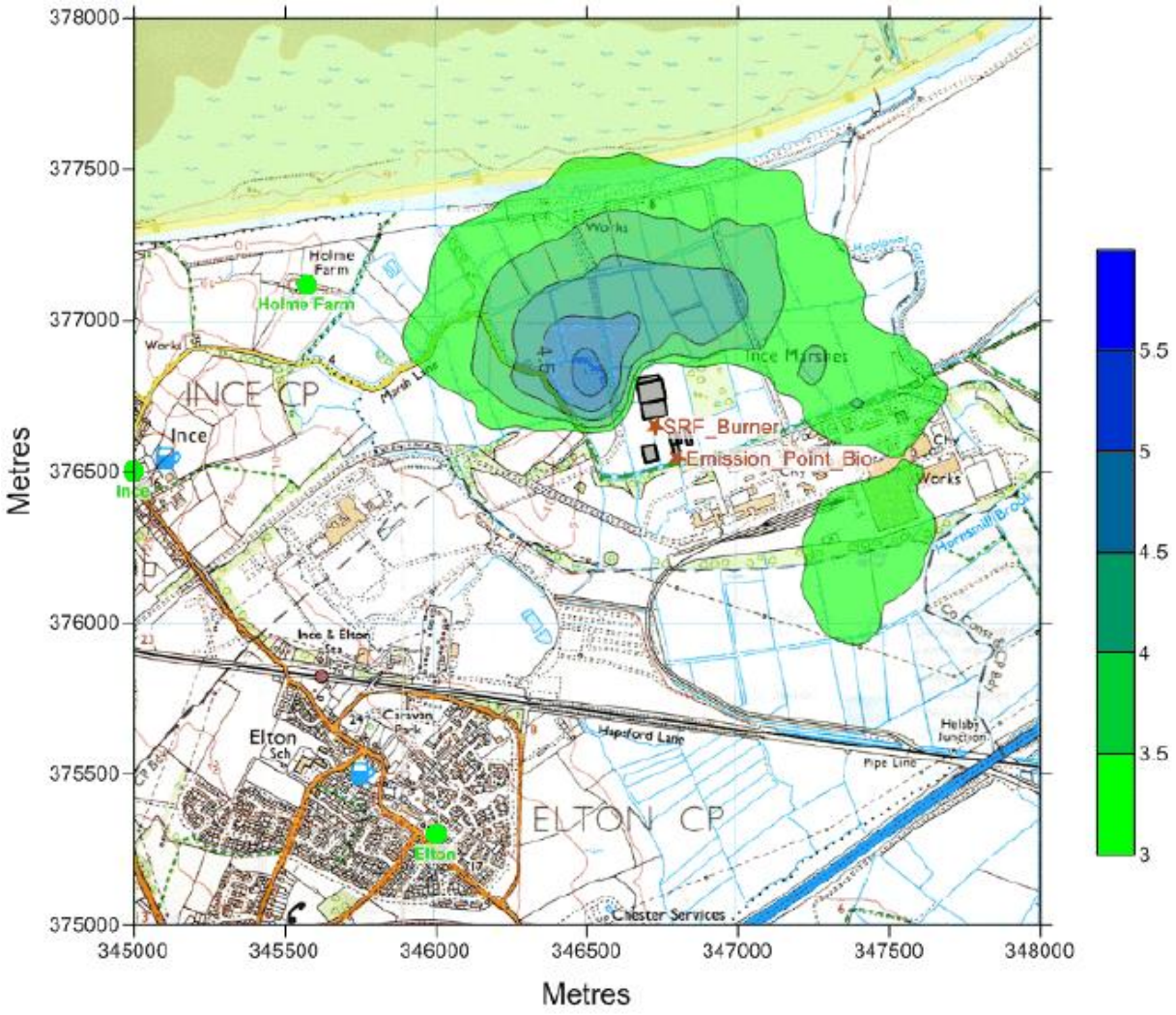

Figure 18: Short-term SO_2 Process Contributions from Ince Bio Park

Information obtained from Peel Environmental Ince Ltd's Ince Resource Recovery Park Environmental Statement.

Ince Resource Recovery Park

3.27 Although not yet constructed, planning permission has been approval by CW&CC for the Ince Resource Recovery Park. The development covers approximately 134 hectares of land and will comprise waste reprocessing and a renewable energy facility, involving up to a total of 95MW of energy. The development area is divided into multiple plots, which will be developed separately to provide a soil treatment facility, a plastics facility, a resource recovery business centre, a commercial and industrial waste transfer station, a block making facility and several other resource recovery facilities. The layout of the development is presented in Figure 19. It is likely to lead to the release of a range of pollutant emissions which will contribute to local air pollution.

