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Mr Scott Jeffries
Director Major Infrastructure Assessments
Department of Planning
GPO Box 39
Sydney NSW 2001

Attention: Glenn Snow

Dear Sir

Re: Project Approval Modification Application
Intermodal Logistics Centre at Enfield, Sydney Ports Corporation
(Major Project No 05_0147, DoP File No. 9037344)

Sydney Ports Corporation (SPC) submits this application to the Department of Planning to modify the project approval granted by the Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the development of an Intermodal Logistic Centre (ILC) at Enfield.

This application, submitted under Section 75W of the EP&A Act, specifically applies to condition of approval (CoA) 3.2 and the requirements for PM_{10} dust monitoring during soil disturbing works, as discussed and justified below.

1. Project Background

Project Approval for the ILC at Enfield was granted by the Minister for Planning on the 5 September 2007 under Section 75J of the EP&A Act. The approval was for the construction and operation of the ILC with capacity to accept a maximum throughput of 300,000 TEU (one TEU is equivalent to one twenty foot container) per annum, including:

- demolition, relocation or removal of former railway buildings and structures;
- earthworks and drainage including the levelling of the site, formation of landscape mounds and detention basins and removal of unsuitable materials, as required;
- construction and operation of:
  - an intermodal terminal for the loading and unloading of containers;
  - warehousing for the packing and unpacking of containers and the short-term storage of cargo;
  - empty container storage facilities for the storage of empty containers to be later packed or transfer by rail;
  - light industrial/commercial area fronting Cosgrove Road;

- a Community and Ecological area for ecological enhancement and community opportunities. This includes the creation of Frog Habitat Area.
- Off-site works including construction of a road bridge over the existing marshalling yards for access to Wentworth Street, local road works on Cosgrove Road and the reconstruction of the Norfolk Rd and Roberts Rd intersection, to manage access/egress of vehicles to/from the ILC site, and rail connections to the freight rail network; and
- internal roads, administration buildings, diesel and LPG storage and fuelling facilities, container washdown area, vehicle maintenance shed, and installation of site services (all utilities, stormwater and sewerage)."

The $153 million project will allow the transfer and storage of container freight to and from Port Botany, packing and unpacking of containers within the proposed warehouses and storage of empty containers for later re-use or for return to the Port. The project will contribute towards achieving the NSW Government target to move 40% of freight containers in and out Port Botany by rail by 2011. In addition, the EA estimated that the operation of the project would eliminate up to 100,000 truck movements and shorten another 250,000 truck movements between the western suburbs and Port Botany providing an annual saving of 6.5 million vehicle kilometres during peak operations (translating to saving of up to $5.5 million per annum in vehicle operating costs and up to $390,000 per annum in accident costs). In addition the project will generate 170 jobs during construction and approximately 510 jobs during operation.

Construction is expected to take approximately 2.5 years.

2. Dust Monitoring requirements in Project Approval

CoP 3.2 states the following:

The Proponent shall, from the commencement of soil disturbing works on the site, continuously monitor ambient dust concentrations (PM_{10}) at the most-affected residential receptor(s) (to the south-east of the site), and at two locations on the site (including one at the south-east of the site) employing the sampling and analysis methods specified under AM-18 or AS3580.9.8. Results of this monitoring shall be recorded in ugm-3 and shall be utilised for the purpose of site preparation and construction dust management under condition 6.3e of this approval.

Construction dust management is addressed in CoA 6.3e which states:

As part of the CEMP for the project, required under condition 6.2 of this approval, the Proponent shall prepare and implement the following Management Plans:

e) a Construction Dust Management Protocol to detail how dust impacts will be mitigated, monitored and managed during construction of the project. The Plan shall include procedures for the identification of situations in which site preparation or construction works may contribute to an ambient PM_{10} concentration (24-hour) of greater than 50 ugm-3 at any off-site residential receptor, with details of measures to be implemented (including alteration or cessation of works, as may be relevant) to prevent or minimise exceedance of this criterion, in so far as the exceedance may relate to activities associated with the project

Under CoA 3.2, three continuous PM_{10} site monitors are required for the project using sampling and methods specified under AM-18 or AS3580.9.8. Two monitors are required on site, with one of them at the south-east of the site, and one off-site at the most-affected residential receptor to the south-east of the site. AM-18 or Approved Method 18 refers to the AS 3580.9.6 which is the Australian Standard for PM_{10} monitoring using a High Volume Air Sampler (HVAS) – Gravimetric Method. AS 3580.9.8 refers to PM_{10} monitoring using Tapered Element Oscillating Microbalance (TEOM) unit.

