Appendix N

Air Quality Assessment

Sustainable Resource Centre, Teralba

CiviLake on behalf of Lake Macquarie City Council

8 June 2010

Air Quality Impact Assessment

Sustainable Resource Centre, Teralba

Air Quality Impact Assessment

Sustainable Resource Centre, Teralba

Prepared for

CiviLake on behalf of Lake Macquarie City Council

Prepared by

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1.0 Introduction

CiviLake, a business unit of Lake Macquarie City Council (LMCC), proposes to develop a Sustainable Resource Centre (SRC) at Teralba, NSW, which would primarily be used to process and re-sell waste materials generated by its construction, demolition and maintenance operations. The proposed facility would be designed to handle up to 110,000 tonnes of material per year, with possible future expansion to accommodate in the order of 200,000 tonnes per annum (tpa) if the materials and demand exist.

The Department of Environment, Climate Change and Water (DECCW) indicated that an air quality impact assessment (AQIA) using atmospheric dispersion modelling was required to address the potential odour and dust emissions from the facility. This document reports on the methodology and results used in the assessment.

1.1 Scope of Works

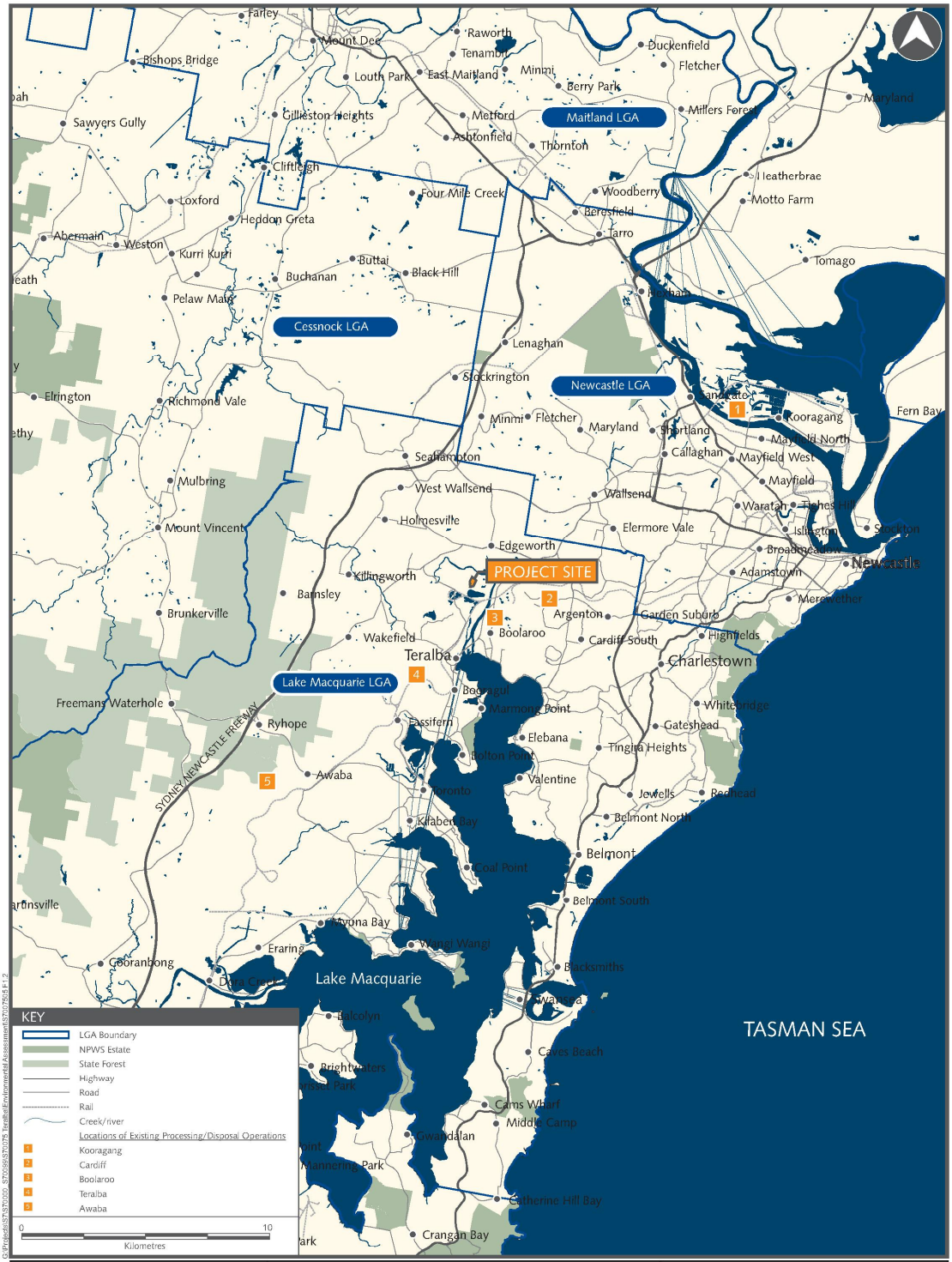
Dispersion modelling was undertaken using AUSPLUME (v6.0) to estimate the ground level concentrations of dust [total suspended particulates (TSP) and fine particulates (PM_{10})] and odour expected to be generated from operation of the facility. The assessment considered emissions from the facility when operating at the proposed maximum throughput level of 218,000 tpa.

The assessment was conducted in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (DEC, 2005). Emission factors published by the Australian Government for the National Pollutant Inventory were used to estimate dust emissions from the proposed operations. Odour emission rates measured at a green waste facility in Sydney were used as conservative estimates of possible odours generated by the operations. Ambient PM_{10} concentrations measured at the DECCW's monitoring station in Wallsend were added to the maximum predicted concentrations predicted by the dispersion modelling to develop cumulative pollutant concentrations, which were compared against air quality criteria specified by the DECCW.

1.2 Site Description

The proposed SRC is to be located on a seven hectare site at 80 The Weir Road, Teralba (refer to **Figure 1**). The site includes lots 42, 43, 53 and 54 DP 16062 and is dissected by an electricity easement. The site currently has a light agricultural land use, but was previously used for the disposal of biosolids. Bushland surrounds the site on all sides, with the nearest receptor being the Teralba Worm Farm Waste Education Centre, owned and operated by Council, which is approximately 300 m from the site. Other neighbouring premises include a miniature aircraft club (approximately 400 m north of the site), and the Edgeworth Sewage Treatment Works (approximately 400 m north-northeast). The nearest residence is approximately 500 m north of the site. Future uses of the surrounding land include conservation, recreation and sporting facilities.

Figure 1 Site location



PROJECT ID S70075 CREATED BY TO LAST MODIFIED TO 24 06 2010 AECOM www.aecom.com AECOM does not warrant the accuracy or completeness of information displayed in this map and any person using it does so at their own risk. AECOM shall bear no responsibility or liability for any errors, faults, defects, or omissions in the information.		**Location of Existing Processing/ Disposal Operations** **Lake Macquarie City Council** *Environmental Assessment* Teralba Sustainable Resource Centre Teralba Figure **1.2**

2.0 Project Description

The proposed facility would be categorised as a crushing, grinding and separating operation for construction and demolition materials such as concrete, bricks, gravel, road base, asphalt, tiles, soils and green waste.

2.1 Material Volumes

CiviLake currently generates over 110,000 tonnes of hard material from its own operations, as summarised in **Table 1**. These materials would make up the primary source of feed for the facility.

Table 1 Indicative Material Volumes

Material Source	Composition	Indicative Volume (tpa)
Road excavation	Asphalt, aggregate, road base, VENM	5,000
Road excavation (non-bituminous)	Road base, VENM	60,000
Mixed reclaimed asphalt pavement	Aggregate	7,500
Recycled sealing aggregate	Aggregate	500
Concrete	Concrete	4,000
Foreshore maintenance	Dredge waste sea grass	2,000
Parks and gardens (green waste)	Weeds, hard wood	3,000
Maintenance (roads, drainage, kerb/gutter, cycle ways etc)	Concrete, green waste, asphalt, road base, other	15,000
Street sweeper	Leaf litter, aggregate and litter	1,000
Clean fill (VENM)	Soil etc.	2,500
	Total	**100,500**

2.2 Material Processing

Materials would be received at the facility weighbridge, where a visual inspection would be undertaken to ensure the materials are clean and not contaminated. Fees would be charged for the acceptance of the material according to a differential pricing system to encourage separation of materials. Any suspicious material would be either rejected directly or tipped in a designated area of the site for further inspection before rejection (if unsuitable) or stockpiling (if suitable). Received materials would consist of some material ready for immediate sale and other materials that require processing before selling. Materials would be deposited into respective stockpiles prior to reprocessing, which would vary according to the material type, output materials required and market need. Processing would primarily consist of crushing (e.g. concrete, reclaimed asphalt pavement, bricks and tiles); mixing in a pug mill (concrete, aggregate); and washing (recycled metal materials swept up from roads). Products would be stockpiled to await pickup. Feed and product stockpiles would be maintained in a moist condition to minimise dust generation.

The potential processing pathways are shown in **Table 2**.

Table 2 Material Processing Pathways

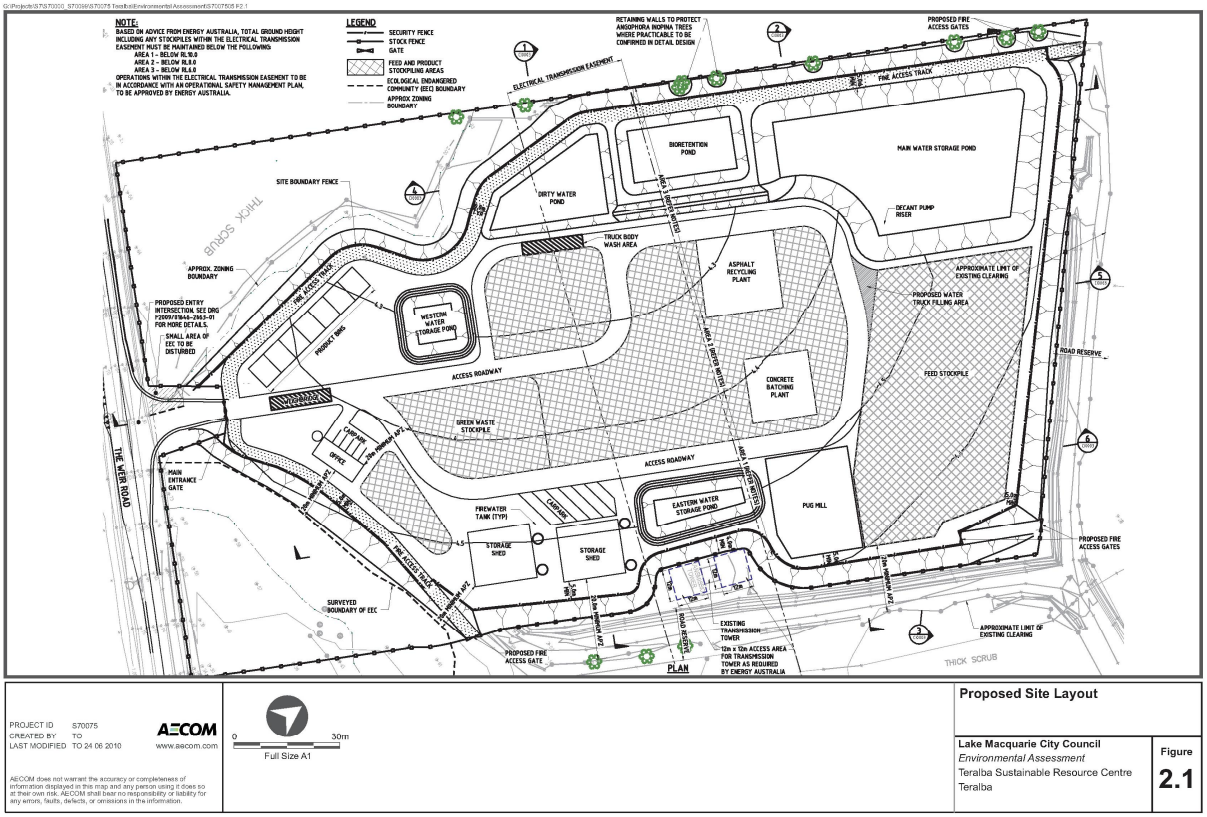
Material	Processing	Product
Concrete, bricks, tiles	Crushing/screening	Various aggregates Crusher dust
	Blending	Road base
Asphalt/road base	Crushing/screening	Recycled road base Gravel products
	Asphalt recycling	Asphalt
Green waste	Shredding, mulching	Woodchip
	Blending	Soil blends
Soil	Screening/blending	Soil blends

Figure 2 shows the proposed layout of operations on the site. The following plant, equipment and buildings would be required for the operation of the facility:

- Double story gatehouse, situated at the entry to the site to allow for visual screening of incoming loads;
- A 60 tonne incoming/outgoing weighbridge located approximately 70 m from the Weir Road verge to allow for truck queuing;
- Site office/administration area;
- Two storage sheds with lunch room and amenities for the storage of plant and other recyclables;
- ARAN Modumix 11 pug mill with 400 tonnes per hour (tph) capacity;
- Asphalt recycler;
- Two screening plants with a combined processing capacity up to 300 tph;
- Concrete batching plant and silo to produce approximately 5,000 tonnes/year;
- Truck wash bay for dust management;
- Feed and end product stockpiles;
- Product storage bays made from concrete blocks, situated away from processing areas;
- Three large loaders moving up to 400 tph (depending on length of travel);
- 10,000 L capacity water cart;
- Staff and visitor car parking; and
- Landscaping.

The main plant and processes are described in the following sections.

Figure 2 Site Layout



2.2.1 Pug Mill

An Aran Modumix 11 pug mill, currently located at the Metromix Quarry, would be transferred to the site. The 17 m high mill has a capacity of 400 tph, and is used for grinding and mixing in the concrete and asphalt processes. The pug mill is expected to operate between the hours of 7 am to 6 pm (although operations would typically be expected to cease by 3.30 pm). Moist stockpiled material would be mixed with a small volume of powder stored in the pug mill silo (approximately 1 % powder to gravel ratio) and water to form a moist (not wet) product that is loaded onto trucks via a conveyor. No dust emissions are generated during the loading process due to the moisture content of the material. The pug mill processing operations are also essentially dust free – the gravel placed in the pug mill should contain sufficient moisture to prevent dust generation, and the pug mill is enclosed and serviced by two dust extractors with filters that are replaced regularly. The pug mill currently operates at the Metromix Quarry, and is not known to generate dust emissions during operation. The pug mill is shown in **Figure 3**.

