[App/101]

THE FELIXSTOWE BRANCH LINE AND

IPSWICH YARD IMPROVEMENT ORDER INQUIRY

PROOF OF EVIDENCE OF

JOHN DAVID DRABBLE

Port of Felixstowe

ROYAL HASKONING

This proof of evidence relates to the implications of the following application:

An application under section 1 of the Transport and Works Act 1992 for works to improve Ipswich Yard through the provision of new sidings and other associated works between London Road Bridge and Ipswich railway station and to construct a second railway line in alignment with and to the southern side of the existing Felixstowe Branch Line from a point west of Mile Post 78.5 on the Branch Line to a point east of the railway platforms at Trimley station, to include works to level crossings along the Branch Line, made on 13 December 2005 and including the revisions and amendments submitted to the Secretary of State for Transport on 5 May 2006.	Application reference: TWA 05/APP/04

1. INTRODUCTION

1.1 My name is John David Drabble and I am employed by Royal Haskoning as an Advisory Group Director in the Environment Division, specialising in air quality, air pollutant emissions, atmospheric dispersion modelling, regulation and permitting and environmental impact assessment.

1.2 I have a Bachelor of Science Honours Degree in Chemistry, and a Master of Science Degree (with Distinction) in Environmental Protection. My background following first graduation was in the field of Occupational Hygiene, which is a discipline concerned with the recognition, assessment and control of risks to health associated with exposure to air contaminants in the workplace.

1.3 I subsequently spent eight years as Senior Scientific Officer in the Pollution Control section at Manchester City Council, dealing with ambient environmental air pollution. There I was responsible for management of the extensive ambient air quality monitoring network and submission of statutory reports to Government, and I represented the City Council on regional and national working groups relating to the government's Air Quality Strategy.

1.4 Since joining Royal Haskoning in 2002 I have acted as Project Manager or Director on a wide variety of air quality dispersion modelling and environmental impact projects. I am a Member of the Institute of Air Quality Management, the Institution of Environmental Sciences and the Institution of Chemical Engineers. I am a regular visiting lecturer at Salford University on ambient air quality and health impacts. I

have more than 20 years experience in the assessment of air pollutants and their effects.

1.5 I gave evidence on air quality matters at both the Bathside Bay and the Felixstowe South Reconfiguration Inquiries.

2. SCOPE OF EVIDENCE

2.1 My evidence relates to ambient air quality issues arising from the proposed Felixstowe Branch Line and Ipswich Yard Improvement Order (the proposed Order). It therefore covers the release, dispersion and potential impact of pollutant emissions to atmosphere from construction activities, freight rail transport, and relevant activities at Ipswich Yard.

2.2 The assessment of the air quality impacts of the construction and operational phases of the proposed scheme was presented in the Environmental Statement (ES) [CD 5]. The Addendum to the ES addressed the proposed changes to the scheme at Westerfield in terms of the predicted impact of traffic exhaust emissions when queuing during barrier down times. [CD 8].

2.3 The Secretary of State has requested to be informed on the effect of the Order on the Ipswich locomotive refuelling point. The potential impact on air pollutant concentrations is addressed in my evidence.

2.4 My evidence therefore covers the following elements of the **Statement of Matters** for this Inquiry:

> **5.** The likely impacts of the scheme on local residents and the environment, including:
>
> **(c)** effects on…. air quality…..
>
> **(d)** the effects of increased use of the Ipswich locomotive refuelling point; (**only in respect of air quality effects**);
>
> **(e)** the impacts of the proposed construction site adjacent to the sheltered housing at Reeve Lodge, Trimley St Martin (**only in respect of air quality effects**);
>
> **and**
>
> **8**. The measures proposed by FDRC for mitigating any adverse impacts of the scheme on local residents, businesses and the environment, including:
>
> **(a)** the proposed Code of Construction Practice for the scheme; (**only in respect of air quality effects**).

2.5 I also address in section 6 the Objections which have been raised in respect of air quality matters, and set out my response to these.

3. BASELINE AIR QUALITY

3.1 In order to assess the impact of pollutant emissions arsing from the scheme the background air quality along the length of the branch line, at Ipswich Yard and at Westerfield was considered. Information on air pollutant concentrations in the atmosphere is sometimes available from local authority monitoring surveys. Alternative data are available as estimated background air pollution maps, published via Defra's Air Quality Archive[1], together with adjustment factors to calculate equivalent concentrations in previous and future years.

3.2 Suffolk Coastal District Council monitors air quality at a number of locations. The monitoring network in the district includes the use of nitrogen dioxide diffusion tubes, and automatic monitoring of a number of pollutants at specific town centre sites. Diffusion tube monitoring has been centred on locations in Felixstowe, Kesgrave, Woodbridge, Leiston, Farnham and Melton. The monitoring network was revised in 2003, when the focus of the diffusion tube survey was shifted to roadside locations, to inform the Council's duties under the Local Air Quality Management regime. Consequently there are no data for the more background and rural locations along the rail line between Trimley St Mary and Warren Heath.

