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ENVIRONMENTAL STATEMENT REGULATION 22 ADDENDUM - MARCH 2016
MAIN VOLUME & REVISED APPENDIX 10.1

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1.0 Introduction to Regulation 22 ES Addendum

1.1 Background

1.1.1 Planning permission is being sought for the mixed use development of the site of the former Westferry Printworks on the Isle of Dogs within the London Borough of Tower Hamlets (LBTH). The planning application was accompanied by an Environmental Statement (ES), submitted in relation to the Town and Country Planning (Environmental Impact Assessment) Regulations, 2011 (the EIA Regulations), as amended. An independent Interim Review of the Environmental Statement (ES) has been undertaken by Temple Consultants in association with BMT in relation to the ES accompanying detailed planning application for the above development, which was submitted on 10th August 2015. This document is referred herein as the Temple IRR[1]. Within this review a number of potential issues were identified for additional information, which could form a request for further information under Regulation 22 of the EIA Regulations. Additionally, there were other points that were viewed as points of clarification. Following responses from the applicant to the various issues, a draft Final Review Report[2] - the Temple FRR - was produced, which identified whether the applicant's responses were acceptable or not. In many cases, Potential Regulation 22 points, as well as points of clarification, were resolved. However, a number of issues required further attention from the applicant team.

1.1.2 A request for further environmental information under Regulation 22 of the EIA Regulations is made when an authority determines that further information is necessary in order for the statement to be an Environmental Statement in line with the requirements for an ES as set out in Schedule 4 of the EIA Regulations. The purpose is to ensure the planning authority can give proper consideration to the likely significant environmental effects of a development proposal.

1.1.3 The draft Temple FRR was dated on 22nd January 2016, and received by the applicant team slightly later. The GLA decided on the 4th February 2016 that it should act as the determining planning authority for this planning application, which was then 'called-in'. At this stage a number of outstanding points arising from the draft Temple FRR remained to be settled. A Supplementary Responses Document was in the process of being prepared but had not been submitted before the call-in.

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[1] Temple Consulting (2015) *Interim Review Report of the Environmental Statement for Westferry Printworks,* November 2015, including 3 appendices by BMT

[2] Temple Consulting (2016) *Final Review Report of the Environmental Statement for Westferry Printworks,* January 2016, including 3 appendices by BMT

1.1.4 Recognising this, the GLA has retained Ramboll Environ, in conjunction with Parsons Brinkerhoff WSP and BRE, to advise on the outstanding points arising from the Temple draft FRR. The Ramboll Environ Review Report (RERR) has, in most cases, found that the applicant's Supplementary Responses document has addressed the Potential Regulation 22 Points. In particular, the bulk of the Potential Regulation 22 points were considered to have been addressed adequately with further clarificatory comments, and thus no longer required the submission of further environmental information, beyond that in the submitted ES.

1.2 Further Environmental Information Included in this ES Addendum

1.2.1 Four items have been identified that, whilst largely considered to have been satisfactorily addressed, have not been completely resolved. In each case, the applicant has taken the view that the extent of the responses provided to date is sufficient for these four items to be treated as additional environmental information under Regulation 22. These items are as follows:

- The impact of changes in the development programme, due to delays in the process relative to the original outline programme set out in Chapter 5.0 of the ES;

- The consideration of additional cumulative developments – five were identified in the Temple IRR – in the context of the cumulative assessment of environmental effects; in all cases these related to schemes for which the planning applications post-dated the Westferry Printworks application and thus could not have been readily foreseen when the application was made;

- Issues related to the baseline public transport capacities and the assessment of impact of the Development on these services, which were primarily addressed in the Transport Assessment by RH-DHV and summarised in Chapter 8.0 of the ES. These matters have been further addressed in relation to the reduced car parking proposed by design modifications made in December 2015 in a letter submitted to LBTH by RH-DHV. This is appended herewith, recognising that the Transport Assessment by RH-DHV forms Volume 3 of the ES.

- The points raised by the LBTH sustainable drainage specialists in their role as lead local flood authority, which involved further consideration of the drainage strategy for the Development by Walsh and Partners, which has involved refinement of the drainage proposals

1.2.2 In addition to these four points, the response on certain air quality matters raised in the Temple IRR were seen as of sufficient weight to be identified as further environmental information under Regulations 22 in the Temple draft FRR. The applicant does not aver from this opinion, and the revised Appendix 10.1 to the Air Quality Chapter 10.0 of the ES is submitted formally as a part of the present Regulation 22 ES Addendum. The material contained has already been reviewed by LBTH and their consultants, and considered to adequately address the points raised in the Temple IRR.

1.2.3 Finally, various points have been made with regard to the impact of the Development on sailing conditions on the docks. Following the submission of the ES with the planning application, and following discussions with the Docklands Sailing and Watersports Centre (DSWC), further analysis of wind tunnel test data included in Appendix 17.1 of the ES was undertaken. The results involved slightly different assessment criteria from those developed by the applicant’s specialist advisors at the Wolfson Unit of the University of Southampton. These have been made publicly available, and since the results did not change materially the results of the assessment were not formally submitted under Regulation 22. However, further testing has been undertaken of variations in massing at the request of the GLA. For the purposes of completeness, the latter information is included as additional Appendices 17.3 and 17.4 as part of this Regulation 22 Addendum. In addition, a revision to Chapter 17.0 of the ES is provided, which includes an assessment of effects based on the DSWC criteria. These criteria have since been adopted for all subsequent work by the Wolfson Unit in relation to the interpretation of wind tunnel testing data.

1.2.4 Addenda are provided to the Chapters 2.0, 5.0, 8.0, 10.0 (including a revised Appendix 10.1), 11.0 and 17.0. The latter includes a revised Appendix 17.2 and two additional appendices 17.3 and 17.4, as indicated above.

2.0 Environmental Impact Assessment Methods

2.3 Assessment Scenarios and Approach

A number of additional schemes were identified in the Temple IRR that it was suggested should be additionally considered by the applicant. All the schemes were the subject of planning applications that post-dated the Westferry Printworks application. At the time of the Temple IRR, none had been determined, although Hertsmere House (PA/15/02675) has since received a Resolution to Grant planning permission from LBTH. Alpha Square (PA/15/02671) has been refused planning permission by LBTH, although the GLA has not yet provided a direction on this refusal. This serves to reinforce the points made about uncertainty in relation to cumulative impact assessment, particularly when the net of proposals includes schemes that have not received a planning consent. This re-emphasises that robust cumulative impact assessment involves acknowledging uncertainty in delivery of projects (e.g. the implemented Riverside South development- PA/08/02249).

Additional Cumulative Schemes submitted following Planning Application

2.3.11 The response provided emphasised the importance of the likely confidence interval around any assessments of cumulative effects, given uncertainties in delivery of consented schemes, multiple schemes on sites (consented and proposed), the likelihood of gaining planning permission, and related factors. It was contended, given the number of schemes, that the sensitivity to changes in individual scheme characteristics (with the notable exception of Wood Wharf) would be reduced by the simple scale of cumulative change proposed by over 30 cumulative schemes. In essence the overall scale of change is large and this makes the assumptions more robust within the confidence interval. It is contended that this argument remains valid.

2.3.12 The response noted that three of the schemes (Cuba Street, Hertsmere House and Alpha Square), proposed or consented schemes had been included in the assessment; in the case of Alpha Square (50 Marsh Wall) the scheme - along with 54 Marsh Wall - had been withdrawn soon before the present application was made but retained in the assessment. Angel House (225 Marsh Wall) differs from these in that a scheme at that location was not considered in the ES, and the Response to the IRR was in error on this point. Each of the schemes is briefly considered below, with regard to the sensitivity of the cumulative assessment presented in the ES.

South Quay Plaza

2.3.13 The South Quay Plaza Application PA/15/03074 is a minor material amendments application under S73, for variation of condition 4 (Approved Drawings) of Planning Permission PA/14/00944. For the purposes of cumulative assessment involves changes of a minor degree that are not material to the assessment in the August 2015 ES, with regard to this site.

2.3.14 Application PA/15/03073 relates to the erection of a 56 storey building (denoted SQP4), comprising up to 396 residential (Class C3) Units and 189m^2 of retail (Class A1-A4) space. The buildings covered by the permissions PA/14/00944 (and PA/15/03074) are denoted SPQ1-3+. SPQ4 would be immediately adjacent to the approved South Quay Plaza development. The SQP4 site was formerly fully developed but is presently a cleared site surrounded by hoarding. The proposed 56 storey height for SQP4 would be intermediate between the consented SQP1 (68 storeys) and SQP2 (36 storeys) of the approved scheme (and also as proposed by PA/15/03074). At 54 storeys it would be somewhat taller than the nearby Pan Peninsula and the slightly more distant Landmark development. In this sense the visual impact of the overall South Quay Plaza development would be reinforced but still predominantly related to the consented 68 storey block (SQP1). The Site is too remote from Westferry Printworks to be of relevance in relation to wind microclimate, TV interference or sunlight and daylight issues.

2.3.15 In terms of gross internal area SQP4 would provide about a quarter of that for the overall revised South Quay Plaza scheme, and about 30% of the combined residential units (1290). This will increase the child yield over the whole South Quay Plaza development – by about 30 of primary school age and 13 of secondary school age- and the demand for GP services slightly by about 0.4 of a GP. There would be a net increase in employment by about 10 FTE, although the wider development would reduce jobs on site by about 1700FTE. The impact on transport trips would still remain modest, since the employment –related trips would be reduced from the current baseline due to the reduced employment accommodation on-site. There would be slight uplift in public transport trips with the addition of SQP4, albeit a net reduction on the Jubilee Line and DLR when compared with the current uses for the overall South Quay Plaza site. The number of net additional car trips generated would be about 110 in the am and pm peak period over the entire South Quay Plaza site. The assessment in the scheme TA indicates that the impact, cumulatively, of the incremental changes, which included Angel House and Westferry Printworks, on the principal junctions considered in the Westferry Printworks ES would be of negligible significance.

2.3.16 Issues related to land-take would be mainly related to the SQP4 site, and it is notable that ecology was scoped out of the ES.

Hertsmere House

2.3.17 The cumulative assessment considered consented scheme PA /08/02709, which was for a 63 storey building with 30,085m^2 of office space, 192 hotel rooms and 74 serviced apartments. This has been replaced by a 67 storey building with 861 residential units and 949m^2 (GIA) of flexible commercial floorspace (PA/15/02675). In terms of visual impact, the scale of change or appearance – given the site's distance from Westferry Printworks (>1km) – would not be material for wireline representations. The scheme's inclusion was largely on the basis of cumulative visual impact. The Site is too remote from Westferry Printworks to be of relevance in relation to wind microclimate, TV interference or sunlight and daylight issues. The scheme is beyond a 1km radius of Westferry Printworks. With regard to effects related to land-take (e.g. archaeology, ecology etc.) the land occupied by development is the same for both schemes considered at this site. The consented scheme would have had no resident population or child yield.

2.3.18 Despite the proposed residential use, the proposal only includes 11 car parking spaces, compared with 75 for the consented scheme. The change in use was expected to result in a relative reduction on public transport demand at peak periods when compared with the consented PA/08/02709 scheme, which included a large element of office space. The reduction in employment space would reduce the accommodation available at the Site by about 2500FTE. This change would be anticipated to reduce public transport demand from the consented scheme, notwithstanding the demand arising from the residential uses. The transport demand for Jubilee line, DLR and bus services was estimated at 4,890 one-way person trips for PA/08/02709, as net increase for the baseline. Most of this would be in the peak period for a large office use. The current residential proposals would generate a greater spread of trips, and the net change in the AM and PM peaks is estimated at 191 and 201, respectively for underground/DLR trips. The likely impact on such trips would thus be substantially reduced from the PA/08/02709 scheme. The net change in peak period bus trips are estimated at 15 and 10, respectively for the peak AM and PM periods for the current scheme. This contrasts with figures of about 60 for the PA/08/02709 scheme.

Cuba Street

2.3.19 At Cuba Street, the scheme considered (PA/11/01299) comprises two towers of 40 storeys (Tower A; 127.2m AOD) and 52 storeys (Tower B; 160.2m AOD), accommodating 429 residential units (Use Class C3), 120 bed hotel with associated health and leisure facilities. The current application (PA/15/02528) involves two buildings of up to 41 storeys (136m AOD) and 26 storeys, providing 448 residential units, flexible retail/ community uses and ancillary spaces. The scheme included in the cumulative visual assessment, which in fact is quite difficult from to distinguish from wider development in the wireline views, is taller than the current lower density scheme. Overall, its contribution to cumulative visual impacts is likely to be slightly more modest than that of the scheme included in the August 2015 ES.

2.3.20 With regard to other considerations, the slight changes on the content of the scheme (increase by 19 residential units and elimination of hotel) would not materially affect issues related to demand for services (child yield, overall population) or public transport demand (or traffic). The loss of the hotel might reduce operational employment generation by about 40. The Site is too remote from Westferry Printworks to be of relevance in relation to wind microclimate, TV interference or sunlight and daylight issues.

2.3.21 With regard to effects related to land-take (e.g. archaeology, ecology etc.) the land occupied by development is the same for both schemes considered at this site.

2.3.22 Overall, the differences between the scheme considered and the current application scheme are too small to affect the various assessments of cumulative effects set out in the August 2015 ES.

Alpha Square

2.3.23 With regard to the application for Alpha Square (PA/15/02671), this is in many respects a variant of the withdrawn scheme (PA/14/03281), and still includes a 63 storey block. The application considered in the ES included three buildings of 63, 32 and 20 storeys above ground, comprising 727 residential units (Class C3), 273 hotel rooms (Class C1), provision of ancillary amenity space, a new health centre (Class D1), a new school (Class D1), ground floor retail uses (Class A3 and A4). Whilst this scheme was withdrawn before the application was made, it, along with 54 Marsh Wall, was considered in the ES since the change occurred very shortly before completion of the assessments (this was noted in Table 2.2) and the accompanying text. The current application includes 20, 34 and 65 storey towers, providing 634 residential units, hotel use and a primary school, and a similar range of ground floor uses.

2.3.24 As noted with the above schemes regarding land-take effects (archaeology, ecology etc.) the land-take impact is the same for both schemes considered at this site. The Site is too remote from Westferry Printworks to be of relevance in relation to wind microclimate, TV interference or sunlight and daylight issues.

2.3.25 Overall, the differences between the scheme considered and the current application scheme are too small to affect the consideration of cumulative effects as set out in the August 2015 ES.

Angel House (225 Marsh Wall)

2.3.26 As noted above, Angel House (PA/15/02303) was not considered as a cumulative scheme in the ES. The current site (0.28ha) is occupied by offices (c. 3,400m^2GIA) that are in use, along with areas of hard-standing, some ornamental landscaping and trees. The Site is too remote from Westferry Printworks to be of relevance in relation to wind microclimate and sunlight and daylight issues.

2.3.27 The proposals would alter the current office uses of Angel House to residential uses of about 420 units. A new residential population of approximately 732 people has been estimated, including 24 primary school age and 11 secondary school age children. There would be net reduction in employment from the site of about 76 FTE.

2.3.28 Only 17 parking spaces are proposed, replacing the 50 currently available. The cumulative impact on traffic is expected to be low, and a reduction in car movements at peak periods is anticipated relative to the existing uses at the Site. The effects on peak period use of buses, which would be likely to be different services from those on the other side of the Isle of Dogs, and the DLR, which would be on the same link as Westferry Printworks, would be minor according to the scheme TA. The net change in DLR trips in the peak AM and PM periods is indicated to be 47 and 29, respectively. The peak period net change in bus trips would be 26 in the Am peak and 15 in the PM peak, respectively.

Overall Implications of the Additional/Modified Schemes for Assessment of Cumulative Operational Effects

2.3.29 The main implications of the altered and additional schemes related to issues of visual impact would relate to two additional towers of in excess of 50 storeys. These would both be located in close proximity to schemes - the wider South Quay Plaza Development and the Meridian Gate scheme (PA/14/01428) - that involve taller or similar height buildings. The overall impact, given the scale of Development in such close proximity and the backdrop (especially Wood Wharf), would be reinforced in terms of views from Greenwich Park or from the west and east of the Isle of Dogs. In these views the combined Development around Marsh Wall and the existing (and extended) Canary Wharf cluster tends to stand as a fairly coherent grouping, within which the additional towers would not be dominant contributors. Westferry Printworks - and in some views the existing Baltimore Wharf and the Landmark Development (or indeed Hertsmere House) – stands separately and the relationship with the aforementioned cluster would not be fundamentally altered by the two additional towers.

2.3.30 In terms of socio-economic effects the changes in uses would seem to involve a net reduction in employment space, both existing and in the pipeline, by about 2,200FTE. This would not change the significance of the provision of SME focussed space at the Development at Westferry Printworks, which would remain of **negligible-minor beneficial** significance. With regard to the residential population, the incremental increase would be of the order of 1,900; this estimate is with 54 Marsh Wall excluded and Hertsmere House included, which previously had no permanent residential space and is a large additional contributor. This uplift in population compares with an estimate of 9,950 in the ES, and this would lead to a requirement for slightly more than an additional GP. Notably, cumulatively, the schemes offer healthcare facilities. The change, whilst an uplift of about 19%, would not alter likely significance of the impact of this additional population on services. The net increase in cumulative child yield would be about 100 primary school age children and about 56 secondary school children from the additional and altered development. This further emphasises the beneficial cumulative effect of the proposed secondary school included in the Development. The revised proposals for Alpha Square (50 Marsh Wall) still include a 400 pupil (assumed 2 form entry) primary school.

2.3.31 With regard to traffic and related environmental effects the revised and additional schemes are not anticipated to lead to material net increases or decreases in car-related trips in the peak periods, when compared with the baseline positions or the previously considered consented schemes (where appropriate) for the sites of interest. With regard to the DLR, the additional buildings at Angel House and SQP4 would have the effect of increasing cumulative trips by 47 and 29 in the AM and PM peaks, respectively , compared with the position in the ES (1529 in the AM peak and 1828 in the PM peak). With regard to the Jubilee Line/Crossrail the change of Hertsmere House from largely office and hotel-led mixed uses to residential-led mixed uses would be expected to reduce overall cumulative trip rates, albeit that the cumulative assessment was focussed on the DLR.

2.3.32 In terms of operational cumulative impacts, the gross effects of the amended (or indeed new) schemes are not considered to be of a magnitude that would alter in material terms the assessments of the significance of cumulative effects related to redevelopment of these sites.

Cumulative Construction Effects

2.3.33 As part of the RERR Ramboll Environ, which considered the above responses to be acceptable, it was suggested that the matter of construction phase effects should be addressed. The basic considerations relating to these effects are set out below.

2.3.34 In all cases, except Angel House, schemes of similar scale were considered within the cumulative impact assessments in the ES, as submitted in August 2015. Thus, implicitly, the likely cumulative effects of construction were largely considered in relation to each of the relevant sites.

2.3.35 None of the additional cumulative schemes is within 400m radius of the Site. Based on the cumulative assessments carried out in respect of noise, vibration, dust and air quality effects from the construction site, these additional schemes are sufficiently distant for significant cumulative effects to occur. Similar considerations apply to matters such as potential effects related to spillage risks and related risks to water resources and soil quality. Issues of how each of the cumulative scheme programmes meshes with others, including the principal development under consideration, are additional matters that confound cumulative assessment of construction effects.

2.3.36 With regard to traffic-related cumulative effects, which may encompass traffic noise and air quality effects as well as traffic impact, the fact that similar scale development were considered at all sites except Angel House (ref: PA/15/02303) is relevant; an additional building is also proposed at the South Quay site – SQP4 – by the most recent application (ref: PA/15/03074). Thus the overall levels of construction traffic expected from cumulative schemes are likely to be of similar magnitude as those anticipated for the schemes considered with the August 2015 ES. Notably the revisions made to the Development in December 2015 have reduced the extent of the basement and related excavation by about 20%. This would remove about 4,000 HGV loads of material (or one-way 8,000 HGV lorry movements) from the total assumed for the assessment presented in the August 2015 ES. This would reduce the cumulative effects of construction lorry movements relative to the position assumed in the August 2015 ES.

5.0 Construction and Development Programme

As part of the points of clarification to the Temple IRR, the applicant explained the conservative character of the use of a 2021 assessment date, as was explained in paragraphs 2.8.9 and 2.8.10 of the ES as submitted in August 2015. Paragraph 2.9 of the Response to the IRR concludes that, *"the use of a later assessment date would not change the assessment of operational effects, since the emission rates for the 2021 year assumed would be greater than those for a later year"*. The Temple FRR accepts the aforementioned explanation and conclusion, but notes that the programme has slipped. For the reasons stated previously a later opening date would not change the assessments of operational effects. The draft FRR, however, notes that "*No response provided to explain if construction until early 2022 would have any material effect on construction assessment"*. The following additional information deals with the implications for the assessment of construction effects. This text continues from Section 5.2, paragraph 5.2.59.

5.2 Construction Programme and Works for the Development

Implications of Programme Extension

5.2.60 The construction impact assessments presented in the August 2015 ES are based on the elapsed time of the programme, rather than a fixed end date or start date (see Section 2.9 paragraphs 5.2.1-5.2.3 and Table 5.1. As noted in the Temple draft FRR, the assumed programme may be delayed so that a year of opening later than 2021 is likely. In this context, the reduced extent of excavation for the basement is factor that will reduce the time required to commence construction, compared with the elapsed time programme assumed in the August 2015 ES.

5.2.61 Since the programme assumed in the August 2015 ES was based on elapsed time rather than fixed dates, the delay in the programme would not fundamentally alter the assessment of effects from, say, construction traffic noise or air quality. In this regard the points made in paragraphs 2.3.33-2.3.39 above in this document are relevant considerations.

5.2.62 Notwithstanding this reduction in excavation, a delay in commencing development would result in the programme being shifted by a consistent period between the start of redevelopment - noting that some preliminary investigatory works do not require planning permission - and the completion of the final block. Currently, this shift in the programme would be of the order of 6 months to 1 year (to 2022 completion), although in terms of elapsed time the programme would still be envisaged to accord with that set out in the

ES. On this basis it is concluded that a simple delay in the commencement of the programme would not affect the assessments presented. For example, the numbers of construction vehicle movements predicted would not change materially. If anything the reduced extent of basement excavation envisaged for the December 2015 Revised Proposals will reduce the volume of HGV traffic envisaged by about 8% from the situation assumed in the August 2015 ES

5.2.63 On this basis, it is concluded that the assessments presented in the August 2015 ES with regard to construction effects would not be affected materially by a delay in the commencement of development activity. In those cases where an assessment year is relevant (air quality), the adoption of a later date would, if anything, indicate slightly reduced magnitudes of operational effects; however, see the addendum to Chapter 10.0 included here, which shows that the assumed background concentrations are now based on more conservative assumptions.

5.2.64 The possibility of the programme being stretched due to other factors (e.g. external economic factors – see paragraph 2.6 of the Response to the IRR) would not be expected to alter the magnitude of maximum impacts on noise or air quality due to traffic. If there were to be a relative delay between the completion of Phase 1 and the commencement of Phase 2, for example, the impacts predicted would be of the same broad magnitude and the effects of similar magnitude on existing and proposed (i.e. Phase 1) receptors. If the overall programme were to be stretched, the timescales for the construction of blocks would not be expected to change but the overlaps between activities for each block could be reduced.

5.2.65 Such considerations would have the effect of reducing the magnitude (marginally) of the maximum impacts, albeit that the timescale over which effects are exerted would be extended. This is a common trade-off with redevelopment proposals. The implications would be greatest for the larger towers T03 and T04, which would be implemented during the later parts of the programme. Once these commence, there would be substantial acoustic shielding of existing off-site receptors by the earlier phases of the Development, in exactly the same way as envisaged for the assumed elapsed time programme. Moreover, the distances involved would tend to result in the greatest risks of dust/particulate matter exposure being related to the 'new' on-site receptors. The stretching of the programme would not affect, materially, the assessment of effects on off-site receptors. On this basis, the assessments of the construction site-related effects would be essentially the same as those of the redevelopment programme assumed in the August 2015 ES. The assessment of effects on the 'new' receptors on-site would be essentially unchanged. However, the duration of effects, which have not been determined to be significant with regard to key effects such as air quality, dust, noise and vibration, would be extended. In effect the duration of exposure to low significance effects - on-site only – could be extended in the event that an unforeseen elongation of the development programme, due to, for example, an economic shock.

5.2.66 As noted previously though, the current indications are that the main changes in development programme currently envisaged are of a shortening of the elapsed time programme due to the substantially reduced extent of basement excavation required.

5.2.67 Most importantly, the approach to mitigation would not be affected by a simple delay in the programme or its prolongation by unforeseen factors, such as an economic downturn. The overall approach to mitigation, through the implementation of a Construction Environmental Management Plan (CEMP) and related Construction Logistics Plan (CLP) –both secured by planning condition or obligation – and the incorporated mitigation measures and monitoring procedures, would remain unchanged by the factors considered above.

5.2.68 On this basis it is concluded that no new significant residual effects would arise from a delay in commencing development. With regard to other factors that might cause a programme delay, the adoption of a rigorous approach to mitigation, secured by a CEMP and CLP, would ensure that the residual effects would be of the same levels of significance as assessed for the elapsed time programme set out in Section 5.2 of the August 2015 ES.

8.0 Transport

The Temple draft FRR identified a number of transport issues as potential Regulation 22 points. The RERR indicates that issues relating to public transport capacity and impacts on public transport required further information. Notwithstanding this, the applicant has taken the view that some of the additional information submitted is sufficient to constitute additional environmental information under Regulation 22.

The following sections are provided as supplementary material to Section 8.6 of Chapter 8.0, commencing after paragraph 8.6.56 in the August 2015 ES.

Effects on the Jubilee Line

8.6.57 The effects on the Jubilee Line are dealt with below. Base data for the Jubilee Line are set out in the following table, whilst Table 2 shows the Development trips as set out in the TA (ES Volume 3) and also Table 8.10 of Volume 1 Chapter 8.0).

Table 1: Canary Wharf Station TfL RODS report created at 13:35:59 on 07-08-2015, based on survey data up to 2014 and reconciled to Autumn 2014 counts

Direction	AM Peak Hour		*Mid-day**		PM Peak Hour	
	Inbound	Outbound	*Inbound*	*Outbound*	Inbound	Outbound
Jubilee Line – Westbound	20,522	16,738	*4,141*	*5,423*	6,492	19,501
Jubilee Line – Eastbound	22,363	5,363	*5,944*	*3,912*	14,162	15,252

**The mid-day data has been extracted by way of a comparison and to demonstrate that the off-peak demand is significantly lower than peak demand*

Table 2: Data extracted from Transport Assessment, Table 7.17 (Table 8.10 in ES Volume 1 Chapter 8.0) - Development DLR / London Underground trips:

Time Period	Arrivals	Departures
08:00-09:00	163	156
17:00-18:00	102	109

8.6.58 Based on the above data, the trips associated with the Development have been assigned as shown in Table 3. Table 4 then shows the base plus trip attraction for the Development.

Table 3: Assignment of Development (Table 2) trips by direction of travel, directional split defined by data in Table 1

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
Jubilee Line – Westbound	78	118	32	61
Jubilee Line – Eastbound	85	38	70	48

Table 4: Base + Development Trip Attraction (Table 1 + Table 3)

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
Jubilee Line – Westbound	20,600	16,856	6,524	19,562
Jubilee Line – Eastbound	22,448	5,401	14,232	15,300

8.6.59 Based on the above data, the trips associated with the Development are expressed as a percentage impact in Table 5 and Table 6 shows the additional demand per train.

Table 5: Percentage Impact

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
Jubilee Line – Westbound	0.380%	0.706%	0.494%	0.314%
Jubilee Line – Eastbound	0.380%	0.706%	0.494%	0.314%

Table 6: Average Additional Demand per Train

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
Jubilee Line – Westbound	3	4	1	2
Jubilee Line – Eastbound	3	1	2	2

8.6.60 On the Jubilee Line there are 30 trains per hour, which will increase in 2020 to 36 per hour, giving a practical capacity of 29,232 pphpd. Based on RODS data for 2014 train loadings for Inbound Canada Water-Canary Wharf are currently at 89.2% capacity; Inbound North Greenwich to Canary Wharf at 80.1% capacity; Outbound Canary Wharf to Canada Water at 62.5% capacity ; and Canary Wharf to North Greenwich at 19.6% capacity. Based on these figures the additional trips related to the Development are well within the existing and anticipated future capacities.