Figure 3 Pug Mill (currently located at the Metromix Quarry)

2.2.2 Concrete Batching Plant

A concrete batching plant would occasionally be operated on site to product low-strength concrete products suitable for applications such as foot path construction. Small batches (6 – 7 tonnes) are expected to be produced utilising concrete crushed on site. The batch process would be expected to take less than one hour. The plant and silo, around 10 m high, would produce approximately 5,000 tpa.

2.2.3 Mobile Plant

Three large loaders would be used to move materials around the site at volumes of up to 400 tph. Two crushing and screening plant with a combined capacity of up to 300 tph would also be used at the facility. A tub grinder would be used for around two campaigns per year (around 3 days per campaign) to shred and mulch green waste, primarily that collected after storm events.

2.2.4 Green Waste

Dry green waste would be received at the site, primarily consisting of materials that have been mulched or chipped at the pick-up locations and seaweed harvested from around the lake area. Mulch material would be blended with soil and stockpiled for immediate sale (no further processing required), with turnaround times of less than three weeks anticipated. No composting of green waste would occur. No grass clippings or putrescible wastes would be received at the site.

2.3 Product Storage

Materials would be separated into feed stockpiles and end product stockpiles. Stockpiles would be a maximum of 8 m high, with those located within the transmission line easement restricted to heights of 2 - 3 m. An example feed stockpile is shown in **Figure 4**.

Figure 4 Example Feed Stockpile

Some materials would be stored in product bins. The 7 m x 10 m product storage bins, constructed from large concrete blocks (similar to those shown in **Figure 5**), would be located along the south eastern site works boundary. The product bins would store the following:

- Approximately 7,000 - 8,000 tonnes of new and recovered sealing aggregate per year (around 600 to 700 tonnes of new sealing aggregate and approximately 500 tonnes of recovered aggregate would be stored at any one time);
- An estimated 15,000 tonnes of reclaimed asphalt pavement per year, with not more than 5,000 tonnes stored at any one time; and
- Approximately 5,000 cubic metres (m3) of mulch (blend of hardwood and leaf) per year. In order to prevent combustion and associated bushfire risk, mulch stockpiles would be turned regularly. Material from mulch stockpiles would generally be removed and replenished on a weekly basis, with older material removed first.

Figure 5 Example Product Storage Bins, Boolaroo Transfer Station

Two storage sheds would be located north of the product bins along the eastern site works boundary. These sheds would be used to store plant and equipment when not in use, as well as other miscellaneous recyclable

material such as road signs, steel survey pegs, some construction materials (pipes, pavers etc.), safety materials, and erosion and sediment control devices. These materials are not expected to generate dust emissions.

2.4 Operation

The proposed facility would be operated by five full-time staff. Proposed operating hours for the different activities are summarised in **Table 3**.

Table 3 Operating Hours

Day	Operating Hours	
	Crushing/Processing	Materials Deliveries
Monday – Friday	7 am – 6 pm	As for crushing/processing, plus after hours deliveries for up to 50 nights per year
Saturday	7 am – 1 pm	
Sunday/public holidays	No work	8 am – 5 pm

2.5 Site Access

All access for construction and operation of the facility would be via a single entry / exit point located at the centre of the site along The Weir Road. Materials would be delivered to the site by medium to large rigid trucks. A new two-lane road would be constructed to provide safe access for heavy vehicles, and would be sealed with bitumen for 20 m into the site. A 6 m wide, all weather access road would provide internal access and circulation. The site design includes a number of manoeuvring areas along the access road and around the designated truck parking area located near the south eastern corner of the site to provide truck access to all areas of the facility.

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3.0 Potential Emissions from the Facility

3.1 Construction Emissions

The site would be filled with materials generated by CiviLake's construction activities over approximately three years. The filling activities would involve the delivery and placement of approximately 60,000 m^3 of material over the site area for each year within the construction period. It is anticipated that this would require in the order of 3,300 truck deliveries per year (or in the order of 11 per day) during the construction period. Once the appropriate freeboard level has been reached, plant and equipment would be delivered to the site.

The construction works may generate dust. Products of fuel combustion from vehicles and equipment used in construction activities are also potential air emissions. These emissions, however, can be minimised and managed through standard dust mitigation measures and vehicle selection and maintenance procedures. As such, no detailed investigation of the impacts of these emissions was undertaken.

3.2 Operational Emissions

Emissions from the operation of the proposed facility primarily relate to dust/particulate emissions from materials handling, processing and wind erosion of stockpiles, and potential odour emissions from green waste handling and storage and leachate collection areas.

3.2.1 Dust

Airborne particles are commonly differentiated according to size based on their equivalent aerodynamic diameter. Particles with a diameter of less than or equal to 50 micrometres (μm) are collectively referred to as total suspended particulates (TSP). Adverse effects of TSP are primarily aesthetic, as they can cause soiling and discolouration when they settle on surfaces. These large particles can, however, cause some irritation of mucosal membranes and can increase health risks from ingestion if contaminated. Particles with diameters of 10 μm or less (known as PM_{10} or fine particles) tend to remain suspended in the air for longer periods than larger particles, and can penetrate into human lungs, causing a wider range of health effects.

Exposure to particulate matter has been linked to a variety of health issues, such as respiratory problems (for example coughing, aggravated asthma, and chronic bronchitis) and non-fatal heart attacks. Furthermore, if the particles contain toxic materials (such as lead, cadmium, zinc) or live organisms (such as bacteria or fungi), toxic effects or infection can occur from the inhalation of the dust.

Particulate matter can be emitted from natural sources (bushfires, dust storms, pollens and sea spray) or as a result of human activities such as combustion activities (motor vehicle emissions, power generation and incineration), bulk material handling, crushing operations, unpaved roads and wood heaters. While dust may be emitted from all aspects of the proposed facility's operations, the main potential sources of dust are materials handling (loading and unloading), processing and storage.

The main processing activities that would be undertaken on the site are:

- Crushing/screening (concrete, bricks, tiles, asphalt, road base);
- Blending (concrete, bricks, tiles, green waste, soil); and
- Shredding/mulching (green waste).

Approximately eight products would be generated on site:

- Aggregates;
- Crusher dust;
- Road base;
- Recycled road base;
- Gravel products;
- Asphalt;
- Woodchip; and
- Soil blends.

Products and materials with the smallest particle sizes and lowest moisture contents, such as crusher dust and soil blends, are likely to generate the most dust, particularly during strong winds.

3.2.2 Odour

Odours are complex mixtures of gases that are typically light, volatile (i.e. evaporate easily) chemicals that are inhaled with air. The perception of odour is a very subjective experience, and is affected by a number of factors such as sensitivity to a particular odour, the acuteness of the sense of smell, and the connotations of a particular odour to an individual. As odour is a subjective experience, people have different reactions and sensitivities to smells - what is offensive to one person may not be offensive to another. Offensive odours can adversely affect people's health and well-being, causing stress and other physical symptoms.

The potential odour sources associated with the green waste activities of the project are:

- Raw material receival (particularly if the materials are wet), storage and handling;
- Processing of the green waste (blending with soil, mulching and wood chipping);
- Storage of the final products; and
- Collection, storage and re-use of liquid effluent (leachate).

The DECCW licences facilities according to the types of organic material they can receive based on the potential adverse environmental effects of the materials. The categories are shown in **Table 4**.

Table 4 DECCW Categorisation of Organic Materials

Potential Environmental Impact	Category	Types of Organic Materials	
		Type	Examples
Lowest	1	Garden and landscaping organics	Grass; leaves; plants; loppings; branches; tree trunks and stumps
		Untreated timber	Sawdust; shavings; timber offcuts; crates; pallets; wood packaging.
		Natural organic fibrous organics	Peat; seed hulls/husks; straw; bagasse and other natural organic fibrous organics.
		Processed fibrous organics	Paper; cardboard; paper-processing sludge; non-synthetic textiles.
Medium	2	Other natural or processed vegetable organics	Vegetables; fruit and seeds and processing sludges and wastes; winery, brewery and distillery wastes; food organics excluding organics in Category 3.
		Biosolids and manures	Sewage biosolids, animal manure and mixtures of manure and biodegradable animal bedding organics.
Highest	3	Meat, fish and fatty foods	Carcasses and parts of carcasses; blood; bone; fish; fatty processing or food.
		Fatty and oily sludges and organics of animal and vegetable origin Dewatered grease trap; fatty and oily sludges of animal and vegetable origin.	Dewatered grease trap; fatty and oily sludges of animal and vegetable origin.
		Mixed residual waste containing putrescible organics	Wastes containing putrescible organics, including household domestic waste that is set aside for kerbside collection or delivered by the householder directly to a processing facility, and waste from commerce and industry.

Potential	Category	Types of Organic Materials
Source: DECCW Website - http://www.environment.nsw.gov.au/waste/envguidlns/composting3.htm#table3		

The storage and processing of green waste has a much lower risk of generating offensive odours compared to operations that compost biosolids, manure or food waste, such as the neighbouring worm farm. The facility is intended to receive materials from Council's construction and maintenance activities; organic wastes received on site would include dry dredge material, hardwoods from park and garden maintenance, and leaf litter. These materials all fall into Category 1, meaning they are unlikely to greatly affect the environment or cause offensive odour emissions. No grass clippings are to be accepted at the site.

3.3 Impact Assessment Criteria

The DECCW's impact assessment criteria for dust levels are shown in **Table 5**. These levels represent cumulative concentrations – that is, the contribution of any individual source together with existing background concentrations.

Table 5 DECCW Impact Assessment Criteria for Dust

Pollutant	Concentration ($\mu g/m^3$)	Averaging Period
Fine particulates (PM_{10})	50	24 hours
	30	Annual
Total suspended particulates	90	Annual
Pollutant	**Existing background dust fallout level (g/m^2.month)**	**Maximum acceptable increase over existing fallout levels (g/m^2.month)**
Deposited dust	2	2
	3	1
	4	0

The DECCW's odour assessment criteria[1] are shown in **Table 6**. These criteria take into account individual sensitivity to odour in the community, and use a statistical approach based on population size. As population size increases, the likelihood of sensitive individuals being within that population also increases; as such, areas with larger populations require more stringent criteria.

Table 6 Impact Assessment Criteria - Complex Odours

Population	Criteria (OU)*
Urban (≥ ~2000) and/or schools and hospitals	2
~ 500	3
~ 125	4
~ 30	5
~ 10	6
Single residence (≤ ~2)	7
*99th percentile nose response time	

[1] Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales. Department of Environment and Conservation (NSW), 2005.

An odour assessment criterion of 2 OU was adopted for this facility due to the urban land uses situated within 1 km of the site. In order to provide a conservative assessment, this report compared the maximum predicted odour concentrations (i.e. 100th percentile) to the odour impact assessment criterion (99th percentile).

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4.0 Existing Environment

Air quality in the Lake Macquarie area is considered to be reasonable. The city falls within the Greater Metropolitan Airshed and, as such, can receive pollutants from as far away as Wollongong depending on wind patterns. Pockets of reduced air quality are found near emission sources, including industry and roads with high heavy vehicle traffic[2]. The main sources of particulates near the site are electricity generation and coal mining operations, while the neighbouring worm farm and sewerage treatment plant are potential local sources of odour.

4.1 Climate

The Bureau of Meteorology (BOM) records meteorological data at a number of automatic weather stations around the country. The closest BOM station to the site is located at Nobbys Signal Station, approximately 17 km east-northeast of the proposed site. Average climate parameters are shown in **Appendix A**.

The warmest temperatures occur between November and March, with the warmest average maximum temperatures occurring in January (26 ^{0}C). The coldest temperatures are recorded in the winter months, with the lowest average minimum temperature occurring in July (8 ^{0}C).

The highest average rainfall is recorded in March with 120 mm, while November is the driest month (70 mm). Humidity in the area is relatively high, with recorded levels typically between 56 and 80 %. Wind speeds are typically higher at 3 pm compared to 9 am, although there is little difference in the wind speeds recorded diurnally between May and July.

Winds recorded at 9 am are predominantly drainage valley flows, blowing from the northwest with a smaller westerly component. In the afternoons, sea breezes from the east – south quadrant dominate. Wind speeds of up to 40 km/h have been recorded. Wind roses are shown in **Appendix B**.

4.2 Dust

The DECCW operates a network of air quality monitoring station at various locations around the state. The closest, most representative station to the proposed project is located at Wallsend. The Wallsend station monitors PM_{10} levels; a summary of the recorded data is shown in **Table 7**.

Table 7 Wallsend Ambient Monitoring Data Summaries

Year	PM_{10} (µg/m^3)	
	Max. 24 Hr Average	**Annual Average**
2005	**50.7**	18.2
2006	**52.0**	18.5
2007	**50.9**	17.3
2008	**56.5**	15.4
2009	**2150.3***	26.7
Maxima	**56.5**	26.7
Ambient Air Quality Goal	***50***	***30***
* Recorded during a severe dust storm – excluded from calculations		

The above data indicate that particulate levels in the area exceed the ambient air quality goals for 24 hour maximum concentrations.

Deposited dust is not publically monitored in the area immediately surrounding the site. Mannering Colliery, located approximately 27 km southwest of the proposed development, monitors deposited dust levels via a

[2] Lake Macquarie City Council State of the Environment Report, 2008

network of 5 dust gauges (DG1-5) around the colliery. Data published in 2007 indicated that the maximum measured dust deposition level in the area between 2001 and 2006 was 2.9 g/m^2.month as shown in **Table 8**.

Existing deposited dust levels at the proposed project site are expected to be lower than this, due to the relative lack of close dust generating sources. The 2.9 g/m^2.month maximum was adopted as a conservative background estimate of deposited dust for this assessment.