The TEOM allows the collection of data continuously which can then be retrieved in real-time via a web interface or be downloaded manually. On the other hand, the HVAS works by exposing a filter for a sampling period of 24 hours. The filters then need to be changed and sent to a laboratory for analysis, resulting in a delay of about 1 week before results are known. Also, the HVAS only gives a 24hr average value compared to continuous data by the TEOM. The HVAS technology has not been considered any further, as this delay is unacceptable to SPC.

TEOM requires an air conditioned enclosure, which contains the data logging and communication systems. The TEOM enclosure needs access to an uninterruptible power supply (240V grid power available). This is potentially a constraint for the required on-site monitors as there is no power on site (other than on existing tenant facilities located in the middle of the site). Further discussion on this matter is provided in Section 4 of this submission.

3. Environmental Assessment (EA) - Dust modelling results and recommended monitoring

The EA undertaken by SKM (October 2005) as part of the Part 3A project approval, assessed the potential impacts on construction dust on the residential communities nearby. The results of the study are summarised below.

Construction dust assessment - Methodology

For the purposes of the air quality assessment undertaken in the EA 4 stages were assumed for construction, as follows:

- Stage 1 – site preparation
- Stage 2 – earthworks and drainage
- Stage 3 – road and rail infrastructure
- Stage 4 – warehousing and final works.

Activities assumed in stage 1 included:

- Construction of sealed haul roads
- Construction of stormwater detention ponds
- Removal / land farming of contaminated material
- Removal of stockpile 5 (unsuitable material)
- Landscaping mounds

Activities assumed in stage 2 included:

- Earthworks
- Stormwater trunk drainage

- Service adjustments
- Retaining wall / battered embankments (for rail access).

Stage 3 construction works were assumed to include bridge and road works, rail line and sidings and container pavement works. Stage 4 was assumed to include buildings, pavements areas and landscaping.

Modelling in the Environmental Assessment

The air quality impacts from the construction of the ILC were assessed by predicting concentrations of particulate matter and dust deposition rates for two scenarios comprising the most intensive construction phases. Scenario 1 was developed from an estimate of the *maximum level of activity* planned at any time in construction Stage 1, and similarly Scenario 2 was developed from a highest level of activity in construction Stage 2. Stages 3 and 4 of the construction would result in limited dust production and were not modelled. 'Gridded' and 'discrete' receptors were located over and around the site for comparisons of modelled air quality impacts with the relevant air quality criteria listed in **Table 1**.

Table 1: NSW EPA Air Quality Assessment Criteria for the Enfield ILC Proposal

Pollutant	Averaging Period	Ambient Air Quality Criteria	Number of Allowable Exceedence Days/Year
TSP	Annual	90 $\mu g/m^3$	nil
PM_{10}	24-hour	50 $\mu g/m^3$	5
PM_{10}	Annual	30 $\mu g/m^3$	nil

The assessment methodology involved incorporating emission rates for all dust sources associated with construction activities and site-representative meteorological data into the NSW EPA regulatory model AUSPLUME.

The annual datasets of hourly-average meteorological and background PM_{10} data used for the dispersion modelling were constructed from NSW EPA Lidcombe station data. The processed meteorological data included hourly averages for temperature, wind speed and wind direction, mixing layer height and stability class.

Dust particle emission rates or total suspended particle (TSP) emission factors were calculated for the activities described by Scenario 1 and Scenario 2 and these were input to the AUSPLUME model.

Air dispersion modelling was undertaken for each of the stages presented above using the AUSPLUME model, with Lidcombe meteorological data, which is representative of the long-term meteorological data for the area and consistent with EPA requirements. Monthly averaged dust deposition rates and maximum 24-hour PM_{10} concentration plots were prepared and compared against relevant ambient air quality goals.

Selected sites were identified as discrete receptors to allow ease of impact description. These sites are in the following locations (approximately) and are shown in Figure 1:

- R1 Cosgrove Road – south east of the site;
- R2 Punchbowl Road – south of the site;
- R3 Boronia Parade– south west of the site ;
- R4 Wentworth Street – south west of the site; and
- R5 Roberts Road – north west of the site.

Results

The modelling undertaken showed that the long term air quality criteria for PM_{10} and TSP impacts (annual averages) and dust deposition impact (monthly average from annual average) would not be exceeded even by worst-case, high intensity construction impacts. The focus of the air quality impacts during the construction phase was therefore directed at the potential short-term impacts from PM_{10} concentration. As such, the requirement for air quality impacts during construction is no more than 5 exceedances per year of the air quality criterion for maximum 24 – hour average PM_{10} (50 ug/m^3 including background levels).