3.3 As a result of the change in the monitoring approach only pre-2003 data are available for some sites, and only post-2003 data for others more recently introduced into the network. The monitoring locations that best represent background nitrogen dioxide

[1] *www.airquality.co.uk/archive/laqm/tools.php*

levels in the study area would be the 'urban background' sites in Kesgrave. The ES [CD 5, Annex L, Table 4.1] gives recent annual mean NO_2 concentrations for these sites, and for comparison data from urban background locations in Felixstowe town are also presented. The range of annual mean nitrogen dioxide concentrations in Kesgrave between 2000 and 2004 was approximately 15 to 20 µg/m^3. Felixstowe town centre levels in the same period were in the range of approximately 17 to 28 µg/m^3. As would be expected, the indication is that the background NO_2 concentrations are lower in the district of Kesgrave than in the urban location of Felixstowe town, but both locations are likely to be influenced by road traffic sources[2,3].

3.4 Background pollutant data are available on the UK Air Quality Archive on a 1km x 1km grid basis. The ES [Table 4.2, Annex L, Environmental Statement, CD 5] gives the background pollutant concentrations obtained from this data source, and as used in the dispersion modelling study. These values were derived from the average Air Quality Archive background map values for the ten grid squares through which the rail line section in question would pass. The nitrogen dioxide concentration in 2005 was assumed to be 19.5 µg/m^3. Projected background values for 2023 were calculated in accordance with recommended procedures Defra Technical Guidance[4].

---

[2] *Suffolk Coastal District Council (2003). Report on the Updating and Screening Assessment of Air Quality in the Suffolk Coastal District, June 2003. Report reference ENV/254/22 [CD 38]*

[3] *Suffolk Coastal District Council (2005). Air Quality in the Suffolk Coastal District, Progress Report, May 2005. Report reference ENV/254/24 [CD 46]*

[4] *Defra (and the Devolved Administrations) (2003). Local Air Quality Management Technical Guidance LAQM.TG(03) [CD 40].*

3.5 The benchmark air quality standards used in the impact assessment were those laid down in the government's Air Quality Strategy and the associated Air Quality Regulations, as amended, [CD 68 & 69] and these are given in the ES [Table 3.1, Annex L, CD5][5,6,7,8]. The Regulations prescribe air quality 'Objectives', against which Local Authorities are required to periodically review and assess air quality within their respective areas.

3.6 Suffolk Coastal District Council completed the second round of statutory air quality review and assessment procedures in 2004, and, as concluded from the first round, no formal Air Quality Management Area (AQMA) was designated within the borough. The updated detailed assessment process concluded that exceedences of the relevant air quality Objectives were unlikely, and any future decision on AQMA declaration would be informed by the results of ongoing air pollutant monitoring. In accordance with Defra requirements for a rolling programme of review and assessment, the Council then produced an Air Quality Progress Report in 2005, in which monitoring results were updated and new and proposed future developments were described. The conclusion was that further investigation would be necessary in respect of traffic-

---

[5] *Department of the Environment, Transport and the Regions (2000a). The Air Quality Strategy for England, Wales and Northern Ireland. – Working Together for Clean Air. DETR Cm4548; London, The Stationery Office.*

[6] *Department of the Environment, Transport and the Regions (2000b). The Air Quality (England) Regulations 2000 (No 928); London, The Stationery Office [CD 68]*

[7] *Department for Environment, Food and Rural Affairs (2003a). The Air Quality Strategy for England, Wales and Northern Ireland: Addendum. PB7874; London, The Stationery Office*

[8] *Department for Environment, Food and Rural Affairs (2003b). The Air Quality (England)(Amendment) Regulations 2002 (SI 2002 No 3043); London, The Stationery Office [CD 69]*

related emissions in Woodbridge, and shipping emissions associated with the Port of Felixstowe, but air quality at all other locations was still expected to meet the health-based air quality objectives.

3.7 Existing air quality in the Suffolk Coastal district can generally be described as good. The assertion of generally good air quality would be expected for a coastal town in an essentially rural setting, and the possible existence of local traffic-related hotspot areas is consistent with the national context.

3.8 Background air quality at the Ipswich Fuel Point location was considered using the same approach. Background pollutant concentrations for this location were obtained from the UK Air Quality Archive, for the 1km x 1km grid square centred on OS grid reference 615500, 243500. Ipswich Borough Council has declared three AQMAs due to NO_2 from traffic exhaust emissions on specific town centre roads, but not in areas close to Ipswich Yard, the Fuel Point or the Westerfield crossing.