8.6.61 The data provided above is based on the TA, and the currently published TfL RODS data. Development trips will be marginally lower than above, as the Development now proposes 722 residential units.

8.6.62 The assessment is based on trains running at a frequency of 30 trains an hour at peak times, in both east and westbound directions. It also assumes all DLR/Underground trips use the Jubilee Line – therefore a worst case scenario.

8.6.63 The above assessment has not sought to add growth to background line loading data, or add demand from other committed developments as this would act to reduce the percentage impact of development demand.

8.6.64 The assessment excludes the impact of Crossrail on Jubilee Line services. Crossrail will connect with the Canary Wharf Estate, with journeys originating from Abbey Wood via Woolwich to the east, and from Reading from the west, via central London.

8.6.65 On the basis of the foregoing analysis, and taking account of the completed Crossrail, the impact of the development on the Jubilee Line will be less than 1% or four additional passengers per train. This is considered to be of **negligible** significance.

8.6.66 In terms of cumulative effects the same conclusion holds. The relatively small impact of the development in the counter peak direction, once combined with the substantial improvements accompanying the introduction of Crossrail services indicates that no significant on cumulative impact on Jubilee Line services is expected.

Operational Development Impact on DLR Services

8.6.67 Base data for the DLR are set out in the following Table 7, whilst Table 8 shows the Development trips as set out in the TA (ES Volume 3) and also Table 8.10 of Volume 1 Chapter 8.0). The 2014 passenger demand data (Table 7) is based on 2013 observed counts, factored up by 1% to create a 2014 base. Through Crossharbour station, trains run at a frequency of 23 trains an hour north and southbound from 08:00-09:00, and 15 trains per hour 17:00- 18:00 (2016 timetable). The calculation assumes that all Underground trips first use the DLR line – therefore a worst case scenario.

8.6.68 The Capacity of the Bank –Lewisham Branch is estimated as 7,305 in each direction, based on 15 trains per hour (487 per train). The capacity of the Stratford-Lewisham Branch based on 5 per hour is estimated at 2435 (AM period only). By 2021, this is expected to be increased on the Stratford-Lewisham branch to 8 trains per hour 2592 (2 car) in both directions and peak periods. It is clear from these data that the most constrained capacities relate to the AM peak inbound to/from south (65.9%) and AM peak outbound to/from North (72.9%). For other times and directions DLR capacity is under limited pressure.

Table 7: 2014 Passenger Demand, Crossharbour Station (ref: Glengall Quay Transport Assessment, Tables 7.22 to 7.25 - application number PA/14/3585)

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
DLR – to/from North	1,858	7,105	4,275	2,484
DLR – to/from South	6,420	1,491	2,015	4,005

Table 8: Data extracted from Transport Assessment, Table 7.17 (Table 8.10 in ES Volume 1 Chapter 8.0) - Development DLR / London Underground trips are:

Time Period	Arrivals	Departures
08:00-09:00	163	156
17:00-18:00	102	109

8.6.69 Based on the above data, the trips associated with the Development have been assigned as shown in Table 9. Table 10 then shows the base + trip attraction for the Development.

Table 9: Assign Development (Table 8) trips, by direction of travel, directional split defined by data in Table 7

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
DLR – to/from North	37	129	69	42
DLR – to/from South	126	27	33	67

Table 10: Base + Development Trip Attraction (Table 7 + Table 9)

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
DLR – to/from North	1,895	7,234	4,344	2,526
DLR – to/from South	6,546	1,518	2,048	4,072

8.6.70 Based on the above data, the trips associated with the Development are expressed as a percentage impact in Table 11 and Table 12 shows the additional demand per train.

Table 11: Percentage Impact

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
DLR – to/from North	1.97%	1.81%	1.62%	1.68%
DLR – to/from South	1.97%	1.81%	1.62%	1.68%

Table 12: Average Additional Demand per Train

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
DLR – to/from North	2	6	5	3
DLR – to/from South	5	1	2	4

8.6.71 Trip generation for the development is based on the TA. Development trips will be marginally lower than above, as the development is now 722 residential units. The assessment presented here has not sought to add growth to background line loading data, or add demand from other committed developments as this would act to reduce the percentage impact of development demand.

8.6.72 The assessment excludes the impact of Crossrail on Jubilee Line services. Crossrail will connect with the Canary Wharf Estate, with journeys originating from Abbey Wood via Woolwich. Currently mainline rail services link Abbey Wood and Woolwich with the DLR, at Greenwich. For passengers from Woolwich, Abbey Wood (and beyond), with a destination in and around Canary Wharf, linking to the DLR at Greenwich is currently an attractive travel route. However, Crossrail will provide existing DLR passengers with a fast, direct, high frequency viable alternative, which is likely to reduce travel demand on the DLR through Crossharbour station.

Sensitivity Test – All DLR trips route to/from the north

8.6.73 The following tables summarise a sensitivity test to assess the situation with all trips being assumed to be to/from the North. This shows that in the context of the capacities noted in paragraph 7.23, the likely effect on the DLR capacity would still be likely to be acceptable. The additional passengers per train for the outbound AM peak hour trains to/from the north would increase from 6 to 7; this is the most capacity constrained direction of travel.

Table 9a: Assign development (Table 8) trips, by direction of travel

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
DLR – to/from North	163	156	102	109
DLR – to/from South	0	0	0	0

Table 10a: Base + Development Trip Attraction (Table 7 + Table 9)

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
DLR – to/from North	2,021	7,261	4,377	2,593
DLR – to/from South	6,420	1,491	2,015	4,005

Table 11a: Percentage Impact

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
DLR – to/from North	8.77%	2.20%	2.39%	4.39%
DLR – to/from South	0.00%	0.00%	0.00%	0.00%

Table 12a: Average Additional Demand per Train

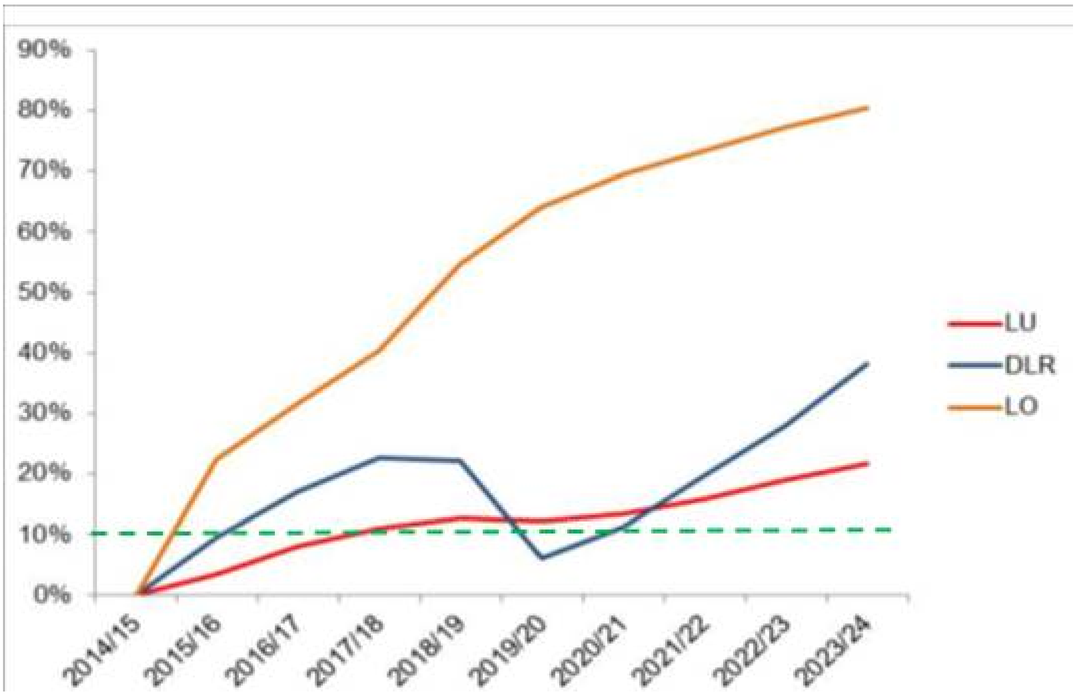
Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
DLR – to/from North	7	7	7	7
DLR – to/from South	0	0	0	0

8.6.74 An important factor to consider is that Crossrail will offer some capacity relief for the DLR. Moreover, in addition to that measures will come forward as part of the Area Action Plan for the Isle of Dogs, which is currently being prepared by TfL, in conjunction with the Borough. A number of initiatives are already identified to resolve current issues, and these include the introduction of longitudinal seating within carriages (with the introduction of this facility commencing from mid-2016), which will increase effective capacity by 10 per cent, easing passenger flow through the trains at busy times.

8.6.75 In terms of growth on the DLR in general, Crossrail will result in a reduction in demand from 2019 as indicated in Figure 1 below. With Crossrail serving the Canary Wharf estate it is likely that this reduction in demand will be experienced through Crossharbour station, and this is referred to in the TA (ES Volume 3) , para 2.7.2, which states:

"Crossrail will connect with the Canary Wharf Estate, with journeys originating from Abbey Wood via Woolwich. Currently mainline rail services link Abbey Wood and Woolwich with the DLR, at Greenwich. For passengers from Woolwich, Abbey Wood (and beyond), with a destination in and around Canary Wharf, linking to the DLR at Greenwich is currently an attractive travel route. However, Crossrail will provide existing DLR passengers with a fast, direct, high frequency viable alternative, which is likely to reduce travel demand on the DLR through Crossharbour station."

Figure 1: Forecast growth in passenger journeys - TfL Data, October 2015 [3]



8.6.76 These figures can be placed into context with the 2014 passenger demand data previously provided. From 2014/15 to 2020/21, we can expect an approximate 10% increase in passenger numbers. If this was realised then passenger numbers would increase, as detailed below.

Table 13: 2014 Passenger Demand, Crossharbour Station (ref: Glengall Quay Transport Assessment, Tables 7.22 to 7.25 - application number PA/14/3585)

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
DLR – to/from North	1,858	7,105	4,275	2,484
DLR – to/from South	6,420	1,491	2,015	4,005

Table 14: 2020/21 Passenger Demand, Crossharbour Station – 10% Uplift in flow

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
DLR – to/from North	2,044	7,816	4,703	2,732
DLR – to/from South	7,062	1,640	2,217	4,406

[3] Rail and Underground Panel: Date: 16 October 2015: Item: London Overground and Docklands Light Railway Growth

8.6.77 In the same period, the network will experience increased capacity. The 10% uplift in passengers numbers is likely to be absorbed by the increase in the capacity of trains (longitudinal seating), and the potential increase in service capacity to Stratford also has the ability to mitigate this increase in passenger demand.

8.6.78 The final item to consider is the South Quay masterplan. While this masterplan will not improve the capacity or frequency of DLR services, it will create better pedestrian connections between the Isle of Dogs and the Canary Wharf Estate and this has the potential to have a positive impact on the number of passengers boarding and alighting at Crossharbour.

8.6.79 On the basis of these factors, the conclusion drawn in the ES that the effects of the Development on DLR services would not be significant is supported. It is acknowledged , however, that the delivery of improvements by others in terms of the DLR, Crossrail and improved pedestrian links are all important initiatives that are necessary to reach this conclusion.

Operational Development Impact on Bus Services

8.6.80 Peak hour bus use generated by the Development would be dominated by arrivals to the secondary school. Average bus capacity is about 62 passengers. Thus the overall capacity of the relevant services indicated in Table 14 is about 2170 per hour in each direction.

Table 13: Data extracted from Transport Assessment, Table 7.17 (Table 8.10 in ES Volume 1 Chapter8.0) - Development Bus trips are:

Time Period	Arrivals	Departures
08:00-09:00	417	29
17:00-18:00	19	27

Table 14: Available bus services (within PTAL walk distance), and typical service frequency (per hour)

Route Number	AM Peak Hour (08:00-09:00)		PM Peak Hour (17:00-18:00)	
	Northbound	Southbound	Northbound	Southbound
D3 (Westferry Road)	6	6	6	6
D7 (Westferry Road)	9	9	9	9
135 (Westferry Road)	6	6	6	6
D6 (Crossharbour)	8	8	8	8
D8 (Crossharbour)	6	6	6	6
TOTAL	**35**	**35**	**35**	**35**

8.6.81 If it is assumed that all arrivals in the morning from a destination to the north, then passengers are split over 35 buses at an average of 12 passengers per bus.

8.6.82 The school will generate 405 bus arrivals, assuming all pupils are present on-site. If we consolidate these movements into a 30-minute period then we can expect the impact on any service to be, on average 23 passengers per bus. In RH-DHV's review of data published for other local development projects BODS data have not been found for the services listed above and data have been requested from TfL. Of note, it is likely that the direction of travel for school pupils will be opposite to the majority of commuter journeys and so these buses may retain a reserve capacity and I will make the inquiry with TfL.

10.0 Air Quality

As part of the Temple IRR, a number of queries raised by the Air Quality officer at LBTH were highlighted as requiring responses. Some of these were potential Regulation 22 points. WYG, the air quality specialists on the team, provided a revised version of Appendix 10.1 of the ES. The responses encompassed within the revision to Appendix 10.0 were considered satisfactory by Temple. However, the changes made were of a sufficient extent to be considered by Temple to constitute additional information under Regulation 22 of the EIA Regulations. The Applicant team agrees with this view, and the revised Appendix 10.1 is formally submitted as part of this ES Addendum under Regulation 22.

Modest changes are required to Chapter 10.0 to take account of some changes in the assessment methods and model verification procedures set out in the revised version of Appendix 10.1. These changes are reflected in the following changes to Section 10.3 and Section 10.5. No other revisions or supplementary information is required for the ES Chapter 10.0, which summarises the findings of Appendix 10.1

10.3 Assessment Methods and Significance Criteria

Operational Phase Methodology

The following text replaces paragraph 10.3.16 of the August 2015 ES.

10.3.16 Paragraph of the ES submitted in August 2015 sets out the model correction factors used to estimate the fraction of oxides of nitrogen (NOx) emitted as nitrogen dioxide (NO_2). The verification procedure set out in revised Appendix 10.1 derives a model correction of 2.55 to be applied to roadside predicted NOx concentrations before converting to NO_2. This contrasts with a factor of 3 applied originally as set out in paragraph 10.3.16 of the ES submitted in August 2015. The model verification procedure is set out in Section 6.2 of the revised version Appendix 10.1 submitted herewith. The other change to the procedure is that background data for 2011 has been used in preference to the 2021 data used for NOx and NO_2 in the August 2015 ES. No changes are required with regard to PM10 concentrations which had already adopted the 2011 background data in the August 2015 ES.

10.5 Assessment of Effects of Development

The changes in the adjustment factors outlined above and the background data for NOx and NO_2 have resulted in changes in future predicted NO_2 concentrations, although the changes in concentrations predicted to be in general reduced. This requires following revisions to Tables 10.7 and 10.8 of the ES, although the overall assessment of the significance of effects is unchanged. Paragraphs 10.5.14-10.5.16 are replaced as follows.

Revised Table 10.7 Predicted Annual Average Concentrations of NO_2 at Receptor Locations (µg/m^3)

Receptor (see Figure 10.1 for locations)		Nitrogen Dioxide (µg/m^3)		
		2021 Do Minimum	2021 Do Something	Development Contribution
R1	1-15 Kelly Court (1st storey)	45.83	46.05	0.22
R2	Millennium Harbour (1st storey)	33.35	33.57	0.22
R3	49 The Quarterdeck	31.33	31.44	0.11
R4	Caravel Close	34.98	35.3	0.32
R5*	Hotel*	34.87	35.09	0.22
R6	Westwood House (1st storey)	31.58	31.95	0.37
R7	42 Marsh Wall	35.55	35.81	0.27
R8	Walkers Lodge	40.66	41.1	0.43
R9	71 Preston's Road	50.06	50.36	0.3
PR1	Proposed Residential Receptor	31.06	31.17	0.11
PR2	Proposed Residential Receptor	30.96	31.03	0.07
PR3	Proposed Residential Receptor	30.44	30.51	0.07
PR4	Proposed Residential Receptor	30.23	30.28	0.06
PR5	Proposed Residential Receptor	30.04	30.13	0.09
Annual Mean Air Quality Objective not to be exceeded		**40 µg/m^3**		
Note: *Non-Residential receptors are marked with asterisk				

Revised Table 10.8: Significance of Effects at Key Receptors (Nitrogen Dioxide)

NO_2 Significance Effects at Key Receptors				
Receptor	**Development Contribution (DS-DM) (µg/m^3)**	**% Change in Concentration Relative to AQAL**	**% of Annual Mean Concentration in Assessment Year**	**Significance**
R1	0.22	<1%	>110% of AQAL	Negligible
R2	0.22	<1%	76-94% of AQAL	Negligible
R3	0.11	<1%	76-94% of AQAL	Negligible
R4	0.32	<1%	76-94% of AQAL	Negligible
R5*	0.22	<1%	76-94% of AQAL	Negligible
R6	0.37	<1%	76-94% of AQAL	Negligible
R7	0.27	<1%	76-94% of AQAL	Negligible
R8	0.43	<1%	103-109% of AQAL	Negligible
R9	0.3	<1%	>110% of AQAL	Negligible
PR1	0.11	<1%	76-94% of AQAL	Negligible
PR2	0.07	<1%	76-94% of AQAL	Negligible
PR3	0.07	<1%	76-94% of AQAL	Negligible
PR4	0.06	<1%	76-94% of AQAL	Negligible
PR5	0.09	<1%	76-94% of AQAL	Negligible

10.5.14 The maximum predicted increase in annual average exposure to nitrogen dioxide at any existing residential receptor, due to changes in traffic movements associated with the development, is 0.43µg/m^3, at Walkers Lodge (R8).

10.5.15 The significance of changes in traffic flow associated with the development with respect to annual mean NO_2 exposure has been assessed with reference to the criteria in Section 10.3. The outcomes of the assessment are summarised in Revised Table 10.8.

10.5.16 The percentage of change in concentration relative to AQAL is less than 1% for all receptors. The significance of the effect in 2021 is determined to be **negligible** for all of the receptors. This is a reduced level of significance for receptors R6-R8 as reported in the ES of August 2015, but unchanged for all others.

10.9 Summary of Assessment

The summary table (Table 10.13) for the assessment requires amendment to take account of the matters set out above.

Revised Table 10.13: Assessment Summary

Air Quality Assessment Summary	**Summary description of the Identified Likely Significant Impact**			
	Construction	**NO_2 emissions generated by traffic**	**PM_{10} emissions generated by traffic**	**Point source emissions**
Sensitivity of Receptor	Medium	High to Very High	Low	Low
Likely Impact Magnitude	Low Risk to High Risk	Imperceptible to Small	Imperceptible	Imperceptible to Small
Significance and Nature of Impact		Negligible	Negligible	Negligible
Mitigation	See section 10.6	See section 10.6	See section 10.6	See section 10.6
Residual Likely Impact Magnitude	Negligible	Imperceptible to Small	Imperceptible	Imperceptible
Residual Significance and Nature of Impact		Negligible to Minor	Negligible	Negligible
Confidence Level	Low	High	High	High

11.0 Water Resources and Flood Risk

A number of points were made by the GLA and LBTH in relation to the drainage strategy for the Development. These were addressed by further changes to the drainage strategy by Walsh & Associates, which were submitted in December 2015. The following text provides additional material to the ES Chapter 11.0, commencing from paragraph 11.6.27 and replacing the text as far as paragraph 11.6.34.

Revised Drainage Strategy

11.6.27 The surface water drainage strategy for the Site has been revised by Walsh & Associates to meet the criteria suggested by the GLA and LBTH. The revised plan has been submitted (ref: 3886-320) with an accompanying note by Walsh & Associates. The revision has been facilitated by the reduction of the basement footprint, which in turn has become possible due to the reduction in car parking proposed. This revised strategy has been designed to meet the design criteria set out the Mayor's Sustainable Development and Construction SPG[4], requiring runoff to be reduced to 3 times the greenfield rate on previously developed sites (paragraph 3.4.10 of the SPG). This revised strategy addresses the point raised at paragraph 10.4.6 of the IRR, and meets the requirements of LBTH and the GLA. With regard to the other issues raised, the following points are relevant.

Treatment and Pollution Control (para 10.4.5)

11.6.28 The principal catchments where drainage in the revised strategy is to be discharged to the dock are areas of hard and soft landscaping, building roofs. These are shown on the Drainage Plan (ref: 3886-320) as catchments 6a-6d, 7 and 8a-8b.

- Catchment 6a-6d comprises clean roof areas discharging to the catchments 8a-8b (see below), as well as infiltration to permavoid in catchments 8a and 8b. The latter would comprise permavoid (area 2750m^2 with an attenuation capacity of 234m^3) underlying soft landscape. This will provide for removal of solids, whilst pollutant levels at the outlets of the permavoid areas would be expected to be reduced. The catchment area would total about 4700m^2.

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[4] Mayor of London (2014) *Sustainable Design and Construction* The London Plan Supplementary Guidance, London Plan 2011 Implementation Framework April 2014, 139pp; and Air Quality Consultants and Environ UK (2014) Air Quality Neutral Planning Support Update: GLA 80371, 38pp April 2014

- Catchment 7 comprises dockside catchments (c. 4,069m^2) to the south of flood protection crest – these discharged to the dock with the original scheme.

- All roadway and other lower quality drainage would, like, the current site, outfall to the current combined and surface water sewers.

11.6.29 The strategy has taken account of the topography of the Site and gradients of pipework to maximise discharge to the dock. The nature of the catchments and the treatment afforded by the landscape and permavoid in catchment 8a/b will ensure that the quality of the discharge will not adversely affect the water quality of the dock. The discharge of surface water drainage to the docks is subject to consent from the Canals and Rivers Trust. It is not anticipated that a consent/permit for the discharge would be required from the Environment Agency under the Water Resources Act 1991 or EPR2010. Areas (the school, B06, B07) to the north of the main site road are at elevations that are too low in elevation to discharge to the dock under gravity, but would discharge to the via in-line attenuation tanks for B06 and B07, and permavoid layers associated with playing fields and open hard-standing areas of the school.

Impermeable Areas (para 10.4.8)

11.6.30 The Walsh & Associates note needs to be read in conjunction with the plan and the notes on this plan (3886-320). This shows that the existing impermeable area has been estimated at 51,064m^2 (note 5 on plans 3886-320). The catchments of existing surface water discharge are given in note 6 as:

- 39,371m^2 discharging to the surface water sewer on Millharbour; and

- 11,692m^2 to the combined sewer on Westferry Road.

11.6.31 Note 7 then states an assumption that the additional impermeable area would be 5,100m^2 with the Development; this is seen as a conservative assumption. This volume would be mitigated by a combination of rainwater harvesting, vegetated podium areas/roofs and permeable paving/permavoid areas.

Adoption, Monitoring and Maintenance

11.6.32 It is noted that the LBTH SuDS guidance states at “LBTH would not normally adopt green roofs, porous paving, containers or rainwater harvesting systems”. A more likely approach would be that a Development Management Team would be responsible for the general management. The main elements to be maintained would be the surface water drains and attenuation tanks, which would be adopted at appropriate connection points by

Thames Water. A possible approach to funding could be commuted sum, unless further legislation is forthcoming to define the funding of the maintenance regime for the surface water drainage network. The following table sets out the typical inspection regime for the SuDS features, which would be maintained as part of the wider landscape management of the open space.

Addendum Table 11.6a:Typical inspection and maintenance requirements

Activity	**Indicative frequency**	**Typical tasks**
Routine/regular maintenance	Monthly (for normal care of SuDS)	• litter picking • grass cutting • inspection of inlets, outlets and control structures.
Occasional maintenance	Annually (dependent on the design)	• silt control around components • vegetation management around components • suction sweeping of permeable paving • silt removal from catchpits, soakways and cellular storage.
Remedial maintenance	As required (tasks to repair problems due to damage or vandalism)	• inlet/outlet repair • erosion repairs • reinstatement of edgings • reinstatement following pollution • removal of silt build up.

Blockage of the Drainage System

11.6.33 The management of the drainage system is addressed above. The revised system is sized to accommodate the 1:100 year rainfall event. Blockage of the drainage system will be minimised by the adoption of hydrobrake flow rates being of no less than 5L/s to maintain adequate flow rates. The above management regime will aim to minimise factors that could lead to blockage. The design of the drainage system and the attenuation facilities are designed to operate effectively at the 1% Annual Event Probability levels to ensure that there is no flooding risk transferred off-site by the Development, as stated in the FRA (Appendix 11.1) by RH-DHV.

17.0 Wind and Sailing

A revision of Chapter 17.0 is provided, which revises the original assessment provided in the ES as submitted in August 2015. The changes reflect the adoption of sailing criteria proposed by the Docklands Sailing and Watersports Centre (DSWC), which are slightly different from those developed by the Wolfson Unit of Southampton University. Whilst more stringent, the criteria are applied equally to the baseline and post-development scenarios and thus the differences between these scenarios have tended to be similar to those arising from the original analysis carried out by the Wolfson Unit.

Two additional Appendices are also provided, along with a revised version of Appendix 17.2, reflecting the adoption of the DSWC criteria for further analysis. The additional appendices are:

- Appendix 17.3 includes additional testing of varied massing on the wind conditions carried out by RWDI Anemos and then analysed using the updated DSWC criteria by the Wolfson Unit of Southampton University;
- Appendix 17.4 includes the Wolfson Unit's analysis of the above wind tunnel test data.

Environmental Statement Addendum

Appendix 10.1: Revised Air Quality Assessment by

White Young Green

Environmental Statement Addendum

Regulation 22 Addendum

Westferry Printworks

March 2016

Northern & Shell Investments No.2 Limited

Former Westferry Printworks

London Borough of Tower Hamlets

Air Quality Assessment

December 2015

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Document Control

Project:	Former Westferry Printworks Air Quality Assessment
Client:	Northern & Shell Investments No.2 Limited
Job Number:	A084823
File Origin:	O:\Acoustics Air Quality and Noise\Active Projects

Document Checking:

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Issue	Date	Status
1	07 October 2014	First Draft
2	30 October 2014	First Issue
3	02 December 2014	Second Issue (addressing DP9 comments)
4	02 April 2015	Third Issue (Revision of the facade of the Building 07)
5	12 May 2015	Fourth Issue (Revision of the facade of the Building 07)
6	16 June 2015	Fifth Issue (Revision of Building 07 Heights)
7	03 July 2015	Sixth Issue (the traffic data 2014 scheme and the latest road source emission rates)
8	05 August 2015	Seventh Issue (minor amendments – update development descriptions)
9	23 October 2015	Eighth Issue (Revision of CHP unit to 0.174 MWth each)
10	21 December 2015	Ninth Issue (addressing the ES Review Comments)

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Figures

Note: Figures 1 to 20 are produced for the assessment of air quality impact from point sources.

Appendices

1. Introduction

WYG Planning and Environment (WYG) were commissioned to prepare an Air Quality Assessment for the proposed redevelopment of former Westferry Printworks, London.

The Development will be for mixed-uses, including a 1200 pupil secondary school in the north west of the Site. The residential and commercial accommodation will be accommodated in a total of 10 buildings of varying heights. The tallest of these (Tower 4) would have a maximum height of 110m AOD (c. 105m above ground) and comprise 30 storeys (ground plus 29 floors). Seven of the buildings would be of less than 9 storey height.

The residential accommodation would provide 737 units, in a variety of tenures and sizes from 1 to 4 bedroom units.

In addition to the secondary school, the Development will include further employment space. This would include retail use, flexible restaurant and café and drinking establishment uses, flexible office and financial and professional services uses, community uses and a gym.