The initial modelling trials included all standard dust mitigation measures such as use of water sprays on freshly-exposed areas, sealed haul roads, wind breaks where they existed, and water trucks applied to exposed areas used by construction vehicles. These initial trials indicated that even with the usual dust mitigation measures for a construction site, there would be significantly high levels of PM_{10}. Therefore additional trials were undertaken to determine what further management actions would be required for the modelling estimates of the PM_{10} impacts to fall below the criterion of 50 $\mu g/m^3$. In this respect a first step was to restrict activities only to periods during which hourly average wind speed was less than 5 m/s.

The air quality criterion for maximum 24-hourly average PM_{10} was still slightly exceeded off-site. Therefore the additional restriction of a complete halt to construction operations was applied when the (incident) wind direction was in the sector 210° to 340°. This sector was chosen primarily to reduce the PM_{10} impacts predicted for the residential areas near the south east of the ILC site. The result of this additional restriction reduces the air quality impacts to acceptable levels for both Scenario 1 and 2. The results show that is, there are unlikely to be more than 5 exceedances per year of the PM_{10} 24-hour air quality criteria in the majority of areas surrounding the ILC site. The results also show that two areas to the south east and north west of the site where a number of residences exist are contained within the contour of 5 exceedences of the PM_{10} 24-hour criteria (refer to Figure 2).

- Figure 1 Receptor Sites

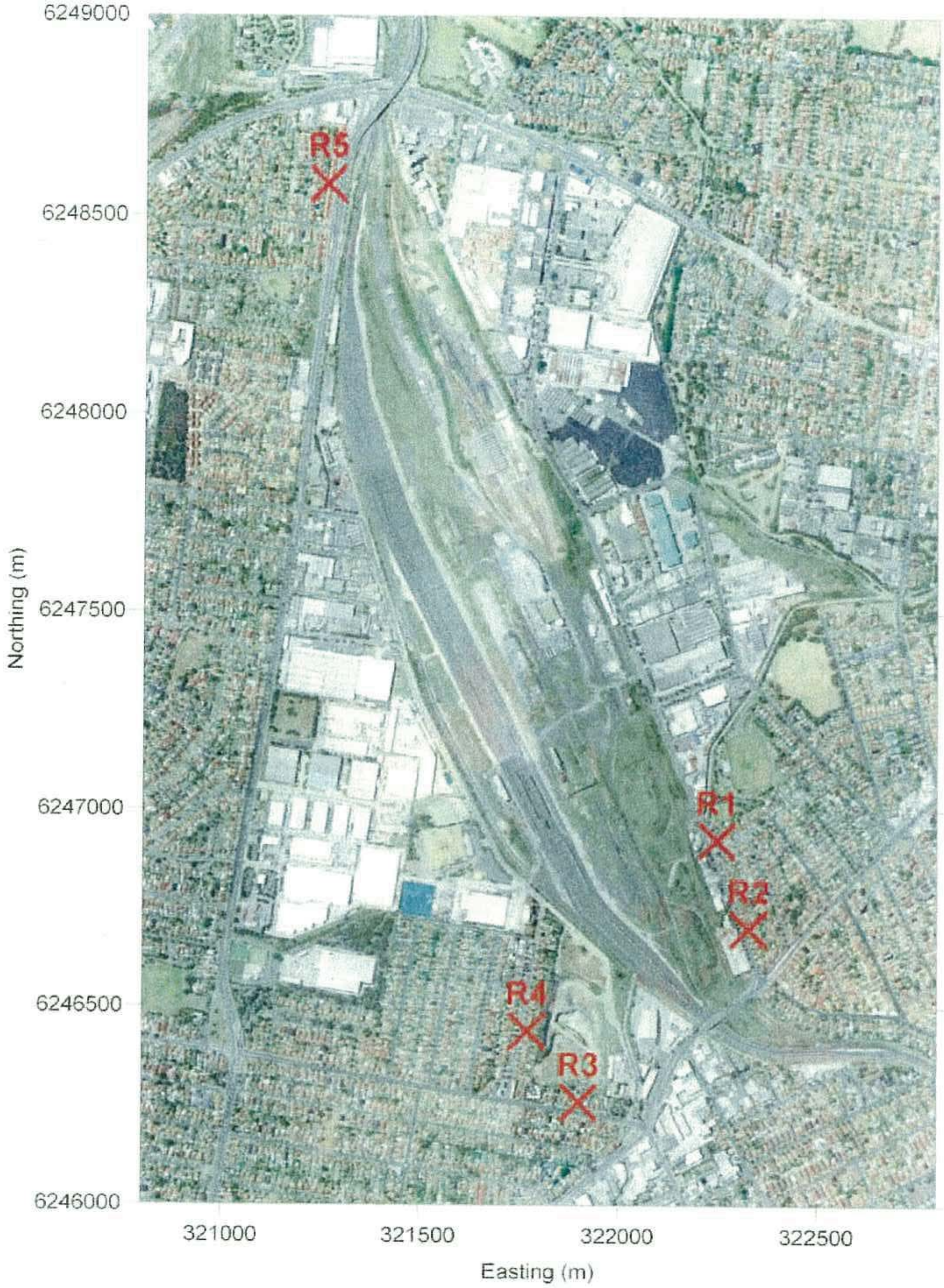
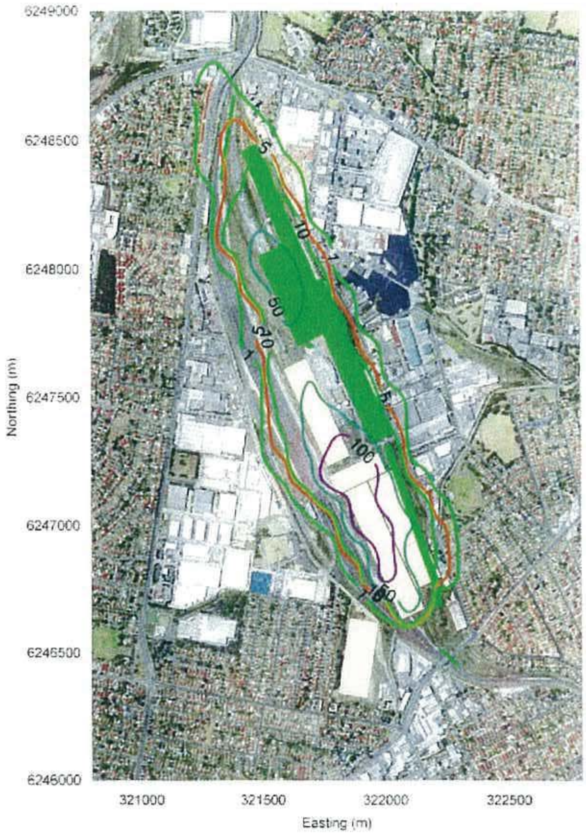