Table 8 Annual Average Dust Deposition (insoluble solids, g/m^2.month) - Mannering Colliery

Year	DG1	DG2	DG3	DG4	DG5
2001	1.3	0.9	1.0	1.4	0.8
2002	2.9	0.7	1.0	1.1	0.7
2003	1.2	0.6	1.0	0.7	0.8
2004	0.5	0.5	1.0	0.6	0.7
2005	1.0	0.8	1.0	0.7	1.0
2006 (Jan - Jun)	0.8	1.0	1.0	0.7	0.9
Source: Holmes Air Sciences (2007), Mannering Colliery – Continuation of Mining – Air Quality and Greenhouse Gas Impact Assessment.					

4.3 Odour

Ambient odour monitoring is not typically undertaken, and no publically available data were identified for the area surrounding the SRC. It should be noted that odours from different sources are not typically cumulative; that is, odours from the worm farm would be expected to be quite different to that from the proposed SRC and from the neighbouring STP as the odours are from different types of materials and have different characters. As such, existing odours in the area are not likely to be increased by odour emissions from the proposed SRC; in fact, the strength and character of odours from the worm farm, due to its processing of putrescibles material, may serve to mask any odour emissions from the SRC.

5.0 Atmospheric Dispersion Modelling

5.1 Dispersion Model

Emissions of dust and odour from the facility were assessed by dispersion modelling using AUSPLUME v6.0. AUSPLUME is a Gaussian plume dispersion model developed by the Victorian EPA. AUSPLUME is approved by the DECCW for use in regulatory assessments undertaken in NSW. The model uses the Gaussian dispersion model equation to simulate the dispersion of a plume from point, area or volume sources. Mechanisms for determining the effect of terrain on plume dispersion are also included. AUSPLUME operates on an hourly time step, and, therefore, requires hourly dispersion parameter data, including wind speed and wind direction. The dispersion of each pollutant plume is determined for each hour using conventional Gaussian model assumptions. Gaussian models are best used to identify pollutant concentrations at receptor locations close to emissions sources, as they can overestimate concentrations at longer distances.

Dispersion modelling was undertaken in accordance with the guidelines in the DECCW's Approved Methods[3]. This document prescribes calculation modes for accounting for terrain effects, building wake effects, horizontal and vertical dispersion curves, buoyancy effects, surface roughness, plume rise, wind speed categories and wind profile exponents.

5.2 Modelling Scenarios

Emissions estimates were prepared for the proposed facility assuming maximum potential operation (i.e. 200,000 tpa). The following assumptions were made in the development of the emissions inventory and entry of emissions into the dispersion model:

- All processing activities (stockpile unloading, loader and pug mill activities) were assumed to occur continuously between the proposed operating hours of 7 am – 6 pm (in reality, operations are typically likely to occur from 7 am – 3.30 pm on weekdays, 7 am – 1 pm on Saturdays and none on Sundays);
- Material deliveries and stockpile loading were assumed to occur continuously (24 hours per day) to account for after hours deliveries; and
- Concrete batching was assumed to occur for one hour per day, modelled at 7 am (the first hour of operation) to account for potential worst-case meteorological activities.

These assumptions were conservative, and are likely to overestimate potential dust emissions from the site. Water sprays and wind breaks (provided by the vegetated perimeter berm) were assumed mitigation measures for all relevant dust sources.

5.3 Meteorological Data

Meteorology in the area surrounding the Project is affected by several factors such as terrain and land use. Wind speed and direction are largely affected by topography at a small scale, while factors such as synoptic scale winds and complex valley drainage flows that develop during night hours, affect wind speed and direction on a larger scale.

Meteorological data required by AUSPLUME include wind speed, wind direction, temperature and an estimation of the stability class and mixing height for the area surrounding the subject site. Meteorological data are preferably sourced from on-site dedicated meteorological stations that have recorded data over a number of years. Data were obtained from Hunter Water Australia from the meteorological station at Edgeworth STP, but were found to be unsuitable for dispersion modelling purposes[4]. Meteorological data were, therefore, generated using The Air Pollution Model (TAPM), developed by CSIRO, for the year 2007. TAPM was run using the parameters shown in **Table 9.**

[3] Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales. Department of Environment and Conservation (NSW), 2005
[4] Modelling requires hourly data for a minimum 12 month time period. Data provided by Hunter Water was for an insufficient time period.

Table 9 Meteorological Input Parameters

Parameter	Input
TAPM v4.0	
No. of grids (spacing)	4 (30 km, 10 km, 3 km, 1 km)
No. of grid points	25 x 25 x 25
No. of vertical levels	25
Year of analysis	January 2007 to December 2007
Centre of analysis	32°56,151°36.5

Default TAPM parameters were used for land use and terrain data (9 second DEM). Wind rose plots from the TAPM-generated data are provided in **Appendix B**. Statistics relating to the meteorological data are provided in **Appendix C**.

5.4 Odour Peak to Mean Ratios

Odour concentrations affect people over very short time scales, typically less than one second in duration. AUSPLUME does not have the capacity to model pollutant concentrations at these times scales; as such, hourly concentrations are converted to one second concentrations through the application of peak to mean ratios. The following peak to mean ratios (described in **Table 10**) were applied to the odour emissions for the proposed development. Only near-field effects were considered.

Table 10 Factors for Estimating Peak Odour Concentrations in Flat Terrain

Source Type	Pasquill-Gifford Stability Class	Near-field P/M60
Area	A, B, C, D	2.5
	E, F	2.3
From Table 6.1, Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, DEC (2005).		

5.5 Emissions Inventory

Emissions entered into the dispersion model are shown in **Table 11** (dust) and **Table 12** (odour). Dust emission rates were calculated using emission factors published in *Emission Estimation Techniques for the National Pollutant Inventory.* A literature review was conducted to determine odour emission rates; emissions used were those used in a study conducted by Holmes Air Sciences based on odour measurements taken at an Australian Native Landscapes green waste facility at Eastern Creek, NSW[5]. These data have been used in a number of odour impact assessments for a range of facilities, including large landfills and composting activities. Due to the scale and type of facility from which the odour measurements were taken, the emission rates adopted are expected to substantially overestimate odour concentrations from the proposed SRC, which is expected to generate minimal (if any) odours due to the nature of the materials accepted at the site and the lack of composting activities.

[5] Referenced in Holmes Air Sciences. (2007). Air Quality Assessment: Proposed SAWT-BIOWISE Facility Elizabeth Drive, Kemps Creek.

Table 11 Emissions Inventory – Dust Sources

Dust Sources	Source Type	Emissions (g/s)		Hours
		PM_{10}	TSP	
Wind erosion (stockpiles)	Area (12,427 m^2)	0.02	0.05	continuous
Roads (wheel-generated dust) (8 sources)	Volume	0.01	0.01	continuous
Loading (stockpiles)	Volume	0.01	0.03	continuous
Unloading (stockpiles)	Volume	0.09	0.20	7 am - 6 pm
Loaders (3 sources)	Volume	0.028	0.06	7 am - 6 pm
Concrete batching	Volume	0.0143	0.06	7 am
Pugmill	Volume	0.022	0.06	7 am - 6 pm

The pug mill is expected to have little to no actual emissions during its operations, which are expected to be relatively infrequent. The pug mill was also modelled as a volume source. As such, the contribution of the pug mill to dust emissions is expected to be very conservative.

Potential odour sources were taken to be the green waste stockpile, the bioretention pond that receives leachate from the green waste stockpile, and the product bins storing the blended soil/green waste mixtures. The receival of green waste was not considered likely to generate odour emissions as material delivered to the site would be dry and not decomposing. Furthermore, no published data regarding likely odour emissions from this type of material could be found at the time of preparation of this report. As such, odour emissions from the receival of green waste material were not included in the assessment. Emission rates assumed for the identified sources are shown in **Table 12**.

Table 12 Emissions Inventory - Odour Sources

Odour Source	Area (m^2)	SOER (OU/s/m^2)	OER (OU/s)	Near field peak to mean ratios		Assumptions
				Convective (A -D)	Stable (E, F)	
Green waste stockpile	1,763	0.13	236.2	0.33	0.31	-
Bioretention pond	450	0.17	76.5	0.43	0.39	Assumed to be a leachate pond in aerobic condition
Product bins (2 sources)	70	0.04	2.8	0.10	0.092	Product assumed to be 70% soil, 30% organic matter based on advice from CiviLake; the emission rate was, therefore, assumed to be 30% of the emission rate from the green waste stockpile

5.6 Terrain Data and Sensitive Receptors

The terrain surrounding the facility was digitised for entry into the model. A 5 km x 5 km grid with a 0.2 km spacing, centred approximately on the site, was used as shown in **Figure 6**. Sensitive receptors were identified through inspection of aerial photographs for the closest potential residences, and included in the dispersion modelling to generate predicted ground level pollutant concentrations at these locations. The receptors are described in **Table 13** and shown on the contour plots in **Figures 7 - 10**.

Figure 6 Terrain

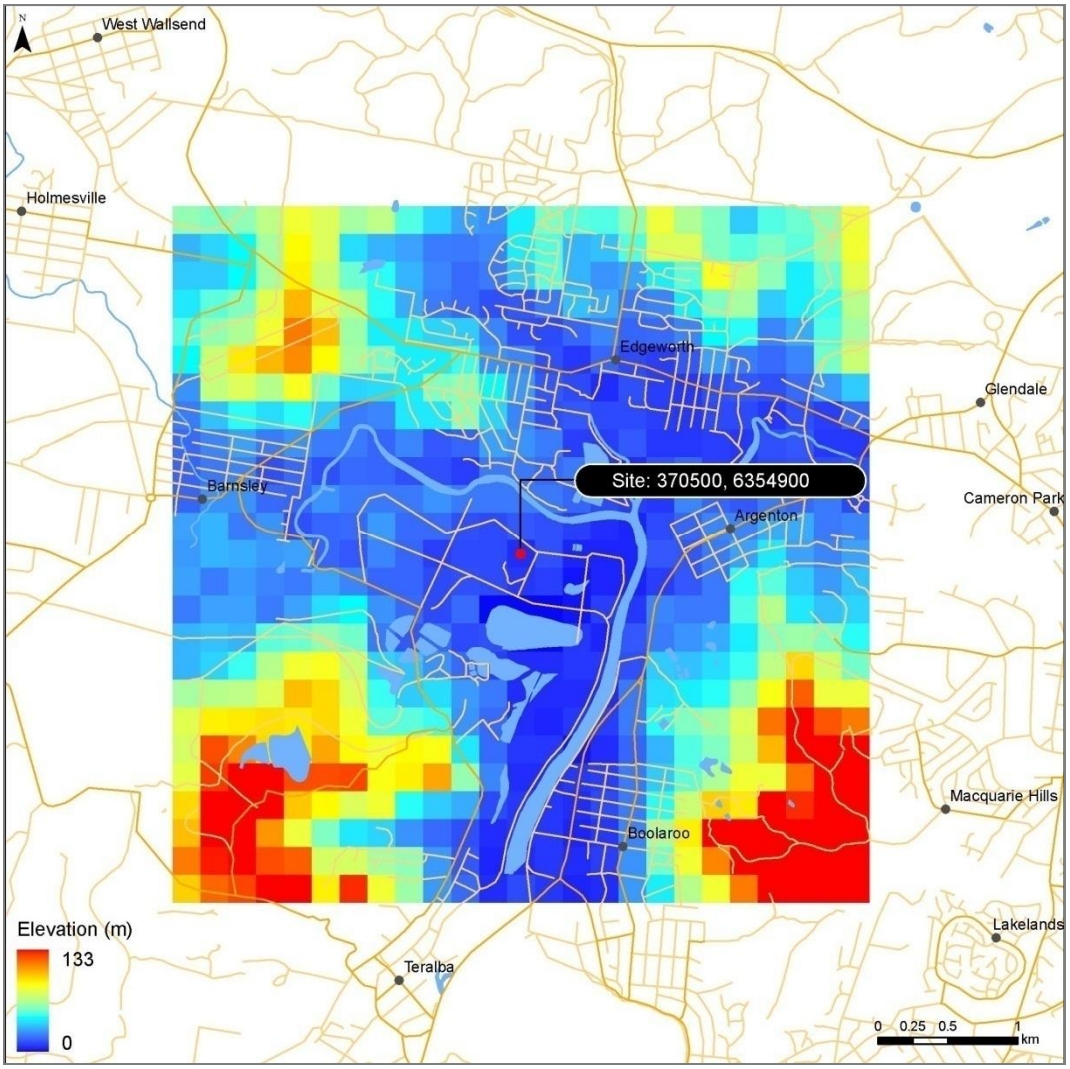


Table 13 Sensitive Receptor Details

No.	Easting	Northing	Elevation
1	368921	6355445	10
2	369433	6354728	11
3	369620	6354654	9
4	369593	6355692	12
5	370429	6355592	10
6	371172	6354685	3
7	371109	6354555	5
8	371106	6354389	2
9	371086	6354314	0
10	371606	6355132	10
11	371592	6354737	8

6.0 Assessment of Potential Air Quality Impacts

6.1 Dust

The results of the dust modelling, consisting of PM_{10}, TSP and deposited dust, are shown in **Sections 6.1.1 – 6.1.3**.