Open space forms an important part of the Development, with about 72% of the Site area. There is proposed to be 1.95ha of publicly accessible open space and 0.45ha of open space for residents.

Overall 404 car parking spaces are proposed, of which 376 would be for the Site's residents including 76 spaces reserved for disabled drivers. The remaining 28 spaces at the Development would be allocated to commercial uses provided for their operational needs only. An energy centre including combined heat and power plant will be provided for the Development.

Report Revision History

This ninth version has been updated to response the LBTH officer's comments. The details of the comments are presented in Appendix B and the major update includes:

- Section 6.2 Model verification using the LBTH diffusion tube data;
- The 2014 NO_2 and PM_{10} background data have been used for all (a) the baseline assessment; (b) 2021 'Do Minimum' assessment; and (c) 2021 'Do Something' assessment. The 2014 NO_2 and PM_{10} background has been used to produce worst case assessment;
- Including new Chapter 8: Cumulative Effect from both Traffic and Energy Centre;
- Including new Chapter 9: Air Quality Neutral Assessment; and
- Site Specific Mitigation Measures have been updated in line with 'The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance 2014' and the 'Tower Hamlets Code of Construction practice.'

In addition, the ninth version has updated the point source modelling section (Chapter 7) using a new flue height at the onsite energy centre. The flue will terminate 6m above the roof level (Roof: +28.51m AOD) or 3m above the Dry Air cooler (DAC) enclosure.

The eighth version has been updated using the latest provided information on the CHP unit. The modelling section for the point source was updated accordingly by using CHP having a capacity of 0.174 MWth each.

Minor amendments have been made to the seventh version by updating the development descriptions.

The sixth version has been updated using the traffic data 2014 scheme and the latest road source emission rates (the EFT version 6.0.2 Nov 2014). The assessment also presents additional modelling of the air quality effects from HGVs operating during the construction phase. The significance of the impact effects has been updated using the latest guidance (May 2015) produced by EPUK and IAQM.

Previous version (the fifth issue) updated the point source modelling sections of the report using the final Building 07 heights (2015 scheme) and Block 06 heights (2015 Scheme). Therefore the modelling section for the point source was updated accordingly.

Previous version (the fourth Issue) updated the point source modelling section of the report. The external wall, window arrangement to the northern edge of the Building 07 has been revised and finalised and therefore the modelling section has been updated accordingly.

Previous version (the Third Issue) updated the point source modelling section of the report. The external wall, window arrangement to the northern edge of the Building 07 was revised and the modelling section was updated accordingly.

Previous version (the Second Issue) addressed the comments raised by DP9. The planning policies of the London Borough of Tower Hamlets have been clarified and further minor amendments have been made to the First Issue report (30 October 2014). The revised scheme has also been updated within the point source modelling section of this report.

1.1 Site Location and Context

The following assessment stages have been undertaken as part of this assessment:

- Baseline evaluation;
- Assessment of potential air quality impacts during the construction phase;
- Assessment of potential air quality impacts from traffic during the operational phase;
- Assessment of potential air quality impacts from point sources at off-site Barkantine Energy Centre and on-site Westferry Energy Centre; and,
- Identified mitigation measures (as required).

The results of the assessment are detailed in the following sections of this report.

The construction phase assessment considers the potential effects of dust and particulate emissions from site activities and materials movement using a qualitative risk assessment method based on the Institute of Air Quality Management's 'Guidance on the Assessment of Dust from Demolition and Construction' document, published in 2014.

The assessment of the potential air quality impacts that are associated with the operational phase has focused on the predicted impact of changes in ambient nitrogen dioxide (NO_2) and particulate matter (PM_{10}) as a result of the development at key local receptor locations. The changes have been referenced to EU air quality limits and UK air quality objectives and the magnitude and significance of the changes have been referenced to non statutory guidance issued in 2015 by Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM).

2. Policy and Legislative Context

2.1 Documents Consulted

The following documents were consulted during the undertaking of this assessment:

Legislation and Best Practice Guidance

- National Planning Policy Framework, Department for Communities and Local Government, March 2012;
- Planning Practice Guidance: Air Quality, March 2014;
- The Air Quality Standards Regulations, 2010
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2007
- The Environment Act, 1995
- Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009
- Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, HA 207/07 - Air Quality, Highways Agency, 2007
- Land-Use Planning & Development Control: Planning For Air Quality, EPUK & IAQM, 2015.
- The Control of Dust and Emissions from Construction and Demolition – Best Practice Guide, Greater London Authority and London Councils, 2006
- Guidance on the Assessment of Dust from Demolition and Construction (Institute of Air Quality Management, 2014)
- Defra Local Air Quality Management Note on Projecting NO_2 concentrations (April 2012)
- H1 Annex F – Air Emissions (Environment Agency, December 2011)

Websites Consulted

- Google maps (maps.google.co.uk)
- The UK National Air Quality Archive (www.airquality.co.uk)
- Department for Transport Matrix (www.dft.go.uk/matrix)
- emapsite.com
- MAGIC (http://magic.defra.gov.uk/)
- Planning Practice Guidance (http://planningguidance.planningportal.gov.uk/)
- Greater London Authority (http://london.gov.uk); and,

- Tower Hamlets Council website (http://towerhamlets.gov.uk)

Site Specific Reference Documents

- Tower Hamlets Air Quality Action Plan (December 2003)
- Tower Hamlets Local Development Framework Core Strategy 2025 (Adopted September 2010)
- Managing Development Document: Development Plan Document (Adopted April 2013)
- Fourth Round Updating and Screening Assessment for London Borough of Tower Hamlets, 2009
- 2014 Air Quality Progress Report for Tower Hamlets Council, April 2014.
- The London Plan, Greater London Authority, 2015
- The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance 2004
- Tower Hamlets Code of Construction Practice.

2.2 Air Quality Legislative Framework

European Legislation

European air quality legislation is consolidated under Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidates previous legislation which was designed to deal with specific pollutants in a consistent manner and provides new air quality objectives for fine particulates. The consolidated Directives include:

- **Directive 1999/30/EC** – the First Air Quality "Daughter" Directive – sets ambient air limit values for nitrogen dioxide and oxides of nitrogen, sulphur dioxide, lead and particulate matter;
- **Directive 2000/69/EC** – the Second Air Quality "Daughter" Directive – sets ambient air limit values for benzene and carbon monoxide; and,
- **Directive 2002/3/EC** – the Third Air Quality "Daughter" Directive – seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

The fourth daughter Directive was not included within the consolidation and is described as:

- **Directive 2004/107/EC** – sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

UK Legislation

The Air Quality Standards Regulations (2010) seek to simplify air quality regulation and provide a new transposition of the Air Quality Framework Directive, First, Second and Third Daughter Directives and also transpose the Fourth Daughter Directive within the UK. The Air Quality Limit Values are transposed into the updated Regulations as Air Quality Standards, with attainment dates in line with the European Directives. SI 2010 No. 1001, Part 7 Regulation 31 extends powers, under Section 85(5) of the Environment Act (1995), for the Secretary of State to give directions to Local Authorities (LAs) for the implementation of these Directives.

The UK Air Quality Strategy is the method for implementation of the air quality limit values in England, Scotland, Wales and Northern Ireland and provides a framework for improving air quality and protecting human health from the effects of pollution.

For each nominated pollutant, the Air Quality Strategy sets clear, measurable, outdoor air quality standards and target dates by which these must be achieved; the combined standard and target date is referred to as the Air Quality Objective (AQO) for that pollutant. Adopted national standards are based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS) and have been translated into a set of Statutory Objectives within the Air Quality (England) Regulations (2000) SI 928, and subsequent amendments.

The AQOs for pollutants included within the Air Quality Strategy and assessed as part of the scope of this report are presented in Table 1 along with European Commission (EC) Directive Limits and World Health Organisation (WHO) Guidelines.

Table 1. Air Quality Standards, Objectives, Limit and Target Values

Pollutant	Applies	Objective	Concentration Measured as[10]	Date to be achieved and maintained thereafter	European Obligations	Date to be achieved and maintained thereafter	New or existing
PM_{10}	UK	50µg/m^3 by end of 2004 (max 35 exceedances a year)	24-hour mean	1st January 2005	50µg/m^3 by end of 2004 (max 35 exceedances a year)	1st January 2005	Retain Existing
	UK	40µg/m^3 by end of 2004	Annual mean	1st January 2005	40µg/m^3	1st January 2005	
Nitrogen Dioxide	UK	200µg/m^3 not to be exceeded more than 18 times a year	1 Hour Mean	31st December 2005	200µg/m^3 not to be exceeded more than 18 times a year	1st January 2010	Retain Existing
	UK	40µg/m^3	Annual Mean	31st December 2005	40µg/m^3	1st January 2010	

Within the context of this assessment, the annual mean objectives are those against which residential receptors will be assessed and the short term objectives apply to all receptor locations, both residential and non residential.

Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV) LAs are required to periodically review and assess air quality within their area of jurisdiction under the system of LAQM. This review and assessment of air quality involves assessing present and likely future air quality against the AQOs. If it is predicted that levels at the façade of buildings where members of the public are regularly present (normally residential properties) are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 Planning and Policy Guidance

National Policy

The National Planning Policy Framework (NPPF) supersedes the suite of Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) which previously guided planning policy making. The NPPF broadly retains the principles of PPS 23: Planning and Pollution Control and states that:

> *'Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan.'*

The Planning Practice Guidance (PPG) web-based resource was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 to support the National Planning Policy Framework and make it more accessible. A review of PPG: Air Quality identified the following guidance:

> *'When deciding whether air quality is relevant to a planning application, local planning authorities should consider whether the development would:*
>
> *Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more.*

Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area.

Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.

Give rise to potentially significant impact (such as dust) during construction for nearby sensitive locations.'

Regional Policy

The London Borough of Tower Hamlets Council (LBTH) lies within the Greater London Authority (GLA) Area. The London Plan (2015) addresses the improvement of air quality. Policy 7.14 within the London Plan specifically relates to air quality improvement:

'Policy 7.14 Improving Air Quality

Strategic

A. The Mayor recognises the importance of tackling air pollution and improving air quality to London's development and the health and well-being of its people. He will work with strategic partners to ensure that the spatial, climate change, transport and design policies of this plan support implementation of his Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimise public exposure to pollution.

Planning Decisions

B. Development proposals should:

a) minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see policy 6.3)

b) promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils' 'The control of dust and emissions from construction and demolition'

c) be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs)

d) ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area based approaches *e) where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified.*

Local Policy

LBTH formally adopted the Core Strategy (CS) in September 2010 and the Managing Development Document in April 2013. Following a review of the Local Development Framework, the following policies were identified as being relevant to the development from an air quality perspective.

Managing Development Document Policy - DM9

1 Major development will be required to submit an Air Quality Assessment demonstrating how it will prevent or reduce associated air pollution during construction or demolition. Minor development will be required to submit details outlining practices to prevent or reduce associated air pollution during construction or demolition.

2 Development located in the Tower Hamlets Clear Zone will need to demonstrate consideration of the Clear Zone objectives.'

Core Strategy Strategic Policy - SP03

(...)

2. Address the impact of noise and air pollution in the borough by:

(...)

c. Continuing to promote the use of public transport and reducing reliance on private motor vehicles.

d. Managing and improving air quality along transport corridors and traffic-congestion points by working with Transport for London.

e. Implementing a "Clear Zone" in the borough to improve air quality.

The above Local policies are applicable to the proposed redevelopment of the former site. The following assessment provides the results of the air quality effects of the proposed redevelopment, and provides the mitigation measures necessary to ensure any effects due to air quality emissions is minimised.

3. Assessment Methodology

The potential environmental effects of the operational phase of the proposed development are identified, in so far as current knowledge of the site and development allows. The significance of potential environmental effects is assessed according to the latest guidance produced by EPUK and IAQM in May 2015.

The methodology used to determine the potential air quality effects of the construction phase of the proposed development has been derived from the IAQM 'Guidance on the Assessment of the Impacts of Dust from Demolition and Construction' document and is summarised in Section 5.

3.1 Determining Significance of the Air Quality Effects

The significance of the effects during the operational phase of the development is based on the latest guidance produced by EPUK and IAQM in May 2015. The guidance provides a basis for a consistent approach that could be used by all parties associated with the planning process to professionally judge the overall significance of the air quality effects based on severity of air quality impacts.

The following rationale is used in determining the severity of the air quality effects at individual receptors:

1. The change in concentration of air pollutants, air quality effects, are quantified and evaluated in the context of air quality objectives. The effects are provided as percentage of the Air Quality Assessment Level (AQAL), which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)';
2. The absolute concentrations are also considered in terms of the AQAL and are divided into categories for long term concentration. The categories are based on the sensitivity of the individual receptor in terms of harm potential. The degree of harm potential – to change - increases as absolute concentrations are close to or above the AQAL;
3. Severity of the effect is described as qualitative descriptors, negligible; slight; moderate or substantial, by taking into account in combination the harm potential and air quality effect. This means that a small increase at a receptor which is already close to or above the AQAL will have higher severity compared to a relatively large change at a receptor which is significantly below the AQAL, >75% AQAL.
4. The effects can be adverse when air quality concentration increase or beneficial when concentration decrease as a result of development.
5. The judgement of overall significance of the effects is then based on severity of effects on all the individual receptors considered.

6. Where a development is not resulting in any change in emissions itself, the significance of effect is based on the effect of surrounding sources on new residents or users of the development, i.e., will they be exposed to levels above the AQAL.

Table 2. Impact Descriptors for Individual Receptors

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
≤75% of AQAL	Negligible	Negligible	Minor	Moderate
76-94% of AQAL	Negligible	Minor	Moderate	Moderate
95-102% of AQAL	Minor	Moderate	Moderate	Substantial
103-109 of AQAL	Moderate	Moderate	Substantial	Substantial
≥110 of AQAL	Moderate	Substantial	Substantial	Substantial

4. Baseline Conditions for Traffic Assessment

4.1 Air Quality review and Assessment

This section provides a review of the existing air quality in the vicinity of the proposed development site in order to provide a benchmark against which to assess potential air quality impacts of the proposed facility. Baseline air quality in the vicinity of the proposed development site has been defined from a number of sources, as described in the following sections.

Air Quality Review

As required under section 82 of the Environment Act 1995, LBTH has conducted an ongoing exercise to review and assess air quality within its area of jurisdiction. The assessments have indicated that concentrations of NO_2 and PM_{10} are above the relevant AQOs at locations of public exposure. LBTH has therefore declared a borough wide AQMA.

The proposed redevelopment site is located within the AQMA. As such it is expected that existing concentrations of NO_2 and PM_{10} are likely to be elevated in this location.

Air Quality Monitoring

Monitoring of air quality within LBTH is undertaken through continuous and non-continuous monitoring methods. These have been reviewed in order to provide an indication of existing air quality in the area surrounding the proposed development site.

<u>Continuous Monitoring</u>

The UK Automatic Urban and Rural Network (AURN) is a country-wide network of air quality monitoring stations operated on behalf of the Department for the Environment Food and Rural Affairs (DEFRA). Monitoring data for AURN sites is available from the UK National Air Quality Archive.

LBTH currently operates four continuous air quality monitoring stations (Poplar TH1 site was closed in July 2013). Annual mean concentrations of NO_2 and PM_{10} monitored at these sites in 2013 are presented within Table 3.

Table 3. Monitored Annual Mean NO2 and PM10 Concentrations

Site ID	UK NGR(m)		Location	Site Type	NO_2 Annual Mean Concentration 2013 (·g/m^3)	PM_{10} Annual Mean Concentration 2013 (·g/m^3)
	X	Y				
TH2	535922	182221	Mile End Road	Roadside	57	n/a

TH4	538290	181452	Blackwall	Roadside	58	28
TH5	536487	184238	Victoria Park	Background	33	21

As Table 3 illustrates, the recorded NO_2 concentrations at two of the automatic monitoring sites exceeded the Air Quality Objective (AQO) of 40µg/m^3 in 2013. The PM_{10} concentrations at all the automatic monitoring sites were below the NAQO of 40µg/m^3.

Non Continuous Monitoring

LBTH also operates a network of diffusion tubes. The most recently available data for these tubes is contained within the 'Fourth Round Updating and Screening Assessment for London Borough of Tower Hamlets, 2009'. NO_2 concentrations were monitored at 80 locations in 2008 and the closest NO_2 diffusion tube monitoring results are presented in Table 4 below. However, the diffusion tube monitoring program was discontinued in 2009, therefore, the most recelty available diffusion tube data is from 2008. The monitoring data from 2008 to 2014 at the Mile End continuous monitoring station are also available and where continuously monitored data have been analysed. A reduction factor for the data from the automatic monitoring station 2008 to 2014 was used to determin a reduction factor of 1.105 for NO_2. This reduction factor of 1.105 was then applied to the diffusion tube data of 2008, to calculate a level of 2014 which is presented in Table 4.

Table 4. Nitrogen Dioxide Monitoring Locations

ID	UK NGR(m)		Location	Within AQMA	NO_2 Annual Mean Concentration 2008 (µg/m^3)	Adjusted NO_2 Annual Mean Concentration 2014 (µg/m^3)
	X	Y				
59	536973	180628	Westferry Road	Yes	51.1	46.2
60	537115	180074	Westferry Road	Yes	58.3	52.8
62	537352	178686	Mast House Terrace	Yes	49.9	45.2
64	538037	178357	Limeharbour	Yes	47.2	42.7
65	538552	178766	East Ferry Road	Yes	44.0	39.8
67	538432	179044	Seyssel Street	Yes	44.0	39.8
69	537523	179835	Lawn House Close	Yes	46.0	41.6
70	538369	180182	Admirals Way	Yes	44.8	40.5
72	536973	180628	Preston's Road	Yes	40.9	37.0

As Table 4 illustrates, six of the nitrogen dioxide diffusion tube monitoring sites would exceed the National Air Quality Objective of 40µg/m^3 in 2014. Diffusion Tubes 59 to 70 lie within the extents of the main study area, therefore these monitoring locations have been utilised within the verification process.

4.2 Meteorology

Meteorological conditions have significant influence over air pollutant concentrations and dispersion. Pollutant levels can vary significantly from hour to hour as well as day to day, thus any air quality predictions need to be based on detailed meteorological data. The ADMS model calculates the dispersion of pollutants on an hourly basis using a year of local meteorological data. The meteorological data used in the assessment is derived from 2014 London City Meteorological Station. This is the nearest meteorological station which is considered representative of the development site, with all the complete parameters necessary for the ADMS model. Reference should be made to Figure 22 for an illustration of the prevalent wind conditions at the London City Meteorological Station site.

4.3 Background Concentrations

The use of background concentrations within the modelling process ensures that pollutant sources other than traffic are represented appropriately. Background sources of pollutants include industrial, domestic and rail emissions within the vicinity of the study site.

Background concentrations as used within the prediction calculations were referenced from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the development site. In June 2014 Defra issued revised 2011 based background maps for NO_X, NO_2, PM_{10} and $PM_{2.5}$ which incorporate updates to the input data used for modelling. The updated mapped background concentrations used in the assessment, are summarised in Table 5 below.

The background for NO_X and NO_2 are the 2021 year of the background map after using the NO_2 adjustment for NO_x sector removal tool (v4.0, 19 June 2014) (http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxsector). The sum of "Primary_A_Rd_in_2021" NO_x has been removed from the original background map data because the traffic data for modelling will include the A road traffic flows explicitly modelled within the assessment.

The 2014 NO_2 and PM_{10} background has been used to produce worst case assessment.

Table 5. Background Air Quality Levels (µg/m3)

UK NGR(m)		2014		
X	Y	NO_2	NO_x	PM_{10}
537500	180500	38.98	64.96	24.06
538500	180500	41.75	70.43	24.38
537500	179500	29.35	45.37	20.96
538500	179500	28.35	43.40	21.20

4.4 Traffic Emission Sources

A desktop assessment has identified that traffic movements are likely to be the most significant local source of pollutants affecting the site and its surroundings. The principal traffic derived pollutants likely to impact local receptors are nitrogen dioxide and particulate matter.

The assessment has therefore modelled all roads within the immediate vicinity of the proposed development site which are considered likely to experience significant changes in traffic flow as a result of the proposed development. Full details of the traffic data input into the ADMS Roads 3 model can be found in Figure 21 providing a visual illustration of the modelled road sources.

It should be noted that the contribution of minor roads and rail sources that are not included within the dispersion model is considered to be accounted for via the use of background air quality levels.

4.5 Sensitive Receptors for Traffic Assessment

Receptors that are considered as part of the air quality assessment are primarily those existing receptors that are situated along routes predicted to experience significant changes in traffic flow as a result of the proposed development. The traffic data utilised within this assessment was taken from the Transport Assessment (TA). This traffic data is provided up to Westferry Road, north of the site access. As there is no traffic data south of the proposed development site, this area has not been modelled. As such, there are no receptor locations south of the site.

The receptor locations are summarised in Table 6 below and the spatial locations of all of the receptors are illustrated in Figure 21.

Table 6. Modelled Sensitive Receptor Locations for Traffic Assessment

Discrete Sensitive Receptor		UK NGR (m)		Height (m)
		X	Y	
R1	1-15 Kelly Court (1st storey)	537025.8	180659.2	4.0
R2	Millennium Harbour (1st storey)	537094.5	179844.9	4.0
R3	49 The Quarterdeck	537173.0	179651.3	1.5
R4	Caravel Close	537159.1	179270.2	1.5
R5*	Hotel*	537276.1	179945.6	1.5
R6	Westwood House (1st storey)	537594.4	179454.6	4.0
R7	42 Marsh Wall	538128.1	179718.1	1.5
R8	Walkers Lodge	538263.8	179763.1	1.5
R9	71 Preston's Road	538333.9	180073.7	1.5
PR1	Proposed Residential Receptor (2nd storey)	537203.8	179151.9	6.5
PR2	Proposed Residential Receptor (ground floor)	537209.1	179233.3	1.5
PR3	Proposed Residential Receptor (ground floor)	537235.5	179285.5	1.5
PR4	Proposed Residential Receptor (ground floor)	537259.3	179244.6	1.5
PR5	Proposed Residential Receptor (ground floor)	537562.3	179295.1	1.5

Note: *Non-Residential receptors are marked with asterisk

4.6 Ecological Receptors

Air quality impacts associated with the proposed development have the potential to impact on receptors of ecological sensitivity within the vicinity of the site. The Conservation of Habitats and Species Regulations (2010) require competent authorities to review planning applications and consents that have the potential to impact on European designated sites (e.g. Special Protection Areas).

A study was undertaken to identify any statutory designated sites of ecological or nature conservation importance within the extents of the dispersion modelling assessment. This was completed using the Multi-Agency Geographic Information for the Countryside (MAGIC) web-based interactive mapping service, which draws together information on key environmental schemes and designations. Following a search within a 1km radius of the site boundary, the following sites were identified.

- Local Nature Reserves – Mudchute Park Farm; approximately 300 metres from the site boundary.

Considering the distance between the proposed site and ecological site, it is not considered that the development would result in any significant impacts at this locally designated ecological location. As such this receptor location is not considered further within this assessment.

5. Assessment of Air Quality Impacts from Construction

5.1 Pollutant Sources

Other than negligible emissions from construction vehicles and equipment the main emissions during construction are likely to be dust and particulate matter generated during earth moving (particularly during dry months), or from construction materials. In respect of fires on site it should be noted that suitable management strategies will be in place to prevent burning of any material during the construction phase. The main potential effects of particulates/dust are:

- Visual – dust plume, reduced visibility, coating and soiling of surfaces leading to annoyance, loss of amenity, the need to clean surfaces;
- Physical and /or chemical contamination and corrosion of artefacts;
- Coating of vegetation and soil contamination;
- Health effects due to inhalation e.g. asthma or irritation of the eyes.

A number of other factors such as the amount of precipitation and other meteorological conditions will also greatly influence the amount of particulate matter generated.

Construction activities can give rise to short-term elevated dust/PM_{10} concentrations in neighbouring areas. This may arise from vehicle movements, soiling of the public highway, demolition or windblown stockpiles.

5.2 Particulate Matter (PM_{10})

The UK Air Quality Standards seek to control the health implications of respirable particulate matter PM_{10} (a standard size fraction where the median diameter is 10 microns). However, the majority of particles released from construction will be greater than this in size.

Construction works on site have the potential to elevate localised PM_{10} concentrations in the area. On this basis, mitigation measures should still be taken to minimise these emissions as part of good site practice.

5.3 Dust

Particles greater than 10μm are likely to settle out relatively quickly and may cause annoyance due to their soiling capability. There are no formal standards or criteria for nuisance caused by deposited particles, however, a deposition rate of 200mg/m^2/day is often presented as a threshold for serious nuisance though this is usually only applied to long term exposure as people are generally more tolerant of dust for a short or defined period. Significant nuisance is likely when the dust coverage of surfaces is visible in contrast with adjacent clean areas, especially when it happens regularly. Severe dust nuisance occurs when the dust is perceptible without a clean reference surface.

Construction activities have the potential to suspend dust, which could result in annoyance of residents surrounding the site. Measures should be taken to minimise the emissions of dust as part of good site practice. Recommended mitigation measures proportionate to the risk associated with the development and based on best practice guidance are discussed in the following sections.

5.4 Methodology

The construction phase assessment utilises the IAQM Guidance on the Assessment of Dust from Demolition and Construction document published in February 2014.

In total, 4 processes are considered, namely demolition, earthworks, construction and trackout. For each of these phases, the significance of the potential dust impacts is derived following the determination of a dust emission magnitude and the distance of activities to the nearest sensitive receptor, therefore assessing worst case impacts. A full explanation of the methodology is contained in Appendix A. In order to keep consistency throughout the Environmental Statement reporting, the terms/phases for the descriptions of the significance of the impacts for the construction phase has been modified and changed to the ones presented in Table 2, for example, High significance for construction expressed as substantial; medium as moderate; low as minor). This modification will not bring any changes on the methodological assumptions nor on the assessment results.

Proposed receptors have also been included to assess the affect of elements of the construction phases as they are completed.

5.5 Assessment Results

Based on the methodology detailed in Appendix A and prior to the implementation of appropriate mitigation measures, the potential impact significance of dust emissions associated with the construction phase of the proposed development is presented in Table 7 below. The assessment is based on the nearest sensitive receptors to each source activity.

Table 7. Impact Significance of Construction Activities without Mitigation on Surrounding Receptors

Source	Summary Risk of Impacts Prior to Mitigation		
	Dust Soiling	Health Effects of PM_{10}	Ecological
Demolition	High Risk	Medium Risk	n/a
Earthworks	Medium Risk	Low Risk	n/a
Construction	Medium Risk	Low Risk	n/a
Trackout	Low Risk	Low Risk	n/a

Table 8. Impact Significance of Construction Activities without Mitigation on New Receptors at Phase 1A (Buildings B3 (residential, offices and healthcare) and T2 (residential and restaurant)

Source	Summary Risk of Impacts Prior to Mitigation		
	Dust Soiling	Health Effects of PM_{10}	Ecological
Demolition	Low Risk	Low Risk	n/a
Earthworks	Medium Risk	Medium Risk	n/a
Construction	Low Risk	Low Risk	n/a
Trackout	Medium Risk	Medium Risk	n/a

Table 9. Impact Significance of Construction Activities without Mitigation on New Receptors at Phase 2A (buildings B4 (residential, gym and office), and T3 (residential and restaurant)

Source	Summary Risk of Impacts Prior to Mitigation		
	Dust Soiling	Health Effects of PM_{10}	Ecological
Demolition	Low Risk	Low Risk	n/a
Earthworks	Medium Risk	Medium Risk	n/a
Construction	Low Risk	Low Risk	n/a
Trackout	Medium Risk	Medium Risk	n/a

Table 10. Impact Significance of Construction Activities without Mitigation on New Receptors at Phase 2B (building T4 (Residential, club, and restaurants)

Source	Summary Risk of Impacts Prior to Mitigation		
	Dust Soiling	Health Effects of PM_{10}	Ecological
Demolition	Low Risk	Low Risk	n/a
Earthworks	Medium Risk	Medium Risk	n/a
Construction	Low Risk	Low Risk	n/a
Trackout	Medium Risk	Medium Risk	n/a

Appropriate mitigation measures are presented in Section 8. Following the adoption of these measures, the subsequent impact significance of the construction phase is not predicted to be significant.