Figure 2 – Modelling results – Left hand side Figure: Construction Scenario 2: Maximum 24-hour average PM_{10} including Background (ug/m3), Criterion 50 ug/m3: Wind Speed < 5 m/s & excluding Wind direction sector 210-340°. Right hand side Figure: Construction Scenario 2: Exceedances of 24-hour average PM_{10} Criterion 50 ug/m3: Wind Speed < 5 m/s & excluding Wind direction sector 210-340°



The EA indicated that while wind speed and wind direction restrictions are required in the modelling to demonstrate compliance with criteria, this should not be interpreted as meaning that construction works need to cease under these meteorological conditions. Any requirements to cease work on these occasions would need to be considered if the real time monitoring devices at sensitive receivers suggest criteria are likely to be exceeded. Monitoring during construction would be undertaken in these areas to ensure air quality impacts are adequately identified and managed.

With respect to construction stages 3 and 4, air quality impacts would be lower than those for Stages 1 and 2. As such no dispersion modelling assessment for these stages was warranted. The general dust control measures described for Stages 1 and 2 will be implemented for Stages 3 and 4.

The results for the dust deposition determined from each of the construction scenarios were provided as a single result, determined from an annual statistic. This follows EPA (2001) guidelines where the two annual statistics for dust deposition are added together and converted to a monthly average and added to the background dust deposition of 2 g/m^2/month, determined for the site. The results for monthly average dust deposition at discrete receptors showed that no significant air quality impacts are expected from dust deposition, with dust mitigation measures in place.

EA's Dust Mitigation and Monitoring

The EA indicated that potential for off-site dust emissions created during the construction of the ILC would be minimised through the development and implementation of a Dust Management Plan (DMP) as part of the Construction Environmental Management Plan (CEMP) prepared as part of the project.