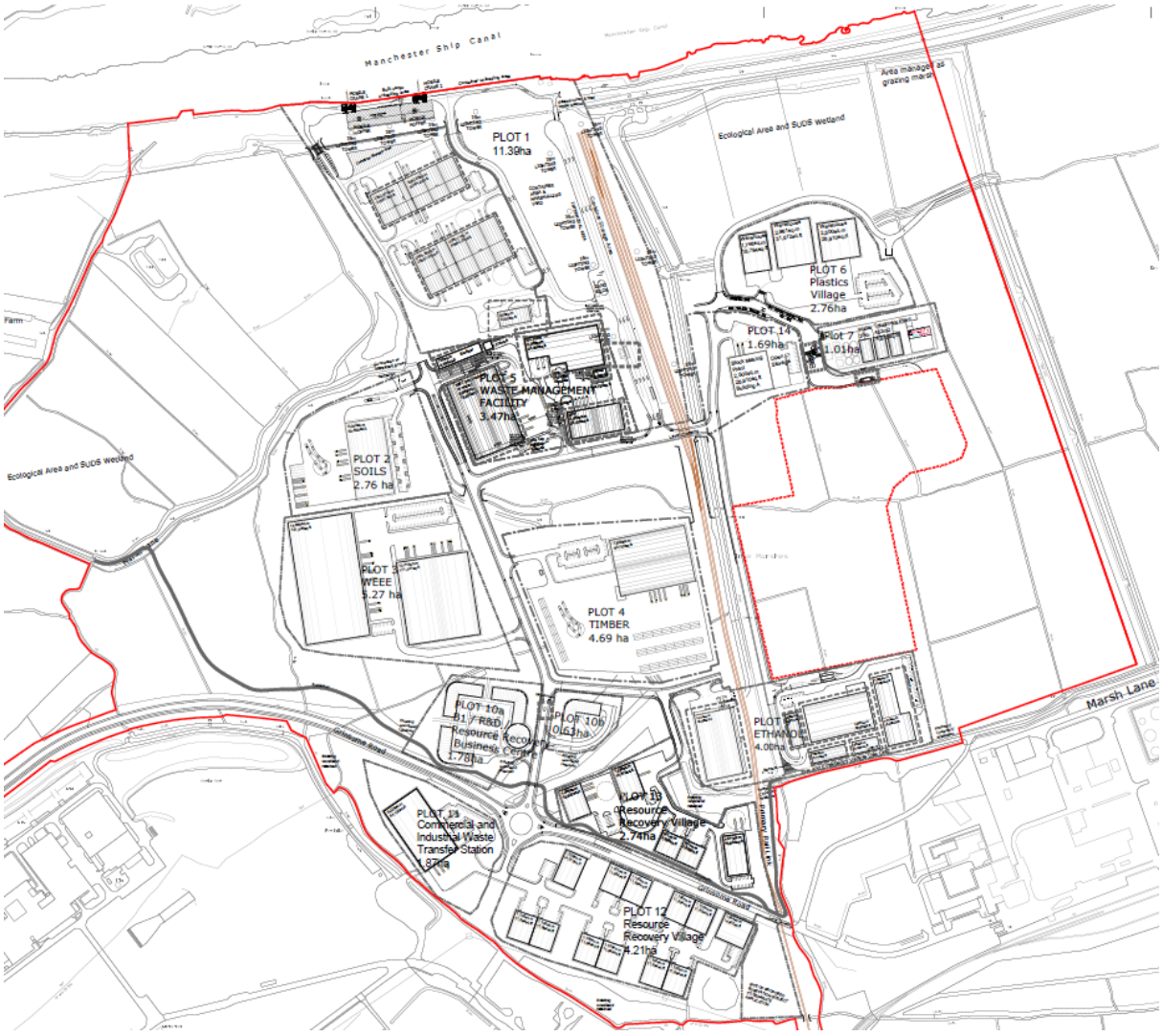

Figure 19: Site Plan of the Ince Resource Recovery Park

Information obtained from Fletcher RAE (UK) Ltd drawing number 12705-PL07 K.