6.1.1 Predicted PM_{10} Concentrations

Predicted ground level PM_{10} concentrations were assessed for the 24 hour and annual time periods. The predicted maximum annual average concentrations resulting from operation of the facility alone (i.e. excluding background concentrations) are shown in **Figure 7**, while maximum 24 hour concentrations are shown in **Figure 8**. Concentrations predicted at the identified sensitive receptor locations are provided in **Table 14.**

Figure 7 Predicted Maximum Annual Average PM_{10} Concentrations (µg/m^3)

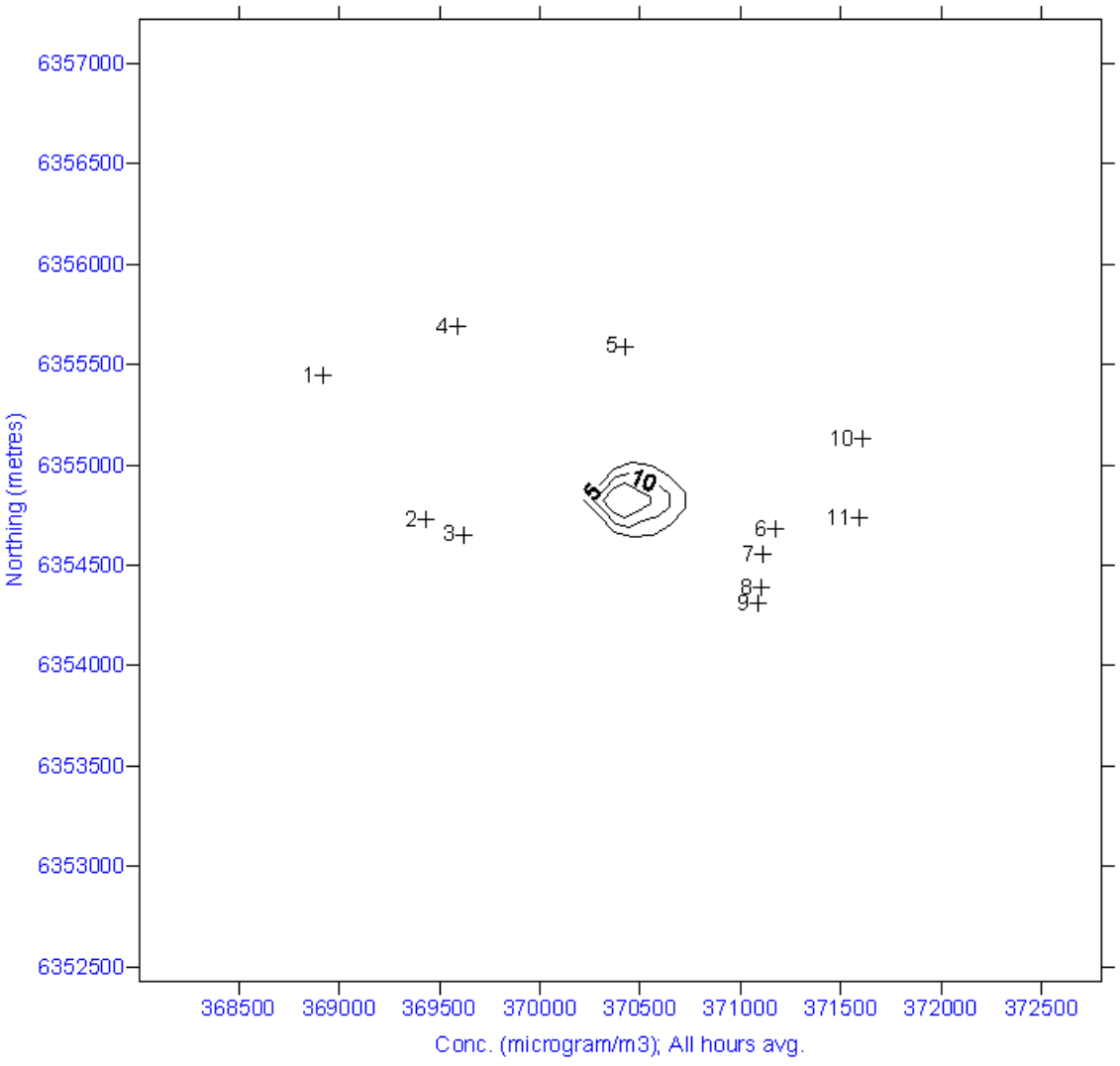
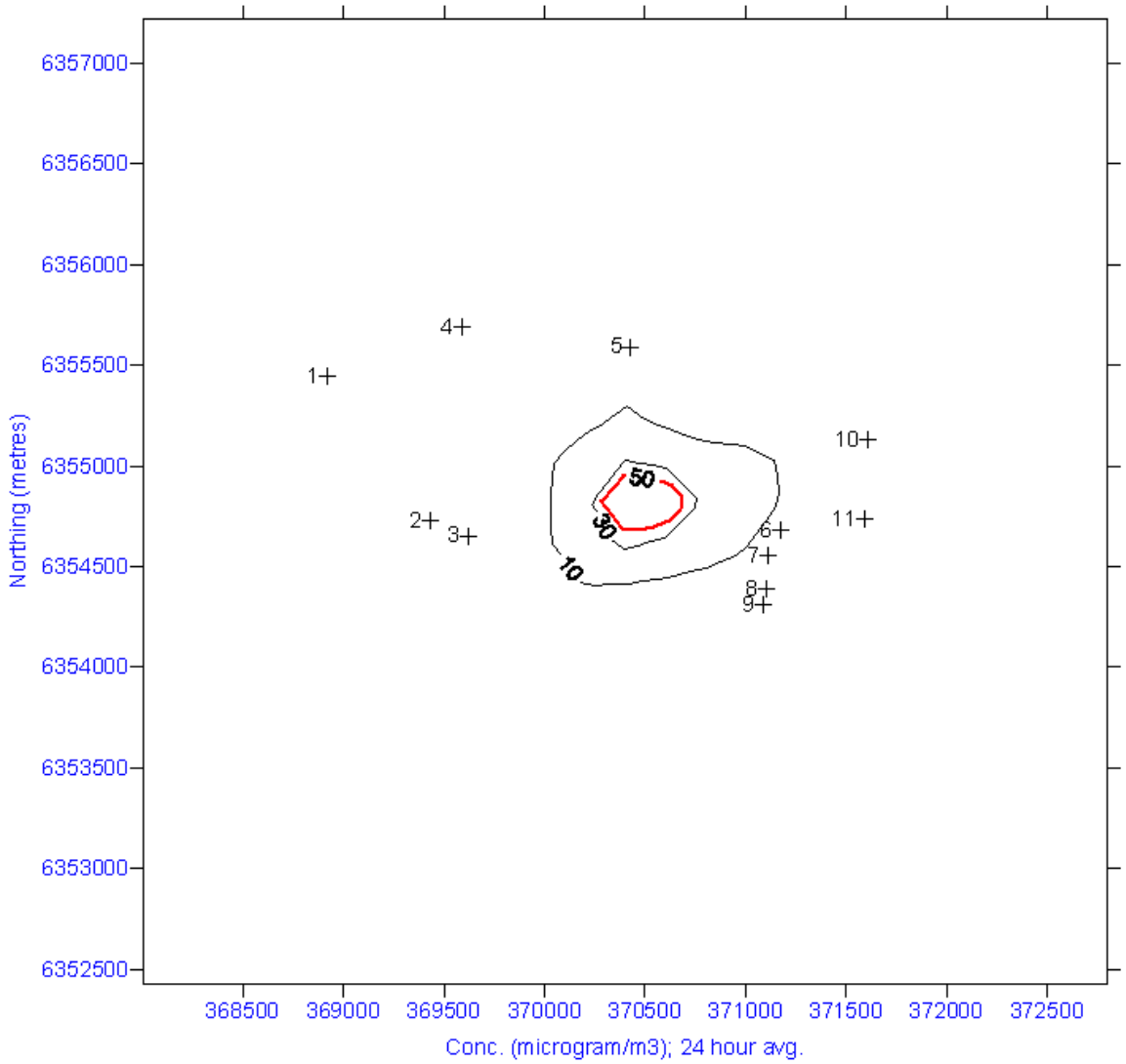


Figure 8 Predicted Maximum 24 Hour PM_{10} Concentrations ($\mu g/m^3$)



Due to the elevated background concentrations, cumulative 24 hour PM_{10} concentrations are not shown in **Table 15**. Contributions of the SRC to annual PM_{10} levels was very small as shown below, and cumulative annual PM_{10} concentrations were predicted to be lower than the impact assessment criterion. The development is not, therefore, expected to substantially affect long-term fine particulate levels in the area.

Table 14 Predicted Ground Level Concentrations of PM_{10} ($\mu g/m^3$)

Receptor Number	Maximum Predicted Concentrations ($\mu g/m^3$)		
	24 Hour PM_{10}	Maximum Annual PM_{10}	Cumulative Annual PM_{10}
1	1.4	0.1	26.8
2	2.2	0.2	26.9
3	2.5	0.3	27.0
4	1.8	0.2	26.9
5	4.7	0.4	27.1
6	7.6	0.7	27.4
7	8.5	0.8	27.5
8	7.9	0.6	27.3
9	6.8	0.5	27.2
10	6.5	0.3	27.0
11	6.7	0.4	27.1
Impact assessment criteria	**-**	**-**	***30***

As shown in **Figure 7**, no exceedances of the 24 hour PM_{10} criterion were predicted at any sensitive receptor location based on modelled emissions from the facility alone. The DECCW Approved Methods, however, require maximum cumulative concentrations to be compared to the guideline criterion. The maximum background concentration of 24 hour PM_{10} exceeds the criterion of 50 $\mu g/m^3$. As such, a contemporaneous impact and background assessment was undertaken for 24 hour PM_{10} for sensitive receptor 7, which was the sensitive receptor for which the dispersion model returned the highest predicted concentration. Contemporaneous results are shown in **Table 15**.

Table 15 24 Hour Average PM_{10} Concentrations ($\mu g/m^3$) at Receptor 7

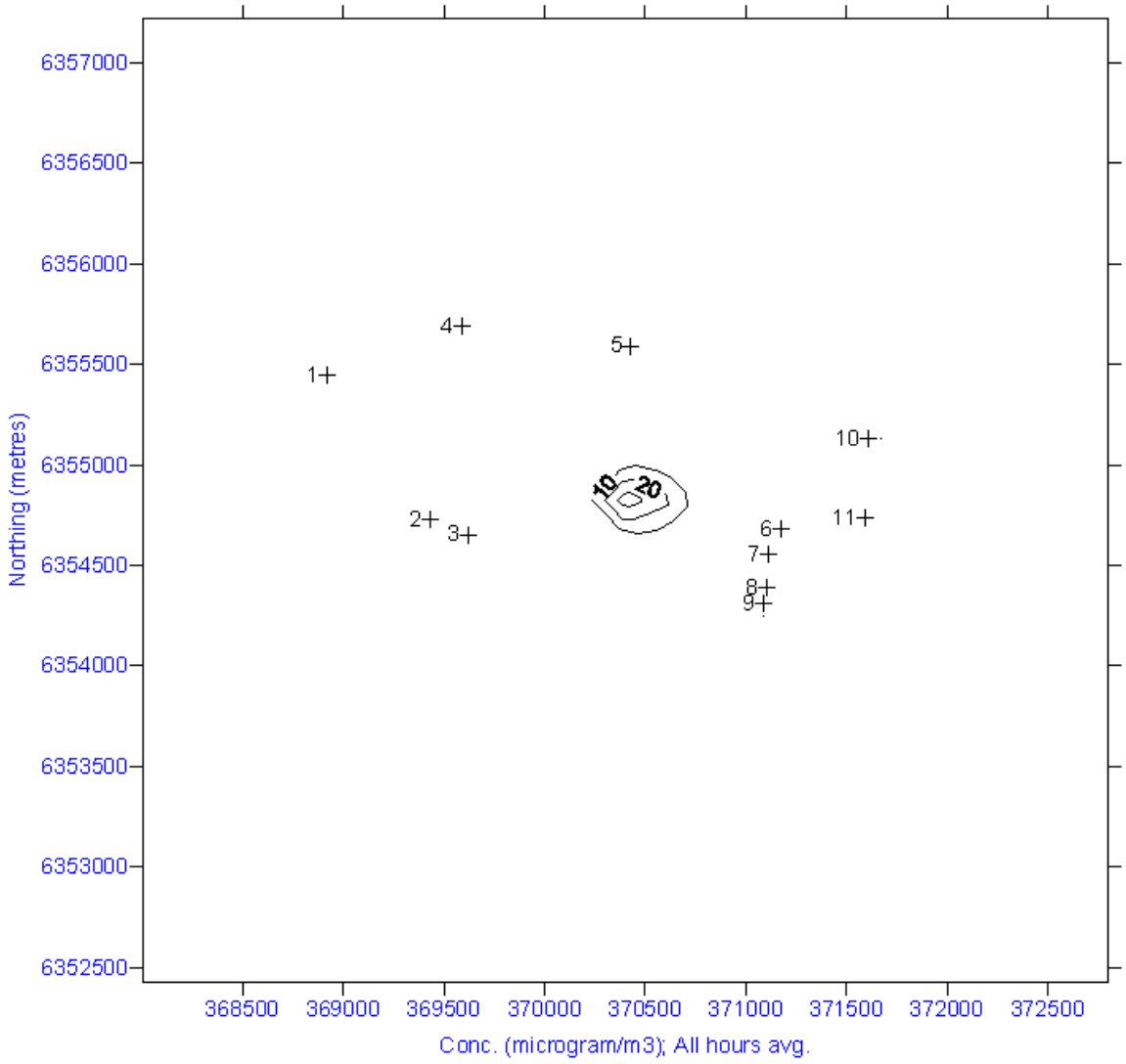
Highest Background Concentrations				Highest Predicted Increments			
Date (2007)	Background	Predicted Increment	Total	Date	Background	Highest Predicted Increment	Total
05/05	**50.9**	4.45	**55.35**	3/08	21.05	8.47	29.52
04/05	**50.8**	2.64	**53.44**	13/09	33.37	5.97	39.34
03/10	46.5	1.28	47.78	28/08	16.80	5.23	22.03
06/10	41.1	1.85	42.95	27/08	16.47	4.94	21.41
30/01	38.4	0.86	39.26	13/05	21.51	4.79	26.30
30/10	37.3	0.01	37.31	27/07	24.34	4.78	29.12
28/01	37.2	0.55	37.75	24/07	23.83	4.67	28.50
16/10	36.6	1.31	37.91	3/06	26.05	4.50	30.55
12/01	36.0	0.00	36.00	5/05	**62.76**	4.45	**67.21**
11/01	35.1	0.00	35.10	26/07	28.63	4.27	32.90
N.B. Exceedances are noted in **bold type**.							

As shown, operation of the proposed development was not predicted to result in any additional exceedances of the 24 hour PM_{10} impact assessment criterion based on either the highest background concentrations or the highest predicted contributions from the facility. As such, the development is not expected to adversely affect short-term fine particulate concentrations in the area.

