Technical note:
Planning application support

1. Summary of the air quality review

The development therefore introduces no new exposure above the NO_2 annual mean AQO.

In the worst case, the development may give rise to small exceedences of the NO_2 short term AQO.

The impacts of the ship emissions would be said to give rise to moderate adverse effects at worst, if they were the subject of a new planning application and assessed using the latest EPUK and IAQM guidance.

The application as a whole is air quality neutral for transport emissions.

Mitigation measures should be discussed between RBoG and the applicant.

2. General information about planning application

Application

GLA Application number	2515b	Date received	14 August 2015
London Borough	RB Greenwich 15/0973/F	Date appraised	20 August 2015
Site History	LAND AT ENDERBY WHARF, CHRISTCHURCH WAY, GREENWICH, SE10 0AG The Site comprises the northern part of the wider Enderby Wharf scheme which is approximately 3.6 ha, which received full planning consent in 2012 for a mix of (Planning Ref. 10/3063/F). The application was supported by an Environmental Statement (ES) dated October 2010. In 2014, a Section 73 (s73) application was submitted (and subsequently granted planning permission in August 2014) by Enderby Wharf LLP for a series of minor material amendments to the 2012 Permission (Planning Ref. 13/3025/MA). The 2014 consented amendments included revisions to the elevated treatment of the buildings and rationalisation of the internal floorspace which included a reduction in floorspace within Block A which was amended in height from 14 storeys down to 8 storeys. The wider Enderby Wharf scheme has been implemented under the 2014 Section 73 planning permission. Construction has begun on the first phase of the development with first occupation of the residential units expected in June 2015. An energy centre is part of the consented wider Enderby Wharf scheme.		

Brief description	In May 2015, the Environmental Statement air quality chapter associated with the revised application for the northern element of the Enderby Wharf Development was considered. The development comprises the erection of a cruise liner terminal building, skills academy (Use Class D1), 477 residential units (increasing from 93) (Use Class C3), retail, restaurants and cafes and drinking establishments (Use Classes A1, A3 and A4), vehicular access with associated servicing facilities, car parking, landscaping, public realm (including improvements to the Thames Path), play spaces, infrastructure and associated parking. Emissions from cruise ships were not modelled in the Environmental Statement chapter having been scoped out following the LAQM.TG(09) guidance. Royal HaskoningDHV was commissioned by Royal Borough of Greenwich (RBoG) to undertake detailed air dispersion modelling to consider pollutant emissions from cruise liners hotelling at Enderby. Royal HaskoningDHV also calculated the Air Quality Neutral benchmark for the D1 planning uses. These additional assessments are reviewed here.

3. About the area (air quality related)

Is the site in an AQMA?	Yes, Borough-wide AQMA
The AQMA is declared for	NO_2 and PM_{10}
AQMA emissions source(s)?	Local road transport and road transport from outside the borough.
Other existing significant emission source(s) in the area?	None specified by RBG
Existing residential properties that could be affected?	10 to 100 residential properties within 20m of the red line, but they are 250m from the ships at berth
Any ecological receptors that could be affected? If yes, designation and distance? *(Ecological receptors defined as SSSI, SPA, SAC and Ramsar sites)*	None in the vicinity of the site.
Local monitoring data available?	Yes, 3 automatic monitors within 1km of the site recording NO_2, PM_{10} and $PM_{2.5}$. Five diffusion tubes within 1km monitoring NO_2.

4. Description of additional modelling

The AERMOD (Lakes Environmental model version 8.9.0) dispersion modelling software has been used to model emissions of NO_X, SO_2, PM_{10} and $PM_{2.5}$ from a typical cruise vessel in berth at the cruise terminal.

Emissions

NO_x emissions from marine diesel engines are controlled the Engine International Air Pollution Prevention (EIAPP) Certificate and the subsequent demonstration of in service compliance in accordance with the requirements of the mandatory, regulations 13.8 and 5.3.2 respectively, NOx Technical Code 2008 (resolution MEPC.177(58) as amended by resolution MEPC.251.(66))[1].

The NO_x control requirements of Annex VI apply to installed marine diesel engines of over 130 kW. Different levels (Tiers) of control apply based on the ship construction date, and within any particular Tier, the actual limit value is determined from the engine's rated speed. Tier II emissions (construction date on or after 1 January 2011) have been assumed.