5.6 Assessment of Air Quality Impacts from Construction Traffic

Assessment of air quality impact from the construction traffic, specifically from the heavy good vehicle traffic flows (HGVs), has been undertaken to predict the change in nitrogen dioxide due to the associated HGV's movement. The assessment has been undertaken using ADMS Roads.

HGV Movements

Blue Sky Building has produced a document to describe the proposed programme of demolition and construction works in relation to the development. It identifies four construction stages: Demolition, Sub-structure, superstructure and fit out. The estimated numbers of demolition and construction related vehicle journey for different stages of the works range from 20 to 60 vehicles per day. Vehicle movement are two-way and thus one vehicle generates 2 movements. Therefore the maximum vehicle movements are 120 per day in any stage.

Hours of Work

It is anticipated that the working hours for demolition and construction at the site will be generally be 08:00 – 18:00 hours weekday and 08:00 – 13:00 hours Saturday.

Access and Egress

The current proposals are that during the demolition and early construction stages, access and egress would be from Westferry Road (A1206).

Receptors

Four receptors have been placed on each side of the Westferry Road. The first receptor was located 2 m away from the kerb and the next receptor is 2 meter further away from the kerb. Those receptors are not selected as actual residential or commercial receptors. The receptors have been selected to provide the potential impact profiles adjacent the Westferry Road.

ADMS Modelling Results from the HGVs

The ADMS Model has predicted concentrations of NO_2 at each of the selected receptors and those concentrations are the net contributions from the movements of the construction HGVs.

The predicted contributions in nitrogen dioxide concentrations by the construction HGVs, in current year 2015 are presented in Table 8.

Table 11. Predicted Annual Average Concentrations of NO2 at Receptor Locations (μg/m3) from Construction HGV Movements

Receptor		X	Y	Nitrogen Dioxide (μg/m^3)
CR1	Westside of Westferry Road – 2 m away kerb	537105	179704	0.53
CR2	Westside of Westferry Road – 4 m away kerb	537103	179704	0.47
CR3	Westside of Westferry Road – 6 m away kerb	537101	179704	0.42
CR4	Westside of Westferry Road – 8 m away kerb	537099	179704	0.39

Receptor		X	Y	Nitrogen Dioxide ($\mu g/m^3$)
CR5	Eastside of Westferry Road – 2 m away kerb	537125	179704	0.65
CR6	Eastside of Westferry Road – 4 m away kerb	537127	179704	0.58
CR7	Eastside of Westferry Road – 6m away kerb	537129	179704	0.52
CR8	Eastside of Westferry Road – 8 m away kerb	537131	179704	0.47

Table 11 shows a trend of the fall-off in nitrogen dioxide concentrations with distance from the road and that the maximum predicted concentration is at the receptor closest to the kerb. The maximum predicted concentration, due to the HGV traffic movements associated with the development, is $0.65\mu g/m^3$, occurring at the receptor of 2 m away the kerb. The concentration decreases down to $0.47\mu g/m^3$ at a location of 8 m away from the kerb.

6. Assessment of Air Quality Impacts from Traffic

In the context of the proposed development, transportation is identified as the dominant emission source that is likely to cause potential risk of exposure of air pollutants at receptors.

The operational phase assessment therefore consists of the quantified predictions of the change in nitrogen dioxide and particulate matter for the operational phase of the development due to changes in traffic movement. Predictions of air quality at the site have been undertaken for the operational phase of the development using ADMS Roads.

In accordance with the provided traffic data, as contained within the supporting Traffic Assessment (TA), the operational phase assessment has been undertaken with an assumed operational opening year of 2021. The assessment scenarios are therefore:

- 2021 'Do Minimum' = Baseline + committed development
- 2021 'Do Something' Scenario = Baseline + committed development + Proposed Development

6.1 Existing and Predicted Traffic Flows

Baseline data and the projected 'do minimum' and 'do something' traffic data have been provided for the operational phase assessment in the form of Annual Average Daily Traffic figures (AADT).

Emission factors for the projected 'do minimum' and 'do something' scenarios have been calculated using the Emission Factor Toolkit Version 6.0 (June 2014).

For the purposes of the air quality assessment only roads predicted to experience significant changes in flows have been included in the air quality model. These represent the primary access routes to the proposed development site. Where unavailable, traffic speeds have been estimated based on site observations and national speed limits. All of the roads within the dispersion model are illustrated in Figure 21. Detailed traffic figures are provided in the table below.

Table 12. Traffic Data

Link	Average 2-way Speed (km/h)	2014 Baseline		2021 Do Minimum		2021 Do Something	
		AADT	%HGV	AADT	%HGV	AADT	%HGV
A1206 Westferry Road north of site access	25.30	7984	8.3	12221	8.3	13245	7.7
Millharbour	18.70	4125	1.9	6319	1.9	7694	1.6
Marsh Wall	25.4	11378	3.1	19840	3.1	20515	3.2
Westferry Road (Limehouse Link to Limehouse Causeway)	24.20	17423	10.4	21669	10.4	22560	10.2
Preston's Road	27.35	21834	5.7	30291	5.7	31589	5.6
Manchester Road to Marsh Wall	32.00	9768	2.5	---	---	---	---
Westferry Road to Manchester Road	32.00	11018	1.3	---	---	---	---

6.2 Model Verification

Model verification involves the comparison of modelled data to monitored data in order to gain the best possible representation of current pollutant concentrations for the assessment years. The verification process is in general accordance with that contained in Annex 3 of the TG (09) guidance note and uses the most recently available diffusion tube monitoring data to best represent this.

The verification process consists of using the monitoring data and the published background air quality data in the UK National Air Quality Information Archive to calculate the road traffic contribution of nitrogen oxides (NO_X) at the monitoring locations. Outputs from the ADMS Roads model are provided as predicted road traffic contribution NO_X emissions. These are converted into predicted roadside contribution NO_2 exposure at the relevant receptor locations based on the updated approach to deriving NO_2 from NO_X for road traffic sources published in paragraphs 2.22 to 2.27 of Local Air Quality Management TG(09). The calculation was derived using the NO_X to NO_2 worksheet in the online LAQM tools website hosted by DEFRA.

A model correction of 2.55 was applied to roadside predicted NO_X concentrations before converting to NO_2. This figure demonstrates that the model was over predicting the road traffic emissions at the monitoring locations, likely due to the effects of congestion and stop-start driving behaviour in the study area and the effects of increased tailpipe emissions as traffic accelerates away from the roundabouts and junctions. Table 13 summarises the final model/monitored data correlation following the application of the relevant adjustment factor.

Table 13. Comparison of Roadside Modelling & Monitoring Results for NO2

Monitoring location	NO_2 µg/m^3		
	Monitored NO_2	Modelled NO_2	Difference (%)
59	56.47	62.46	-10.62
60	64.53	62.05	3.84
62	55.14	54.69	0.81
65	58.34	52.96	9.22
67	48.62	51.48	-5.89
69	50.83	58.04	-14.18
70	49.50	47.92	3.21

The final model produced data at the monitoring locations to within 25% of the monitoring results, as recommended within TG(09).

The final verification model correlation coefficient (representing the model uncertainty) is 0.999. The 'ideal value' correlation coefficient recommended in Box A3.7 of TG(09) is 1.00. The model is therefore considered to be verified and suitably representative of local emissions and exposures.

6.3 Summary of Traffic Model Inputs

Table 14. Summary of ADMS Roads model Inputs

Parameter	Description	Input Value
Chemistry	A facility within ADMS-Roads to calculate the chemical reactions in the atmosphere between Nitric Oxide (NO), nitrogen dioxide (NO_2), Ozone (O_3) and Volatile organic compounds (VOCs).	No atmospheric chemistry parameters included
Meteorology	Representative meteorological data from a local source	**London City Airport Met Station**, hourly sequential data
Surface Roughness	A setting to define the surface roughness of the model area based upon its location.	**1.5m** representing a typical surface roughness for cities/woodland
Latitude	Allows the location of the model area to be set	United Kingdom = **51.49º**
Monin-Obukhov Length	This allows a measure of the stability of the atmosphere within the model area to be specified depending upon its character.	Mixed Urban/Industrial = **100m.**
Elevation of Road	Allows the height of the road link above ground level to be specified.	All road links were set at ground level = **0m**.
Road Width	Allows the width of the road link to be specified.	Road width used depended on data obtained from OS map data for the specific road link
Topography	This enables complex terrain data to be included within the model in order to account for turbulence and plume spread effects of topography	No topographical information used
Time Varied Emissions	This enables daily, weekly or monthly variations in emissions to be applied to road sources	No time varied emissions used
Road Type	Allows the effect of different types of roads to be assessed.	**London** road settings were used
Road Speeds	Enables individual road speeds to be added for each road link	Based on national speed limits
Canyon Height	Allows the model to take account turbulent flow patterns occurring inside a street with relatively tall buildings on both sides, known as a "street canyon".	No canyons used within the model
Road Source Emissions	Road source emission rates are calculated from traffic flow data using the in-built DfT database of traffic emission factors.	The **EFT** Version **6.0.1 (2014)** dataset was used. The latest Version 6.0.2 was also used in the assessment to confirm that the two versions produce the same prediction results.
Year	Predicted DfT emissions rates depend on the year of emission.	**2014** data for verification and operational phase assessment

6.4 ADMS Modelling Results

Traffic Assessment

The ADMS Model has predicted concentrations of NO_2 at relevant receptor locations adjacent to roads likely to be effected by the development, as summarised in the following tables. Only receptors close to roads where there is predicted to be a change in emissions have been assessed.

<u>Nitrogen Dioxide</u>

<u>Baseline</u>

The predicted annual average concentrations of NO_2 at existing receptors range from 30.16 µg/m³ to 50.18 µg/m³ in 2014, indicating the concentrations exceeded the AQO at some receptors. Those predicted concentrations have been compared to an annual pollution map which shows the annual mean pollution for the NO_2 during 2010 in detail across London. The annual pollution map in the area (http://www.londonair.org.uk/london/asp/annualmaps.asp) shows the NO_2 concentration ranges 32 µg/m³ to 60 µg/m³ at the modelled existing receptors. It can be seen that the predicted annual average concentrations of NO_2 are in line with those shown in the annual pollution maps.

Table 15 presents a summary of the predicted change in nitrogen dioxide concentrations at relevant receptor locations, in the projected year 2021, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 15. Predicted Annual Average Concentrations of NO_2 at Receptor Locations (µg/m3)

Receptor		Nitrogen Dioxide (µg/m³)			
		2014 Baseline	2021 Do Minimum	2021 Do Something	Development Contribution
R1	1-15 Kelly Court (1st storey)	50.09	45.83	46.05	0.22
R2	Millennium Harbour (1st storey)	32.84	33.35	33.57	0.22
R3	49 The Quarterdeck	31.12	31.33	31.44	0.11
R4	Caravel Close	34.28	34.98	35.30	0.32
R5*	Hotel*	34.14	34.87	35.09	0.22
R6	Westwood House (1st storey)	31.47	31.58	31.95	0.37
R7	42 Marsh Wall	34.84	35.55	35.81	0.27
R8	Walkers Lodge	43.18	40.66	41.10	0.43
R9	71 Preston's Road	50.18	50.06	50.36	0.30
PR1	Proposed Residential Receptor	31.83	31.06	31.17	0.11
PR2	Proposed Residential Receptor	30.97	30.96	31.03	0.07
PR3	Proposed Residential Receptor	30.50	30.44	30.51	0.07
PR4	Proposed Residential Receptor	30.41	30.23	30.28	0.06
PR5	Proposed Residential Receptor	30.16	30.04	30.13	0.09
Annual Mean Air Quality Objective not to be exceeded		**40 µg/m³**			

Note: *Non-Residential receptors are marked with asterisk

As indicated in Table 15, a number of modelled receptor locations are predicted to exceed the annual AQO for NO_2 in both the 'do minimum' and 'do something' scenarios.

The maximum predicted increase in annual average exposure to nitrogen dioxide at any existing residential receptor, due to changes in traffic movements associated with the development, is 0.43µg/m³, at Walker's Lodge (R8).

The significance of changes in traffic flow associated with the development with respect to annual mean NO_2 exposure has been assessed with reference to the criteria in Section 3. The outcomes of the assessment are summarised in Table 16.

Table 16. Significance of Effects at Key Receptors (Nitrogen Dioxide)

NO_2 Significance Effects at Key Receptors				
Receptor	Development Contribution (DS-DM) (µg/m³)	% Change in Concentration Relative to AQAL	% of Annual Mean Concentration in Assessment Year	Significance
R1	0.22	0%	>110% of AQAL	Negligible
R2	0.22	0%	76-94% of AQAL	Negligible
R3	0.11	0%	76-94% of AQAL	Negligible
R4	0.32	0%	76-94% of AQAL	Negligible
R5*	0.22	0%	76-94% of AQAL	Negligible
R6	0.37	0%	76-94% of AQAL	Negligible
R7	0.27	0%	76-94% of AQAL	Negligible
R8	0.43	0%	103-109% of AQAL	Negligible
R9	0.30	0%	>110% of AQAL	Negligible
PR1	0.11	0%	76-94% of AQAL	Negligible
PR2	0.07	0%	76-94% of AQAL	Negligible
PR3	0.07	0%	76-94% of AQAL	Negligible
PR4	0.06	0%	76-94% of AQAL	Negligible
PR5	0.09	0%	76-94% of AQAL	Negligible

The percentage of change in concentration relative to AQAL is less than 1% for all of the existing and proposed receptors. The effect significance in 2021 is determined to negligible for the receptors all receptors.

It should be noted that this assessment presents a worst case scenario of the proposed development in that it makes a number of worst case assumptions. For example, it is assumed there will be an increase from 19840 AADT for 2021 Do Minimum scenario to 20515 AADT for 2021 Do Something scenario.

Particulate Matter

Table 17 presents a summary of the predicted change in annual mean PM_{10} concentrations at relevant receptor locations in the projected year 2021, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 17. Predicted Annual Average Concentrations of PM10 at Receptor Locations (µg/m3)

Receptor		Particulate Matter (µg/m³)			
		2014 Baseline	2021 Do Minimum	2021 Do Something	Development Contribution
R1	1-15 Kelly Court (1st storey)	25.30	25.31	25.36	0.05
R2	Millennium Harbour (1st storey)	21.49	21.67	21.72	0.05
R3	49 The Quarterdeck	21.23	21.31	21.33	0.02

Receptor		Particulate Matter (µg/m³)			
		2014 Baseline	2021 Do Minimum	2021 Do Something	Development Contribution
R4	Caravel Close	21.74	21.97	22.04	0.07
R5*	Hotel*	21.70	22.04	22.08	0.04
R6	Westwood House (1st storey)	21.28	21.36	21.43	0.07
R7	42 Marsh Wall	22.22	22.63	22.69	0.05
R8	Walkers Lodge	23.58	23.65	23.74	0.10
R9	71 Preston's Road	25.90	26.20	26.28	0.07
PR1	Proposed Residential Receptor	21.33	21.26	21.28	0.02
PR2	Proposed Residential Receptor	21.21	21.24	21.26	0.02
PR3	Proposed Residential Receptor	21.13	21.15	21.17	0.01
PR4	Proposed Residential Receptor	21.12	21.11	21.12	0.01
PR5	Proposed Residential Receptor	21.08	21.08	21.10	0.02
Annual Mean Air Quality Objective not to be exceeded			**40 µg/m³**		

As indicated Table 17 the maximum predicted increase in annual average exposure to particulate matter at any existing residential receptor, due to changes in traffic movements associated with the development, is 0.10µg/m³, at Walkers Lodge (R8).

All modelled receptor locations are predicted to meet the AQO for PM_{10} in both the 'do minimum' and 'do something' scenarios.

The significance of changes in traffic flow associated with the development with respect to annual mean PM_{10} exposure has been assessed with reference to the criteria in section 3. The outcomes of the assessment are summarised in Table 18.

Table 18. Significance of Effects at Key Receptors (Particulate Matter)

PM_{10} Significance Effects at Key Receptors				
Receptor	Development Contribution (DS-DM) (µg/m³)	% Change in Concentration Relative to AQAL	% of Annual Mean Concentration in Assessment Year	Significance
R1	0.08	0%	<75% of AQAL	Negligible
R2	0.08	0%	<75% of AQAL	Negligible
R3	0.04	0%	<75% of AQAL	Negligible
R4	0.12	0%	<75% of AQAL	Negligible
R5*	0.08	0%	<75% of AQAL	Negligible
R6	0.12	0%	<75% of AQAL	Negligible
R7	0.09	0%	<75% of AQAL	Negligible
R8	0.17	0%	<75% of AQAL	Negligible
R9	0.13	0%	<75% of AQAL	Negligible
PR1	0.04	0%	<75% of AQAL	Negligible
PR2	0.03	0%	<75% of AQAL	Negligible
PR3	0.02	0%	<75% of AQAL	Negligible
PR4	0.02	0%	<75% of AQAL	Negligible
PR5	0.03	0%	<75% of AQAL	Negligible

In 2021, the predicted concentrations at all the 9 modelled receptors are below the Air Quality Objective of 40 $\mu g/m^3$. All receptors show a 0% change (<0.5%) as a result of the development. The effect significance is deemed to be negligible.

7. Assessment of Air Quality Impacts from Point Sources

7.1 Point Sources of Pollutants

This section presents an Air Quality Assessment of the impact of emissions from:

- The Barkantine Energy Centre (BEC), which is adjacent to the proposed development site. The Centre consists of a 1.3 MWe/1.6 MWth CHP gas engine, with four back-up 1.4 MW gas boilers; and,

- Onsite Westferry Energy Centre (WEC), which is located at the basement of Building B07. The Centre consists of 11 Hoval boilers (912kW each) and 2 CHP gas engines.

The assessment studies the potential impact of NO_2 emissions from the engine and boiler operations at the above mentioned Energy Centres on the proposed residential units. Mitigation measures are presented and discussed to minimise the impacts to the proposed development.

The assessment has been undertaken in the following 2 stages:

- Stage 1: impact screening from the BEC only; and
- Stage 2: emission impacts from both the BEC and the WEC.

7.2 Buildings in the Modelling Assessment

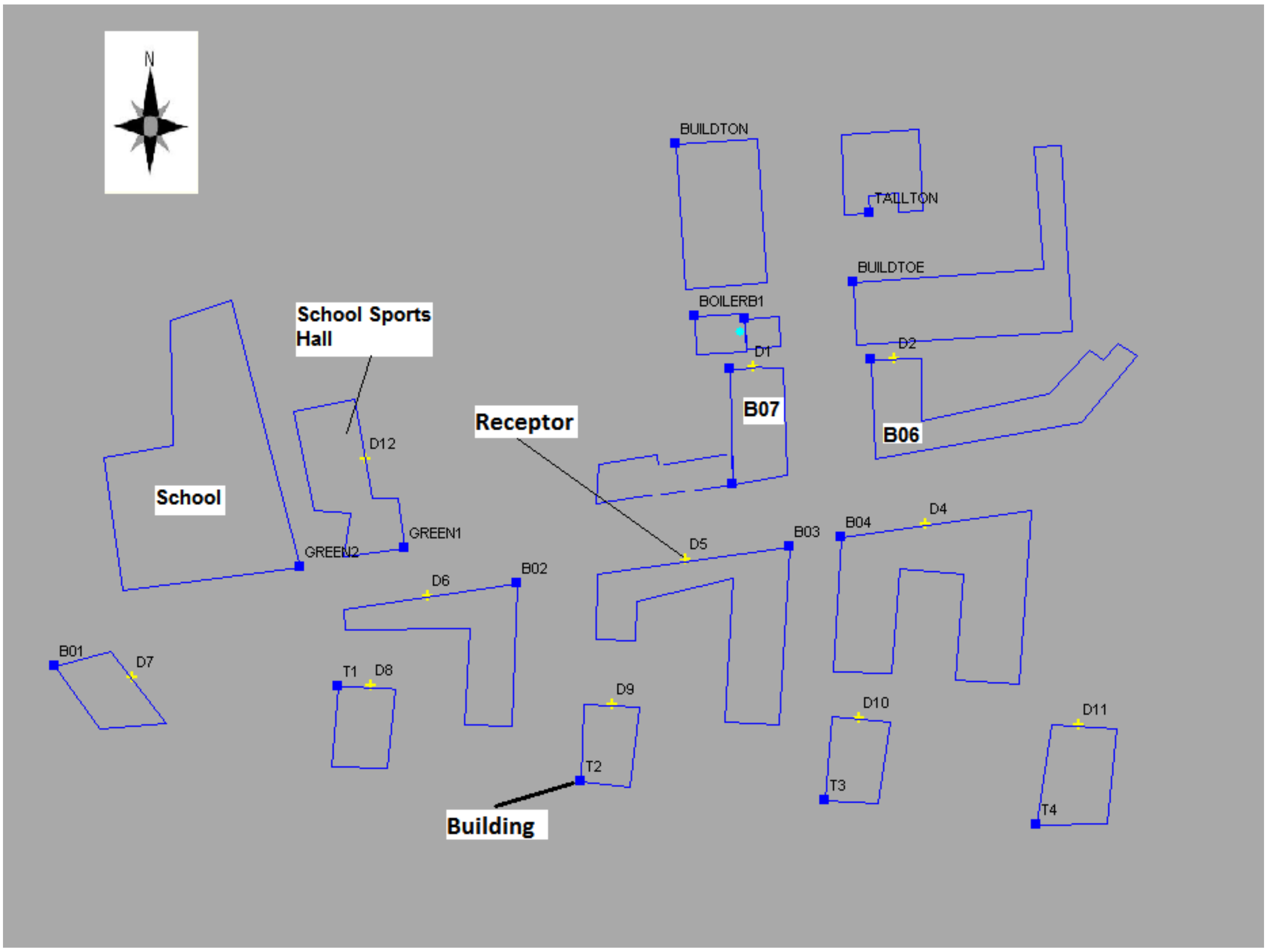
Buildings nearby or immediately adjacent to the two Energy Centres could potentially cause building downwash effects on emission sources and have therefore been modelled. The locations and dimensions of the buildings used in the model are given in Table 19 and illustrated in Figure 1.

Table 19. Locations and Heights of Buildings Used in the Model

Name		UK NGR (m)		Height (m)
		X	Y	
1	Building to East/Existing	537455	179298	12
2	Building to North/Existing	537395	179344	10
3	Building to North/Existing	537460	179321	30
4	B07 East Section /Proposed	537413	179269	22.5
5	B07 West Section /Proposed	537414	179231	19.2
6	B06/Proposed	537460	179272	19.2
7	B03/Proposed	537433	179210	23
8	B02/Proposed	537342	179197	23
9	B01/Proposed	537187	179169	23
10	Green Building 1/Existing	537304	179209	23
11	Green Building 2/Existing	537269	179203	23
12	T1 (Tower Building)/Proposed	537282	179163	38

Name		UK NGR (m)		Height (m)
		X	Y	
13	T2 (Tower Building)/Proposed	537363	179131	38
14	T3 (Tower Building)/Proposed	537445	179125	38
16	T4 (Tower Building)/Proposed	537516	179117	38
17	B04/Proposed	537451	179213	23
18	Boiler Build 1/Existing	537401	179287	12
19	Boiler Build 2/Existing	537418	179286	8

Figure 1 Buildings in the model and sensitive receptor locations at the north side of buildings for screening assessment



7.3 Meteorological Data

The meteorological data used in the assessment is derived from 2010 London City Airport, which is considered representative of conditions within the vicinity of the proposed development site, with all the complete parameters necessary for the AERMOD model. Reference should be made to Figure 22 for an illustration of the prevalent wind conditions at the London City Airport.

7.4 NO_x to NO_2 Conversion for Point Source Assessment

Ground level NOx concentrations have been predicted through dispersion modelling. NO2 concentrations reported in the results section assume 70% conversion from NOx to NO2 for annual means and a 35% conversion for short-term (hourly) concentrations, based upon the EA recommended methodology for a worst case scenario assessment.

7.5 Background Concentration for Point Source Assessment

Background concentrations used for the point source assessment were referenced from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the development site. The NO_2 background concentration of 28.27 µg/m^3 was the average values of the concentrations for 2014 at grid points (537500, 179500; and 537500, 178500) adjacent to the proposed development of Westferry Printworks and two Energy Centres.

7.6 Stage 1 – Screening Assessment from the BEC

The objectives of this screening assessment are twofold:

1. To identify which building block will be most affected by the emissions from the BEC; and
2. To determine at which height/elevation the worst predicted impact is likely to occur.

Emission Rate and Process Conditions of the BEC

The BEC consists of a 1.4 MWe/1.6 MWth CHP gas engine, two 1.4 MW gas boilers and two 1.45 MW gas boilers.

It is assumed that the engine and boilers are all operating at full load at all time to produce a conservative assessment. It is also assumed that combustions of each unit volume of gas (fuel) will produce a total gaseous volume of 12.5 times of the fuel volume. All exhaust gases will be released to atmosphere by a single 18 m height stack. The boiler specification is show in Table 20 below.

Table 20. Biomass Boiler Specification

Parameter	Value
Fuel type	Gas
Nominal Appliance rating	7.1 MW
Internal Diameter of stack	0.875m
Stack Locations (UK NGR)	537417, 179281
Temperature of Exhaust Flue Gas	190 ℃
Efflux Velocity	8.0 m/s

Parameter	Value
Stack Height	18 m

NO_2 emissions have been calculated using the maximum thermal capacity (e.g. kWth) of the engine/boilers and the emission factors published in the EMEP/CORINAIR Guidebook. The mass emission used in the assessment is presented in Table 21.

Table 21. Biomass Boiler Emissions (Full Load)

Pollutant	Emission Rate (g/s) from the BEC
NO_x	0.408

Emissions were assumed to be constant, e.g., the engine/boiler in operation for 24-hours per day, 365 days per year. The backup boilers were also modelled to be operating continuously throughout the year; therefore the results presented within this assessment are considered to represent an absolute worst case scenario.

Sensitive Receptors for the Screening Assessment

The term 'sensitive receptors' includes all newly proposed residential buildings that may be affected by the emissions to air from the BEC. The assessment has been undertaken to determine the potential impacts at different elevations and facades (representing the bedroom window levels) for each of the proposed residential blocks. The sensitive building receptors are contained in Table 22.