6.1.2 TSP

Total suspended particulates were modelled over the annual time scale. The predicted maximum TSP concentrations resulting from operation of the facility alone are shown in **Figure 9**. As shown, the maximum predicted concentrations were centred on the project site. Concentrations predicted at sensitive receptor locations are provided in **Table 16**.

Figure 9 Predicted Maximum Annual Average TSP Concentrations (µg/m^3)



TSP concentrations are not publically monitored. In order to provide an estimate of cumulative TSP concentrations, ambient PM_{10} was expected to represent 40 %[6] of the ambient TSP concentration specified in **Table 7** (i.e. ambient TSP was assumed to be 66.8 µg/m^3 compared to 26.7 µg/m^3 of PM_{10}). Concentrations at all modelled sensitive receptor locations were well below the impact assessment criterion, with the contribution from

[6] Based on SPCC measurements of particle size distributions in dust in the Hunter Valley cited in NSW Minerals Council Technical Paper: Particulate Matter and Mining Interim Report, 2000 and ratios of PM_{10}/TSP specified in the NPI Emission Estimation Technique Manual for Mining version 2.3 (2001)

the facility being negligible in most instances. As such, the facility is not expected to adversely affect local long-term TSP concentrations.

Table 16 Predicted Ground Level Concentrations - TSP (µg/m^3)

Receptor	TSP Concentration (µg/m^3)	
	From Facility	Cumulative
1	0.19	67.0
2	0.39	67.2
3	0.53	67.3
4	0.32	67.1
5	0.60	67.4
6	1.16	68.0
7	1.25	68.0
8	0.98	67.8
9	0.85	67.7
10	0.44	67.2
11	0.58	67.4
Impact assessment criterion		***90***

6.1.3 Deposited Dust

The results of the dust deposition modelling are shown in **Table 17**. The impact assessment criteria for deposited dust allows a maximum increase of 2 g/m^2.month over existing dust levels, or a maximum total dust deposition level of 4 g/m^2.month at any location. As predicted deposition levels at all sensitive receptor locations were below these levels and as such the operation of the proposed facility is not expected to adversely affect levels of deposited dust in the local area.

Table 17 Predicted Ground Level Concentrations - Deposited Dust (g/m^2.month)

Receptor	Deposited Dust Concentration (g/m^2.month)	
	From Facility	Cumulative Concentration
1	0.01	2.91
2	0.03	2.93
3	0.04	2.94
4	0.03	2.93
5	0.05	2.95
6	0.1	3.0
7	0.1	3.0
8	0.1	3.0
9	0.1	3.0
10	0.03	2.93
11	0.04	2.94
Impact assessment criteria	***2*** *(maximum allowable increase)*	***4*** *(maximum total level)*

6.2 Odour

Results of the odour modelling are shown in **Figure 10** and **Table 18**. As discussed in **Section 4.3**, odour concentrations are not cumulative unless they come from similar sources with similar characters. As there are no similar odour sources in the area, background odour concentrations relevant to this project (i.e. those representative of green waste only, rather than putrescibles waste or sewerage) were assumed to be negligible. Concentrations at all sensitive receptor locations were well below the adopted impact assessment criterion of 2 OU. It should be noted that the data presented represent maximum concentrations (100th percentile) and are, therefore, more conservative than the 99th percentile concentrations to which the impact assessment criterion relates.

Figure 10 Predicted Maximum Odour Concentrations (1 second nose response time)

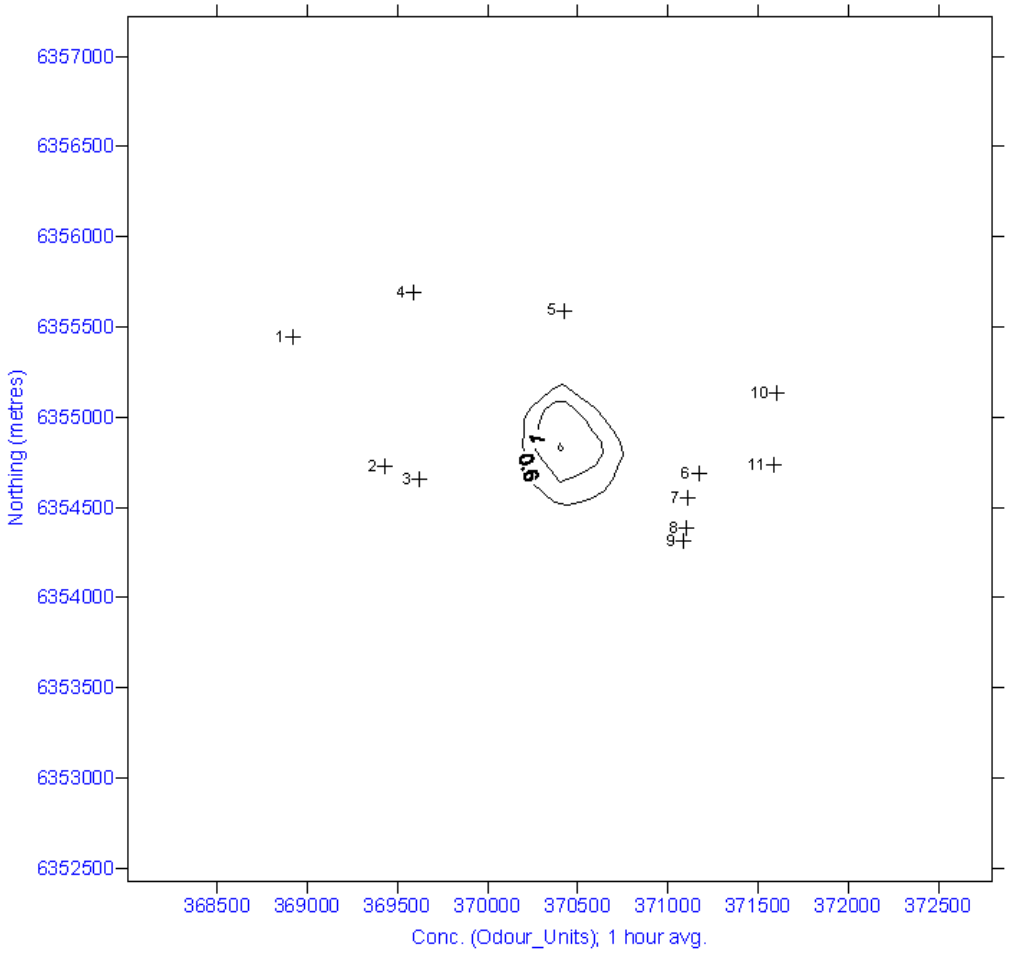


Table 18 Predicted Ground Level Odour Concentrations (OU/m^2)

Receptor	Predicted Odour Concentration (OU)
1	0.12
2	0.17
3	0.12
4	0.14
5	0.16
6	0.28
7	0.27
8	0.25
9	0.24
10	0.19
11	0.18
Impact assessment criterion	***2***

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7.0 Environmental Safeguards

7.1 Construction

Dust emissions may arise during construction of the proposed facility. A Construction Environmental Management Plan (CEMP) should be prepared, which should include dust mitigation measures. Such measures should include undertaking activities that are most likely to generate dust, such as excavation/fill works, only during periods of low wind speed. Exposed areas should be stabilised as soon as possible to minimise dust generation. Water sprays should be used on unsealed areas and stockpiles.

7.2 Operation

7.2.1 Dust

A variety of management actions can be undertaken to minimise dust emissions from the site. An Operational Environmental Management Plan (OEMP) should be developed that includes measures to monitor, assess and rectify any resultant air quality issues associated with the Project, if approved.

The OEMP should include measures such as:

- Use of water sprays for:
  - all processing activities; and
  - on all exposed stockpiles as required.
- Reduced operation during windy conditions;
- Covering of vehicles with potentially dusty loads before leaving the site;
- Installation of a wheel wash for vehicles travelling onto and off-site;
- Sealing of operational surfaces wherever possible, and cleaning them regularly;
- Use of water carts on unsealed areas when required; and
- Maintenance of the vegetated perimeter berms to serve as a barrier to dust emissions leaving the site.

The proposed project design includes construction of sealed/gravel roads from the public roadway to the gatehouse and use of water sprays to suppress deposited particles on unsealed roads and stockpiled material, which would also serve to minimise dust emissions.

The DECCW guidelines do not specify performance requirements or measures for biological particulate matter, such as particles generated by green waste. General particulate minimisation and mitigation activities should serve to control emissions of both biological particulates and ultrafine ($PM_{2.5}$) particulate matter[7].

7.2.2 Odour

The minimisation of offensive odours from the facility would require the use of appropriate management and control techniques, which should be developed by the operator in consultation with the DECCW.

Such practices would include[8,9]:

- Good housekeeping and raw material handling practices;
- Careful screening of raw materials (all potentially malodorous raw materials delivered to the site or material with a sufficiently high moisture content that are likely to give rise to odour during storage prior to use should be rejected or subjected to special handling/storage procedures to minimise off-site odour emissions). The size of stockpiles should be kept to a minimum;
- All surfaces and equipment liable to come into contact with raw materials or waste should be impervious, easily cleaned, and kept clean; and

[7] DECCW Website (http://www.environment.nsw.gov.au/waste/envguidlns/composting4.htm)

[8] DEFRA. (2009).Good Practice and Regulatory Guide on Composting and Odour Control for Local Authorities. Department for Environment, Food and Rural Affairs: London. www.defra.gov.uk.

[9] Department of Environment and Conservation (NSW). Environmental guidelines: Composting and related organics processing facilities, 2004.

- Good site drainage should be maintained to prevent green waste from becoming waterlogged.

As water captured on the site has the potential to generate odour if it becomes anaerobic, consideration should be given to implementing processes and/or equipment to minimise potential odour emissions, such as using captured site water for dust suppression/cleaning wherever feasible and appropriate, and/or aerating or treating the water. Leachate ponds can generate odours if they become anaerobic, such as through leachate ponding in the drainage system or inadequate aeration in the storage system. To minimise adverse effects, the leachate collection and storage systems should be designed in accordance with DECCW guidelines[6] and maintained appropriately.

The proposed vegetated perimeter berm may not only assist with minimising off-site dust emissions, but may possibly reduce odour emissions from the site as well by enhancing turbulence and vertical mixing, thereby improving dispersion.

As the Teralba facility would not accept materials such as food waste, odour generation at the site is expected to be minimal. Stockpiles of green waste material (both feed and product) should be kept as small as practicable, and the quantity of materials received for processing should be based on current trends for product demand. Material turnover at the site is intended to be high, with green waste materials stored on site for no more than two months.

8.0 Conclusions

CiviLake proposes to develop a Sustainable Resource Centre at Teralba, NSW, which would primarily be used to process and re-sell waste materials generated by its construction, demolition and maintenance operations. The proposed facility would be designed to handle up to 100,000 tonnes of material per year, with possible future expansion to around 200,000 tpa if the materials and demand exist.

Raw materials would be delivered to the site and processed to form a number of usable end products. Processing works would include screening, crushing, blending, mulching and composting. The materials, processing operations and products have the potential to generate dust emissions, with odour emissions also possible from the green waste activities, namely stockpiling, the green waste product bins, and the bioretention pond that receives leachate from the green waste stockpile. Emissions from receival and processing of the green waste material were assumed to be negligible.

Potential emissions from the site were estimated for the facility operating at the potential maximum rate using emission factors developed for use with the National Pollutant Inventory and published odour emissions from green waste facilities. A conservative assessment of emissions was undertaken, assuming worst-case operating hours and odour emissions.

Dispersion modelling was conducted for all identified sources of dust (PM_{10}, TSP and deposited dust) and odour. The concentrations of all pollutants predicted to be emitted from the site were below the relevant impact assessment criteria when assessed in isolation and cumulatively (by adding existing background pollutant concentrations to the predicted site emissions). For maximum 24 hour PM_{10}, the elevated background concentration required a contemporaneous impact assessment to be conducted, which was achieved using hourly monitored data obtained from the DECCW's monitoring station at Wallsend with the hourly model predictions to develop predicted cumulative concentrations. Again, the analysis predicted no exceedances of the impact assessment criterion.

Emissions from the pug mill will be required to meet emission standards under the Protection of the Environment Operations (Clean Air) Regulation 2002. A limit of 20 mg/m^3 for total solid particles applies to plant/equipment installed after September 2005. Council will be required to demonstrate proof of performance of the pug mill if the project is approved and the pug mill is moved to and operated at the site.

A CEMP and OEMP should be developed and implemented at the site, should the proposal be approved, to manage dust and odour emissions. Provided that appropriate management and mitigation measures are developed and utilised, dust and odour emissions from the proposed facility are not expected to adversely affect local air quality in terms of fine particulate, total particulate or deposited dust levels, or to adversely affect the amenity or health of sensitive receptors in the area.