4. CONSTRUCTION PHASE AIR QUALITY IMPACTS

4.1 The air quality assessment of the construction phase of the scheme was based on consideration of the construction programme, predicted plant and equipment usage, and location in relation to residential properties. There are two potential sources of air pollutants associated with these activities, namely fugitive dust generation in the form of PM_{10} particulate matter and HGV and plant exhaust emissions.

4.2 The impact of on-site generation and re-suspension of settled materials causing fugitive emissions of particulate matter depends upon a wide variety of factors. Such particulate matter is generally in the 'coarse' size range and tends to rapidly fall from the airstream. Studies have shown that only around 20% of total suspended particulate matter from construction activity is in the PM_{10} size range[9,10]. The direct impacts would typically be on site, although local wind speed and direction will affect dispersal.

4.3 In respect of potential fugitive construction dust generation, Department for Environment, Food and Rural Affairs (Defra) Air Quality Technical Guidance TG(03)[4] provides a screening approach for the determination of the likely contribution of various pollutant sources to ambient air quality. For the review and assessment of fugitive and uncontrolled PM_{10} sources including major construction works, TG(03) states

> '*Emissions from these sources are not well quantified, and it is therefore difficult to predict PM_{10} concentrations with any accuracy…. It should be noted that these fugitive sources will only impact upon the objectives if they are in operation in or after 2004 or 2010.'*
>
> (These being the target years for the existing and provisional PM_{10} Objectives).

---

[9] *Quality of Urban Air Review Group (1996). Airborne Particulate Matter in the UK. Third report for DoE. ISBN 0 9520771 3 2. [CD 43]*

[10] *Airborne Particles Expert Group (1999). Source Apportionment of Airborne Particulate Matter in the UK. DETR/AEA Technology. ISBN 0-7058-1771-7 [CD 44]*

4.4 The guidance further states that *'concentrations fall off rapidly on moving away from the source*', and the determination of public exposure should consider the distance between the receptor and the actual source within the site, and not the site boundary. Potential exposures beyond 200m of the source can be ignored (for the purposes of assessment against the 2004 objective), if the background concentration is less than 26μg/m^3; in this case the existing background concentration in 2005 is calculated to be 19.3μg/m^3, and so it can be concluded that only those properties within 200m of the construction activities have the potential to be significantly exposed.

4.5 The location of the construction compound adjacent to the roundabout on High Street in Trimley St Martin as originally proposed was re-located during the course of the planning discussions, to minimise the potential noise and dust impact upon residents of Reeve Lodge. The new main compound area is well beyond 200m from Reeve Lodge and fugitive dust impacts are not likely to be significant at this receptor location.

4.6 A Code of Construction Practice (COCP) will be operated which will incorporate construction dust minimisation and management techniques. The approach will follow best practice guidance on the control of dust emissions from construction activities, published after the ES was prepared[11]. The COCP will be operated as a consequence of the planning conditions for the scheme, for which FDRC are at

[11] *Greater London Authority and London Councils (2006). The Control of Dust and Emissions from Construction and Demolition – Best Practice Guidance. November 2006.*

present seeking to agree terms. Details of how the COCP will be enforced are covered in the Proof of Evidence of Ian Guilder [App/41].

5. BRANCH LINE OPERATIONAL IMPACTS

5.1 The ES [section 4.9, CD 5] describes the dispersion modelling study undertaken to predict pollutant concentrations at receptor locations, resulting from the release and dispersion of freight train exhaust emissions. The receptor locations were selected as the residential properties in closest proximity to the rail line along the length of the proposed scheme. As such the modelling results represent the impact of the scheme at worst-case locations. The ES [Table 4.43, CD 5] gives a description of the nine locations considered.

5.2 Primary emissions of nitrogen oxides, PM_{10} particulate matter and sulphur dioxide were calculated. Total carbon dioxide emissions likely to be generated by the scheme were also estimated. The operational impacts of increasing train movements were assessed between a base year (2005) and a fully developed scheme in 2023.

5.3 Baseline train movement data were supplied by the project team, sourced from the existing passenger train timetable and existing freight train data provided by HPUK. Projected freight movement data were provided by predictions from ongoing impact assessment studies for the Felixstowe South Reconfiguration Scheme, and Network Rail SAP analysis and reports. Mr Harston's evidence provides the details of these baseline and predicted rail movements. For the purposes of the air quality studies, it was assumed that there were 47 rail freight movements per day in 2005, and that by

2023 there would be 76 rail freight movements per day. The model input values and other technical data are presented in the ES.