Table 22. Modelled Sensitive Receptors

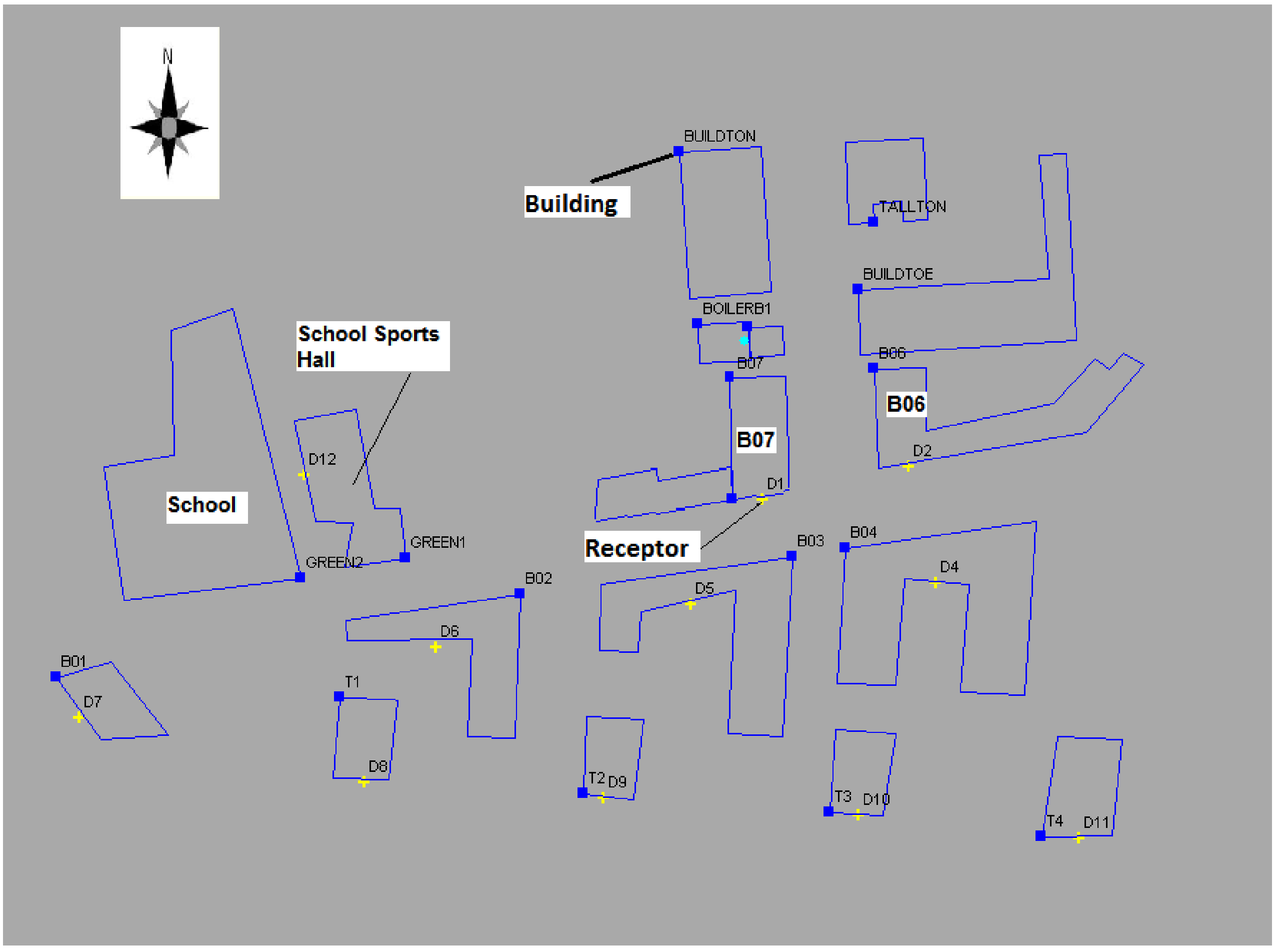
Building Name		UK NGR (m) at the north side of buildings		UK NGR (m) at the back side of the buildings	
		X	Y	X	Y
D1	B07	537420	179270	537422	179231
D2	B06	537468	179272	537471	179240
D4	B04	537478	179217	537481	179201
D5	B03	537398	179206	537399	179196
D6	B02	537312	179193	537314	179180
D7	B01	537213	179166	537195	179156
D8	T1	537293	179163	537290	179135
D9	T2	537373	179157	537370	179129
D10	T3	537456	179152	537455	179124
D11	T4	537530	179150	537528	179116
D12	School Sports Block	537291	179239	537270	179237

The following receptor heights have been assessed for each building in Stage 1:

- Ground level;
- 5m, 11m, 14.5m, 18m, and 21.5 m above the ground level.

Table 23 and Figure 2 show the identified sensitive receptor locations for the screening assessment.

Figure 2 Sensitive receptor locations on the south of buildings for screening assessment



Stage 1 Screening Assessment Results

The detailed computer modelling assessment of process emissions was undertaken using the input parameters detailed in earlier within this section. All predicted concentrations have been compared to the relevant environmental assessment criteria.

Long-Term NO_2

Predicted long-term (annual mean) NO_2 concentrations at every modelled receptor height for receptors are summarised in Table 23 and Table 24.

Table 23. Predicted Annual Mean NO2 Concentrations at Different Elevations (North Facade)

Receptor Name (front of buildings)	Predicted Annual Mean NO_2 Concentration ($\mu g/m^3$)											
	Ground Level		5m (AGL)		11m (AGL)		14.5m (AGL)		18m (AGL)		21.5m (AGL)	
	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC
B07	2.57	30.84	2.29	30.56	1.69	29.96	1.54	29.81	4.67	32.94	13.74	**42.01**

Receptor Name (front of buildings)	Predicted Annual Mean NO_2 Concentration ($\mu g/m^3$)											
	Ground Level		5m (AGL)		11m (AGL)		14.5m (AGL)		18m (AGL)		21.5m (AGL)	
	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC
B06	2.23	30.50	2.29	30.56	2.97	31.24	3.94	32.21	5.25	33.52	6.18	34.45
B04	3.78	32.05	3.46	31.73	2.86	31.13	2.71	30.98	2.71	30.98	2.77	31.04
B03	1.14	29.41	1.24	29.51	1.70	29.97	2.21	30.48	2.98	31.25	3.99	32.26
B02	0.81	29.08	0.74	29.01	0.85	29.12	1.02	29.29	1.24	29.51	1.48	29.75
B01	0.64	28.91	0.60	28.87	0.64	28.91	0.68	28.95	0.74	29.01	0.79	29.06
T1	0.74	29.01	0.68	28.95	0.76	29.03	0.87	29.14	1.01	29.28	1.16	29.43
T2	1.04	29.31	0.98	29.25	1.15	29.42	1.37	29.64	1.68	29.95	2.04	30.31
T3	1.68	29.95	1.62	29.89	1.67	29.94	1.72	29.99	1.80	30.06	1.87	30.14
T4	1.50	29.77	1.43	29.70	1.38	29.65	1.35	29.62	1.32	29.59	1.28	29.55
School Sports Block	0.92	29.19	0.87	29.14	1.02	29.29	1.20	29.47	1.41	29.68	1.63	29.90

NOTE:

a) PC - Process Contribution;
b) PEC - Predicted Environmental Concentration. Inclusive of background concentration of 28.27 $\mu g/m^3$
c) AGL – above ground level.
d) Number in bold indicates above the ASO of 40 $\mu g/m^3$

Table 24. Summary of Predicted NO2 Concentrations at Different Elevations (South Facade)

Receptor Name (south of buildings)	Predicted Annual Mean NO_2 Concentration ($\mu g/m^3$)											
	Ground Level		5m (AGL)		11m (AGL)		14.5m (AGL)		18m (AGL)		21.5m (AGL)	
	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC
B07	8.90	37.17	7.88	36.15	5.89	34.16	5.39	33.66	5.37	33.64	5.37	33.64
B06	4.70	32.97	4.31	32.58	3.58	31.85	3.45	31.72	4.94	33.21	4.94	33.21
B04	2.41	30.68	2.37	30.64	2.38	30.65	2.40	30.67	2.42	30.69	2.42	30.69
B03	1.19	29.46	1.26	29.53	1.63	29.90	2.02	30.29	2.54	30.81	2.54	30.81
B02	0.79	29.06	0.72	28.99	0.84	29.11	1.00	29.27	1.20	29.47	1.20	29.47
B01	0.60	28.87	0.57	28.84	0.60	28.87	0.63	28.90	0.67	28.94	0.67	28.94
T1	0.72	28.99	0.68	28.95	0.75	29.02	0.84	29.11	0.95	29.22	0.95	29.22
T2	1.03	29.30	0.97	29.24	1.08	29.35	1.22	29.49	1.42	29.69	1.42	29.69
T3	1.45	29.72	1.39	29.66	1.41	29.68	1.45	29.72	1.50	29.77	1.50	29.77
T4	1.22	29.49	1.15	29.42	1.11	29.38	1.09	29.36	1.07	29.34	1.07	29.34
School Sports Block	0.84	29.11	0.79	29.06	0.90	29.17	1.02	29.29	1.17	29.44	1.17	29.44

NOTE:

a) PC - Process Contribution;
b) PEC - Predicted Environmental Concentration. Inclusive of background concentration of 28.27 $\mu g/m^3$
c) AGL – above ground level.

As indicated in Table 23 and Table 24 the long-term PEC of NO_2 at every receptor height for modelled receptors are all below the relevant long-term AQO of 40 $\mu g/m^3$. This is with the exception of the north facade at receptor Block B07 at a height of 21.5 m, where the predicted long-term PEC of NO_2 was 42.01 $\mu g/m^3$. This is approximately 5% higher than the long-term AQO of 40 $\mu g/m^3$.

Short-Term NO_2

Predicted short-term (99.79%-ile 1 hour mean) NO_2 concentrations at each modelled receptor height for all receptors are summarised in Table 25 and Table 26.

Table 25. Predicted 1-hour Mean NO2 Concentrations at Different Elevations (Front Facade)

Receptor Name (north of Buildings)	Predicted 99.79%ile 1-Hour Mean NO_2 Concentration (µg/m^3)											
	Ground Level		5m (AGL)		11m (AGL)		14.5m (AGL)		18m (AGL)		21.5m (AGL)	
	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC
B07	19.03	75.57	16.77	73.31	12.04	68.58	10.47	67.01	25.66	82.20	123.1	179.64
B06	15.74	72.28	13.75	70.29	15.87	72.41	23.65	80.19	34.58	91.11	47.17	103.71
B04	19.31	75.85	17.06	73.60	13.83	70.37	14.72	71.25	17.77	74.31	21.77	78.31
B03	18.63	75.17	17.54	74.08	16.44	72.98	16.43	72.97	19.31	75.84	29.70	86.24
B02	4.92	61.45	4.86	61.40	8.14	64.68	12.39	68.93	17.48	74.02	24.35	80.89
B01	5.69	62.23	6.19	62.73	8.02	64.55	10.19	66.73	12.95	69.49	15.68	72.22
T1	4.56	61.10	5.71	62.25	9.65	66.19	13.46	70.00	18.19	74.73	23.30	79.84
T2	9.68	66.22	9.87	66.41	10.54	67.08	11.14	67.67	12.93	69.47	18.03	74.57
T3	12.15	68.69	12.24	68.78	13.07	69.61	13.96	70.50	16.32	72.86	19.51	76.05
T4	12.49	69.03	12.49	69.03	13.09	69.63	14.07	70.61	14.60	71.14	15.40	71.94
School Sports Block	6.43	62.97	6.59	63.12	9.51	66.05	12.36	68.90	15.13	71.67	19.23	75.77

NOTE:
a) PC - Process Contribution;
b) PEC - Predicted Environmental Concentration. Inclusive of background concentration of 56.54µg /m^3
c) AGL – above ground level.

Table 26. Predicted 1-hour Mean NO2 Concentrations at Different Elevations (South Facade)

Receptor Name (south of Buildings)	Predicted 99.79%ile 1-Hour Mean NO_2 Concentration (µg/m^3)											
	Ground Level		5m (AGL)		11m (AGL)		14.5m (AGL)		18m (AGL)		21.5m (AGL)	
	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC
B07	29.06	85.60	25.50	82.04	18.27	74.81	15.91	72.45	14.91	71.45	14.91	71.45
B06	24.71	81.25	21.59	78.13	16.33	72.86	15.54	72.08	23.96	80.50	23.96	80.50
B04	12.47	69.01	12.50	69.04	13.80	70.33	14.89	71.43	17.75	74.29	17.75	74.29
B03	12.46	69.00	12.66	69.20	13.86	70.39	15.41	71.95	18.55	75.08	18.55	75.08
B02	4.62	61.16	4.68	61.21	8.29	64.83	12.82	69.36	17.91	74.45	17.91	74.45
B01	5.89	62.43	6.46	63.00	8.23	64.77	10.26	66.80	12.24	68.78	12.24	68.78
T1	5.97	62.51	7.00	63.54	10.73	67.27	13.57	70.11	17.79	74.33	17.79	74.33
T2	10.31	66.85	10.40	66.94	10.79	67.32	11.03	67.56	12.63	69.17	12.63	69.17
T3	11.79	68.33	11.83	68.37	12.88	69.42	13.89	70.43	16.08	72.62	16.08	72.62
T4	11.70	68.24	11.77	68.31	11.81	68.35	12.45	68.99	13.70	70.24	13.70	70.24
School Sports Block	5.95	62.49	6.13	62.67	8.42	64.96	10.84	67.38	13.58	70.12	13.58	70.12

NOTE:
a) PC - Process Contribution;
b) PEC - Predicted Environmental Concentration. Inclusive of background concentration of 56.54 µg /m^3
c) AGL – above ground level.

As indicated in Table 25 and Table 26 the short-term PEC of NO_2 at each modelled receptor height for all receptors are all below the relevant short-term AQO of 200 µg/m^3.

<u>Stage 1 Screening Assessment Result Summary</u>

The screening assessment results indicated that:

1. The building block B07 will be most affected by the emissions from the BEC;

2. The most affected receptors will be at the top floor of building Block B07. The long-term PEC of NO_2 at a 21.5 m height for receptor B07 was predicted to be higher than the long-term AQO of 40 µg/m^3; and
3. The predicted short-term PEC of NO_2 at every modelled elevation at both north and south facades of the building are all below the relevant short-term AQO of 200 µg/m^3 for the protection of human health.

Since the building block B07 will be most affected by the emissions from the BEC and the WEC is located at the basement of the Building B07, the impact of emissions from the two Energy Centres on the building B07 will be assessed in the Stage 2.

7.7 Stage 2 – Detailed Impact Assessment from both the BEC and the WEC

The objectives in the Stage 2 assessment are twofold:

1. Assessment of impact of emissions from the onsite Energy Centre (WEC); and
2. Combined impact assessment from both the BEC and the WEC. But the focus will be on the emission impact on the Block B07 receptors at each window level.

Since the completion of the Stage 1 Screening assessment, building Block B07 has been redesigned/revised into two sections with different heights: an east section of a 7-story (ground-floor plus 6 stories) building and a west section of a 6-story (ground-floor plus 5 stories) building.

Receptors in the Stage 2 Assessment

More receptor points, which represent each window/door of the bedrooms and sitting rooms for the revised Block B07, have been selected in the stage 2 assessment.

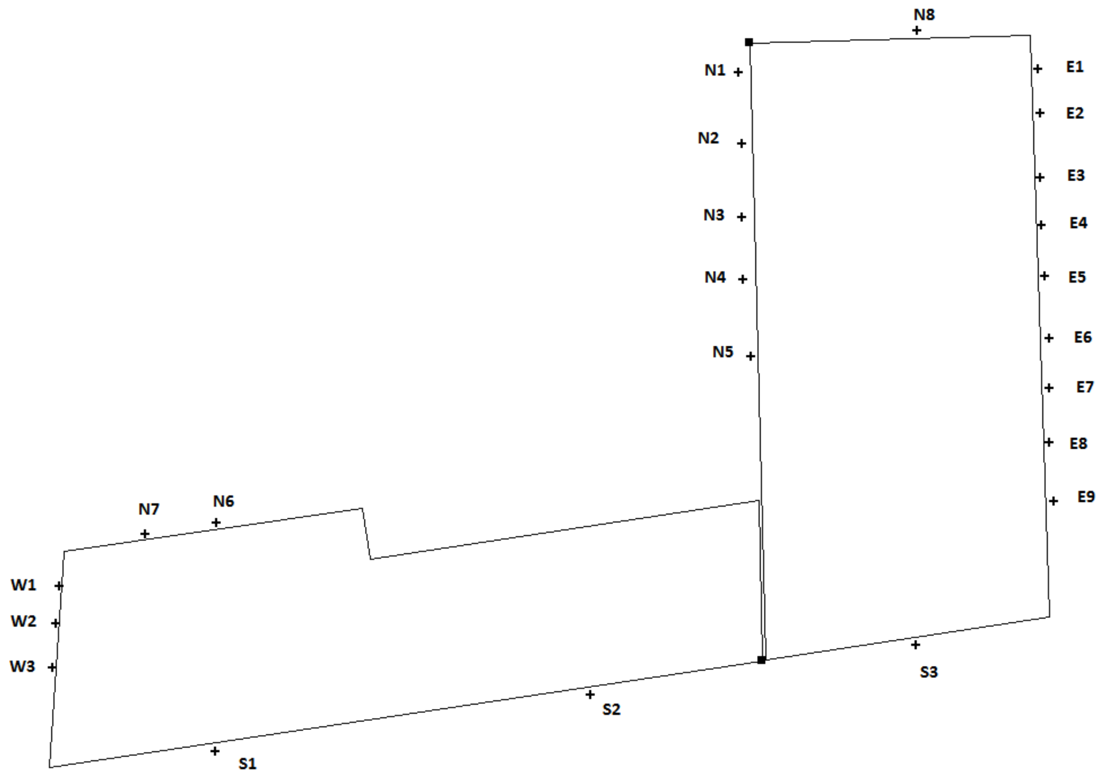
The identified receptors for Block B07 are detailed in Table 27 and shown in Figure 3. It should be noted that these receptors have been used to represent the receptor points at specific window levels. All receptors have been modelled at heights of 1.5m, 4.5m, 7.5m, 10.5m, 13.5m, 16.5mm and 19.5m.

Table 27. Sensitive Receptor Locations for Block B07

Receptor in the Model		UK NGR (m)	
		X	Y
1	N7	537375	179239
2	N6	537380	179240
3	N5	537413	179250
4	N1	537412	179268
5	N2	537412	179263
6	N3	537412	179259
7	N4	537413	179255

Receptor in the Model		UK NGR (m)	
		X	Y
8	E9	537432	179241
9	E8	537432	179245
10	E7	537432	179248
11	E6	537432	179251
12	E1	537431	179268
13	E2	537431	179265
14	E3	537431	179261
15	E4	537431	179258
16	E5	537431	179255
17	W1	537370	179236
18	W2	537369	179233
19	W3	537369	179231
20	S1	537379	179225
21	S2	537403	179229
22	S3	537423	179232
23	N8	537424	179270

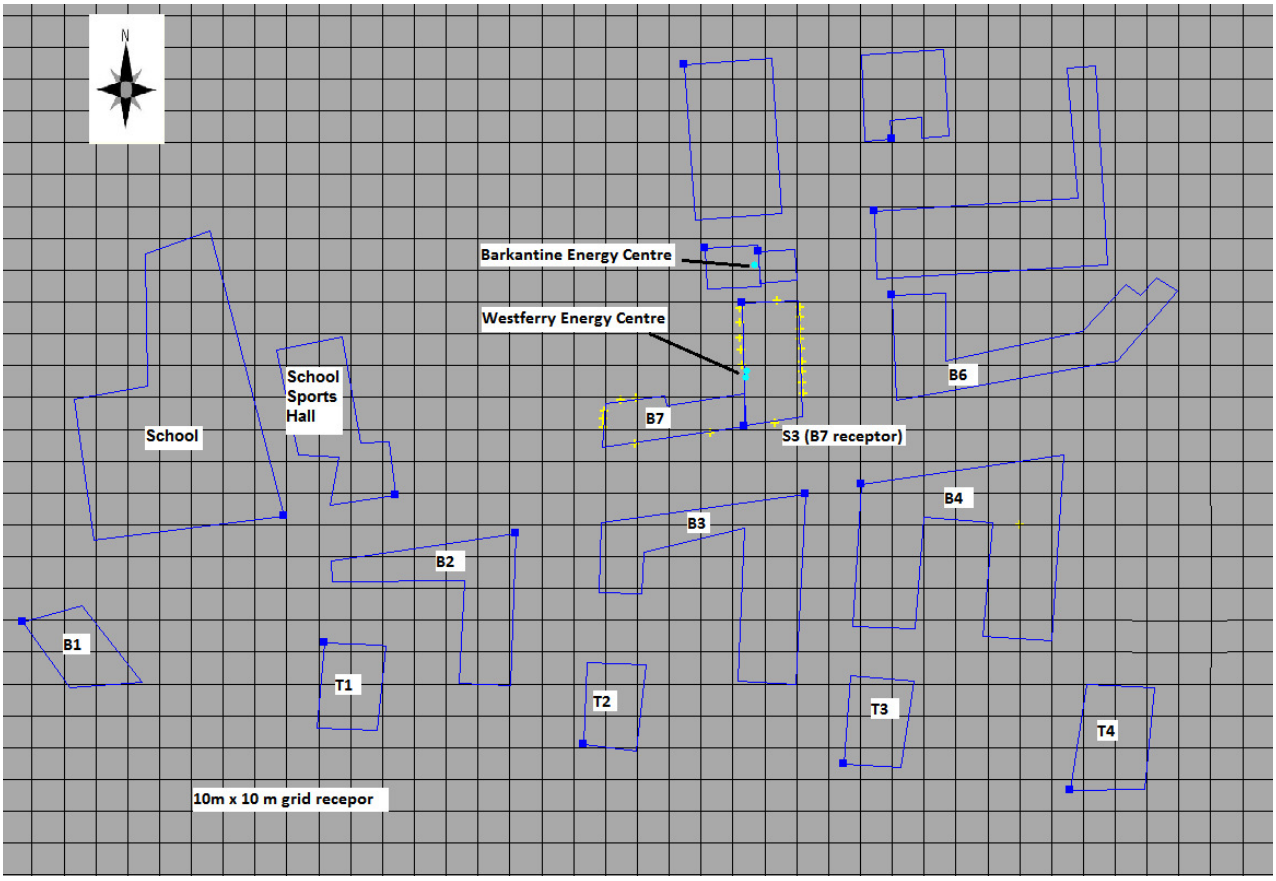
Figure 3 Sensitive Receptor Locations at Single Story Level for Block B07



Cartesian Grid Receptor

A Cartesian receptor grid was used in the model in order to produce the concentration contour lines. The Cartesian receptor grid consists of receptors indentified by their x (East-west) and y (north-south) coordinates. The grid was constructed with grid spacing (x, y) of 10m x 10m over an area covering 500m by 400m with south-west corner UK NGR (m) of 537150, 179050. The grid receptors have also been assessed at each height identified for the Block B07 receptors. Figure 4 shows the grid receptors and the emission sources.

Figure 4 Grid receptors and Emission Sources



Emission Rate and Process Conditions of the WEC

The WEC consists of 11 operations of Hoval boilers (912kW each) and 2 of the CHP gas engines. The CHP unit is at 0.174 MWth each.

The specifications for the boilers and CHP engines utilised in the model are presented in Table 28.

Table 28. Boiler and CHP Gas Engine Specifications in the WEC

Parameter	Hoval Boiler	CHP Gas Engine
Fuel type	Gas	Gas
Nominal Appliance rating	0.912 MW (each boiler)	0.174 MW (each engine)
Internal Diameter of stack	0.75	0.35
Stack Locations (UK NGR)	537415, 179248	537414, 179246
Temperature of Exhaust Flue Gas	90 ℃	190 ℃

Parameter	Hoval Boiler	CHP Gas Engine
Efflux Velocity	5.26 m/s	2.30 m/s
Stack Height	6 m (above the roof) Roof: +28.51m AOD	6 m (above the roof) Roof: +28.51m AOD

NO_2 emissions for the Hoval boilers have been calculated using the client provided NO_x emission rates of 35mg/kWh. NO_2 Emissions for CHP gas engines have been calculated using the maximum thermal capacity (e.g. kWth) of the engine/boilers and the emission factors published in the EMEP/CORINAIR Guidebook. The Mass emissions used within AERMOD are presented in Table 29.

Table 29. Biomass Boiler Emissions (Full Load)

Pollutant	Emission Rate (g/s)	
	11 Hoval Boilers	2 CHP Gas Engines
NO_x	0.098	0.0178

Emissions were assumed to be constant, e.g. the boiler in operation for 24-hours per day, 365-days per year. Therefore, the results presented within this assessment are considered to represent an absolute worst case scenario. The stacks for 11 of Hoval boiler have been modelled a combined single point source as they are installed close to each other.

Stage 2 Assessment Results – Impact of Emission from the WEC

The detailed computer modelling assessment of process emissions was undertaken using the input parameters detailed earlier within this section. All predicted concentrations have been compared to the relevant environmental assessment criteria.

Long-Term NO_2

Predicted long-term (annual mean) NO_2 concentrations from the onsite WEC at the receptors of both eastern and western sections of the Block B07 building are summarised in Table 30.

Table 30. Predicted Annual Mean NO2 Concentrations at Receptors in Block B07 Building

Receptor Name		Predicted Annual Mean NO_2 Concentration (μg/m^3)	
		PC	PEC
1	N7	0.104	28.37
2	N6	0.104	28.37
3	N5	0.105	28.37
4	N1	0.105	28.37
5	N2	0.106	28.38
6	N3	0.106	28.38
7	N4	0.107	28.38
8	E9	0.108	28.38
9	E8	0.108	28.38

Receptor Name		Predicted Annual Mean NO_2 Concentration (µg/m^3)	
		PC	PEC
10	E7	0.109	28.38
11	E6	0.110	28.38
12	E1	0.111	28.38
13	E2	0.113	28.38
14	E3	0.114	28.38
15	E4	0.115	28.38
16	E5	0.117	28.39
17	W1	0.122	28.39
18	W2	0.127	28.40
19	W3	0.132	28.40
20	S1	0.140	28.41
21	S2	0.147	28.42
22	S3	0.153	28.42
23	N8	0.160	28.43

NOTE:

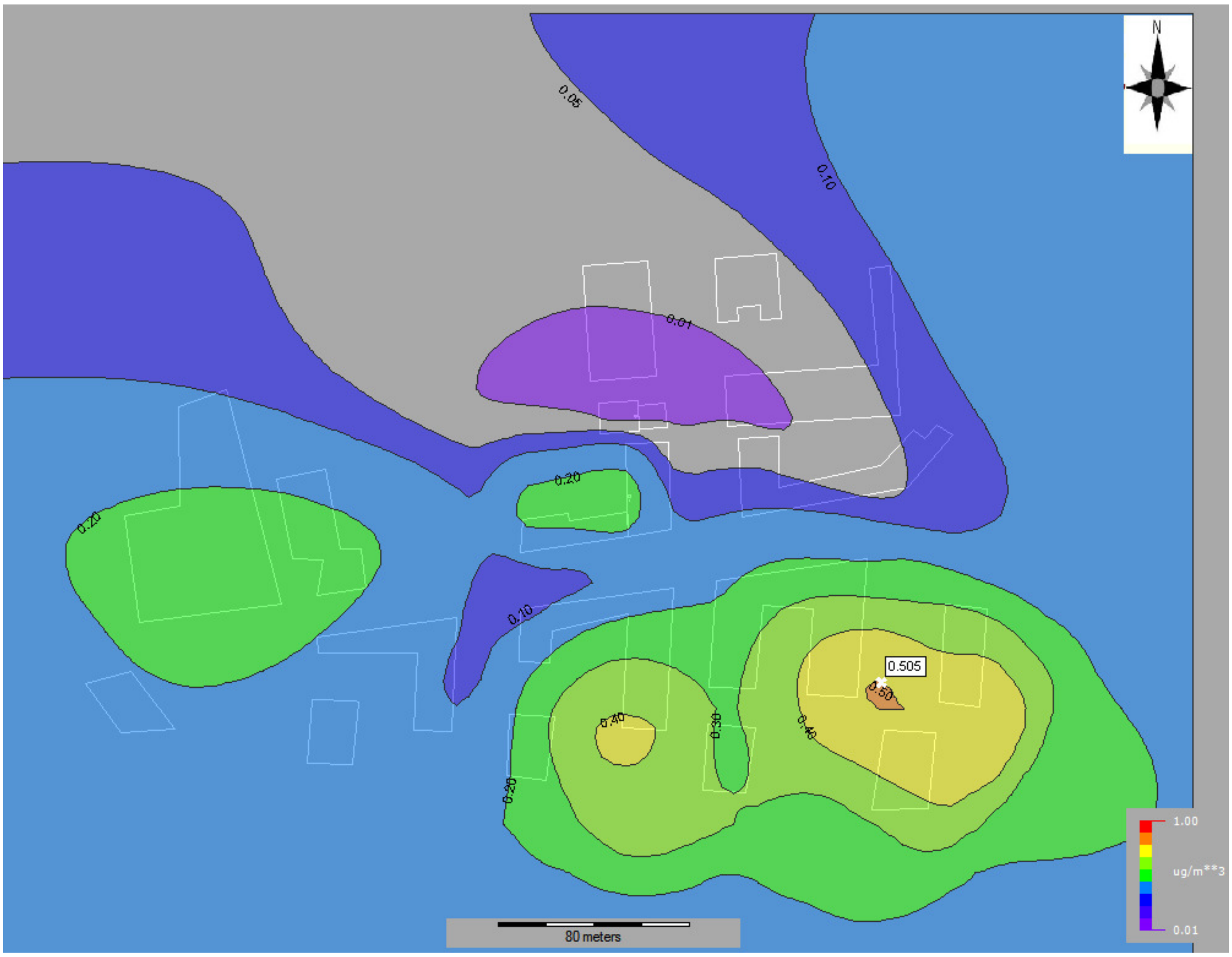
a) PC - Process Contribution; and
b) PEC - Predicted Environmental Concentration. Inclusive of background concentration of 28.27 µg /m^3

As indicated in Table 30, the long-term PECs of NO_2 for all Block B07 receptors are below the relevant long-term AQO of 40 µg/m^3. The maximum process contribution is 0.16 µg/m^3 and the impacts of emissions from the WEC onto the Block B07 building is small.