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Appendix A

Climate Averages, Nobbys Signal Station

Appendix A Climate Averages, Nobbys Signal Station

Climate Averages, Nobbys Signal Station

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Temperature													
Mean maximum temperature (°C)	26	25.4	24.7	22.8	20	17.5	17	18	20	22	24	25	21.8
Mean minimum temperature (°C)	19	19.3	18.2	15.3	12	9.7	8.4	9.2	11	14	16	18	14.2
Rainfall													
Mean rainfall (mm)	89	108	120	117	118	117	95	75	74	73	70	82	1140
Decile 5 (median) rainfall (mm)	71	88	95.2	92	102	87.2	80	58	58	63	65	63	1064
Mean number of days of rain ≥ 1 mm	8.2	8.2	9.2	9.2	9	9.1	8.2	7.5	7.2	7.8	7.8	7.6	99
Other daily elements													
Mean number of clear days	6.3	5.3	6.4	7.4	6.9	7.5	9.7	11	9.3	7.4	5.5	6.3	88.8
Mean number of cloudy days	12	11.9	11.7	10.7	11.9	11.7	9.5	8.3	9	12	12	12	133.1
9 am conditions													
Mean 9am temperature (°C)	22	21.8	20.8	18.1	14.6	12	11	12	15	18	20	21	17.1
Mean 9am relative humidity (%)	77	80	79	78	79	79	77	73	70	68	72	75	75
Mean 9am wind speed (km/h)	21	20.9	20.8	21.6	23.6	26.5	27	26	25	24	23	22	23.4
3 pm conditions													
Mean 3pm temperature (°C)	23	23.4	22.9	21.3	18.8	16.5	16	17	19	20	21	22	20
Mean 3pm relative humidity (%)	72	74	72	66	64	64	59	56	59	64	68	71	66
Mean 3pm wind speed (km/h)	33	32.7	30.6	28.1	26.2	28.3	29	31	34	34	35	35	31.5

Obtained from Bureau of Meteorology web site; http://www.bom.gov.au/climate/averages/tables/cw_061055.shtml; accessed 13 August 2009

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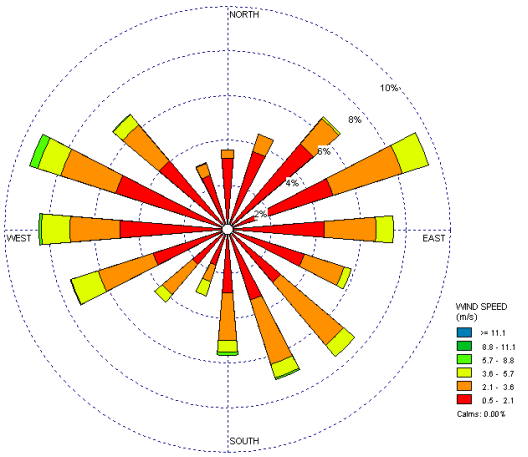
Appendix B

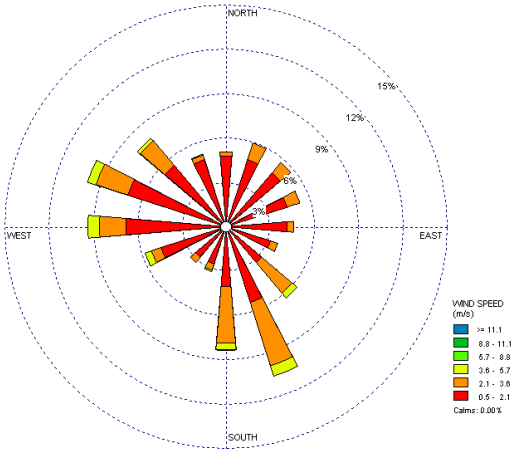
Wind Roses

Appendix B Wind Roses

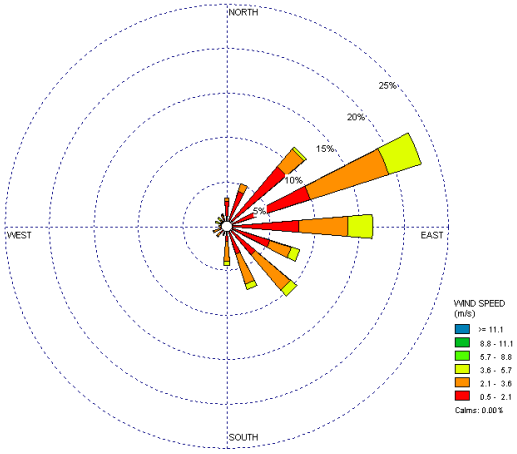
Wind Roses: January 1 – December 31, 2007



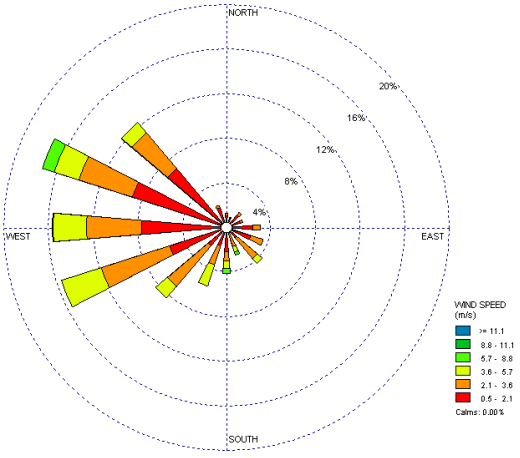
Annual



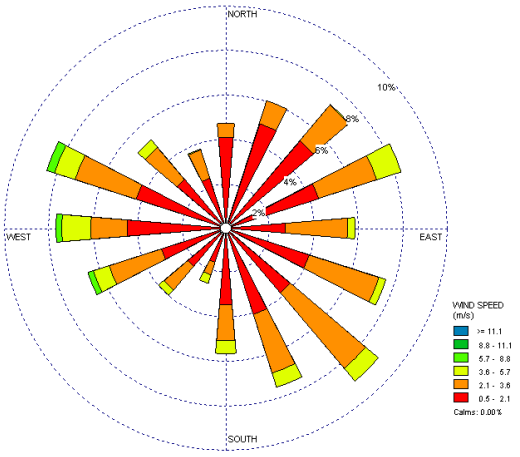
Autumn



Summer



Winter



Spinrg

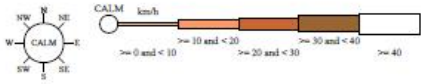
Rose of Wind direction versus Wind speed in km/h (01 Jan 1957 to 28 Feb 2010)

Custom times selected, refer to attached note for details

NEWCASTLE NOBBYS SIGNAL STATION AWS

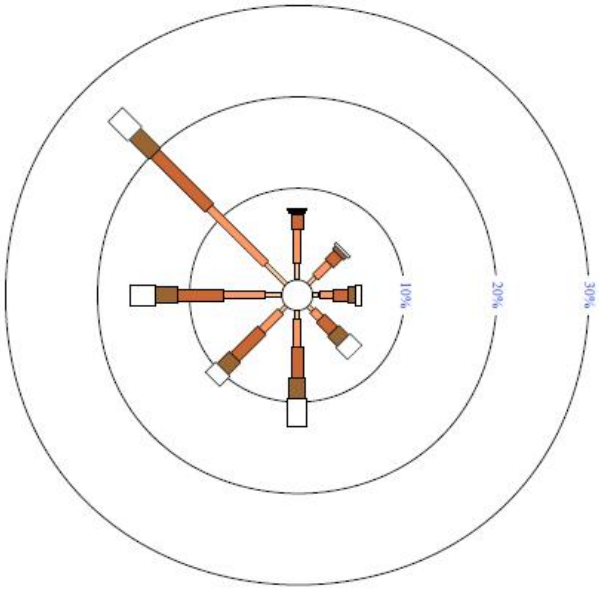
Site No: 061055 • Opened Jan 1862 • Still Open • Latitude: -32.9185° • Longitude: 151.7985° • Elevation 33m

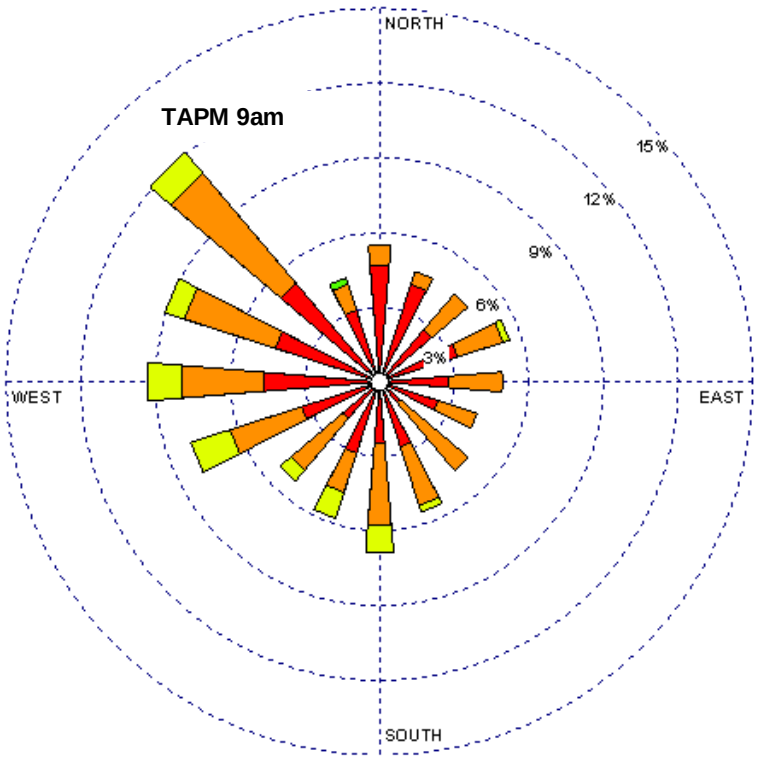
An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



9 am
18976 Total Observations

Calm 8%





Rose of Wind direction versus Wind speed in km/h (01 Jan 1957 to 28 Feb 2010)

Custom times selected, refer to attached note for details

NEWCASTLE NOBBYS SIGNAL STATION AWS

Site No: 061055 • Opened Jan 1962 • Still Open • Latitude: -32.9185° • Longitude: 151.7965° • Elevation 33m

An asterisk (*) indicates that calm is less than 0.5%.
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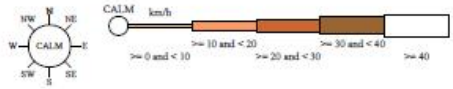
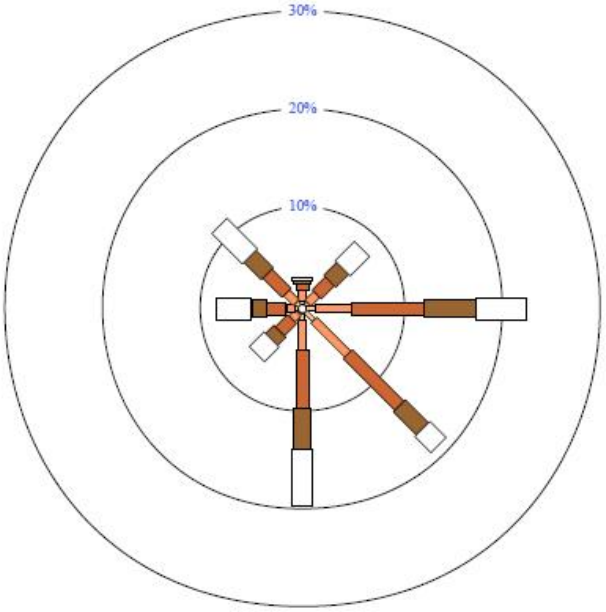
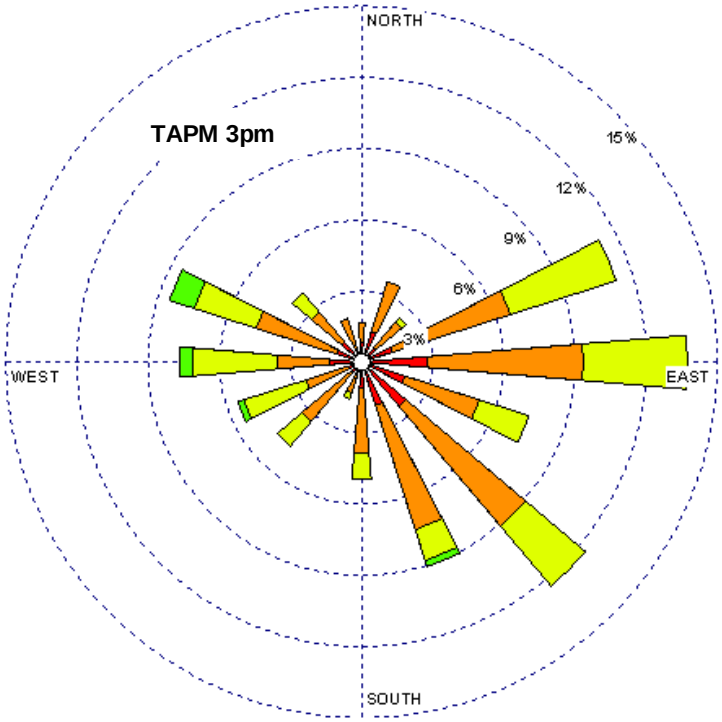


3 pm
18950 Total Observations

Calm 2%





Appendix C

Meteorological Data Analyses

Appendix C Meteorological Data Analysis

C.1. Wind

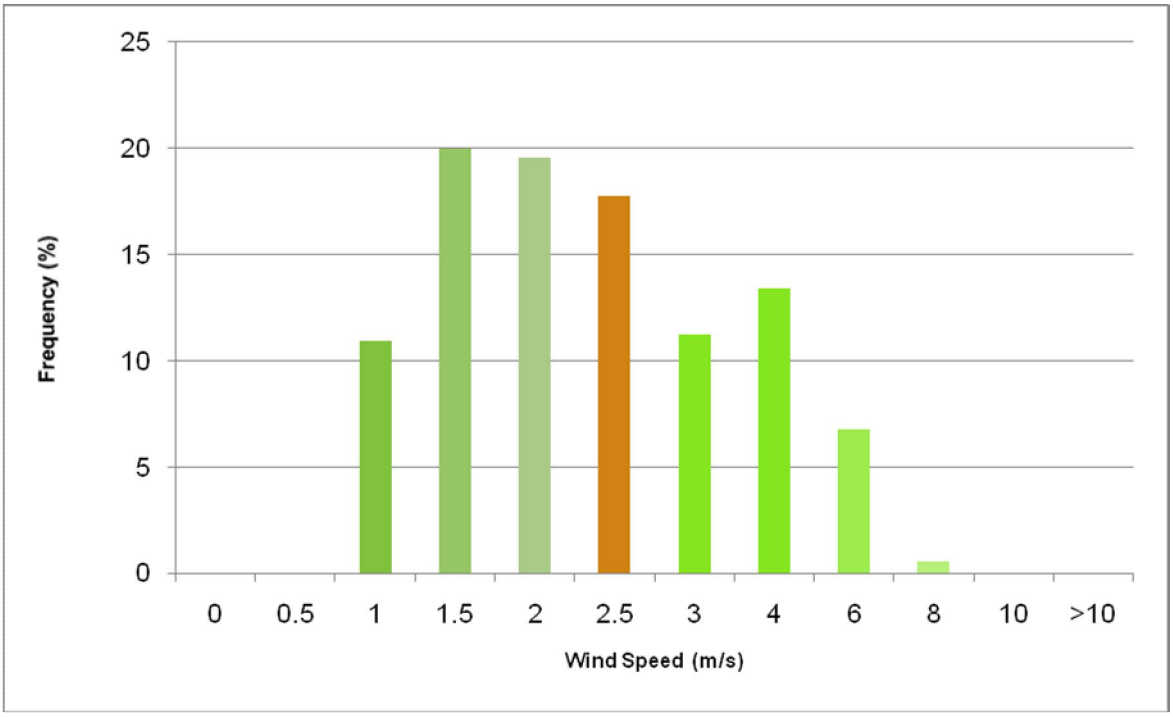
Wind rose diagrams of the predicted meteorological data are shown in **Appendix B**.