5.4 Comparison of the baseline pollutant concentration values with those predicted for the fully developed scheme indicate that for NO_2 the short-term average levels increase with the constructed scheme and more train movements in operation, whereas the long-term (annual) average levels for both NO_2 and PM_{10} are predicted to marginally reduce. The short-term (hourly and 24-hourly) average PM_{10} and SO_2 concentrations show a mixed distribution with marginal increases and decreases depending on receptor location. However none of the respective health-based air quality Objectives is predicted to be exceeded in the base year or fully developed scheme completion year. This assessment does not consider the additional exhaust pollutant generation were the additional freight to be transported by road rather than rail.

5.5 It should be noted that daily PM_{10} concentrations were predicted as the 98.1 percentile of 24-hour mean values, for comparison with the Government's *proposed* Objective set for 2010 of no more than 7 daily exceedences of 50µg/m^3. The proposed annual mean value for the same target year is 20µg/m^3. These proposed Objectives have not been incorporated into Regulations in England, and are somewhat more stringent than the prescribed Objectives, (which are for no more than 35 daily exceedences of 50µg/m^3, and an annual mean of 20µg/m^3). The government is currently consulting on proposals to drop these 2010 Objectives in favour of an exposure-reduction

approach to the management of fine airborne particulate pollution[12]. Neither of these *provisional* daily or annual mean Objectives are predicted to be exceeded at any of the receptor locations in the base year or by 2023 with the scheme fully developed.

5.6 Emissions from freight and passenger rail sources are therefore not predicted to have a significant impact on worst-case receptor locations, those being the residential properties in closest proximity to the rail line, for a fully operational double tracking scheme between Trimley St Mary and Warren Hill.

5.7 Predicted short-term (hourly-average) NO_2 concentrations may be marginally raised at these locations, due an increased number of emission sources, but not such that the 1-hour average Objective will be exceeded. Longer term (annual mean) concentrations are predicted to reduce by 2023, due to the effect of decreasing background concentrations in future years. Under the modelling conditions applied existing and future provisional air quality Objectives would not be breached. The ES concluded that the permanent impact of the scheme on ambient air quality would be of minor adverse significance (in respect of short term pollutant concentrations) and of negligible significance (for annual mean concentrations).

5.8 Total carbon dioxide (CO_2) releases from the assumed train movements as detailed were also calculated, by application of NAEI[13] emission factors. Existing (2005) total

---

[12] *Department for Environment, Food and Rural Affairs (2006). The Air Quality Strategy for England, Wales and Northern Ireland. Consultaion Document on Options for Further Improvements in Air Quality, Volumes 1 and 2. April 2006, Defra. Product Code PB11252a.*

[13] *National Atmospheric Emissions Inventory, www.naei.org/*

CO_2 releases along the dualled length of track would be 1146 tonnes/year; the additional train movements in 2023, assuming the same emission rates, would generate an additional 336 tonnes/year. Whilst this represents an increase of 32% in total CO_2 emissions, the absolute values are small in relation to regional emissions associated with transportation.

5.9 The additional CO_2 emissions due to the use of freight trains for transporting containers would be offset in respect of equivalent carbon dioxide generation were the containers to be transported by road. The CO_2 generation from HGV traffic transporting the additional containers (by 2023), only along the length of the proposed dualled line, would be approximately 746 tonnes per year, more than double the release from equivalent transportation by rail[14]. Clearly this difference is further enhanced if the full hinterland routes were to be considered. The sustainable transportation issue is covered in the evidence of Andrew Harston [App/1] and Stephen Purnell [App/61] .

Standing Train Emissions

5.10 At the time of the preparation of the ES the scheme incorporated new signalling, at which it was predicted that freight trains would not need to be stopped on the route into or from the Port . However for the purposes of the impact assessment, two signals were assumed to be remaining in place, to the west of Keepers Lane, Trimley St Mary (OS ref 627570, 236540), and opposite Morston Hall (OS ref 626015,

[14] Assumptions made: 24-wagon trains; 85% load utilisation; 275 rail working days per year; TEU to container factor of 0.671; container to HGV factor 1.41; average CO2 emission factor for rigid and articulated HGVs 208g/km (rural driving). Sources evidence presented at Bathside Bay and FSR Public Inquiries, and NAEI[13].

238790). A further situation in respect of freight trains standing with engines idling occurs at Ipswich Fuel Point, where Freightliner operates a refuelling station. The impact of emissions from trains standing during refuelling was assessed at this location.

5.11 Releases of diesel engine exhaust pollutants were assessed over a short term period of up to one hour, and were assumed not to affect annual average concentrations. Therefore emissions of nitrogen oxides and sulphur dioxide were considered, which both have assigned short-term air quality Objectives. The other release rate assumptions made in the assessment are described in the ES [section 4.9, CD 5].

5.12 The modelling of NOx and SO_2 emissions from a freight train standing with its engine idling for an assumed (worst-case) 1-hour period indicates that the concentrations at the nearest receptor location to each potential source would be well below the respective short-term health-based air quality Objective. A new signalling scheme for the Branch Line will be required as there will then be two tracks, and it expected that the timetable for the dualled line can be organised so as to preclude trains leaving the North Terminal from standing to join the Branch Line.