Considering both Block B07 receptors and the grid receptors together, the maximum PEC is 28.77µg/m^3 (including the PC concentration of 0.505µg/m^3). This value is also below the relevant long-term AQO of 40 µg/m^3. This maximum occurs at a location (537520, 179170) adjacent to the east of B04, as shown in Figure 5

The combined impacts of emissions from both the BEC and the WEC are discussed in the following section.

Figure 5 Predicted Process Contribution from the WEC emissions – Contour Plot



Stage 2 Assessment Results – Combined Impact of Emissions from BEC and WEC

Long-Term NO_2

Predicted long-term (annual mean) NO_2 concentrations at the modelled Block B07 receptors at each modelled elevation are summarised in Table 31.

Table 31. Predicted Annual Mean NO2 Concentrations at Block B07 Receptors at Each Elevation

Receptor Name	Predicted Annual Mean NO_2 Concentration (µg/m^3)													
	1.5m(AGL		4.5m (AGL)		7.5m (AGL)		10.5m (AGL)		13.5m (AGL)		16.5m (AGL)		19.5m(AGL)	
	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC
1	0.53	28.80	0.51	28.78	0.51	28.78	0.51	28.78	0.51	28.78	0.52	28.79	N/A	N/A
2	0.55	28.82	0.53	28.80	0.52	28.79	0.53	28.79	0.53	28.80	0.54	28.81	N/A	N/A
3	0.56	28.83	0.55	28.82	0.54	28.81	0.54	28.81	0.55	28.82	0.56	28.83	0.57	28.84
4	0.58	28.85	0.56	28.83	0.56	28.82	0.56	28.83	0.57	28.84	0.58	28.85	0.60	28.86
5	0.59	28.86	0.58	28.85	0.57	28.84	0.58	28.85	0.59	28.86	0.60	28.87	0.62	28.89
6	0.61	28.88	0.59	28.86	0.59	28.86	0.60	28.87	0.61	28.88	0.63	28.90	0.64	28.91
7	0.63	28.90	0.61	28.88	0.61	28.88	0.62	28.88	0.63	28.90	0.65	28.92	0.67	28.94
8	0.64	28.91	0.63	28.90	0.62	28.89	0.64	28.91	0.65	28.92	0.68	28.95	0.70	28.97
9	0.66	28.93	0.64	28.91	0.64	28.91	0.66	28.93	0.68	28.95	0.70	28.97	0.73	29.00
10	0.67	28.94	0.66	28.93	0.66	28.93	0.68	28.95	0.70	28.97	0.73	29.00	0.76	29.03
11	0.69	28.96	0.68	28.95	0.68	28.95	0.70	28.97	0.73	29.00	0.76	29.03	0.80	29.07
12	0.71	28.98	0.69	28.96	0.70	28.97	0.72	28.99	0.76	29.03	0.80	29.06	0.84	29.11
13	0.72	28.99	0.71	28.98	0.72	28.99	0.74	29.01	0.78	29.05	0.83	29.09	0.87	29.14
14	0.73	29.00	0.72	28.99	0.73	29.00	0.76	29.03	0.80	29.07	0.86	29.12	0.91	29.18
15	0.74	29.01	0.73	29.00	0.75	29.02	0.78	29.05	0.83	29.10	0.88	29.15	0.95	29.22
16	0.76	29.03	0.75	29.02	0.77	29.04	0.81	29.08	0.86	29.13	0.92	29.19	0.99	29.26
17	0.78	29.05	0.77	29.04	0.79	29.06	0.83	29.10	0.89	29.16	0.95	29.22	N/A	N/A
18	0.81	29.08	0.80	29.07	0.81	29.08	0.85	29.12	0.91	29.18	0.98	29.25	N/A	N/A
19	0.83	29.10	0.82	29.09	0.84	29.11	0.87	29.14	0.93	29.20	1.00	29.27	N/A	N/A
20	0.87	29.14	0.85	29.12	0.86	29.13	0.89	29.16	0.94	29.21	1.00	29.27	N/A	N/A
21	0.91	29.18	0.88	29.15	0.88	29.15	0.89	29.16	0.93	29.20	0.98	29.25	N/A	N/A
22	0.96	29.23	0.92	29.19	0.90	29.17	0.89	29.16	0.91	29.18	0.95	29.22	1.01	29.28
23	1.02	29.29	0.97	29.24	0.92	29.19	0.90	29.17	0.90	29.17	0.93	29.20	0.97	29.24

NOTE:

a) PC - Process Contribution;
b) PEC - Predicted Environmental Concentration. Inclusive of background concentration of 28.27 µg /m^3
c) AGL – above ground level.
d) Long-term ASO of 40 µg /m^3

As indicated in Table 31, long-term PECs of NO_2 at every receptor height for all B07 receptors are all below the relevant long-term AQO of 40 µg/m^3.

The contour plots of the predicted PC of all modelled receptors (for both Block B07 receptors and the grid receptors) at each elevation of 1.5m, 4.5m, 7.5m, 10.5m, 13.5m, 16.5m and 19.5m are presented in Figures 6 to 12.

Figure 6 Predicted NO_2 PC from the BEC and WEC (receptor height 1.5m) – Contour Plot

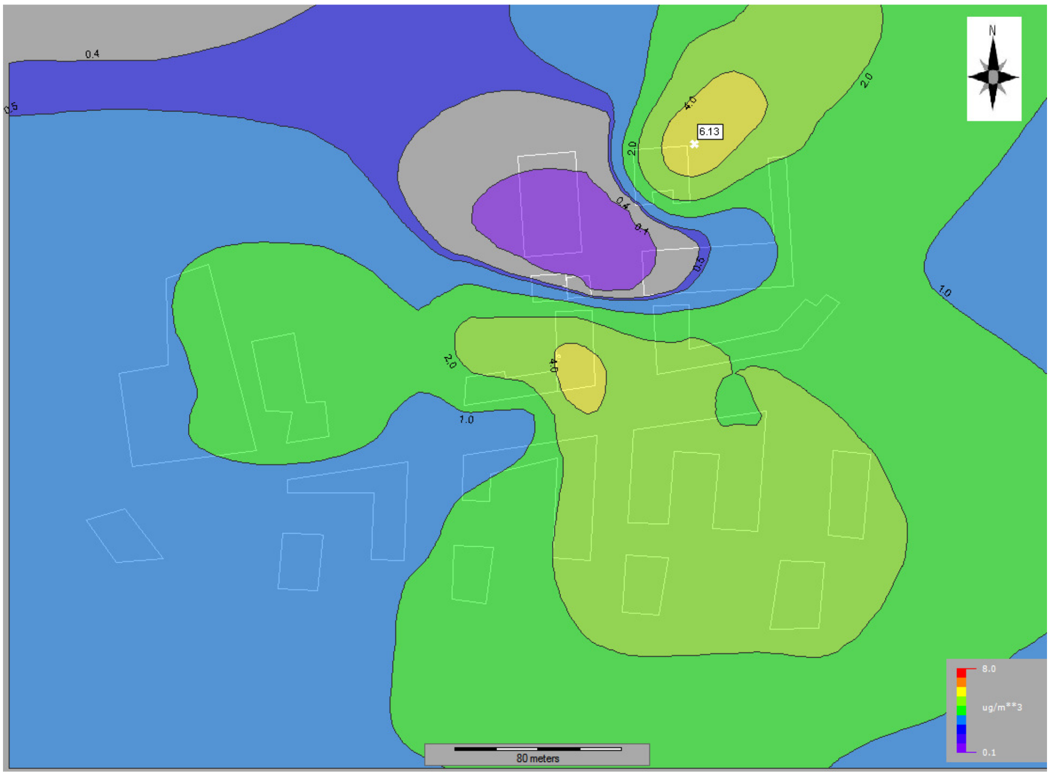


Figure 7 Predicted NO_2 PC from the BEC and WEC (receptor height 4.5m) – Contour Plot

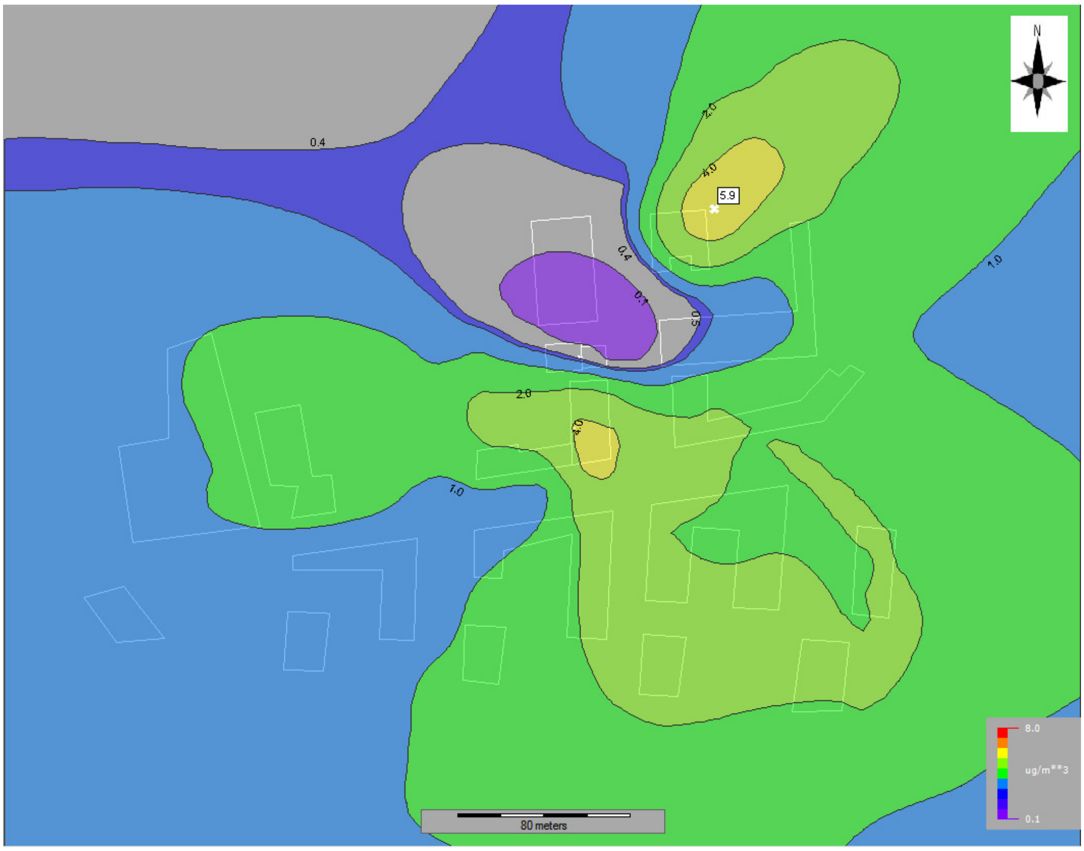


Figure 8 Predicted NO_2 PC from the BEC and WEC (receptor height 7.5m) – Contour Plot

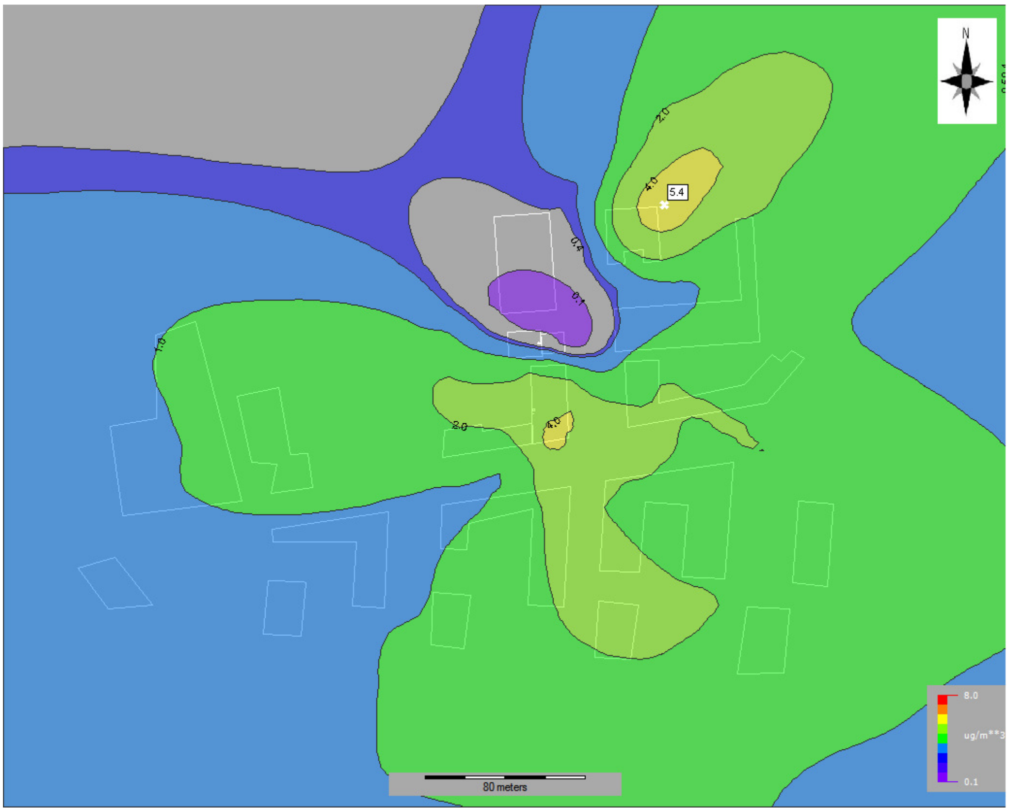


Figure 9 Predicted NO_2 PC from the BEC and WEC (receptor height 10.5m) – Contour Plot

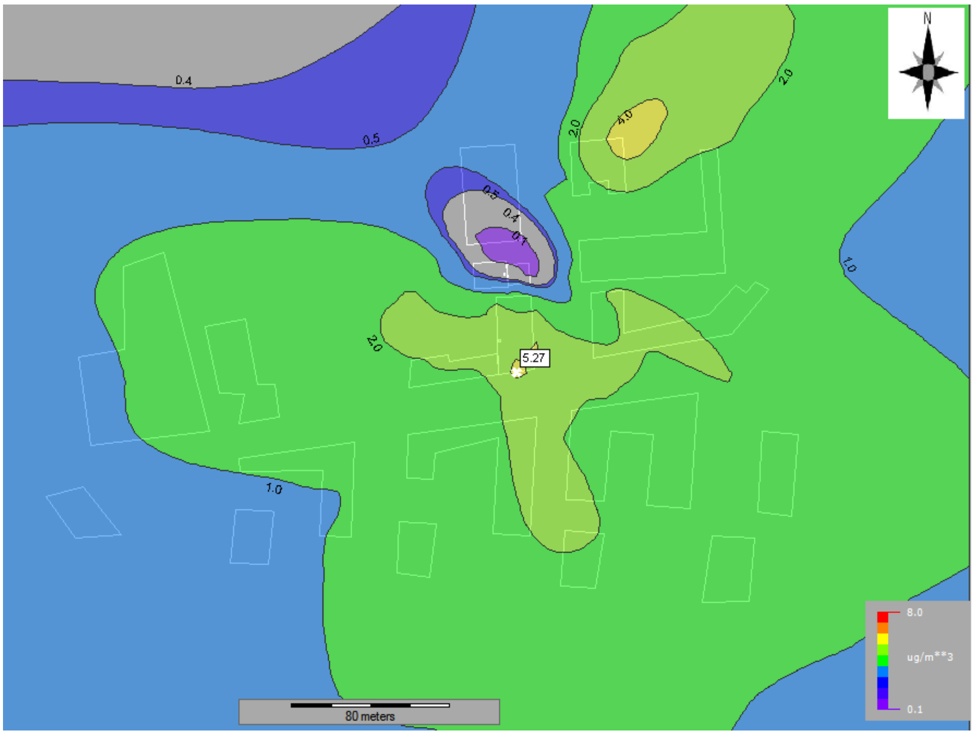


Figure 10 Predicted NO_2 PC from the BEC and WEC (receptor height 13.5m) – Contour Plot

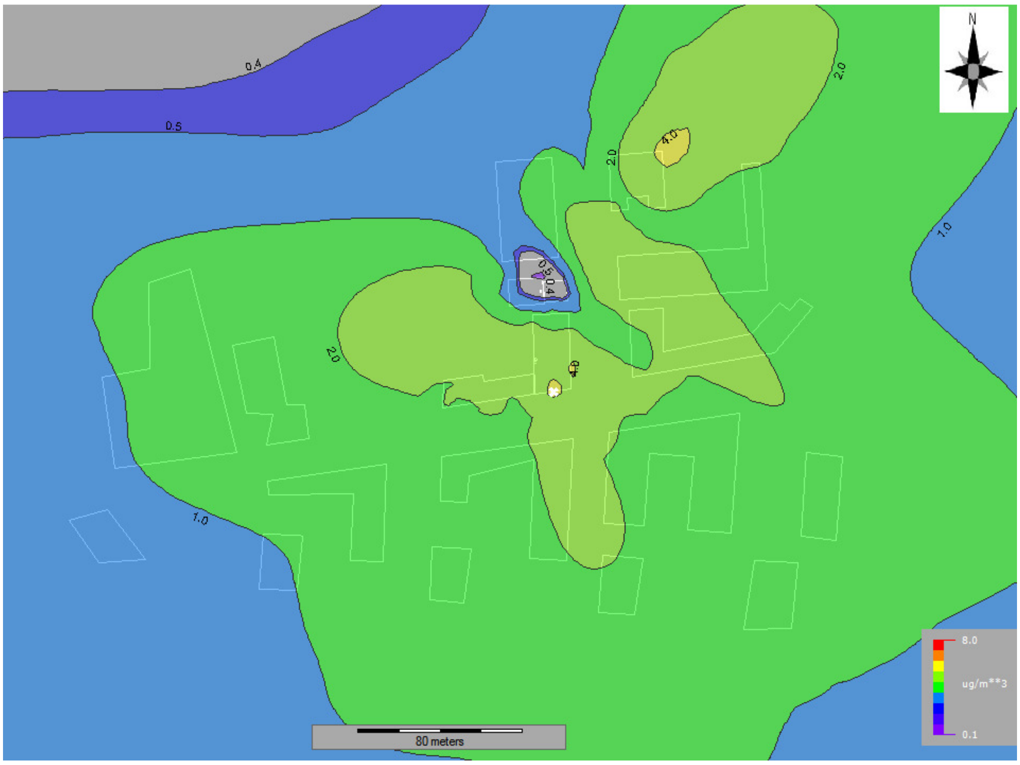


Figure 11 Predicted NO_2 PC from the BEC and WEC (receptor height 16.5m) – Contour Plot

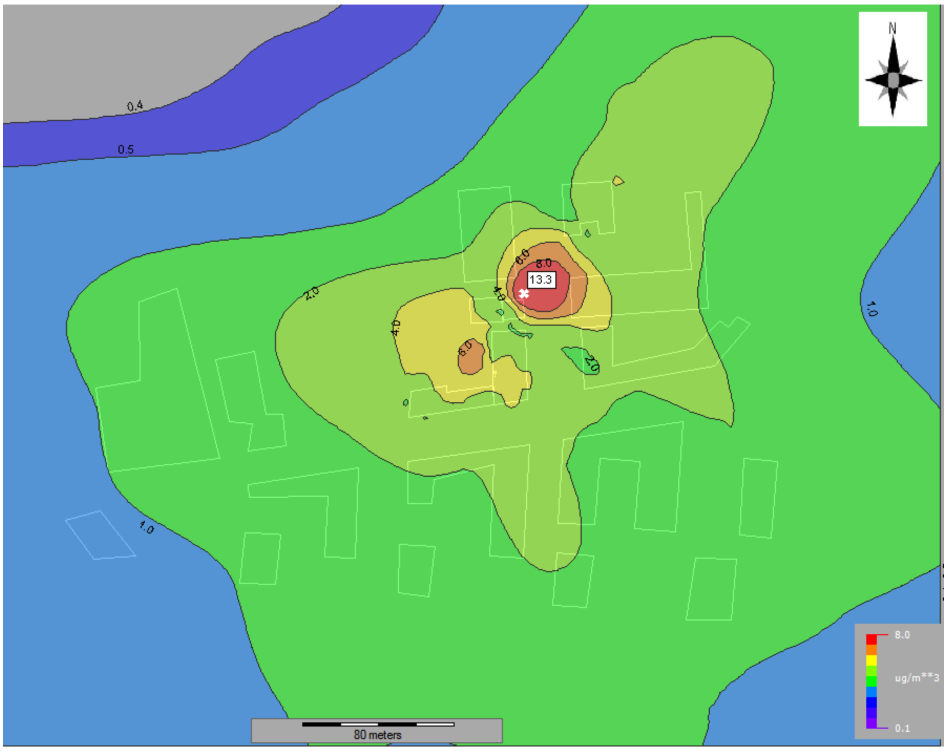
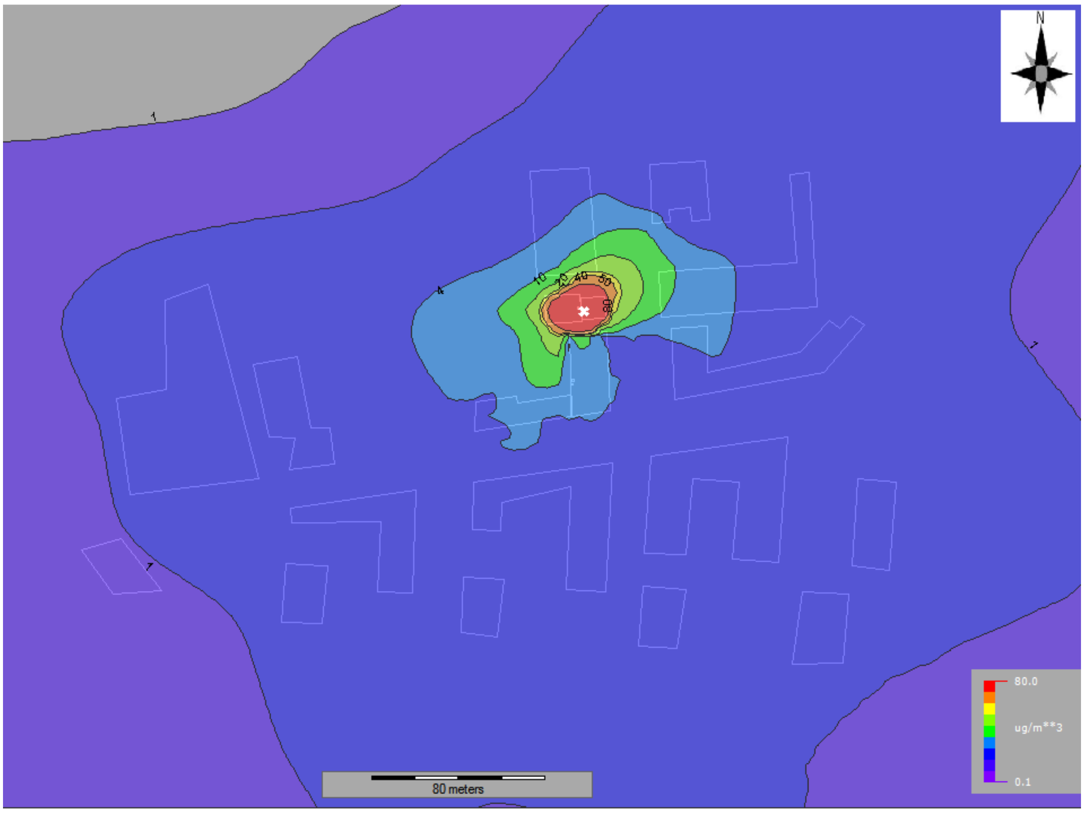


Figure 12 Predicted NO_2 PC from the BEC and WEC (receptor height 19.5m) – Contour Plot



The contour plots show that the predicted maximum concentrations occur adjacent to the emission source of the WEC stack, with a predicted decrease in concentration with the increased distance from the stack. It is also confirmed that the building most likely to be affected is Block B07.

Further studies have been undertaken to study the contour lines adjacent to Block B07 at every modelled receptor height. The results show that the predicted PC/PECs at the modelled receptor elevations of 1.5m, 4.5m, 7.5m, 10.5m, 13.5m, 16.5m and 19.5m are all below the national objectives for long-term protection of human health. However, high concentration contour lines have been predicted to occur close to one section of north facade area of Block B07 (adjacent to the receptor N8) at the receptor height of 19.5m, indicating that Block B07 receptors at this north facade area at the height of 19.5m may be at risk from long-term NO_2 impact. Therefore, the control measures of using mechanical ventilation system should be considered and installed at the following locations:

- All bedrooms and sitting-rooms of the two-bed flat (Flat A in Figure 13) at NW corner of Block B07 on Level 6; and
- All bedrooms and sitting-rooms of the three-bed flat at EW (Flat B) corner of Block B07 on Level 6.

Figure 13 Building 07 Level 06 Floor Plan - Flats with Mechanical Ventilation System

Short-Term NO_2

Predicted short-term (99.79%-ile 1 hour mean) NO_2 concentrations at the modelled receptors in Block B07, are summarised in Table 32.

Table 32. Predicted 1-hour Mean NO2 Concentrations at Block B07 at Each Receptor Height

Receptor Name	Predicted 1-hour Mean (99.79th Percentile) Concentration (µg/m^3)													
	1.5m(AGL		4.5m (AGL)		7.5m (AGL)		10.5m (AGL)		13.5m (AGL)		16.5m (AGL)		19.5m(AGL)	
	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC	PC	PEC
1	10.62	67.16	10.87	67.40	11.26	67.80	11.83	68.36	12.50	69.04	13.25	69.79	N/A	N/A
2	10.99	67.53	11.25	67.79	11.68	68.22	12.26	68.80	12.94	69.48	13.96	70.50	N/A	N/A
3	10.81	67.35	10.89	67.43	11.51	68.05	12.19	68.73	12.98	69.52	14.08	70.62	15.04	71.58
4	10.57	67.11	10.83	67.37	11.34	67.87	11.93	68.47	13.14	69.68	14.68	71.22	15.88	72.42
5	10.08	66.62	10.38	66.92	11.19	67.73	12.13	68.66	13.19	69.73	14.41	70.95	16.22	72.76
6	10.26	66.80	10.54	67.07	11.05	67.59	11.78	68.32	12.67	69.20	14.23	70.77	16.07	72.61
7	10.36	66.90	10.59	67.13	11.27	67.81	12.00	68.54	13.28	69.82	14.91	71.45	16.81	73.35
8	9.91	66.45	10.28	66.82	11.01	67.55	12.06	68.59	13.49	70.03	15.49	72.03	16.89	73.42
9	9.91	66.44	10.31	66.85	10.97	67.51	12.21	68.75	13.71	70.25	15.12	71.66	16.74	73.28
10	9.67	66.21	10.14	66.68	10.68	67.22	11.74	68.28	12.93	69.47	14.65	71.19	16.14	72.68
11	9.14	65.68	9.44	65.98	10.09	66.63	11.50	68.04	12.44	68.98	14.18	70.72	15.41	71.95
12	8.65	65.19	9.03	65.57	9.95	66.48	11.33	67.87	13.08	69.62	14.98	71.52	16.35	72.88
13	8.57	65.11	8.92	65.46	10.08	66.62	11.57	68.11	13.32	69.86	15.31	71.84	17.15	73.69
14	8.79	65.33	9.14	65.68	9.87	66.41	11.23	67.76	13.10	69.64	15.04	71.58	17.39	73.92
15	8.38	64.92	8.68	65.22	9.51	66.05	10.67	67.21	12.04	68.58	13.59	70.13	16.08	72.62
16	7.34	63.88	7.65	64.19	8.68	65.21	9.54	66.08	10.81	67.35	12.58	69.12	14.65	71.19
17	6.43	62.97	6.83	63.37	7.47	64.01	8.43	64.97	10.37	66.90	12.49	69.03	N/A	N/A
18	5.85	62.39	5.96	62.50	6.48	63.02	7.54	64.08	9.10	65.64	11.29	67.83	N/A	N/A
19	6.02	62.56	6.22	62.76	6.56	63.10	7.13	63.67	8.81	65.35	10.97	67.51	N/A	N/A
20	7.29	63.83	7.21	63.75	7.20	63.74	7.65	64.19	8.67	65.21	10.53	67.07	N/A	N/A
21	9.01	65.54	8.75	65.28	8.34	64.88	8.19	64.73	8.76	65.30	10.46	67.00	N/A	N/A
22	11.01	67.55	10.54	67.08	9.82	66.36	9.12	65.66	8.90	65.44	9.35	65.89	10.54	67.08
23	12.69	69.23	10.87	67.40	11.26	67.80	11.83	68.36	9.16	65.70	8.86	65.40	9.22	65.76

NOTE:
a) PC - Process Contribution;
b) PEC - Predicted Environmental Concentration. Inclusive of background concentration of 56.54 µg /m^3; and
c) AGL – above ground level.