Other Sources

3.28 There are also a variety of other minor local sources of air pollution in and around the Parish. This includes pollutant emissions from vehicles using the local roads, emissions from diesel locomotives using the local railway, emissions associated with the provision of heating and hot water for residential and commercial properties, and emissions associated with local agriculture, including multiple livestock sources.

Baseline Concentrations

3.29 Defra provides estimated average background concentrations on a 1 km x 1 km grid across the UK. These include emissions from a range of sources, such as road transport, rail, industrial facilities, aviation, and shipping. In addition, Defra also provides roadside annual mean nitrogen dioxide concentrations which are used to report exceedances of the limit value.

3.30 Many local authorities carry out monitoring as part of the LAQM regime using automatic monitors and passive monitors (diffusion tubes). There are also several other monitoring networks across the country. Where data is available it has been presented in this report.

Defra background concentrations

3.31 Ambient background concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been taken from the national pollution maps published by Defra (2019b). The background concentrations used in this report use the 2018 reference year data for predicting the concentrations for 2020 to 2030 in the immediate vicinity of the neighbourhood. These are shown in Table 6. Predicted NO_2, PM_{10} and $PM_{2.5}$ background concentrations are below the AQAL in all years.

Table 6: Defra Background Mapped Concentrations (µg/m^3)

Pollutant	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
NO_2	13.0	12.7	12.4	12.1	11.9	11.6	11.5	11.3	11.2	11.0	10.9
PM_{10}	9.6	9.5	9.5	9.4	9.3	9.2	9.2	9.2	9.2	9.2	9.2
$PM_{2.5}$	6.6	6.6	6.5	6.4	6.4	6.3	6.3	6.3	6.2	6.2	6.2

Defra roadside concentrations

3.32 Defra has predicted roadside concentrations of NO_2, PM_{10}, and $PM_{2.5}$ for the main roads in the UK (Defra, 2019a) for the years 2017 to 2030 as part of Defra's commitment to report exceedences of the limit values. For 2020, no exceedences of the limit values are predicted in or near to the neighbourhood.

Local Air Quality Monitoring

3.33 CW&CC operate several monitoring sites as part of their LAQM duties within 2 km of the Parish, as presented in Figure 5. This includes both recent and historic monitors for a range of pollutants, which are described further below.

3.34 There are many pollutants that are not monitored in the local area, which may be a risk for members of the neighbourhood. Although measurements of these pollutants are available across the UK, their concentrations are not considered to be representative of conditions in Ince, where there are many local industrial sources.