A range of mitigation measures, which were incorporated into the air quality modelling, were recommended in the EA (for details refer to Appendix F of the EA). These included:

- Undertake regular watering of active work areas, including stockpiles and loads of soil being transported, to reduce wind blown dust emissions;
- Sealed haulage roads to be provided and haulage trucks to use the sealed bitumen haul roads at all times when transporting materials on-site;
- Construct wind breaks in appropriate zones to reduce wind erosion;
- Assess construction works activities and modify as appropriate if off-site real-time dust monitoring data indicates ambient air quality criteria are likely to be exceeded due to project earthworks activity;
- Minimise the area of disturbed / exposed land at any one time;
- Revegetate stockpiles, seal or progressively landscape exposed areas and where material is to remain in situ for a long period of time.

The EA recommended that a meteorological monitoring station be installed at the site of the proposed ILC when background monitoring commences. This would allow the collection of sufficient data to identify adverse air quality impacts within the nearest residential areas that could be attributed to construction earthworks.

The EA also recommended the establishment of "real time" monitoring sites at two locations, providing one each to assess the potential for impacts at residential areas in the south-east and north-west. Providing "real time" monitoring at these locations, together with wind data, will allow the collection of data sufficient to identify adverse air quality impacts within nearest residential areas that could be attributed to construction earthworks.

It is also noted that the recommendations of the EA were based on worst case modelling scenarios. The modelling results were based on estimates of the maximum level of activity planned at any time in stage 1 (Site Preparation) and stage 2 (main construction). In reality construction activities will be staged as discussed in the SPC's CEMP Framework (21 July 2008) and it is unlikely that all the dust sources modelled for each scenario will be occurring at the same time. The period with highest potential for dust impacts will occur from mid 2009 to mid 2010 when main construction of base infrastructure and off site construction works (refer to Figure 1-4 of CEMP Framework) are planned. Site preparation (stage 1) will involve the enabling works described in the CEMP Framework (ie. demolition, remediation, construction of frog habitat area and minor enabling works), which are considered low risk in terms of dust generation, with remediation potentially as the most significant dust risk activity in this phase. Stage 1 activities will therefore have a much lower risk of dust generation than that modelled in the EA Stage 1.

4. Intent of Dust Monitoring Program

Number of Dust Monitoring sites

Based on the air quality modelling and the recommendations made in the EA, SPC has sought further clarification from the Air Quality specialist, SKM, about the number and location of "real time" air monitoring stations required to manage potential dust impacts from construction activities.

SKM, in correspondence dated 12 August 2008 (refer to Attachment 1), has advised that there is no justification for two real time dust monitoring sites to be located in the south-east area as required under CoA 3.2. SKM indicated that there needs to be one station positioned either on the ILC site near the sensitive receptors (but closer to the potential dust source than the sensitive receptors and representing a conservative result) or one station located off-site at the actual receivers (or close to them). Either of these locations would provide the information required to manage dust impacts from construction activities in the Cosgrove Road residential area.

SKM also indicated that it was intended that the monitoring sites proposed in the EA would adequately represent the potential for impact on the adjacent residential areas on Cosgrove Road and Roberts Road. Two stations to manage one area of potentially affected receivers at Cosgrove Road will not provide additional value for dust management purposes. Real time dust monitoring is expensive and can be difficult to establish (due to power requirements and equipment management/security issues). Two stations to manage one single potentially affected receiver would not provide any more meaningful results and is not justified due to the cost and difficulties of establishment.

Dust Monitoring Methodology

As indicated in Section 2 of this submission, the TEOM method requires access to an uninterruptible power supply (240v grid power available). However there is no power on site (other than on existing tenant facilities located in the middle of the site). There are power lines outside the site and on public areas in the vicinity of the site. Potential locations with access to power within/near the residential areas to the south-east and north-west are being investigated, but a number of constraints have been identified in terms of security, need for further approvals and compliance with the relevant Australian Standards for siting air quality monitoring equipment.

SPC has also investigated the use of alternative technology for PM_{10} continuous monitoring that does not require access to an uninterruptible power supply. New laser photometer technology (DustTrak DRX), currently available in the market, simultaneously measures size-segregated mass fraction concentrations corresponding to PM1, PM2.5, PM_{10} and total PM size fractions. DustTrak monitors allow real time PM_{10} monitoring and can be operated with alternative sources of energy (batteries, solar, etc). Attachment 2 provides a brochure which shows details of the DustTrak monitor and provides results from a calibration study between a TEOM and a DustTrak monitor.