The wind roses show the frequency of occurrence of winds by direction and strength. Each wind rose arm represents a wind blowing from the direction it is projected i.e. arm pointing up represents northerly winds. The length of the bar represents the frequency of occurrence of winds from that direction, and wind speed categories are defined by different colours.

The predicted winds for the Teralba area are generally dominated by winds from the NE and NW-SE axis. These patterns are confirmed by wind roses prepared for the Bureau of Meteorology (BOM) station at Newcastle (refer to **Appendix B**).

The estimated mean wind speed for the year at the site is 2.14 m/s, which lies below the range of average wind speeds measured at 9 am and 3 pm for Nobbys (6.5 to 8.8 m/s) reported by BOM. This is likely to the coastal nature of the Nobbys site. The frequency distribution of hourly averaged wind speed values from the TAPM predicted data is shown in **Figure C1**. Wind speeds up to 6 m/s occurred approximately 93% of the time.

Figure C1: Frequency Distribution of Wind Speed



C2. Stability Class

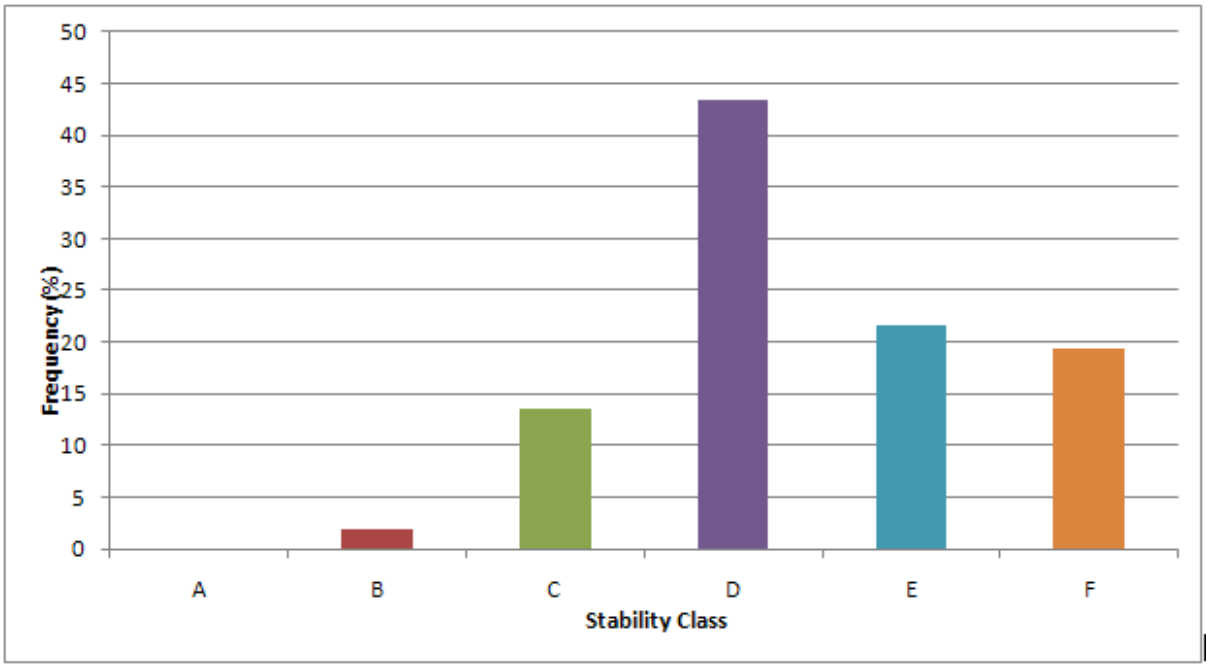
An important aspect of plume dispersion is the atmospheric turbulence level in the region of the plume (near the ground in this case). Turbulence acts to increase the cross-sectional area of the plume due to random motions, thus diluting or diffusing a plume. For traditional dispersion modelling using Gaussian plume models, categories of atmospheric stability are used in conjunction with other meteorological data to describe atmospheric conditions and thus dispersion.

The most well-known stability classification is the Pasquill-Gifford scheme, which denotes stability classes from A to F. Class A is described as highly unstable and occurs in association with strong surface heating and light winds, leading to intense convective turbulence and much enhanced plume dilution. At the other extreme, class F denotes very stable conditions associated with strong temperature inversions and light winds, which commonly occur under clear skies at night and in the early morning. Under these conditions plumes can remain relatively undiluted for considerable distances downwind. Intermediate stability classes grade from moderately unstable (B),

through neutral (D) to slightly stable (E). Whilst classes A and F are strongly associated with clear skies, class D is linked to windy and/or cloudy weather, and short periods around sunset and sunrise when surface heating or cooling is small.

As a general rule, unstable (or convective) conditions dominate during the daytime and stable flows are dominant at night. This diurnal pattern is most pronounced when there is relatively little cloud cover and light to moderate winds. The frequency distribution of estimated stability classes in the meteorological file is shown in **Figure C2**. The data show a total of approximately 13% of hours with either E or F class. This is consistent with the expected occurrence of slightly stable conditions at such a location, given the inland location.

Figure C2: Frequency Distribution of Stability Class

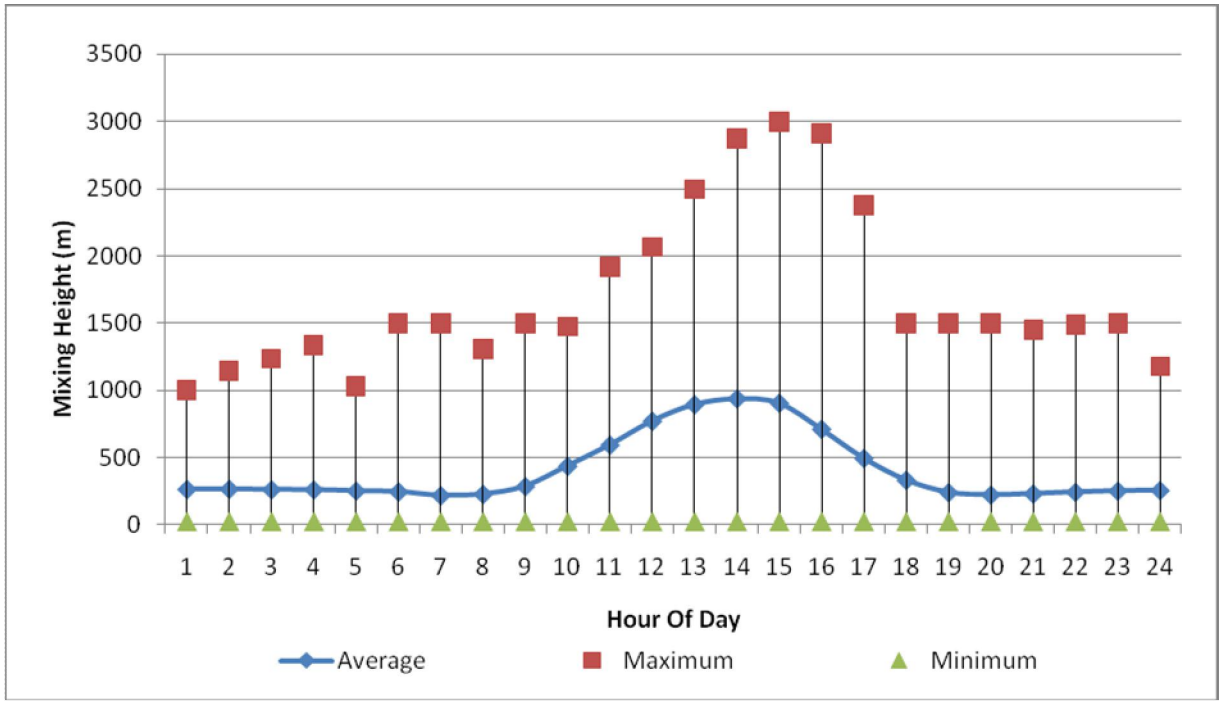


C.3. Mixing Height

Mixing height is the depth of the atmospheric surface layer beneath an elevated temperature inversion. It is an important parameter within air pollution meteorology. Vertical diffusion or mixing of a plume is generally considered to be limited by the mixing height, as the air above this layer tends to be stable, with restricted vertical motions.

The diurnal variation of mixing height for the predicted data is summarised in **Figure C3**. The average mixing heights are lower during the night and early morning hours (< 300 m), increasing after sunrise to an average of 1000 m by mid-afternoon. This pattern of a diurnal cycle is consistent with the inland site.

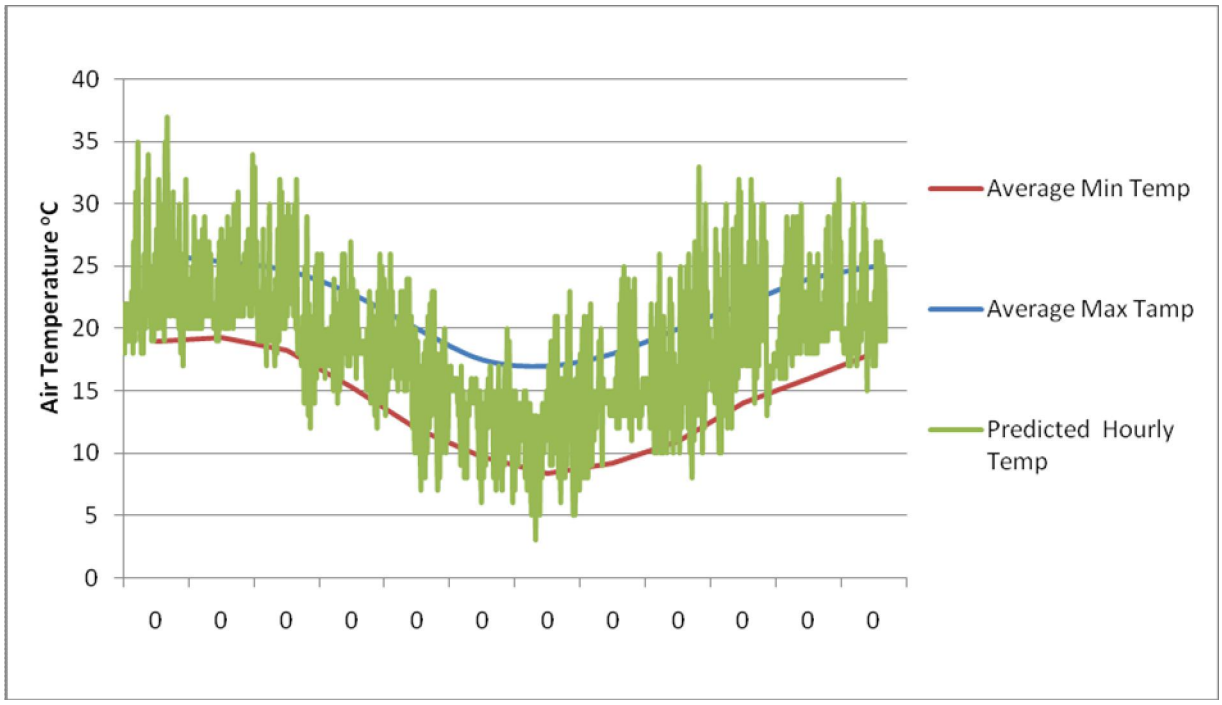
Figure C3: Hourly Mixing Height



C.4. Air Temperature

The following graph illustrates the hourly average air temperature from predicted data compared with measured maximum and minimum monthly temperatures measured at Nobbys BOM Station. The graph clearly shows the predicted hourly average temperature following the local seasonal cycle.

Figure C4: Comparison of Predicted and Measured Air Temperature



Appendix D

Example AUSPLUME Input/Output File

Appendix D Example AUSPLUME Input/Output File

1

Teralba SRC_Dust Modelling_25Mar10

Concentration or deposition	Concentration
Emission rate units	grams/second
Concentration units	microgram/m3
Units conversion factor	1.00E+06
Constant background concentration	0.00E+00
Terrain effects	Egan method
Smooth stability class changes?	No
Other stability class adjustments ("urban modes")	None
Ignore building wake effects?	No
Decay coefficient (unless overridden by met. file)	0.000
Anemometer height	10 m
Roughness height at the wind vane site	0.300 m
Averaging time for sigma-theta values	60 min.

DISPERSION CURVES

Horizontal dispersion curves for sources <100m high	Sigma-theta
Vertical dispersion curves for sources <100m high	Pasquill-Gifford
Horizontal dispersion curves for sources >100m high	Briggs Rural
Vertical dispersion curves for sources >100m high	Briggs Rural
Enhance horizontal plume spreads for buoyancy?	Yes
Enhance vertical plume spreads for buoyancy?	Yes
Adjust horizontal P-G formulae for roughness height?	Yes
Adjust vertical P-G formulae for roughness height?	Yes
Roughness height	0.400m
Adjustment for wind directional shear	None

PLUME RISE OPTIONS

Gradual plume rise?	Yes
Stack-tip downwash included?	Yes
Building downwash algorithm:	PRIME method.
Entrainment coeff. for neutral & stable lapse rates	0.60,0.60
Partial penetration of elevated inversions?	No
Disregard temp. gradients in the hourly met. file?	No

and in the absence of boundary-layer potential temperature gradients given by the hourly met. file, a value from the following table (in K/m) is used:

Wind Speed Category	Stability Class A	B	C	D	E	F
1	0.000	0.000	0.000	0.000	0.020	0.035
2	0.000	0.000	0.000	0.000	0.020	0.035
3	0.000	0.000	0.000	0.000	0.020	0.035
4	0.000	0.000	0.000	0.000	0.020	0.035
5	0.000	0.000	0.000	0.000	0.020	0.035
6	0.000	0.000	0.000	0.000	0.020	0.035

WIND SPEED CATEGORIES
Boundaries between categories (in m/s) are: 1.54, 3.09, 5.14, 8.23, 10.80

WIND PROFILE EXPONENTS: "Irwin Urban" values (unless overridden by met. file)

AVERAGING TIMES
24 hours
average over all hours

1

Teralba SRC_Dust Modelling_25Mar10

SOURCE CHARACTERISTICS

INTEGRATED CIRCULAR AREA SOURCE: SPM1

X0(m)	Y0(m)	Ground El	Radius	No. Vertices	Ver. spread	Height
370498	6354854	7m	63m	10	4m	4m

(Constant) emission rate = 2.00E-06 grams/second per square metre
No gravitational settling or scavenging.