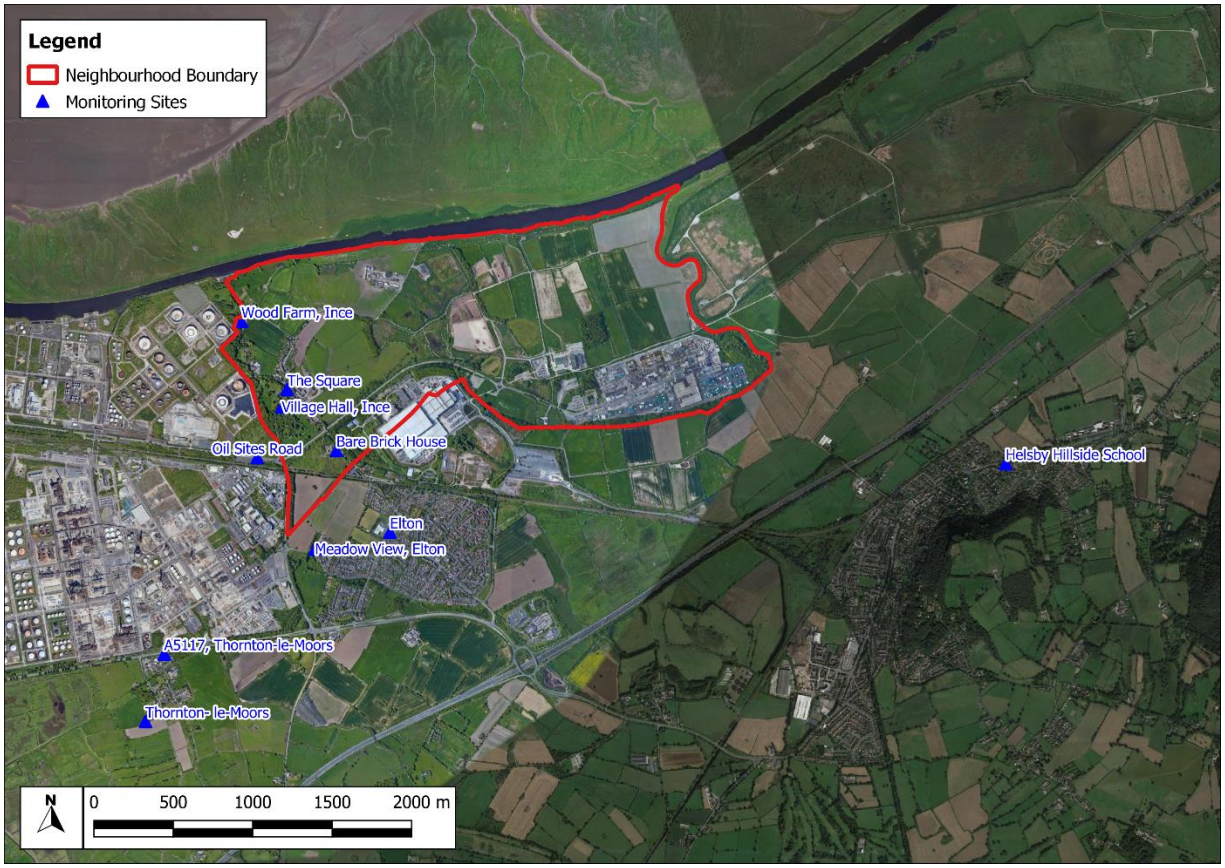

Figure 20: Monitoring locations within 2 km of the Parish

NO_2

3.35 The measured annual mean NO_2 concentrations at these monitoring sites are presented in Table 7 and the 1-hour mean concentrations in Table 8. Within Ince, the maximum concentrations have been measured at the Oil Sites Road monitoring site. The latest annual mean concentration measured shows that this site was well below the AQAL.

3.36 Recently, there has been no monitoring within the neighbourhood. The nearest monitoring site that recently measured NO_2 concentrations is located 1.5 km from the neighbourhood. This most recently measured an annual mean NO_2 concentration of 13 µg/m^3, well below the annual mean AQAL, and had zero exceedences of the 1-hour mean AQAL.

3.37 Figure 21 shows how measured annual mean NO_2 concentrations have changed over the past three decades within 2 km of the Parish.

Table 7: Local Authority NO_2 Monitoring ($\mu g/m^3$)

Site ID – Name (Type)	Distance	Latest Year Measured	Latest Measurement
TLP - Thornton- le-Moors (Industrial)	1.5 km	2018	13.0
HHS - Helsby Hillside School, Helsby (Roadside)	1.6 km	2018	23.0
Oil Sites Road, Ince (Industrial)	Within Ince	2000	31.8
Bare Brick House, Ince (Industrial)	Within Ince	2007	23.0
The Square, Ince (Industrial)	Within Ince	2013	21.6
VI - Village Hall, Ince (Industrial)	Within Ince	2002	15.0
AQAL			**40**

Table 8: Local Authority Number of NO_2 1-Hour Mean Concentrations Above 200 $\mu g/m^3$

Site ID – Name (Type)	Distance	Latest Year Measured	Latest Measurement
TLP - Thornton- le-Moors (Industrial)	1.5 km	2018	0
VI - Village Hall, Ince (Industrial)	Within Ince	2002	(56)
AQAL			**18 (200) [a]**

a Data capture was low and the 99.79th percentile of 1-hour mean concentrations has been provided in parenthesis.

Figure 21: Measured Annual Mean NO_2 Concentrations within 2 km of the Parish ($\mu g/m^3$)

PM

3.38 Local authority PM_{10} monitoring sites within the vicinity of the Parish, are presented in Figure 20. The measured annual mean PM_{10} concentrations for these monitoring sites are presented in Table 9 and the 1-hour mean concentrations are presented in Table 10.

3.39 Within Ince, the latest annual mean concentration measured at the Village Hall monitoring site was well below the annual mean and 24-hour mean AQALs.

3.40 Recently, there has been no monitoring within the Parish. The nearest monitoring site that recently measured PM_{10} concentrations is located 1.5 km from the Parish. The annual mean NO_2 concentration at this site in was most recently 13 µg/m^3, well below the annual mean AQAL, and there were zero exceedences of the 24-hour mean AQAL.

3.41 Figure 21 shows how measured annual mean PM_{10} concentrations have changed over the past two decades within 2 km of the Parish.