SPC has obtained advice from air quality specialists about this technology. Although DustTrak is not consistent with the method of AS3580.9.8, it will achieve the purpose of obtaining continuous PM_{10} dust monitoring information. It was also advised that this method tends to over predict because it also measures aerosols (not just solid particles), and therefore it would provide a conservative result. In addition, SPC could calibrate the DustTrak each month against the TEOM.

5. Requested Modification

SPC requests a modification of CoA 3.2 to:

- Reduce the number of real time dust monitors from three to two and provide some flexibility about the location of the sites (either on site or off-site) as long as the final locations provide sufficient information to manage potential dust impacts on the nearest residential areas from construction activities.

- Provide the option at the second monitoring site to install real time PM_{10} monitoring technology that does not require access to the electricity grid (ie. could be operated on batteries or solar technology). This would be used as a contingency option in case SPC cannot install a second TEOM.

- Provide some clarity and flexibility in the timing of PM_{10} continuous dust monitoring, which should be undertaken during works modelled and assessed as to potentially causing off-site impacts if no mitigation measures are implemented, as identified in Section 3 above.

SPC proposes that condition 3.2 be changed as follows:

The Proponent shall, from the commencement of major soil disturbing works on the site and for the duration of significant earthworks, continuously monitor ambient dust concentrations (PM_{10}) at two locations (either on-site or in the vicinity of the site) suitably positioned to allow assessment and management of dust impacts at the most-affected residential receptor(s). The dust monitoring stations should employ the sampling and analysis methods specified under AS3580.9.8 or other alternative methods for the purpose of continuous PM_{10} dust monitoring. At least one on the site monitors must employ the sampling and analysis methods of AS3580.9.8. Results of this monitoring shall be recorded in μgm^{-3} and shall be utilised for the purpose of dust management during soil disturbing works and significant earthworks on site under condition 6.3e of this approval.

We trust this approach meet DoP's requirements and look forward to receiving your response at your earliest convenience. Please do not hesitate to contact the undersigned or Ricardo Prieto-Curiel (0488 220 642) should you wish to discuss this matter further.

Yours faithfully,

Stephen Zaczkiewicz
Enfield ILC Senior Development Manager

ATTACHMENT 1:
LETTER FROM SKM ON DUST MONITORING PROGRAM

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Environment and Planning Manager
Enfield ILC
Sydney Ports Corporation
Level 6, 207 Kent Street
Sydney, NSW 2000

12 August 2008

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EN02302

Dear Ricardo

Air Quality Monitoring requirements at Enfield Intermodal Logistics Centre

I refer to your request for clarification on the number of dust monitoring sites recommended for the monitoring program required under the consent for the ILC project.

On 5 September the Minister for Planning granted approval under Section 75J of the *Environmental Planning and Assessment Act, 1979* to the construction and operation of the Enfield Intermodal Logistics Centre. The Minister's Conditions of Approval (MCoA) relevant to the monitoring of dust emissions from the site were:

> **MCoA 3.2** The Proponent shall, from the commencement of soil disturbing works on the site, continuously monitor ambient dust concentrations (PM_{10}) at the most-affected residential receptor(s) (to the south-east of the site), and at two locations on the site (including one at the south-east of the site) employing the sampling and analysis methods specified under AM-18 or AS3580.9.8. Results of this monitoring shall be recorded in ugm^{-3} and shall be utilised for the purpose of site preparation and construction dust management under condition 6.3e of this approval.
>
> **MCoA 6.3** As part of the CEMP for the project, required under condition 6.2 of this approval, the Proponent shall prepare and implement the following Management Plans:
>
> **e)** a **Construction Dust Management Protocol** to detail how dust impacts will be mitigated, monitored and managed during construction of the project. The Plan shall include procedures for the identification of situations in which site preparation or construction works may contribute to an ambient PM_{10} concentration (24-hour) of greater than 50 ugm^{-3} at any off-site residential receptor, with details of measures to be implemented (including alteration or cessation of works, as may be relevant) to prevent or minimise exceedance of this criterion, in so far as the exceedance may relate to activities associated with the project

SKM

Results of dust modelling

The modelling undertaken in the Environmental Assessment (EA) showed that the long term air quality criteria for PM_{10} would not be exceeded even by worst-case, high intensity construction impacts. The focus of the air quality impacts during the construction phase was therefore directed at the potential short-term impacts from PM_{10} concentration. As such, the requirement for air quality impacts during construction is no more than 5 exceedances per year of the air quality criterion for maximum 24 – hour average PM_{10} (50 $\mu g/m^3$ including background levels).