5.13 Since the publication of the ES, Ipswich Borough Council has commissioned an air quality monitoring survey at a property on Ancaster Close, where the impact of idling train emissions during current refuelling activities is greatest. Continuous monitoring analysers measured levels of nitrogen oxides and PM_{10} particulate matter over a four month period. Provisional results made available by the Council in January 2007 showed the following values, presented alongside the relevant Air Quality Objectives:

5.14 Summary of Provisional Monitoring Results, Ancaster Close, 8th September to 31st December 2006:

	Nitrogen dioxide, µg/m^3		PM_{10} Particulate Matter, µg/m^3(gravimetric)	
	Annual mean	**1-hour mean**	**Annual mean**	**Daily mean**
Objective	40	200 (18 exceedences per year allowed)	40	50 (35 exceedences per year allowed)
Results Sept-Dec 2006	23 (period average)	164 (0 exceedences of 200 µg/m^3)	22 (period average)	66 (4 exceedences of 50 µg/m^3)

5.15 These provisional data indicate that the statutory Objectives were not exceeded during the monitoring period, assuming that the 4-month period average is representative of conditions over a full year. However, dispersion conditions are variable over the course of a year; typically the worst-case dispersion conditions occur during the winter period, although monitoring surveys should be carried out continuously or for as long as possible given the constraints of time and resources. A year of monitoring is recommended, in particular for pollutants with Objectives based on short-term means over a year; for Objectives based on an annual mean, at least six months monitoring is recommended [paragraph A1.54, Defra Technical Guidance TG(03), CD40]. Ipswich Borough Council has indicated that the monitoring survey will continue until around April 2007, resources permitting.

5.16 Since the publication of the ES, further information on the operational practices and procedures at the Ipswich Fuel Point has been obtained at a meeting with Freightliner on 26th October 2006, as described in Mr Postlethwaite's evidence [App/81 paragraph

4.106 et seq.]. Based on this information, a further dispersion modelling study has been carried out to assess the air quality impact of the combined emissions of a number of locomotives standing with their engines idling at the Fuel Point and in the adjacent sidings. On a typical weekday night, 6 locomotives are refuelled between 24.00 and 06.00, when engines are normally left running for servicing and maintenance checks. At the weekend, typically 10 but up to 13 locomotives (5 Class 57 engines and 8 Class 66 engines) may be started up and left to stand at idle for up to 2 hours. A worst-case scenario of 13 locomotives standing idling for 6 hours every day was modelled, using locomotive diesel engine emissions data supplied by the engine manufacturers (see Technical Annex A for details).

5.17 Freightliner operates two types of locomotive, the older Class 57 and the newer Class 66. Freightliner plans to phase out all of its 12 Class 57 locomotives by 2008. Should the Branch Line scheme be consented, a reasonable assumption would be that Freightliner could win 50% of the new paths. In total, taking into account all extra daytime and night-time train paths, Mr Postlethwaite was advised that this could mean an extra 6 Freightliner Class 66 locomotives with possibly an extra one or two starting from cold during a weekday night, and an extra 6 stabled at weekends. A further worst-case scenario was therefore modelled in which 18 Class 66 locomotives would stand at idle for 6 hours every day.

5.18 Total annual mean nitrogen dioxide concentrations including the background component are predicted to be lower than the existing situation at properties on Ancaster Close. The predicted short-term concentrations show a marginal 5% increase as an average of the 4 property locations selected as receptor points. Despite

the predicted increase in number of locomotives likely to use the Fuel Point, the modelling results reflect the lower emissions from the Class 66 locomotives, and the lower background concentrations in future years. The 2006 modelled nitrogen dioxide levels compare reasonably well with the measurement survey results.

5.19 Summary of Modelling and Provisional Monitoring Results, Ancaster Close

	Nitrogen dioxide, µg/m^3	
	Annual mean	**1-hour mean, (99.8th percentile)**
Objective (2005)	40	200
Results Sept-Dec 2006	23*	164**
Model 2006 (13 loco's)	24	152
Model 2023 (18 loco's)	23	159

* period average monitoring result

** period maximum 1-hour mean

Emissions from Vehicles Queuing at Westerfield

5.20 The Addendum ES [CD 8, section 2.6] describes the existing and predicted with-scheme situations in respect of barrier down times at Westerfield Junction. The potential impact of vehicle emissions on concentrations of NO_2 and PM_{10}, the primary traffic-related pollutants, was assessed at properties adjacent to the crossing. These concentrations will reduce with distance from the road traffic source and so the assessment was conservative in this respect.