3.42 There are no local monitoring sites that measure concentrations of $PM_{2.5}$.

Table 9: Local Authority PM_{10} Monitoring (µg/m^3)

Site ID – Name (Type)	Distance	Latest Year Measured	Latest Measurement
TLP - Thornton- le-Moors (Industrial)	1.5 km	2018	13
VI - Village Hall, Ince (Industrial)	Within Ince	2002	15
AQAL			**40**

Table 10: Local Authority Number of PM_{10} 24-Hour Mean Concentrations Above 50 µg/m^3

Site ID – Name (Type)	Distance	Latest Year Measured	Latest Measurement
TLP - Thornton- le-Moors (Industrial)	1.5 km	2018	0
VI - Village Hall, Ince (Industrial)	Within Ince	2002	(23)
AQAL			**35 (50) [a]**

a Data capture was low and the 90.4th percentile of 1-hour mean concentrations has been provided in parenthesis.

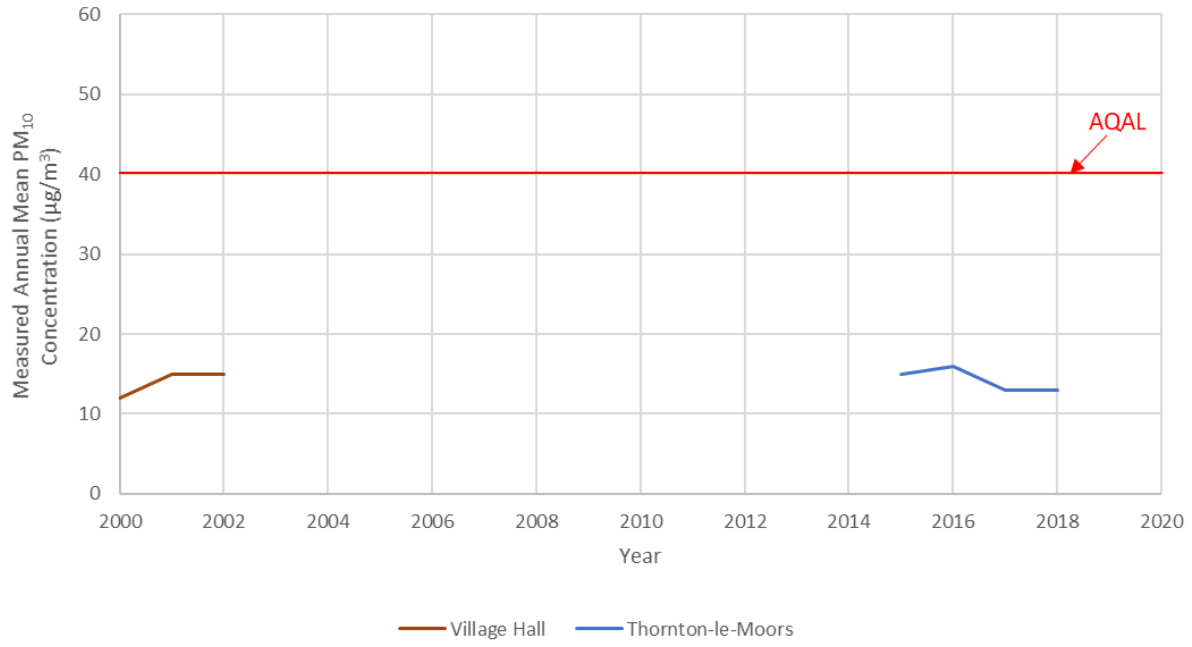

Figure 22: Measured Annual Mean PM_{10} Concentrations within 2 km of the Parish (µg/m^3)

SO_2

3.43 Local authority operated SO_2 monitoring sites, within the vicinity of the Parish, are presented in Figure 20. The measured number of occurrences of concentrations above the 15-minute mean, 1-hour mean,

and 24-hour mean SO_2 AQALs for these monitoring sites are presented in Table 11, Table 12 and Table 13, respectively.

3.44 At the Village Hall monitoring site within Ince, the latest SO_2 concentrations measured were well below the AQALs.

3.45 Recently, there has been no monitoring within the Parish. The nearest monitoring site that recently measured SO_2 concentrations is located 1.5 km from the neighbourhood. This most recently measured an annual mean NO_2 concentration of 13 µg/m^3, well below the annual mean AQAL, and had zero exceedences of the AQALs.