The initial modelling trials included all standard dust mitigation measures such as use of water sprays on freshly-exposed areas, sealed haul roads, wind breaks where they existed, and water trucks applied to exposed areas used by construction vehicles. These initial trials indicated that even with the usual dust mitigation measures for a construction site, there would be significantly high levels of PM_{10}. Therefore additional trials were undertaken to determine what further management actions would be required for the modelling estimates of the PM_{10} impacts to fall below the criterion of 50 $\mu g/m^3$. In this respect a first step was to restrict activities only to periods during which hourly average wind speed was less than 5 m/s.

The air quality criterion for maximum 24-hourly average PM_{10} was still slightly exceeded off-site. Therefore the additional restriction of a complete halt to construction operations was applied when the (incident) wind direction was in the sector 210° to 340°. This sector was chosen primarily to reduce the PM_{10} impacts predicted for the residential areas near the south east of the ILC site. The result of this additional restriction reduces the air quality impacts to acceptable levels. The results show that there are unlikely to be more than 5 exceedances per year of the PM_{10} 24-hour air quality criteria in the majority of areas surrounding the ILC site. The results also show that the two areas to the south east and north-west of the site, where a number of residences exist, are contained within the contour of 5 exceedances of the PM_{10} 24-hour criteria.

While wind speed and wind direction restrictions are required in the modelling to demonstrate compliance with criteria, this should not be interpreted as meaning that construction works would need to cease under these meteorological conditions. Any requirements to cease work on these occasions would need to be considered if the real time monitoring devices at sensitive receivers suggest criteria are likely to be exceeded. Monitoring during construction would be undertaken in these areas to ensure air quality impacts are adequately identified and managed.

SKM

Mitigation of dust impacts during construction

The EA indicated that the potential for off-site dust emissions created during the construction of the ILC would be minimised through the development and implementation of a Dust Management Plan (DMP) as part of the Construction Environmental Management Plan (CEMP) prepared as part of the project.

The DMP would include details of a dust-level monitoring program undertaken prior to the commencement of earthworks and during construction works. Monitoring during construction would allow reporting on dust impacts on a regular basis, to determine if earthworks contribute PM_{10} levels over and above the pre-determined background levels. Specifically where excursions above PM_{10} (24-hour) – 50 $\mu g/m^3$ are reported and shown to be attributed to the earthworks at the site, dust management measures can be implemented.

A meteorological monitoring station will be installed at the site of the proposed ILC when background monitoring commences. This will allow the collection of sufficient data to identify adverse air quality impacts within the nearest residential areas that could be attributed to construction earthworks.

All monitoring would be undertaken in accordance with the NSW EPA (2001) *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales*. The monitoring devices would need to be located in accordance with AS 2922-1987 – *Ambient Air -Guide for Siting of Sampling Units* and AS2923 – *Ambient Air – Guide for the Measurement of Horizontal Wind for Air Quality Applications*.

To minimise potential impacts on air quality resulting from dust generation during the construction phase of the proposal the mitigation measures and controls which were incorporated into the air quality modelling would be implemented.

Numbers of dust monitoring sites

The MCoA requires that the Proponent, from the commencement of soil disturbing works on the site, should monitor ambient dust concentrations (PM_{10}) continuously at 3 locations. This included two stations to assess the impacts on sensitive receivers in the south-east residential area along Cosgrove Road.

The EA recommended the establishment of "real time" dust monitoring sites at two locations, providing one each to assess the potential for impact at residential areas in the south-east and north-west.

SKM

There is no justification for two sites to be located in the south-east area. There needs to be either one station positioned on the ILC site near the sensitive receptors (but closer to the potential dust source than the sensitive receptors and representing a conservative result) or one station off-site at the actual receivers (or close to them). Either of these would provide the information required to manage dust impacts from construction activities in the Cosgrove Road residential area.

It was always intended that the monitoring sites proposed in the EA would adequately represent the potential for impact on the adjacent residential areas on Cosgrove Road and Roberts Road. Two stations to manage one area of potentially affected receivers at Cosgrove Road will not provide additional value for dust management purposes. Real time dust monitoring is expensive and can be difficult to establish (due to power requirements and equipment management/security issues). Two stations to manage one single potentially affected receiver would not provide any more meaningful results and is not justified due to the cost and difficulties of establishment.

If you have any further questions please do not hesitate to contact Matt Davies or me on the number below.