As indicated in Table 32 the short-term PECs of NO_2 for all receptors at every receptor height are all below the relevant long-term AQO of 200 µg/m^3.

The contour plots of the predicted short-term PC of all modelled receptors at each height of 1.5m, 4.5m, 7.5m, 10.5m, 13.5m, 16.5mm and 19.5m are presented in Figures 14 to 20.

Figure 14 Predicted ST NO_2 PC from BEC and WEC (receptor height 1.5m) – Contour Plot

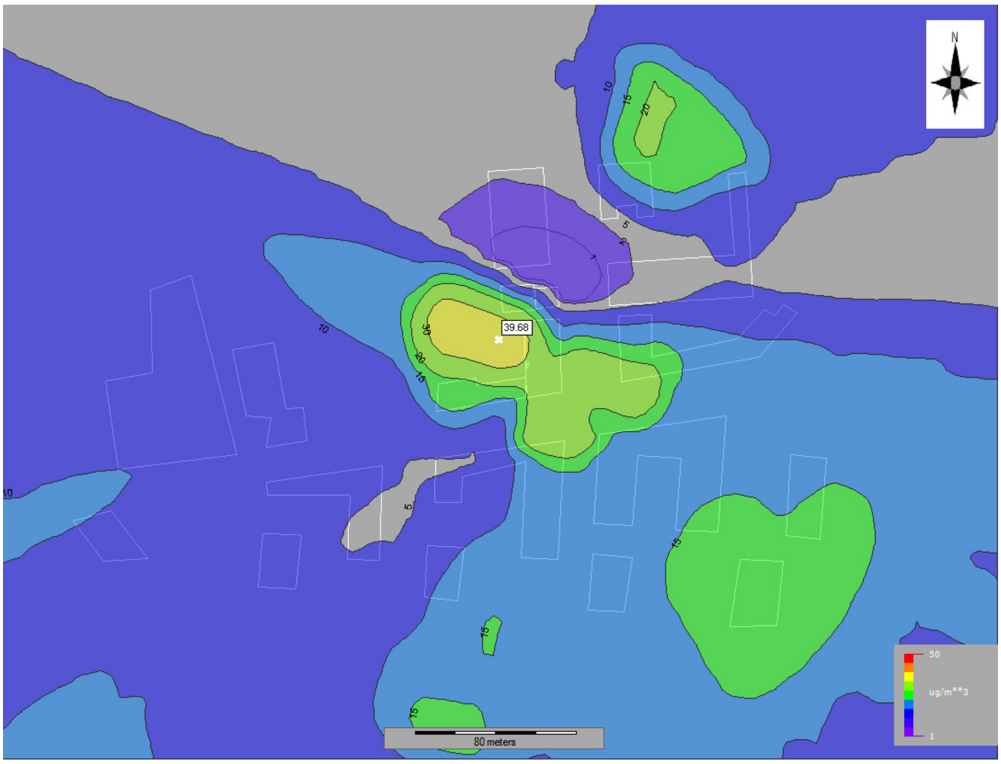


Figure 15 Predicted ST NO_2 PC from BEC and WEC (receptor height 4.5m) – Contour Plot

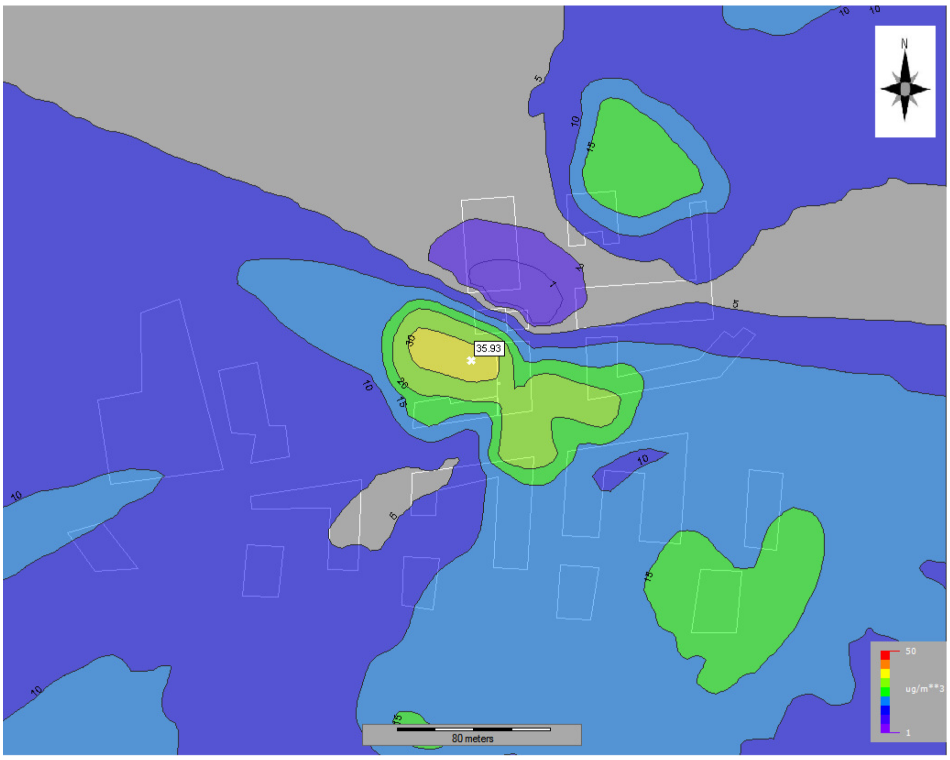


Figure 16 Predicted ST NO_2 PC from BEC and WEC (receptor height 7.5m) – Contour Plot

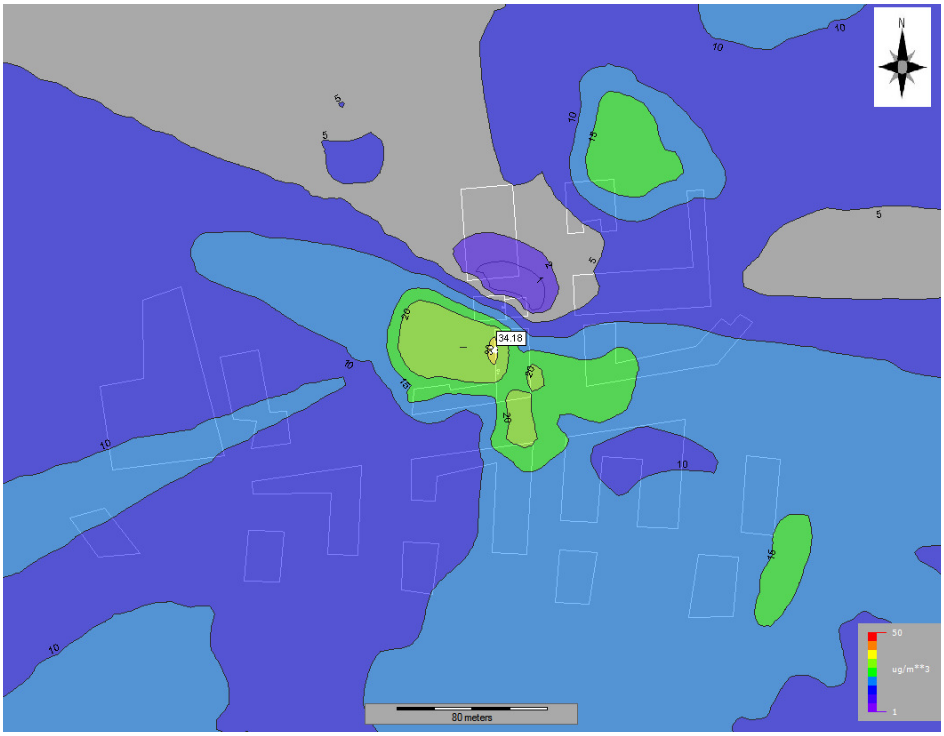


Figure 17 Predicted ST NO_2 PC from BEC and WEC (receptor height 10.5m) – Contour Plot

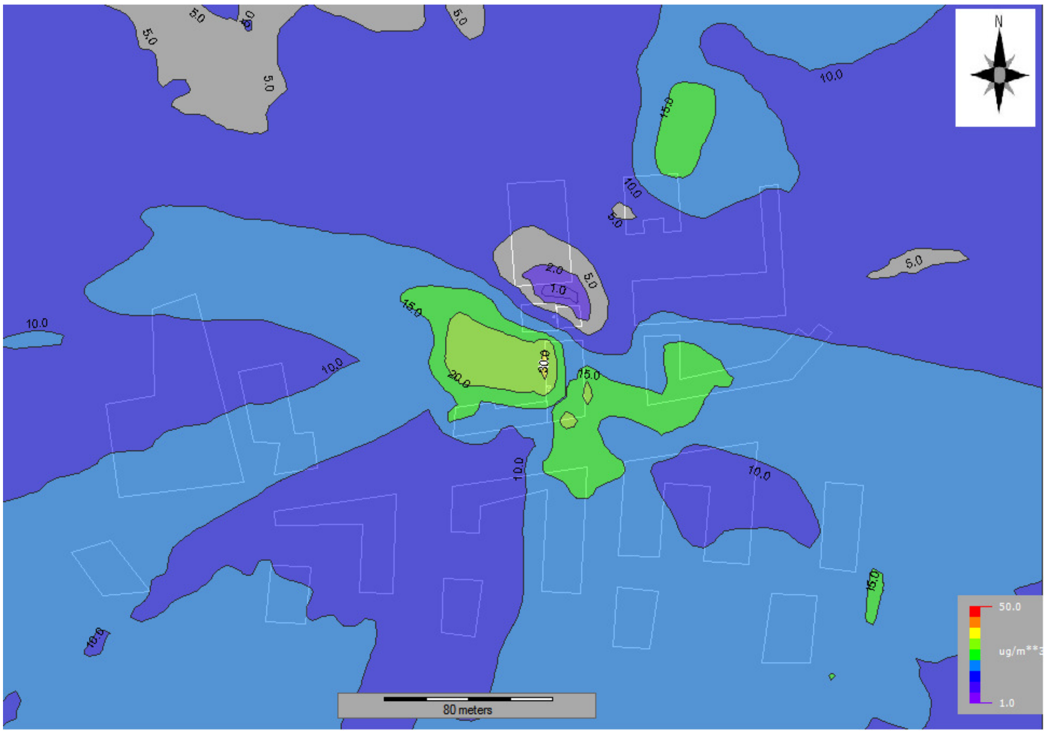


Figure 18 Predicted ST NO_2 PC from BEC and WEC (receptor height 13.5m) – Contour Plot

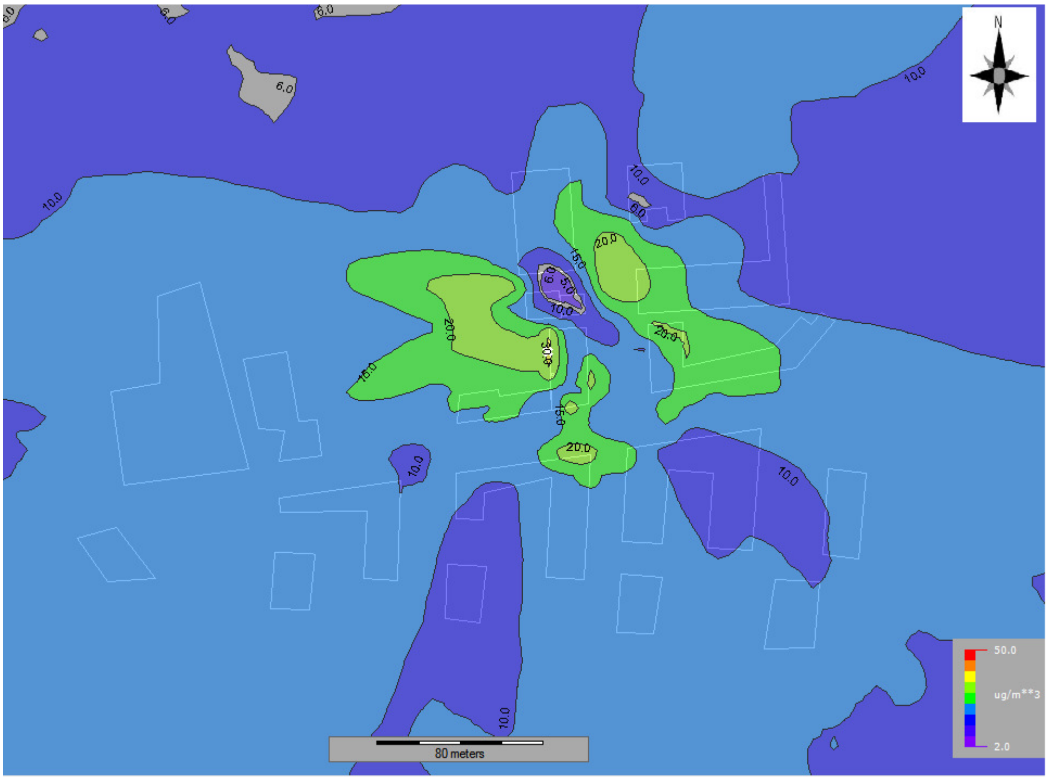


Figure 19 Predicted ST NO_2 PC from BEC and WEC (receptor height 16.5m) – Contour Plot

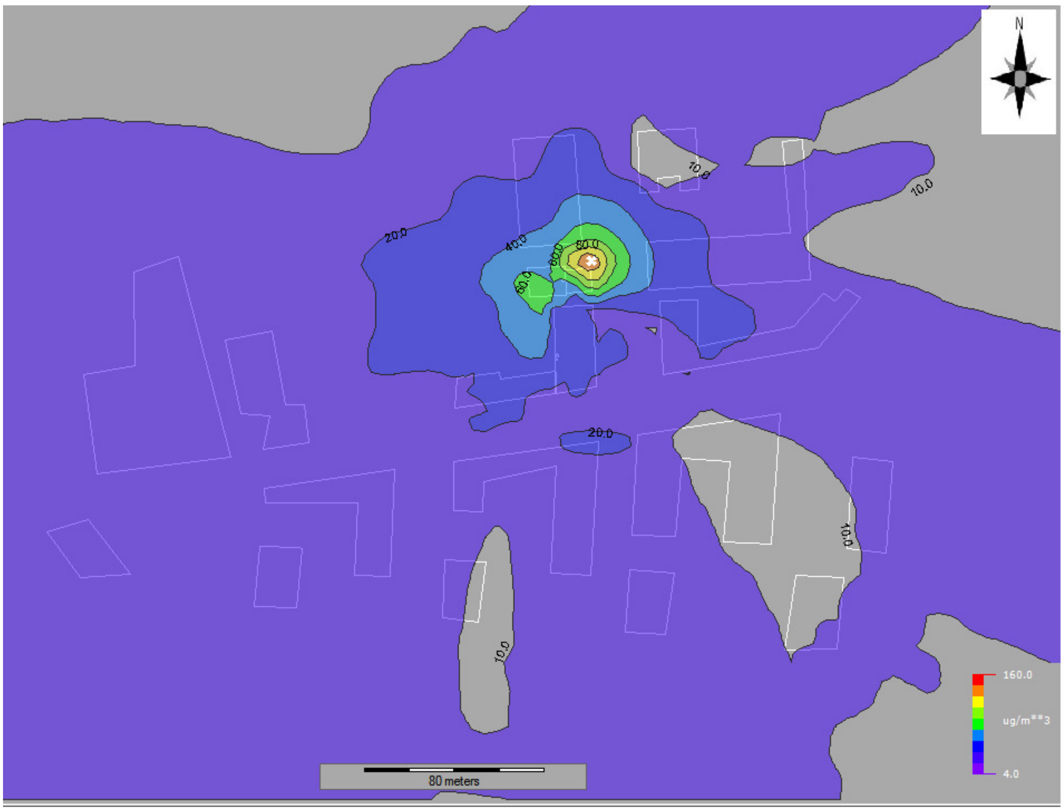
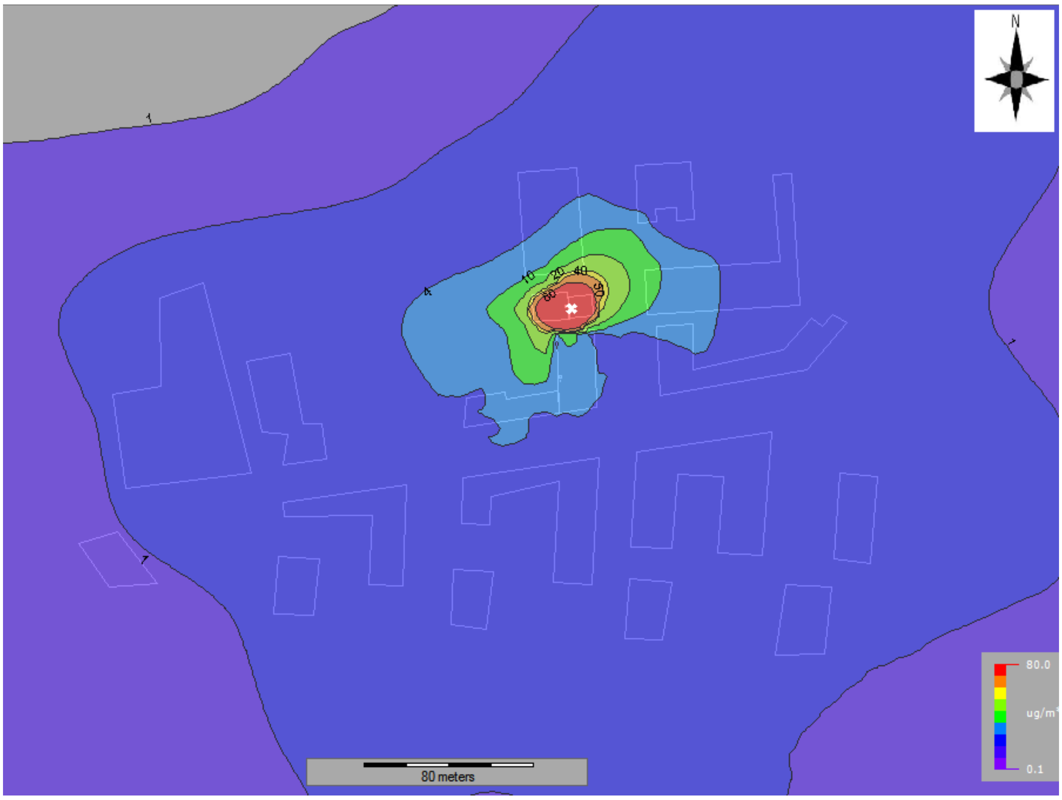


Figure 20 Predicted ST NO_2 PC from BEC and WEC (receptor height 19.5m) – Contour Plot



The contour plots show that the predicted maximum short-term concentrations occur adjacent to the emission source of WEC stack, with a predicted lowering of concentration with the increased distance from the stack. It is also confirmed that the building predicted to experience the greatest effect is Block B07.

Further studies have been undertaken to study the contour lines adjacent to Block B07 at every modelled receptor height/elevation and the results show that the predicted short-term PC/PECs at modelled receptor heights of 1.5m, 4.5m, 7.5m, 10.5m, 13.5m, 16.5m and 19.5m are all below the national objectives for short-term protection of human health. However, high concentration contour lines have been predicted to occur close to one section of north facade area of Block B07 (adjacent to the receptor N8) at the receptor height of 19.5m, indicating that Block B07 receptors at this north facade area at the height of 19.5m may be at risk from short-term NO_2 impact. Therefore, the control measures of using mechanical ventilation system should be considered and installed at the following locations:

- All bedrooms and sitting-rooms of the two-bed flat (Flat A in Figure 13) at NW corner of Block B07 on the Level 6; and
- All bedrooms and sitting-rooms of the three-bed flat at EW (Flat B) corner of Block B07 on the Level 6.

<u>Stage 2 Assessment Results Summary</u>

Both long-term and short-term PEC of NO_2 for all receptors at each receptor height of 1.5m, 4.5m, 7.5m, 10.5m, 13.5m, 16.5mm and 19.5m are all below the relevant long-term and short-term air quality objectives for the protection of human health.

The contour plots of both long-term and short-term NO_2 PCs at receptor heights of 1.5m, 4.5m, 7.5m, 10.5m, 13.5m, 16.5mm and 19.5m show that the predicted maximum long-term and short-term concentrations occur adjacent to the emission source of WEC stack, with a predicted decrease in concentration with the increased distance from the WEC stack. Therefore, the most potentially affected building is Block B07.

Further studies on those contour plots concluded that one section of north facade area of Block B07 (adjacent to the receptor N8) at a height of 19.5m, maybe at risk from long-term and short-term NO_2 impact. Therefore, mechanical ventilation system should be installed at following locations at level 06 for Block B07:

- The bedrooms and sitting-rooms of two-bed flat at NW corner of Block B07 on the Level 06; and
- The bedrooms and sitting-rooms of three-bed flat at EW corner of Block B07 on the Level 06.

8. Cumulative Effect from both Traffic and Energy Centre

8.1 Cumulative Effect

The significance of cumulative contributions/changes from both the traffic flow associated with the development and the operations of boiler and CHP at onsite energy centre; with respect to annual mean NO_2 exposure has been assessed with reference to the criteria in section 3. The outcomes of the assessment are summarised in Table 33.

Table 33. Significance of Cumulative Effects at Key Receptors

Receptors		NO_2 Long Term Significance Impacts at Key Receptors					
Named as in Traffic assessment	Named as in Energy Centre assessment	Actual Development Contribution from Traffic (DS-DM) $\mu g/m^3$	Contribution due to Energy Centre $\mu g/m^3$	Cumulative Contributions/changes $\mu g/m^3$	% Change in Concentration relative to AQAL	% of Annual Mean Concentration in Assessment Year	Significance
R1	D25	0.22	0.128	0.35	0.87	>110% of AQAL	Negligible
R2	D26	0.22	0.131	0.35	0.88	76-94% of AQAL	Negligible
R3	D27	0.11	0.134	0.24	0.61	76-94% of AQAL	Negligible
R4	D28	0.32	0.134	0.45	1.14	76-94% of AQAL	Negligible
R5*	D29	0.22	0.135	0.36	0.89	76-94% of AQAL	Negligible
R6	D30	0.37	0.136	0.51	1.27	76-94% of AQAL	Negligible
R7	D31	0.27	0.136	0.41	1.02	76-94% of AQAL	Negligible
R8	D32	0.43	0.137	0.57	1.42	103-109% of AQAL	Negligible
R9	D33	0.30	0.138	0.44	1.10	>110% of AQAL	Negligible
PR1	D34	0.11	0.139	0.25	0.62	76-94% of AQAL	Negligible
PR2	D35	0.07	0.140	0.21	0.53	76-94% of AQAL	Negligible
PR3	D36	0.07	0.140	0.21	0.53	76-94% of AQAL	Negligible
PR4	D37	0.06	0.141	0.20	0.50	76-94% of AQAL	Negligible
PR5	D38	0.09	0.139	0.23	0.57	76-94% of AQAL	Negligible

As indicated in Table 33 predicted cumulative process contributions (PC) at the modelled receptors range from 0.20 to 0.57 $\mu g/m^3$ (0.50% to 1.42% of AQS).

Based on the methodology outlined in section 3, it can be stated that the cumulative effect significance from both the traffic flow and the operations of boilers and CHP is determined to be negligible at all 14 receptors.

It should be noted that emissions were assumed to be constant, e.g. the boiler in operation for 24-hours per day, 365-days per year. In reality, 1 boiler will be operating 5 hours per day and 365 days per year; 2 boilers will be operating 2 hours per day and 365 days per year; and 1 supplementary boiler will be operating 2 hours per day in winter only (October to March). Therefore, the results presented within this assessment are considered to represent an absolute worst case scenario and the actual impacts would be much less than the predicted in this assessment.

9. Air Quality Neutral

9.1 Background

This Air Quality Neutral assessment considers the emissions of atmospheric pollutants from the development at source (i.e. from vehicles and building services plant) and compares the emissions with the benchmark levels that define neutrality.

The requirement for this Air Quality Neutral report is driven by:

- Policy 7.14 in the London Plan. The London Plan states: "development proposals should be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality"; and
- The Mayor's Air Quality Strategy (MAQS). The MAQS includes a policy which states that "New developments in London shall as a minimum be 'air quality' neutral through the adoption of best practice in the management and mitigation of emissions."

The 'air quality neutral' policy is designed to address the problem of multiple new developments that individually add only a small increment to pollution at the point of human exposure (i.e. ambient concentrations), but cumulatively lead to baseline pollution levels creeping up. The policy requires Developers to design their schemes so that they are at least Air Quality Neutral in terms of emissions at source.

The Greater London Authority (GLA) Sustainable Design and Construction Supplementary Planning Guidance (SPG), published in April 2014, provides a formal definition for the term 'air quality neutral' and allows a transparent and consistent approach to demonstrating whether a development is 'air quality neutral'. This Air Quality Neutral assessment determines whether the proposed development is air quality neutral using the GLA SPG calculation method that separately quantifies building emissions (from heating and power plant) and transport emissions.

The GLA published a report of "Air quality Neutral Planning support update (GLA 80371) in April 2014. This updated report provided a guidance note on the application of the "air quality neutral" policy.

9.2 Benchmark Emissions

9.2.1 Boiler/CHP plant

Westferry Energy Centre (WEC), which is located at the basement of Building B07. The Centre consists of 11 Hoval boilers (having a capacity of 912kW each) and 2 CHP gas engines (having a capacity of 0.174 MWth each). The key pollutants emitted from gas-fired appliances are nitrogen oxides (NO_x).

The GLA 80371 report sets out limits against which NO_x emissions from gas-fired boilers and CHPs must be compared.

9.2.2 Building Emissions Benchmarks (BEBs)

The GLA 80371 report has defined two Building Emission Benchmarks (BEBs), one for NO_x and one for PM_{10}, for a series of land-use classes. The benchmarks are expressed in terms of g/m²/annum. The gross floor area (GFA) is used to define the area.

The derived BEBs for NO_x and PM_{10} Emissions are shown in Table 34.

Table 34 Building Emissions Benchmarks

Land Use Class	NO_x (g/m²)	PM_{10} (g/m²)
Class A1	22.6	1.29
Class A3- A5	75.2	4.32
Class A2and Class B1	30.8	1.77
Class B2- B7	36.6	2.95
Class B8	23.6	1.90
Class C1	70.9	4.07
Class C21	68.5	5.97
Class C31	26.2	2.28
D1 (a)	43.0	2.47
D1 (b)	75.0	4.30
Class D1(c -h)	31.0	1.78
Class D2(a-d)	90.3	5.18
Class D2(e)	284	16.3

Note 1: These benchmarks have been calibrated for London.