5.21 The model results show that the predicted pollutant concentrations in 2006 are well below the relevant health-based Objective, and as background concentrations reduce in future years, the concentrations for 2010 are lower still. These screening assessments are precautionary, in that the DMRB model[15] generally provides a conservative estimate, the assumed vehicle flows and barrier down times were those in the morning peak hour, and a residential property just 5m from the centre of the road was assumed. The air quality impact of vehicle exhaust emissions at properties close to the Westerfield level crossing is therefore unlikely to be significant, and in terms of the Government's health-based pollutant objectives the predicted levels are acceptable.

6. OBJECTIONS

6.1 A number of objections have been submitted in response to consultation on the TWA Application in respect of air quality matters. Several of the Objections make general reference to air quality, emissions, odour or traffic exhausts, to the effect that air quality will deteriorate should the scheme be consented (OBJs 01, 16, 18, 24, 26, 30, 45 and 46).

6.2 My response to these general objections is as follows. The benchmarks for the consideration of impact at properties were the Government's Air Quality 'Objectives', which are based on advice on ambient air quality standards from an expert group within the Department of Health. The derivation of these standards considered the

[15] *Highways Agency (2003). Design Manual for Roads and Bridges, Local Air Quality Screening Method, 2.01, November 2003 [CD 42].*

likely effects on short-term and long-term exposure to a range of air pollutants, including susceptible groups such as the very young, the elderly and those with respiratory conditions.

6.3 The assessment of potential impacts of the scheme concluded that none of the health-based Objectives would be exceeded at any of the receptor locations considered, either over short-term periods or as an annual mean. In many respects the studies used a conservative approach, and the worst-case conclusions can be assumed to reduce with distance from the rail line. As the air quality section of the Environmental Statement concludes, whilst total emissions from diesel engine exhausts would increase, atmospheric dispersion means that levels of the key pollutants would not exceed relevant standards at properties close to the rail line. This is set in the context of decreasing background air pollutant concentrations, and the predicted annual mean values for the key pollutants in 2023 are lower than existing levels.

6.4 One objection (OBJ 13) requested that further information be provided specifically in respect of emissions from vehicles queuing at Westerfield, and two others (OBJ 25 & 30) make reference to the same issue. A response on this issue, including further calculations of predicted air quality impact, was presented in the Addendum ES [section 2.6, CD 8], and this is summarised at sections 5.14 and 5.15 above.

6.5 Four objections (OBJs 08, 09 38, and 43) made reference to emissions from trains standing at signals. The potential impact of emissions from standing trains was assessed in the ES [section 4.9.24, CD 5], for those properties in closest proximity to the existing signals, and no relevant air pollutant Objective was predicted to be

exceeded. Nevertheless this issue has been addressed through the proposed new signal for CO624 and Environmental Board for CO632, which are to be located away from properties.

6.6 Two further objections (OBJs 53 and 55) made specific reference to emissions from freight trains standing at the Ipswich Fuel Point. Further modelling studies have been carried out since the publication of the ES, and a monitoring survey has been commissioned by Ipswich Borough Council.

6.7 The Objections are based on what is perceived to be an existing problem with emissions from locomotives standing with engines idling, and the likelihood of Freightliner securing some of the new paths made available should the scheme be consented, leading to an increase in the number of locomotives refuelling at this Fuel Point. It is acknowledged that exhaust fumes released from trains idling at the Fuel Point will disperse in such a manner that, under certain meteorological conditions, will be visible and potentially odorous at properties on Ancaster Close. However the results of the predictive modelling studies and the continuous monitoring survey currently operated by Ipswich Borough Council have been compared to the Government's health-based Objectives, and both indicate levels below these Objectives. These results are described in paragraphs 5.13 to 5.19 and are detailed in Annexe A of my proof. The monitoring and modelling results would not require Ipswich Borough Council to designate the location as an Air Quality Management Area.

6.8 The Fuel Point has been in use in its current location for a number of years, and its use will continue irrespective of the scheme gaining consent. Its operation is not

required by the scheme, and although the scheme will bring about an increase in operations, the replacement of older locomotives with newer models which emit less exhaust pollution means that any potential impact of the scheme on air quality at this location will not be significant.

7. CONCLUSIONS

7.1 Predicted emissions from diesel freight trains were used in a detailed modelling study to determine the impact on air pollutant concentrations at residential properties along the length of the branch line in question. The modelling study considered both short-term and long-term effects, and used measured meteorological dispersion conditions for each hour of the year, over three different years, to determine how the pollutants nitrogen dioxide, particulate matter and sulphur dioxide would be released and dispersed. The study included consideration of emissions from trains standing at signals, those standing during refuelling at Ipswich Yard, and from vehicles queuing at Westerfield.