3.46 Figure 21 shows how measured annual mean SO_2 concentrations have changed over the past three decades within 2 km of the Parish.

Table 11: Local Authority Number of SO_2 15-Minute Mean Concentrations Above 266 µg/m^3

Site ID – Name (Type)	Distance	Latest Year Measured	Latest Measurement
TLP - Thornton- le-Moors (Industrial)	1.5 km	2018	66
VI - Village Hall (Roadside)	Within Ince	2002	0
ELT – Elton (Industrial)	0.4 km	2018	25
TLM - Thornton- le-Moors (Industrial)	1.5 km	2015	6
AQAL			**35**

Table 12: Local Authority Number of SO_2 1-Hour Mean Concentrations Above 350 µg/m^3

Site ID – Name (Type)	Distance	Latest Year Measured	Latest Measurement
TLP - Thornton- le-Moors (Industrial)	1.5 km	2018	0
VI - Village Hall (Roadside)	Within Ince	2002	0
ELT – Elton (Industrial)	0.4 km	2018	4
TLM - Thornton- le-Moors (Industrial)	1.5 km	2015	0
AQAL			**24**

Table 13: Local Authority Number of SO_2 24-Hour Mean Concentrations Above 125 µg/m^3

Site ID – Name (Type)	Distance	Latest Year Measured	Latest Measurement
TLP - Thornton- le-Moors (Industrial)	1.5 km	2018	0
VI - Village Hall (Roadside)	Within Ince	2002	0
ELT – Elton (Industrial)	0.4 km	2018	0
TLM - Thornton- le-Moors (Industrial)	1.5 km	2015	0
AQAL			**3**

Benzene

3.47 Local authority benzene monitoring sites within the vicinity of the Parish, are presented in Figure 20. The measured annual mean benzene concentrations for these sites are presented in Table 9. All locally measured benzene concentrations are below the AQAL.

3.48 Figure 21 shows how measured annual mean benzene concentrations have changed over the past two decades within 2 km of the Parish.

Table 14: Local Authority Benzene Monitoring (µg/m^3)

Site ID – Name (Type)	Distance	Latest Year Measured	Latest Measurement
VI - Village Hall, Ince (Industrial)	Within Ince	2011	2.8
WF – Wood Farm, Ince (Industrial)	Within Ince	2012	1.2
MV – 18 Meadow View, Elton (Industrial)	0.2 km	2012	0.8
TM – A5117, Thornton- le-Moors (Industrial)	1.1 km	2015	1.9
AQAL			**5**