[1] http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Nitrogen-oxides-(NOx)-%E2%80%93-Regulation-13.aspx

The engine's rated speed is not given in the report. A back-calculation from the NO_X emission rate (8.65 g/s) suggests that for the electrical load of approximately 3,500kW the engine's rated speed is below around 1050 rpm.

Activity

It is stated that there are expected to be 55 vessel calls per year with each liner hotelling for a maximum of 48 hours, giving emissions for 2,640 hours per year. The predicted annual mean concentrations have therefore been pro-rated to account for 2,640 hours operation rather than 8,760 hours. The short term concentrations have not been pro-rated so the prediction of short term impacts is conservative (pessimistic), as the operation of the ship engines for 2,640 hours per year is unlikely to coincide with all of the worst case meteorological conditions.

Predicted impacts

Annual mean NO_2

The maximum predicted Process Contribution (PC) to annual mean NO_2 concentrations at an existing receptor is 2.3 µg m^{-3} at R1, where the resultant Predicted Environmental Concentration i.e. the sum of the PC and the background concentration (PEC) is 33.6 µg m^{-3}. The highest PEC at an existing receptor is 41.9 µg m^{-3} at R10, where the background concentration alone exceeds the AQO of 40 µg m^{-3} and the PC is <0.1 µg m^{-3}. The ship emissions at R10 are therefore not the cause of the exceedence, but they do contribute to increasing the concentration.

The maximum predicted PEC at future receptors are 40.0 (40.01) µg m^{-3} at R25 and 38.0 µg m^{-3} at R16, both of which are commercial receptors. The maximum predicted PEC at a future residential receptor is 37.8 µg m^{-3} at the ground floor of R17.

The development introduces no new exposure above the NO_2 annual mean AQO.

Hourly mean NO_2

The maximum NO_2 99.79th percentile Predicted Environmental Concentration (PEC) at an existing receptor is 125 µg m^{-3}, and is therefore well below the AQO of 200 µg m^{-3}. The maximum exceedences of the short term AQO at future receptors are 224.9 µg m^{-3} on the roof at R19 and 206.6 µg m^{-3} at R18 (ground level). A small exceedence is predicted from the raw concentrations, but the method used provides an upper bound as it assumes that although the ships will not be at berth during every hour of the year, nonetheless that their operation would coincide with all of the worst case meteorological hours during the year.

In the worst case, the development may give rise to small exceedences of the NO_2 short term AQO.

Predicted significance

Under 2015 EPUK and IAQM guidance[3], the predicted impacts would be classed as **moderate adverse** at worst as there is predicted to be an increase of 6% of the AQO in an area where the PEC is predicted to be 76-94% of the AQO. The maximum predicted Process Contribution (PC) to annual mean PM_{10} concentrations is 0.1 µg m^{-3}. Impacts are therefore considered to be negligible.

The impacts of the ship emissions would be said to give rise to moderate adverse at worst, if they were the subject of a new planning application and assessed using the latest EPUK and IAQM guidance.

[3] Environmental Protection UK and the Institute of Air Quality Management (2015) Land-Use Planning & Development Control: Planning For Air Quality

5. Comments on the modelling

- It is assumed that the engine's rated speed is below around 1050 rpm and Tier II emission limits have been used.
- The approach to calculation of NO_2 concentrations from NO_X concentrations is felt to be conservative (pessimistic).
- It is not clear whether modelling the impact of terrain is conservative (pessimistic) in terms of predicted concentrations and a sensitivity test without terrain should have been included. The terrain rises to about 50m yet the proposed buildings in the vicinity of the wharf are up to 100m in height. Given that AERMOD can give unphysical results in complex terrain a sensitivity analysis should have been presented.

6. Comments on the Air Quality Neutral calculation for D1 uses

The Skills Academy and the Cruise Terminal have been assessed against the Air Quality Neutral benchmarks in the *BPTW Planning Enderby Place Thematic Response Document* (June 2015) as these calculations been omitted previously. Land-use class "C1" Hotels has been used as the closest surrogate the cruise terminal and class "D1" Non-residential institutions has been used for the Skill Academy. It was found that the Skills Academy has a lower trip rate than the benchmark (12.2 trips/m^2/annum against the benchmark of 65.1 trips/m^2/annum) and is therefore air quality neutral.