7.2 The study concluded that none of the health-based Objectives would be exceeded at any of the receptor locations considered, either over short-term periods or as an annual mean. In many respects the study used a conservative approach, and the worst-case conclusions can be assumed to reduce with distance from the rail line. The air quality section of the ES concluded that whilst total emissions from diesel engine exhausts would increase, atmospheric dispersion means that levels of the key pollutants were not predicted to exceed relevant standards at properties close to the rail line. This is set in the context of decreasing background air pollutant concentrations, and the

predicted annual mean values for the key pollutants in 2023 are lower than existing levels.

7.3 On matters relating to potential increased pollutant emissions from rail freight the genuine concern of the objectors is acknowledged. However the detailed studies have shown that the range of government health-based air quality Objectives would not be breached as a consequence of the proposed scheme.

7.4 I conclude that the scheme proposed by the Applicant will not give rise to any significant impacts on ambient air quality when associated air pollutant releases and ground level concentrations are compared to the relevant short- and long-term health-based government Objectives.

8. GLOSSARY OF TERMS

Pollutants

CO Carbon monoxide

NO_x A term used to describe the mixture of nitrogen oxides which is present in the atmosphere, comprising nitrogen dioxide (NO_2) and nitric oxide (NO) in varying proportions.

PM_{10} Fine airborne particles with a mean aerodynamic diameter of less than 10 micrometres (one-hundredth of a millimetre).

SO_2 Sulphur dioxide

Units of Measurement

$\mu g/m^3$ Microgrammes (of pollutant) per cubic metre of air. A measure of concentration in terms of mass per unit volume.

ppm Parts per million. The concentration of a pollutant in air in terms of volume ratio. A concentration of 1ppm means that for every million (10^6) units of air, there is one unit of pollutant present.

Data Descriptors

Annual The average of the pollutant concentrations measured for each pollutant

mean	for one year.
Data capture	Gives the percentage of all the possible measurements for a given period that were validly measured.
Exceedence	A period of time where the concentration of a pollutant is greater than, or equal to the relevant air quality standard, objective or benchmark value.
Percentile	A value that is the rank at a particular point in a collection of data. For instance, a 98th percentile of values for a year is the value that 98% of all the data in the year fall below, or equal.
Days with exceedence	The number of days in which at least one period has a concentration greater than, or equal to, the relevant air quality standard, objective or benchmark value (the averaging period will be that defined by that standard, objective or benchmark value).

Air Quality Standards and Objectives

Air Quality Standards	The *standards* set out in the Air Quality Strategy are based purely on medical evidence of the effects of particular pollutants on health. They represent minimum or no significant risk levels. They are not based on a costs and benefits assessment or on technical feasibility, but on the advice of the Expert Panel on Air Quality Standards (EPAQS). The EU limit values are derived from World Health Organisation (WHO) guideline

values (these guidelines are equivalent in concept to the UK standards).

Air Quality Objectives

Air Quality *Objectives* in the Strategy and in Regulations do take account of costs and benefits, and the feasibility of moving towards those standards. The objectives represent the Government's, the Mayor of London's and the Devolved Administrations' medium term policy intentions and are based on the recommended standards. Air quality objectives therefore provide a framework for determining the extent to which policies should aim to improve air quality. They also provide a measure for each of the pollutants of concern against which future progress can be judged.

Other Air Quality Terms

AQMA

Air Quality Management Area. A geographical area designated By Order of a Local Authority demarcating a zone in which one or more statutory air quality Objectives are being or are predicted to be breached.

Receptor (location)

A specific location of interest (typically residential properties or sensitive locations such as schools and hospitals), selected in air dispersion modelling studies, where air pollutant concentrations are calculated.

TECHNICAL ANNEX A

Further Dispersion Modelling and Assessment of Impacts at Ipswich Fuel Point

A1 Dispersion Modelling Scenarios and Input Data

A1.1 A model scenario was created using information obtained from Freightliner regarding its use and procedures at Ipswich Fuel Point. The following assumptions were made:

i. 5 Class 57 locomotives and 8 Class 66 locomotives were assumed to stand with engines idling for 6 hours every day of the year. The 5 Class 57 locomotives were assumed to be located at the two refuelling points, at the inspection pit, and on sidings 5 and 4, ie the closest five locations to Ancaster Close. The 8 Class 66 locomotives were assumed to be located on sidings 1-5.

ii. A second scenario was modelled in which it was assumed that Freightliner would win 50% of the new paths created were the scheme to gain consent. Given that this would mean an extra 6 Freightliner Class 66 locomotives with possibly an extra one or two starting from cold during a weekday night, and an extra 6 stabled at weekends, the scenario accounted for 18 Class 66 locomotives standing at idle for 6 hours every day.

iii. Four receptor locations were used, those being Numbers 41 Ancaster Road (Receptor 1), Number 39 (Receptor 2), Number 37 (Receptor 3) and Number 35 (Receptor 4). Account was taken of the local topography, as Ancaster Close is situated on higher terrain than the Fuel Point.