9.2.3 Transport Emissions Benchmarks (TEBs)

The derived Transport Emission Benchmarks (TEBs) for NO_x and PM_{10} Emissions are shown in Table 35.

Table 35 Transport Emissions Benchmarks

Land use	CAZ	Inner	Outer
NO_x (g/m²/annum)			
Retail (A1)	169	219	249
Office (B1)	1.27	11.4	68.5
NO_x (g/m²/annum)			
Residential (C3)	234	558	1553
PM_{10} (g/m²/annum)			
Retail (A1)	29.3	39.3	42.9
Office (B1)	0.22	2.05	11.8
PM_{10} (g/dwelling/annum)			
Residential (C3, C4)	40.7	100	267

9.3 Air Quality Neutral Calculation

9.3.1 Building Emissions

The energy centre consists of 11 Hoval boilers with the emission rate 35 mg/kWh and 2 CHPs with the emission standards of 51/GJ.

The total annual building NO_x emission from the development can be calculated from the onsite Energy centre data. Based on an annual average emission rate of 0.116 g/s, the building NO_x Emissions is calculated as 3,652 kg/annum.

The Total benchmarked building NO_x emissions is calculated from the land use categories and the BEBs, and is shown in Table 36.

Table 36. Calculation of Benchmarked NO_x emissions Using Building Emissions Benchmarks for Each Land-use Category

Land Use Class	GLA (m^2)	Building Emissions Benchmarks ($gNO_x/m^2/annum$)	Benchmarked Emissions ($kgNO_x/annum$)
Residential (C3)	81,426	26.2	2,133,361
Office (A2/B1)	2,340	30.8	72,072
Restaurant/ café/ drinking establishment (A3/A4)	1,348	75.2	101,370
Retail (A1)	193	22.6	4362
Community and crèche (D1)	702	75	52,650
Healthcare (D1)	253	75	18,975
Office, clubhouse and gym ancillary to residential use	2,465	90.3	222,590
Plant	441	30.8	13,583
Courtyard undercroft, cycle bay	2,449	43	105,307
Basement	22,544	43	969,392
Total Benchmarked Building Emissions			3,693,661

The total building NOx emission of 3,652 kg/annum may be compared with the total benchmarked building NOx emission of 3,693,661 kg/annum. The results indicate that the proposed development site meets the air quality neutral requirement for buildings.

9.3.2 Transport Emissions

The transport assessment provides a summary of 2-way trips by model for the AM peak hour and PM peak hours and the data used for the calculations of AADT are shown in Table 37.

Table 37. A Summary of Trips to/from the Development

Model of Travel	AM Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures
Bus, minibus or coach	24	39	28	35
Taxi	1	0	0	0
Motocycle, scooter or moped	3	3	3	3

Model of Travel	AM Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures
Driving a car or van	97	104	26	37
other	2	6	4	3
Total	127	152	61	78

These have been converted to 12 hour period 0700 – 1900hr by applying a factor of 5, then the 12 hour period trips have been converted to AADT figures by applying a factor of 1.15.

Weekday peak two ways (AM + PM) x 5 = 12hr flows:

418 x 5 = 2090 trips (12hr flows)

2090 x 1.15 = 2404 AADT

The total trips/annum = 2404 x 365 = 877,460.

The NO_x emission factor is 0.370 g/veh-km (for inner London) and thus the development transport NO_x Emission is (877460 x 0.370) = 324.7 kg/annum.

The PM_{10} emission factor is 0.0665 g/veh-km (for inner London) and thus the development transport PM_{10} emission is (877460 x 0.0665) = 58.4 kg/annum.

The total benchmarked building NO_x emissions are calculated from the land use categories and the TEBs, and are shown in Table 38.

Table 38. Calculation of Benchmarked NO_x emissions Using Transport Emissions Benchmarks for Each Land-use Category

Land Use Class	No. of Dwellings	Building Emissions Benchmarks ($gNO_x/m^2/annum$)	Benchmarked Emissions ($kgNO_x/annum$)
Residential (C3)	722	588	424,536
	GLA (m2)		
Office (A2/B1)	2,340	11.4	26,676
Restaurant/ café/ drinking establishment (A3/A4)	1,348	219	295,212
Retail (A1)	193	219	42,267
Community and crèche (D1)	702	219	153,738
Healthcare (D1)	253	11.4	2,884
Office, clubhouse and gym ancillary to residential use	2,465	11.4	28,101
Plant	441	11.4	5,027
Courtyard undercroft, cycle bay	2,449	11.4	27,919
Basement	22,544	11.4	257,002
Total Benchmarked Building Emissions			1,263,362

The total transport NO_x emission of 324.7 kg/annum may be compared with the total benchmarked transport NO_x emission of 1,263,362 kg/annum. The results indicate that the proposed development site meets the air quality neutral requirement for transport for NO_x emission.

The Total benchmarked building PM_{10} emissions is calculated from the land use categories and the TEBs, and is shown in Table 39.

Table 39. Calculation of Benchmarked NO_x emissions Using Transport Emissions Benchmarks for Each Land-use Category

Land Use Class	No. of Dwellings	Building Emissions Benchmarks ($gPM_{10}/m^2/annum$)	Benchmarked Emissions ($kgPM_{10}/annum$)
Residential (C3)	722	100	72,200
	GLA (m2)		
Office (A2/B1)	2,340	39.3	91,962
Restaurant/ café/ drinking establishment (A3/A4)	1,348	39.3	52,976
Retail (A1)	193	39.3	7,585
Community and crèche (D1)	702	2.05	1,439
Healthcare (D1)	253	2.05	519
Office, clubhouse and gym ancillary to residential use	2,465	2.05	5,053
Plant	441	2.05	904
Courtyard undercroft, cycle bay	2,449	2.05	5,020
Basement	22,544	2.05	46,215
Total Benchmarked Building Emissions			283,874

The total transport PM_{10} emission of 58.4 kg/annum may be compared with the total benchmarked transport NO_x emission of 283,874kg/annum. The results indicate that the proposed development site meets the air quality neutral requirement for transport for PM_{10} emission.

9.4 Summary

Both the total building emissions and the total transport emissions are below the relevant benchmarks during the operational phase of the proposed development and no mitigation measures need to be considered. The proposed development meets the London policy requirements to be at least air quality neutral.

10. Mitigation

10.1 Construction Phase

The dust risk categories have been determined in Section 5 for each of the four construction activities. The assessment has determined that the potential impact significance of dust emissions associated with the construction phase of the proposed development is 'minor risk' to 'substantial risk'.

Using the methodology described in Appendix A, site specific mitigation measures associated with the determined level of risk can be found in Section 8.2 of the IAQM Guidance on the Assessment of Dust from Demolition and Construction. The mitigation measures have been divided into general measures applicable to all sites and measures applicable specifically to demolition, earthworks, construction and trackout. They are categorised into 'highly recommended' and 'desirable' measures.

Mitigation measures for the proposed development are detailed in the table below:

Table 34. Site Specific Mitigation Measures

Highly Recommended	Desirable
Communications and dust management	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	
Display the head or regional office contact information	
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, realtime PM10 continuous monitoring and/or visual inspections.	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	
Make the complaints log available to the local authority when asked	
Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.	
Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.	
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked	
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to	

Highly Recommended	Desirable
produce dust are being carried out and during prolonged dry or windy conditions.	
Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period	
Avoid site runoff of water or mud.	
Keep site fencing, barriers and scaffolding clean using wet methods.	
The provision of easily-cleaned hardstandings for vehicles	
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	
Cover, seed or fence stockpiles to prevent wind whipping. Damping down of dusty materials using water sprays during dry weather.	
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable	
Ensure all vehicles switch off engines when stationary - no idling vehicles.	
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)	
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	
Use enclosed chutes and conveyors and covered skips.	
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate	
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	
Avoid bonfires and burning of waste materials.	
Demolition	
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	
Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	
Bag and remove any biological debris or damp down such material before demolition.	
Earthworks	
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise	

Highly Recommended	**Desirable**
surfaces as soon as practicable.	
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable	
Only remove the cover in small areas during work and not all at once	
Construction	
Avoid scabbling (roughening of concrete surfaces) if possible	
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place	
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust	
Trackout	
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	
Avoid dry sweeping of large areas.	
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	
Record all inspections of haul routes and any subsequent action in a site log book.	
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	
Access gates to be located at least 10m from receptors where possible.	

10.2 Non-Road Mobile Machinery

An inventory of all Non Road Mobile Machinery (NRMM) will be kept on-site and registered on 'http://nrmm.London/' showing the emission limits for all equipment and will be made available to local authority offices if required. All NRMM of net power between 37kW and 560kW will be required to meet Stage IIIA of EU Directive 97/68/EC. NRMM should be run on low sulphur diesel.

10.3 Measures to Reduce Emissions of NO_x and Particulates from On-Site Transport

Arrangements should be made with the on-site vehicle drivers to ensure drivers do not leave vehicle engines idling unnecessarily during the construction period.

Following the implementation of the mitigation measures detailed in the tables above, the impact significance of the construction phase is not considered to be significant.

10.4 Operational Phase

Traffic

The assessment of road traffic exhaust emissions has not predicted any exceedances of the AQO as a direct result of the proposed development, the predicted exceedances are likely to happen even without the proposed development.

The whole borough has been designated as an AQMA due to exceedances of the AQO for NO_2. As such, implementing traffic management measures will result in fewer vehicle trips and therefore a reduction in associated vehicle emissions. This is likely to result in reductions of the mean roadside concentrations of traffic-related pollutant concentrations.

The following mitigation measures aim to increase the number of residents travelling to and from the site on foot, by cycle and/or by public transport. As such the number of trips to and from the site made by private car, and especially the single occupancy private car, will be reduced. The following measures are considered best practice but should not be regarded as an exhaustive list of potential mitigation options:

- Minimise reliance upon motor vehicle use through a Framework Travel Plan;
- Promote alternative transport options; and
- Inclusion of pedestrian walkways into surrounding environments.

11. Conclusions

WYG have undertaken an Air Quality Assessment (AQA) for the proposed redevelopment at former Westferry Printworks, London, in accordance with the methodology and parameters previously described within this report.

Construction Phase

Prior to the implementation of appropriate mitigation measures, the potential impact significance of dust emissions associated with the construction phase of the proposed development has been assessed as 'high risk' at the worst affected receptors. Site specific mitigation measures have been recommended based on Section 8.2 of the IAQM Guidance on the Assessment of Dust from Demolition and Construction. It is anticipated that with these mitigation measures in place, the risk of adverse effects due to emissions from the construction phase will be low.

The results of an assessment of air quality impact from the construction traffic, specifically from the heavy goods vehicle traffic flows (HGVs), shows a fall-off in nitrogen dioxide concentrations with distance from the road and that the maximum predicted concentration is at the receptor closest to the kerb. The maximum predicted concentration, due to the HGV movements associated with the development, is 0.65µg/m^3, occurring at the receptor 2 m away from the kerb. The concentrations decrease to 0.47µg/m^3 at a location 8 m away from the kerb.

Traffic Air Quality Assessment

Potential Air Quality Impacts of Nitrogen Dioxide

The 2021 assessment of the effects of emissions from traffic associated with the proposed scheme, has determined that some of the modelled receptor locations are predicted to exceed the annual AQO for NO_2 in both the 'do minimum' and 'do something' scenarios.

The maximum predicted increase in the annual average exposure to nitrogen dioxide at any existing residential receptor is likely to be 0.43µg/m^3, at Walker's Lodge (R8).

The effect significance of the nitrogen dioxide impact from the traffic in 2021 is determined to negligible for all receptors.

Potential Air Quality Impacts of Particulate Matter

Regarding PM_{10} levels, it is expected that all modelled receptor locations are predicted to meet the AQO for PM_{10} in both the 'do minimum' and 'do something' scenarios.

The maximum predicted increase in the annual average exposure to particulate matter at any existing residential receptor due to changes in traffic movements associated with the scheme is 0.10μg/m^3, at Walkers Lodge (R8).

The effect significance of the particulate matter impact from the traffic in 2021 is determined to negligible for all modelled receptors. Following the adoption of the recommended mitigation measures both for construction and operational phases, the development is not considered to be contrary to any of the national, regional or local planning policies.

Point Emission Sources

Air quality assessment of the impacts of emissions of point sources at off-site Barkantine Energy Centre and onsite Westferry Energy Centre has been undertaken. The assessment studies the potential impact of NO_2 emissions from the engine and boiler operations at two Centres on the proposed residential units. Mitigation measures have been presented and discussed to minimise the impacts to the proposed development.

The assessment has been undertaken in the following 2 stages:

- Stage 1: impact screening from the BEC only; and
- Stage 2: emission impacts from both the BEC and the WEC.

The Stage 1 screening assessment concluded that:

- The building block B07 will be most affected by the emissions from the BEC;
- The most affected receptors will be at the top floor of the building Block B07. The long-term PEC of NO_2 at 21.5 m height for receptor B07 was predicted to be higher than the long-term AQS of 40 μg/m^3; and
- The predicted short-term PEC of NO_2 at each modelled receptor height at both north side and back side of the building are all below the relevant long-term AQS of 200 μg/m^3 for the protection of human health.

The Stage 2 Assessment focus on the emission impact on the Block B07 receptors at each window level.

The flue height of the WEC is required to terminate 6m above the roof level (Roof: +28.51m AOD) or 3m above the Dry Air cooler (DAC) enclosure. The assessment results indicated that both long-term and short-term PEC of NO_2 for all receptors at every modelled receptor height of 1.5m, 4.5m, 7.5m, 10.5m, 13.5m, 16.5m and 19.5m are all below the relevant long-term and short-term air quality objectives for the protection of human health.

The contour plots of both long-term and short-term NO_2 PCs at receptor heights of 1.5m, 4.5m, 7.5m, 10.5m, 13.5m, 16.5mm and 19.5m show that the predicted maximum long-term and short-term concentrations occur adjacent to the emission source of WEC stack, with a predicted decrease in concentration with the increased distance from the stack. Therefore, the most potentially affected building is Block B07.

Further studies on those contour plots concluded that one section of north facade area of Block B07 (adjacent to the receptor N8) at a height of 19.5m, maybe at risk from long-term and short-term NO_2 impact. Therefore, mechanical ventilation system should be installed at following locations at level 06 for Block B07:

- The bedrooms and sitting-rooms of two-bed flat at NW corner of Block B07 on the Level 06; and
- The bedrooms and sitting-rooms of three-bed flat at EW corner of Block B07 on the Level 06.

Cumulative Effect from both Traffic and Energy Centre

The significance of cumulative contributions/changes from both the traffic flow associated with the development and the operations of boiler and CHP at onsite energy centre; with respect to annual mean NO_2 exposure has been assessed. The assessment results indicate that the cumulative effect significance from both the traffic flow and the operations of boilers and CHP is determined to be negligible.

Air Quality Neutral

Both the total building emissions and the total transport emissions are below the relevant benchmarks during the operational phase of the proposed development and no mitigation measures need to be considered. The proposed development meets the London policy requirements to be at least air quality neutral.

Figures

Figure 21 **Air Quality Traffic Assessment Area**

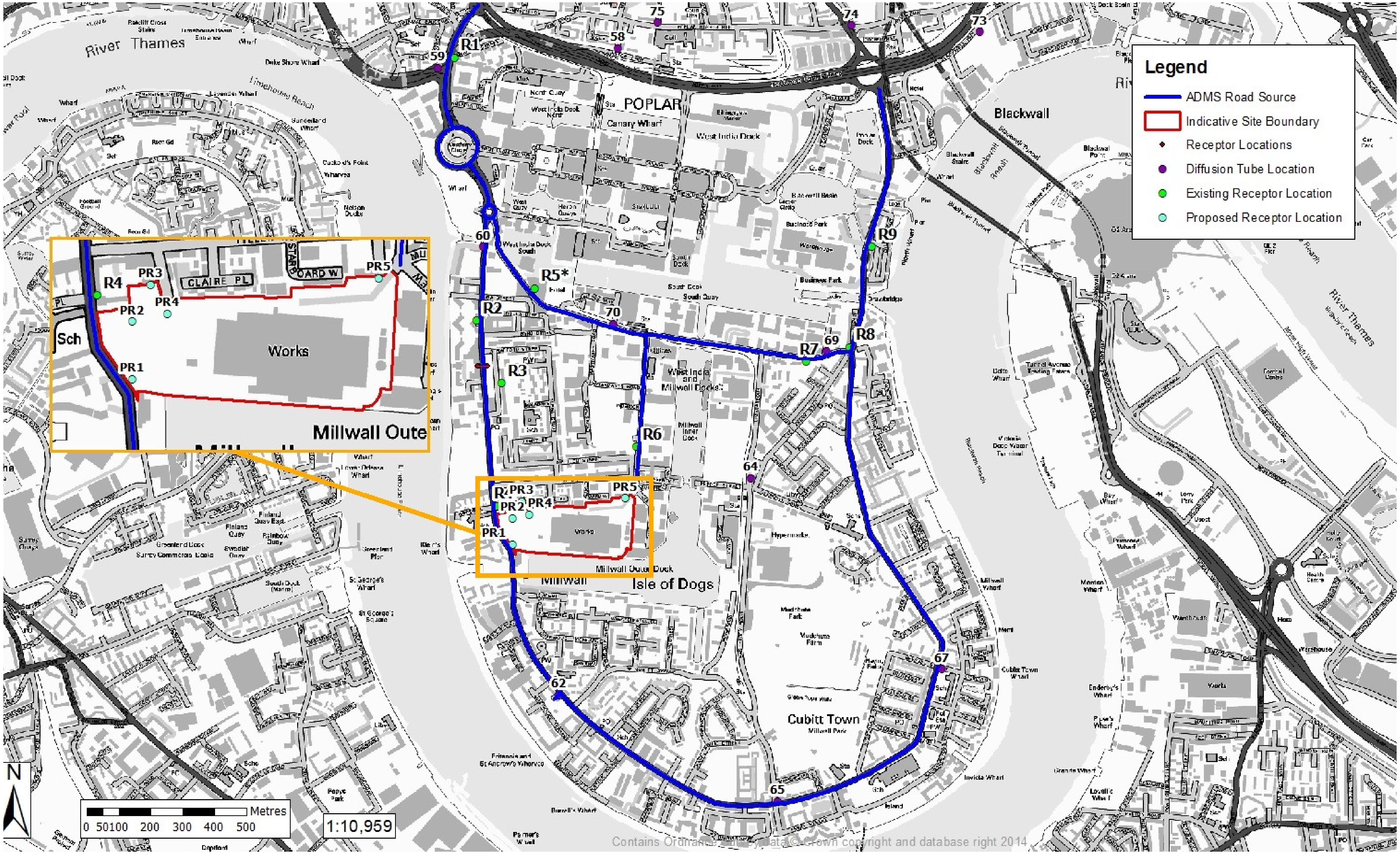
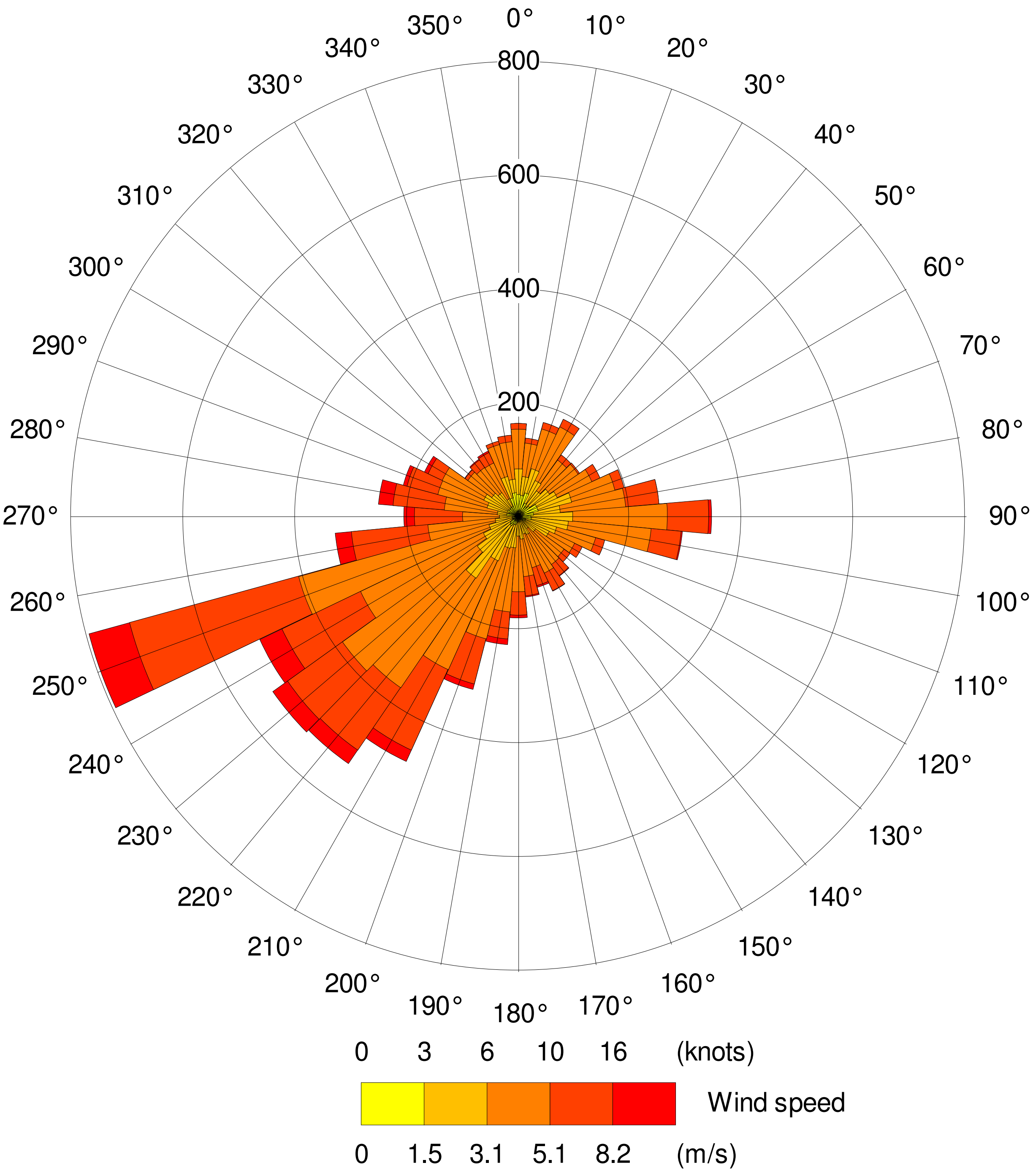


Figure 22 **London City Airport 2014 Meteorological Station Wind Rose**



Appendix A Construction Phase Assessment Methodology

The following information sets out the adopted approach to the construction phase impact assessment in accordance with the aforementioned IAQM guidance[1].

Step 1 – Screen the Requirement for a more Detailed Assessment

An assessment is required if there are sensitive receptors within 350m of the site boundary, within 50m of the route(s) used by construction vehicles on the surrounding road network, or within 500m from the site entrance. A detailed assessment is also required if there is an ecological receptor within 50m of the site boundary.

Step 2A – Define the Potential Dust Emission Magnitude

Demolition

The dust emission magnitude for the demolition phase has been determined based on the below criteria:

- *Large*: Total building volume >50 000m^3, potentially dusty construction (e.g. concrete), on-site crushing and screening, demolition activities >20m above ground level:
- *Medium*: Total building volume 20 000m^3 – 50 000m^3, potentially dusty construction material, demolition activities 10-20m above ground level; and
- *Small*: Total building volume <20 000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

Earthworks

The dust emission magnitude for the planned earthworks has been determined based on the below criteria:

- *Large:* Total site area >10 000m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), > 10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100 000 tonnes.
- *Medium*: Total site area 2 500m^2 – 10 000m^2, Mediumly dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4m-8m in height, total material moved 20 000 tonnes – 100 000 tonnes; and
- *Small:* Total site area <2 500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <10 000 tonnes, earthworks during wetter months.

Construction

The dust emission magnitude for the construction phase has been determined based on the below criteria:

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[1] Institute of Air Quality Management 2014. *Guidance on the Assessment of dust from demolition and construction.*

- *Large:* Total building volume >100 000m^3, on site concrete batching; sandblasting
- *Medium:* Total building volume 25 000m^3 – 100 000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- *Small:* Total building volume <25 000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout

The dust emission magnitude for trackout has been determined based on the below criteria:

- *Large:* >50 HGV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- *Medium:* 10-50 HGV (>3.5t) outward movements in any one day, Mediumly dusty surface material (e.g. high clay content), unpaved road length 50m – 100m; and
- *Small:* <10 HGV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

Step 2B - Defining the Sensitivity of the Area

Sensitivities of People to Dust Soiling Effects

- *High:*
  - Users can reasonably expect a enjoyment of a high level of amenity;
  - The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably expect to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land;
  - Indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.
- *Medium:*
  - Users can reasonably expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home;
  - The appearance, aesthetics or value of their property could be diminished by soiling;
  - The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land;
  - Indicative examples include parks and places of work.
- *Low:*
  - The enjoyment of amenity would not reasonably be expected;
  - Property would not reasonably be expected to be diminished in appearance, aesthetics or value by

soiling;

- There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land;
- Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

Table A1 – Sensitivity of the Area to Dust Soiling Effects on People and Property

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

Sensitivities of People to the Health Effects of PM_{10}

- *High:*
  - Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day);
  - Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.
- *Medium:*
  - Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day);
  - Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM10, as protection is covered by Health and Safety at Work legislation.
- *Low:*
  - Locations where human exposure is transient;
  - Indicative examples include public footpaths, playing fields, parks and shopping streets.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

Table A2 - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28 - 32 µg/m³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24 – 28 µg/m³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Sensitivities of Receptors to Ecological Effects

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

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

Table A3 - Sensitivity of the Area to Ecological Impacts

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

Step 2C - Defining the Risk of Impacts

The risk of impacts with no mitigation is determined by combining the dust emission magnitude determined in Step 2A and the sensitivity of the area determined in Step 2B.

The following tables provide a method of assigning the level of risk for each activity.

Demolition

Table A4 - Risk of Dust Impacts, Demolition

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

Earthworks

Table A5 - Risk of Dust Impacts, Earthworks

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

Construction

Table A6 - Risk of Dust Impacts, Construction

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

Trackout

Table A7 - Risk of Dust Impacts, Trackout

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

Step 3 – Site Specific Mitigation

The dust risk categories for each of the four activities determined in Step 2C should be used to define the appropriate, site-specific mitigation measures to be adopted.

These mitigation measures are contained within section 8.2 of the IAQM Guidance on the Assessment of Dust from Demolition and Construction.

Appendix B Comments on Air Quality from LBTH Officer

The comments on Air Quality from LBTH Officer state:

"I have reviewed the Air Quality section of the Environmental Statement and have the following comments: In the air quality assessment the PM10 background concentration has been used from the base year of 2011 to give a conservative assessment, however for NO_2 the background concentration that has been used is from the 2021 Defra background map. Please can the consultants clarify why the conservative approach used for PM10 was not also applied to NO2?

Section 6.2 – Model Verification, please can the consultants explain the use of a default adjustment factor instead of verifying against local data. Please clarify what guidance is used for this.

An Air Quality Neutral Assessment needs to be completed for the development; this has not been included in the application. Please can the consultants submit this to us for approval.

The demolition/construction assessment is accepted provided the mitigation measures stated in the report are instigated at the development throughout the duration of construction. Please can the developer submit a construction/demolition environmental management plan detailing how the potential air quality effects will be controlled and mitigated in line with the 'The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance 2014' and the 'Tower Hamlets Code of Construction practice.' This is required prior to the commencement of the development.

The assessment recommends that mechanical ventilation be provided for the flats that may be adversely affected by the NO_2 emitted from the Energy Centre. Please include this as a condition should the development be approved."