Yours sincerely

Kenneth Robinson
Project Director
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Fax: 02 9928 2504
E-mail: KRobinson@skm.com.au

ATTACHMENT 2:
BROCHURE OF PM_{10} CONTINUOUS DUST MONITOR DUSTTRAK

Join The Revolution In Real-Time Dust Monitoring – Insist On The New DustTrak II Or DRX Aerosol Monitor.

DustTrak DRX Aerosol Monitors

These new laser photometers simultaneously measure mass and size fraction – something no other monitor can do. Both the desktop and handheld monitors are continuous real-time 90° light-scattering laser photometers that simultaneously measure size-segregated mass fraction concentrations corresponding to PM_1, $PM_{2.5}$, Respirable, PM_{10}, and Total PM size fractions. They combine both particle cloud (total area of scattered light) and single particle detection to achieve mass fraction measurements.

This size-segregated mass fraction measurement technique is superior to either a basic photometer or optical particle counter (OPC). It delivers the mass concentration of a photometer and the size resolution of an OPC.

- Photometers can be used at high mass concentration, but they do not give any size information (unless used with size selective inlet conditioners) and significantly underestimate large particle mass concentrations.
- OPC's provide size and count information; however, they do not provide any mass concentration information and cannot be used in high mass concentration environments.

Comparison of Arizona Road Dust: DustTrak DRX vs. TEOM

The PM_{10} figures on the next page show size-segregated Arizona Road Dust mass concentration measured by the DustTrak DRX monitor. These mass concentrations were compared with a Tapered Element Oscillating Microbalance (TEOM). Three separate experiments were performed with $PM_{2.5}$, Respirable, and PM_{10} inlet conditioners attached to the inlet of the TEOM. Each size-segregated mass fraction channel measured by the DustTrak DRX monitor shows excellent correlation with the TEOM using the proper inlet conditioner.

For additional information on this comparison, see TSI Application Note EXPMN-004.

DustTrak DRX Aerosol Monitor Advantages Over TEOM

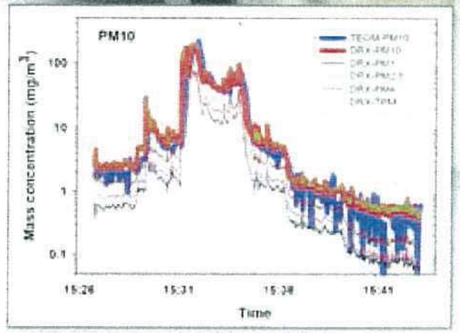
1. Faster response time
2. Continuous and faster data acquisition rate (once per second)
3. Simultaneous measurement of size segregated mass fraction concentrations
4. Size segregated mass fraction data is shown in real time
5. No need for multiple instruments for different size fraction measurements
6. No need for size-selective inlet conditioners
7. No consumables and low maintenance
8. Much lower cost of ownership – one instrument can do the work of five

DustTrak DRX Aerosol Monitor Advantages Over OPCs

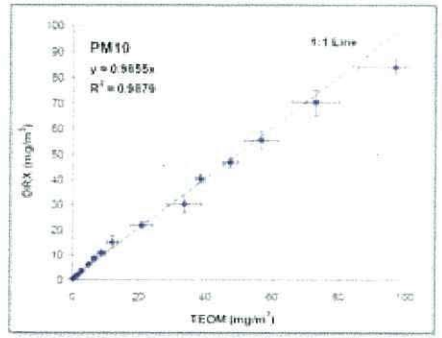
1. Simultaneous measurement of size-segregated mass fraction concentrations
2. Size-segregated mass fraction data is shown in real time
3. Can be used in high mass concentration environments
4. Ability to generate custom calibration factors with integrated gravimetric reference sampling capability based on aerosol of interest
5. Significantly reduces mass conversion errors using particle size and count data due to particle density, refractive index and shape
6. Lower particle detection range down to 0.1 µm in particle size

DustTrak DRX Aerosol Monitor Advantages Over Single-Channel Photometers

1. Greater sensitivity to particles >1 µm in size
2. Simultaneous measurement of size-segregated mass fraction concentrations
3. Size-segregated mass fraction data is shown in real time
4. Ability to generate custom calibration factors with integrated gravimetric reference sampling capability based on aerosol of interest
5. No need for multiple instruments for different size fraction measurements
6. No need for size-selective inlet conditioners



Comparison of Arizona Road Dust (A1) mass concentration measured by the DustTrak DRX and the TEOM with a PM10 impactor.



Linear correlation between DustTrak DRX and TEOM for Arizona Road Dust (A1) mass concentration measurement. The TEOM ran with a PM10 impactor.