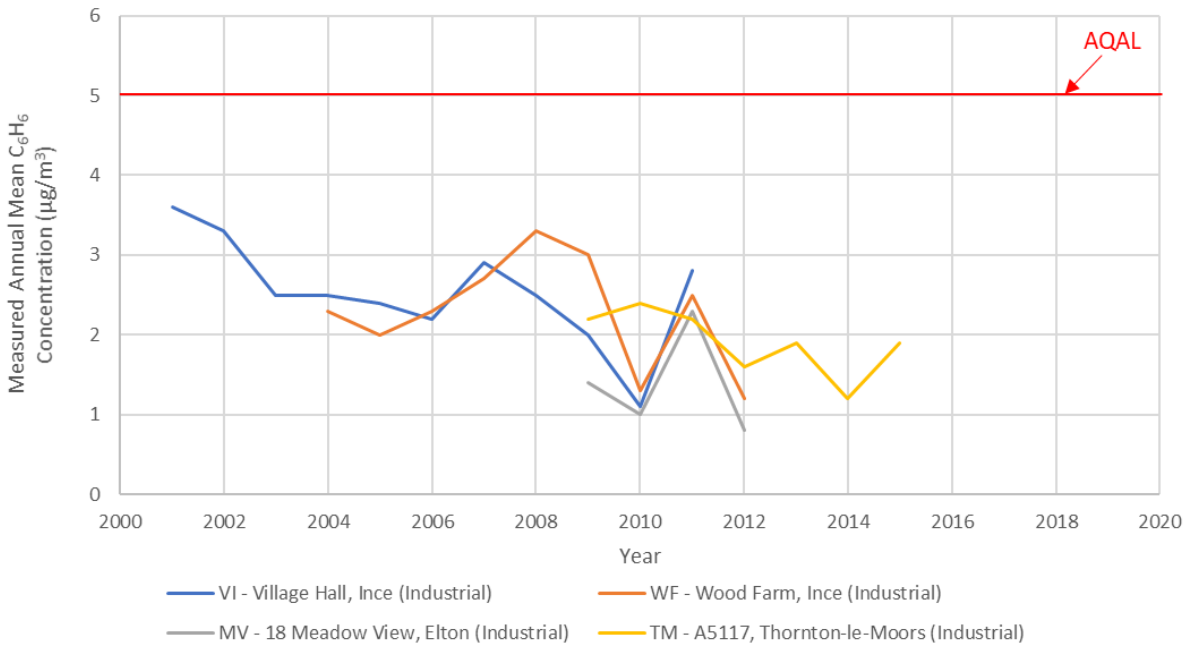

Figure 23: Measured Annual Mean Benzene Concentrations within 2 km of the Parish (µg/m^3)

Other Air Quality Monitoring

AURN Monitoring

3.49 Defra's automatic urban and rural network (AURN) monitoring sites measure pollutant concentrations across the UK. None of these sites are within 2 km of the Parish.

Quinn Glass Monitoring

3.50 Under their environmental permit, Quinn Glass (now Encirc Limited) have carried out NO_2 monitoring in the local area using passive monitoring (diffusion tubes). The average concentrations between March 2005 and October 2007 are given in Table 15 and the locations are shown in Figure 24. All values are well below the AQAL.

Table 15: Quinn Glass NO_2 Monitoring between March 2005 and October 2007 (µg/m^3)

Site ID	Location	Distance	Measurement
1,2,3	Kemira Road between Quinn Glass and Kemira	Within Ince	21.8
4	Farmland north of Quinn Glass site	Within Ince	18.5
5	Farmland northwest of Quinn Glass site	Within Ince	17.1
6,6b,7,8	Ash Road to the south of the Quinn Glass site	640 m	24.2
9	Elton	790 m	26.8
10	Elton	710 m	20.0
IB1	Ince Banks, Mersey Estuary Special Protection Area	230 m	19.0
IB2	Ince Banks, Mersey Estuary Special Protection Area	620 m	19.0
IB3	Ince Banks, Mersey Estuary Special Protection Area	690 m	19.0
IB4	Ince Banks, Mersey Estuary Special Protection Area	440 m	17.0
AQAL			**40**