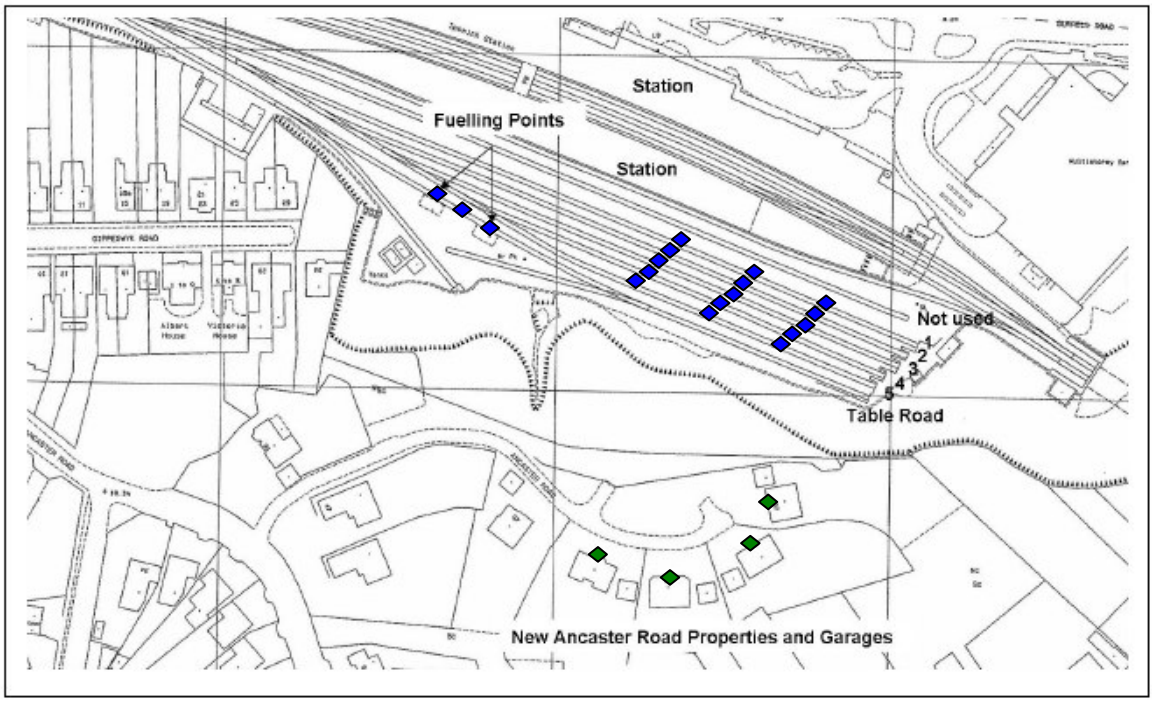
iv. Dispersion conditions were modelled using hourly sequential meteorological data from the Wattisham station; these data were used in the FSR and the Branch Line assessments, and the same data from 1999-2001 were used for consistency. A sensitivity test using the three years' of data indicated that 2001 dispersion conditions gave rise to the highest pollutant concentrations at the receptors, and so data from this year were used in the subsequent modelling study.

v. Background pollutant concentrations were taken from the UK Air Quality Archive, centred on OS grid reference 615500, 243500, and corrected for 2006 and 2023 in accordance with recommended procedures DEFRA LAQM Technical Guidance Note TG(03).

vi. Emissions data for engines at idle were obtained directly from Electro-Motive Diesel Inc[16], manufacturers of the General Motors engines. The release rates used in the modelling were as follows:

Locomotive	Engine	Low Idle NOx release rate, g/s
Class 57	12-645E3B	0.331
Class 66	12N710G3B-U2	0.129

vii. The approximate locations of the locomotives and receptors are shown on the schematic below.



- receptor locations
- assumed release locations (locomotive positions)

[16] *personal communication from David Brann, Manager, Emissions Compliance, EM Diesel Inc, to J Drabble, Royal Haskoning, dated 23rd January 2007.*

A2 Dispersion Modelling Results

The model outputs for each of the receptor locations for the two scenarios are given below.

Scenario	Receptor	Annual mean NO_2, µg/m^3	99.8th percentile of 1-hour mean NO_2, µg/m^3
Background NO_2 2006		20.99	
Background NO_2 2023		27.67	
2006 existing case. 5 Class 57 and 8 Class 66 locos.	R1	24.7	153.0
	R2	24.5	144.0
	R3	24.4	151.0
	R4	24.5	158.0
	Average	**24.5**	**151.5**
2023 Future case. 18 Class 66 locos.	R1	21.8	150.7
	R2	22.3	138.7
	R3	23.4	173.7
	R4	23.8	174.7
	Average	**22.9**	**159.4**
Objectives		**40**	**200**