The cruise terminal has a higher trip rate than the benchmark for hotels (7.6 trips/m^2/annum against a benchmark of 5.0 trips/m^2/annum). The applicant stated that as a hotel operates for the whole year and the cruise terminal only operates for 50% of the year, there will be fewer trips per year than the hotel benchmark, however, this argument is not accepted as both trip rates are for a number of trips per annum and therefore account for seasonal peaks and troughs. The Cruise Terminal is predicted to generate more trips than the hotel benchmark, so cannot be considered to be air quality neutral. However, the other aspects of the development (Retail and Residential) were considered to be air quality neutral in the Environmental Statement chapter, with predicted actual emissions being 53 kg/annum lower than the benchmarked transport emissions. If the distance of trips to the cruise terminal within London is considered to be 20 km, the approximate distance to the edge of London, the Cruise Terminal trips would add around 40 kg/annum over the benchmark, so the development would remain within the overall transport emissions benchmark and be air quality neutral.

The application as a whole is air quality neutral for transport emissions.

7. Recommended mitigation

The emissions from the ships are not predicted to cause exceedence of the NO_2 annual mean AQO and are not predicted to cause an exceedence of the short term NO_2 AQO. They do not cause any new exposure Overall the development is air quality neutral for transport emissions.

However, the ship emissions do contribute to existing exceedences and give rise to moderate adverse impacts. It is recommended that mitigation measures are agreed with the developer in order to offset the additional emissions. As shore side power provision is not considered to be viable for this development, as detailed in the Royal HaskoningDHV Shore side power review[4], it is recommended that this should be in the

[4] Royal HaskoningDHV (2015) Enderby Wharf Cruise Terminal Assessment In support of the Planning Department Annex 1 Shore side power review

form of an Air Quality Management Plan for the development. This could include offsetting options as discussed in the Air Quality Neutral Planning Support produced on behalf of the GLA[5].

Mitigation measures should be discussed between RBoG and the applicant.

The development should seek to incorporate measures detailed in the matrix of measures developed for the new London LAQM regime (Appendix A). Of particular relevance would be measures to reduce emissions from other vehicles movements associated with the development, such as:

- Developing procurement policies to ensure sustainable logistical measures are implemented (and include requirements for preferentially scoring bidders based on their sustainability criteria);
- Organisation of freight to support consolidation (or micro-consolidation) of deliveries, by setting up or participating in new logistics facilities, and/or requiring that council suppliers participate in these;
- Virtual Loading Bays and priority loading for ultra-low emission delivery vehicles;
- Discouraging unnecessary idling by taxis, coaches and other vehicles (e.g. through anti-idling campaigns or enforcement activity);
- Free or discounted parking charges at existing parking meters for zero emission cars;
- Free or discounted residential parking permits for zero emission cars;
- Surcharge on diesel vehicles below Euro 6 standards for Resident and Controlled Parking Zone permits;
- Installation of residential electric charge points; and
- Installation of rapid chargers to help enable the take up of electric taxis, cabs and commercial vehicles (in partnership with TfL and/or OLEV).

Author	Reviewer
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Ben Warren	Christine McHugh

[5] Air Quality Consultants and Environ (2014) Air Quality Neutral Planning Support Update: GLA 80371

Management systems

This document has been produced by Amec Foster Wheeler Environment & Infrastructure UK Limited in full compliance with the management systems, which have been certified to ISO 9001, ISO 14001 and OHSAS 18001 by LRQA.

Appendix A

Air Quality Action matrix

The Air Quality Action Matrix shows the measures boroughs and others will be expected and encouraged to implement to improve air quality in London. This appendix lists the measures. Full information can be obtained on the measures from Appendix II of the material online as part of the Consultation on proposals for a new London Local Air Quality Management system (LLAQM)[6].