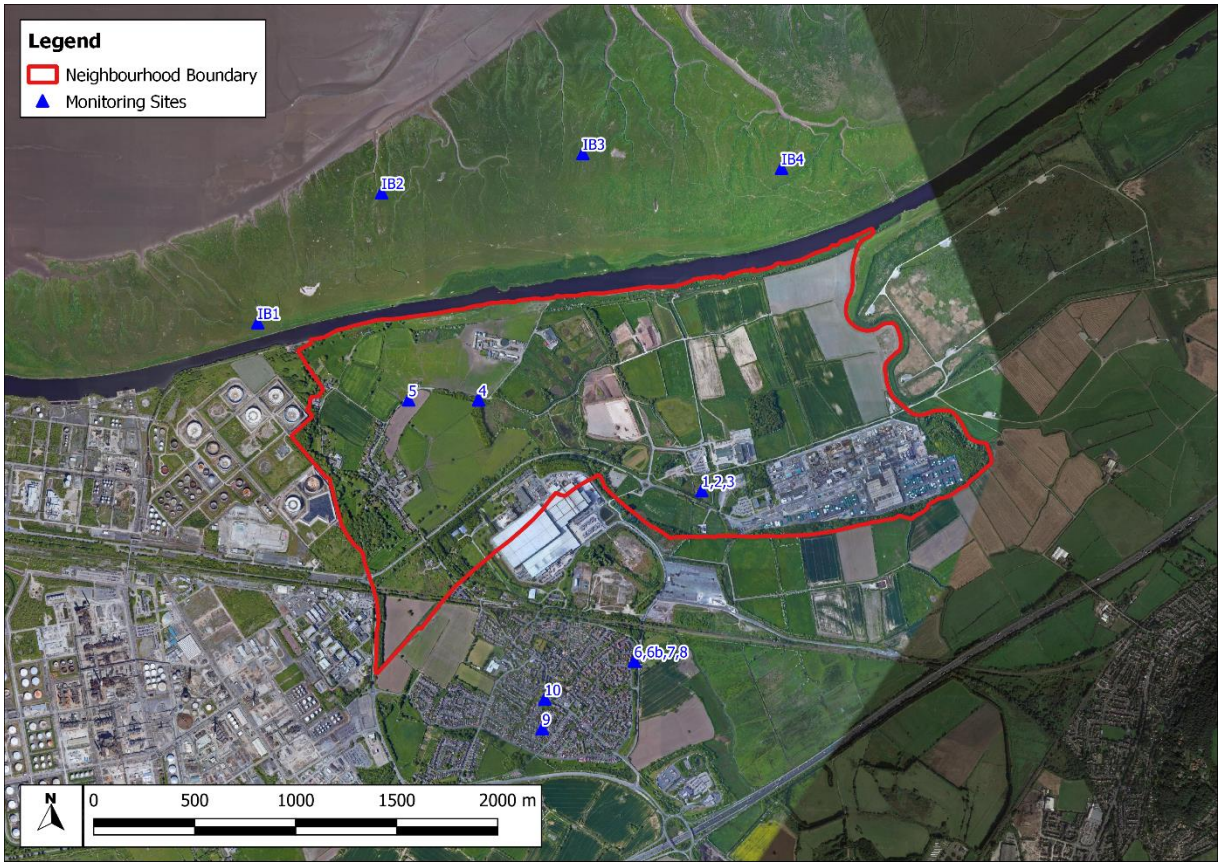

Figure 24: Quinn Glass NO_2 monitoring locations

4 Baseline Summary

4.1 The baseline air quality associated with the site location is based on the following:

Location

- the Parish is located in an industrial region with many local sources of air pollution;
- the Parish is incorporated into the Ellesmere Port Vision and Strategic Regeneration Framework, promoting Ince as an area for employment development;
- the Parish includes residential properties which are sensitive to long-term (annual mean) exposure to pollutants and outdoor locations which are sensitive to short-term exposure (24-hours or less);
- the Parish is located approximately 50 m from the nearest AQMA and there is another AQMA within 1.5 km of the Parish;
- there are nationally and internationally designated ecological sites adjacent to the Parish, but no locally designated sites near the Parish;
- the Environment Agency regulates sites which are at risk of contributing significantly to pollutant concentrations. There are five regulated sites within 2 km of the Parish;
- CW&CC also regulates sites which are at risk of contributing to pollutant concentrations. There are five regulated sites within 2 km of the Parish; and
- there are also other local sources that are not regulated, such as road traffic, railway locomotives, residential and commercial properties and agriculture, as well as the Ince Bio Park and the Ince Resource Recovery Park, both of which may significantly contribute to local air quality.

Baseline Air Quality

- predicted NO_2, PM_{10} and $PM_{2.5}$ background concentrations are below the AQAL;
- nearby local authority measurements and those of Quinn Glass have been well below the NO_2 AQALs for the last two decades;
- nearby local authority measurements have been well below the PM_{10} AQALs for the last two decades;
- nearby local authority monitoring measurements of SO_2 have been below the 1-hour and 24-hour mean AQALs, but above the 15-minute mean AQAL and the nearby AQMA is declared for exceedences of this pollutant; and

- nearby local authority monitoring measurements have been below the benzene AQAL for the last two decades.

Overall Baseline Air Quality

4.2 The current air quality in the Parish is considered likely to be acceptable. Although there may be elevated levels of SO_2 in the local area, CW&CC has investigated this in detail and not identified any areas at risk within the Parish. However, there is a potential for further industrial facilities within Ince, which may pose a risk to members of the public in the future, potentially both for SO_2 and other pollutants.

5 Glossary and References

Glossary

Air Quality Standards	Concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment.
An exceedence	A period of time (defined for each standard) where the concentration is higher than that set out in the Standard.
An objective	The target date on which exceedances of a Standard must not exceed a specified number.
APS	Air Pollution Services
AQAP	Air Quality Action Plan
AQO	Air Quality Objective
AQMA	Air Quality Management Area
Limit Values	Legally binding parameters that must not be exceeded. Limit values are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year, if any, and a date by which it must be achieved. Some pollutants have more than one limit value covering different endpoints or averaging times.
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
NPPF	National Planning Policy Framework
µg/m^3	Microgrammes per cubic metre
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles, more specifically particulate matter less than 2.5 micrometres in aerodynamic diameter

Target values	Used in some EU Directives and are set out in the same way as limit values. They are to be attained where possible by taking all necessary measures not entailing disproportionate costs.
WHO	World Health Organization

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