[6] http://www.london.gov.uk/priorities/environment/consultations/consultation-on-proposals-for-a-new-london-local-air-quality-0

Borough Air Quality Action Matrix (Draft for Consultation)

Theme	**Action #**	**Measure** (click on the internal links below to find more detail on each measure)
Emissions from developments and buildings	1	Ensuring emissions from construction are minimised
	2	Ensuring enforcement of Non Road Mobile Machinery (NRMM) air quality policies
	3	Enforcing CHP and biomass air quality policies
	4	Enforcing Air Quality Neutral policies
	5	Ensuring adequate, appropriate, and well located green space and infrastructure is included in new developments
	6	Ensuring that Smoke Control Zones are appropriately identified and fully promoted and enforced
	7	Promoting and delivering energy efficiency retrofitting projects in workplaces and homes using the GLA RE:NEW and RE:FIT programmes to replace old boilers /top-up loft insulation in combination with other energy conservation measures.
Public health and awareness raising	8	Ensure that Directors of Public Health (DsPHs) have been fully briefed on the scale of the problem in your local authority area; what is being done, and what is needed. A briefing should be provided.
	9	Public Health Teams should be supporting engagement with local stakeholders (businesses, schools, community groups and healthcare providers). They should be asked for their support via the DsPH when projects are being developed.
	10	Director of Public Health to have responsibility for ensuring their Joint Strategic Needs Assessment (JSNA) has up to date information on air quality impacts on the population
	11	Strengthening co-ordination with Public Health by ensuring that at least one Consultant-grade public health specialist within the borough has air quality responsibilities outlined in their job profile (as part of a wider role, not a dedicated air quality post)
	12	Director of Public Health to sign off Statutory Annual Status Reports and all new Air Quality Action Plans
	13	Ensure that the Head of Transport has been fully briefed on the Public Health duties and the fact that all directors (not just Director of Public Health) are responsible for delivering them, as well as on air quality opportunities and risks related to transport in the borough. Provide a briefing which can be disseminated amongst the Transport team.
	14	Engagement with businesses

Theme	**Action #**	**Measure** (click on the internal links below to find more detail on each measure)
Public health and awareness raising	15	Promotion of availability of *air*TEXT
	16	Encourage schools to join the TfL STARS accredited travel planning programme by providing information on the benefits to schools and supporting the implementation of such a programme
	17	Air quality at schools
Delivery servicing and freight	18	Update local authority Procurement policies to include a requirement for suppliers with large fleets to have attained silver Fleet Operator Recognition Scheme (FORS) accreditation
	19	Update Procurement policies to ensure sustainable logistical measures are implemented (and include requirements for preferentially scoring bidders based on their sustainability criteria)
	20	Re-organisation of freight to support consolidation (or micro-consolidation) of deliveries, by setting up or participating in new logistics facilities, and/or requiring that council suppliers participate in these
	21	Virtual Loading Bays and priority loading for ultra-low emission delivery vehicles
Borough fleet actions	22	Join the Fleet Operator Recognition Scheme (FORS) for the borough's own fleet and obtain Gold accreditation
	23	Increasing the number of hydrogen, electric, hybrid, bio-methane and cleaner vehicles in the boroughs' fleet
	24	Accelerate uptake of new Euro VI vehicles in borough fleet
	25	Smarter Driver Training for drivers of vehicles in Borough Own Fleet i.e. through training of fuel efficient driving and providing regular re-training of staff
Localised solutions	26	Green Infrastructure
	27	Low Emission Neighbourhoods (LENs)
Cleaner transport	28	Discouraging unnecessary idling by taxis, coaches and other vehicles (e.g. through anti-idling campaigns or enforcement activity)
	29	Speed control measures e.g. lowering the legal speed limit to 20mph in built up residential areas
	30	Increasing the proportion of electric, hydrogen and ultra low emission vehicles in Car Clubs
	31	Very Important Pedestrian Days (e.g. no vehicles on certain roads on a Sunday) and similar initiatives

Theme	**Action #**	**Measure** (click on the internal links below to find more detail on each measure)
Cleaner transport	32	Free or discounted parking charges at existing parking meters for zero emission cars
	33	Free or discounted residential parking permits for zero emission cars
	34	Surcharge on diesel vehicles below Euro 6 standards for Resident and Controlled Parking Zone permits
	35	Installation of residential electric charge points
	36	Installation of rapid chargers to help enable the take up of electric taxis, cabs and commercial vehicles (in partnership with TfL and/or OLEV)
	37	Reallocation of road space; reducing parking at accessible destinations and/or restricting parking on congested high streets and busy roads to improve bus journey times, cycling experience, and reduce emissions caused by congested traffic
	38	Provision of infrastructure to support walking and cycling
	39	Local Low Emission Zones (LEZ)