VOLUME SOURCE: VS1PM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370445	6354763	7m	1m	38m	0m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.00E-02	8	1.00E-02
9	1.00E-02	10	1.00E-02	11	1.00E-02	12	1.00E-02
13	1.00E-02	14	1.00E-02	15	1.00E-02	16	1.00E-02
17	1.00E-02	18	1.00E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: VS2PM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370478	6354817	7m	1m	38m	0m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.00E-02	8	1.00E-02
9	1.00E-02	10	1.00E-02	11	1.00E-02	12	1.00E-02
13	1.00E-02	14	1.00E-02	15	1.00E-02	16	1.00E-02
17	1.00E-02	18	1.00E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: VS3PM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370446	6354859	7m	1m	38m	0m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.00E-02	8	1.00E-02
9	1.00E-02	10	1.00E-02	11	1.00E-02	12	1.00E-02
13	1.00E-02	14	1.00E-02	15	1.00E-02	16	1.00E-02
17	1.00E-02	18	1.00E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: VS5PM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370557	6354882	7m	1m	38m	0m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.00E-02	8	1.00E-02
9	1.00E-02	10	1.00E-02	11	1.00E-02	12	1.00E-02
13	1.00E-02	14	1.00E-02	15	1.00E-02	16	1.00E-02
17	1.00E-02	18	1.00E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: VS4PM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370484	6354935	7m	1m	38m	0m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.00E-02	8	1.00E-02
9	1.00E-02	10	1.00E-02	11	1.00E-02	12	1.00E-02
13	1.00E-02	14	1.00E-02	15	1.00E-02	16	1.00E-02
17	1.00E-02	18	1.00E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: VS6PM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370513	6354717	7m	1m	38m	0m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.00E-02	8	1.00E-02
9	1.00E-02	10	1.00E-02	11	1.00E-02	12	1.00E-02
13	1.00E-02	14	1.00E-02	15	1.00E-02	16	1.00E-02
17	1.00E-02	18	1.00E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: VS7PM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370425	6354807	7m	1m	38m	0m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.00E-02	8	1.00E-02
9	1.00E-02	10	1.00E-02	11	1.00E-02	12	1.00E-02
13	1.00E-02	14	1.00E-02	15	1.00E-02	16	1.00E-02
17	1.00E-02	18	1.00E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: VS8PM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370420	6354752	7m	1m	38m	0m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.00E-02	8	1.00E-02
9	1.00E-02	10	1.00E-02	11	1.00E-02	12	1.00E-02

13	1.00E-02	14	1.00E-02	15	1.00E-02	16	1.00E-02
17	1.00E-02	18	1.00E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: LPM10

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370498	6354854	7m	4m	2m	2m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.20E-02	8	1.20E-02
9	1.20E-02	10	1.20E-02	11	1.20E-02	12	1.20E-02
13	1.20E-02	14	1.20E-02	15	1.20E-02	16	1.20E-02
17	1.20E-02	18	1.20E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: UPM10

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370498	6354854	7m	4m	2m	2m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	9.00E-02	8	9.00E-02
9	9.00E-02	10	9.00E-02	11	9.00E-02	12	9.00E-02
13	9.00E-02	14	9.00E-02	15	9.00E-02	16	9.00E-02
17	9.00E-02	18	9.00E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: FL1PM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370498	6354854	7m	4m	2m	2m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	2.80E-02	8	2.80E-02
9	2.80E-02	10	2.80E-02	11	2.80E-02	12	2.80E-02
13	2.80E-02	14	2.80E-02	15	2.80E-02	16	2.80E-02
17	2.80E-02	18	2.80E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: CBP

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370532	6354877	7m	10m	2m	1m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.79E+00	8	0.00E+00
9	0.00E+00	10	0.00E+00	11	0.00E+00	12	0.00E+00
13	0.00E+00	14	0.00E+00	15	0.00E+00	16	0.00E+00
17	0.00E+00	18	0.00E+00	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: FL2PM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370488	6354844	7m	4m	2m	2m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	2.80E-02	8	2.80E-02
9	2.80E-02	10	2.80E-02	11	2.80E-02	12	2.80E-02
13	2.80E-02	14	2.80E-02	15	2.80E-02	16	2.80E-02
17	2.80E-02	18	2.80E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: FL3PM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370458	6354874	7m	4m	2m	2m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	2.80E-02	8	2.80E-02
9	2.80E-02	10	2.80E-02	11	2.80E-02	12	2.80E-02
13	2.80E-02	14	2.80E-02	15	2.80E-02	16	2.80E-02
17	2.80E-02	18	2.80E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: PUGPM1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
370576	6354864	7m	10m	2m	1m

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	2.20E-02	8	2.20E-02
9	2.20E-02	10	2.20E-02	11	2.20E-02	12	2.20E-02
13	2.20E-02	14	2.20E-02	15	2.20E-02	16	2.20E-02
17	2.20E-02	18	2.20E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

1

Teralba SRC_Dust Modelling_25Mar10

RECEPTOR LOCATIONS

The Cartesian receptor grid has the following x-values (or eastings):
368002.m 368202.m 368402.m 368602.m 368802.m 369002.m 369202.m
369402.m 369602.m 369802.m 370002.m 370202.m 370402.m 370602.m
370802.m 371002.m 371202.m 371402.m 371602.m 371802.m 372002.m
372202.m 372402.m 372602.m 372802.m

and these y-values (or northings):
6352424.m 6352624.m 6352824.m 6353024.m 6353224.m 6353424.m 6353624.m

6353824.m 6354024.m 6354224.m 6354424.m 6354624.m 6354824.m 6355024.m
6355224.m 6355424.m 6355624.m 6355824.m 6356024.m 6356224.m 6356424.m
6356624.m 6356824.m 6357024.m 6357224.m

DISCRETE RECEPTOR LOCATIONS (in metres)

No.	X	Y	ELEVN	HEIGHT	No.	X	Y	ELEVN	HEIGHT
1	368921	6355445	10.0	0.0	7	371109	6354555	5.0	0.0
2	369433	6354728	11.0	0.0	8	371106	6354389	2.0	0.0
3	369620	6354654	9.0	0.0	9	371086	6354314	0.0	0.0
4	369593	6355692	12.0	0.0	10	371606	6355132	10.0	0.0
5	370429	6355592	10.0	0.0	11	371592	6354737	8.0	0.0
6	371172	6354685	3.0	0.0					

METEOROLOGICAL DATA : AUSPLUME METFILE

AVERAGE OVER ALL HOURS AND FOR ALL SOURCES
in microgram/m3

Y (km) \ X (km):	368.002	368.202	368.402	368.602	368.802	369.002
6357.224	4.95E-02	5.06E-02	5.22E-02	5.43E-02	5.66E-02	5.85E-02
6357.024	5.40E-02	5.54E-02	5.70E-02	5.91E-02	6.16E-02	6.42E-02
6356.824	5.87E-02	6.09E-02	6.29E-02	6.51E-02	6.78E-02	7.09E-02
6356.624	6.27E-02	6.62E-02	6.95E-02	7.25E-02	7.55E-02	7.91E-02
6356.424	6.55E-02	7.06E-02	7.57E-02	8.05E-02	8.50E-02	8.95E-02
6356.224	6.70E-02	7.33E-02	8.02E-02	8.76E-02	9.49E-02	1.02E-01
6356.024	6.76E-02	7.45E-02	8.27E-02	9.22E-02	1.03E-01	1.15E-01
6355.824	6.81E-02	7.50E-02	8.36E-02	9.43E-02	1.08E-01	1.24E-01
6355.624	6.87E-02	7.56E-02	8.42E-02	9.50E-02	1.09E-01	1.28E-01
6355.424	6.89E-02	7.60E-02	8.48E-02	9.57E-02	1.10E-01	1.29E-01
6355.224	6.74E-02	7.48E-02	8.39E-02	9.53E-02	1.10E-01	1.30E-01
6355.024	6.39E-02	7.10E-02	8.00E-02	9.13E-02	1.06E-01	1.26E-01
6354.824	5.90E-02	6.55E-02	7.35E-02	8.38E-02	9.73E-02	1.16E-01
6354.624	5.40E-02	5.98E-02	6.69E-02	7.61E-02	8.80E-02	1.04E-01
6354.424	5.01E-02	5.54E-02	6.22E-02	7.07E-02	8.21E-02	9.76E-02
6354.224	4.78E-02	5.32E-02	6.00E-02	6.86E-02	8.03E-02	9.62E-02
6354.024	4.71E-02	5.28E-02	5.99E-02	6.92E-02	8.15E-02	9.80E-02
6353.824	4.77E-02	5.38E-02	6.15E-02	7.12E-02	8.35E-02	9.89E-02
6353.624	4.91E-02	5.55E-02	6.32E-02	7.26E-02	8.36E-02	9.59E-02
6353.424	5.05E-02	5.68E-02	6.41E-02	7.23E-02	8.11E-02	9.00E-02
6353.224	5.15E-02	5.73E-02	6.35E-02	7.00E-02	7.66E-02	8.34E-02
6353.024	5.17E-02	5.66E-02	6.16E-02	6.66E-02	7.17E-02	7.75E-02
6352.824	5.09E-02	5.48E-02	5.88E-02	6.28E-02	6.72E-02	7.26E-02
6352.624	4.95E-02	5.26E-02	5.58E-02	5.93E-02	6.34E-02	6.85E-02
6352.424	4.76E-02	5.02E-02	5.30E-02	5.62E-02	6.01E-02	6.49E-02

Y (km) \ X (km):	369.202	369.402	369.602	369.802	370.002	370.202
6357.224	5.94E-02	6.00E-02	6.09E-02	6.31E-02	6.63E-02	6.99E-02
6357.024	6.61E-02	6.70E-02	6.79E-02	7.01E-02	7.37E-02	7.80E-02
6356.824	7.38E-02	7.57E-02	7.68E-02	7.88E-02	8.28E-02	8.81E-02
6356.624	8.30E-02	8.63E-02	8.82E-02	9.02E-02	9.47E-02	1.01E-01
6356.424	9.43E-02	9.93E-02	1.03E-01	1.06E-01	1.10E-01	1.18E-01
6356.224	1.09E-01	1.16E-01	1.22E-01	1.27E-01	1.32E-01	1.42E-01
6356.024	1.26E-01	1.37E-01	1.48E-01	1.56E-01	1.63E-01	1.75E-01
6355.824	1.42E-01	1.62E-01	1.82E-01	1.99E-01	2.12E-01	2.28E-01
6355.624	1.52E-01	1.84E-01	2.22E-01	2.61E-01	2.95E-01	3.20E-01

6355.424	1.55E-01	1.94E-01	2.50E-01	3.34E-01	4.33E-01	5.14E-01
6355.224	1.57E-01	1.97E-01	2.62E-01	3.79E-01	6.04E-01	9.32E-01
6355.024	1.54E-01	1.96E-01	2.67E-01	3.98E-01	6.92E-01	1.53E+00
6354.824	1.42E-01	1.82E-01	2.50E-01	3.83E-01	7.00E-01	1.77E+00
6354.624	1.27E-01	1.63E-01	2.22E-01	3.38E-01	5.97E-01	1.27E+00
6354.424	1.20E-01	1.53E-01	2.09E-01	3.10E-01	4.81E-01	7.32E-01
6354.224	1.19E-01	1.52E-01	2.01E-01	2.66E-01	3.49E-01	4.69E-01
6354.024	1.20E-01	1.48E-01	1.81E-01	2.19E-01	2.71E-01	3.32E-01
6353.824	1.17E-01	1.36E-01	1.58E-01	1.86E-01	2.24E-01	2.51E-01
6353.624	1.09E-01	1.23E-01	1.40E-01	1.63E-01	1.88E-01	2.00E-01
6353.424	9.95E-02	1.11E-01	1.26E-01	1.44E-01	1.60E-01	1.65E-01
6353.224	9.13E-02	1.02E-01	1.14E-01	1.28E-01	1.39E-01	1.40E-01
6353.024	8.48E-02	9.40E-02	1.05E-01	1.15E-01	1.21E-01	1.21E-01
6352.824	7.94E-02	8.75E-02	9.63E-02	1.04E-01	1.07E-01	1.06E-01
6352.624	7.47E-02	8.17E-02	8.88E-02	9.43E-02	9.64E-02	9.49E-02
6352.424	7.04E-02	7.65E-02	8.22E-02	8.61E-02	8.72E-02	8.57E-02

X (km):	370.402	370.602	370.802	371.002	371.202	371.402
Y (km)						
6357.224	7.37E-02	7.61E-02	7.55E-02	7.15E-02	6.62E-02	6.06E-02
6357.024	8.24E-02	8.51E-02	8.38E-02	7.85E-02	7.19E-02	6.52E-02
6356.824	9.34E-02	9.64E-02	9.39E-02	8.69E-02	7.87E-02	7.08E-02
6356.624	1.08E-01	1.11E-01	1.07E-01	9.73E-02	8.67E-02	7.81E-02
6356.424	1.26E-01	1.30E-01	1.23E-01	1.10E-01	9.68E-02	8.89E-02
6356.224	1.52E-01	1.56E-01	1.45E-01	1.26E-01	1.11E-01	1.07E-01
6356.024	1.90E-01	1.94E-01	1.75E-01	1.48E-01	1.33E-01	1.36E-01
6355.824	2.51E-01	2.54E-01	2.19E-01	1.81E-01	1.75E-01	1.85E-01
6355.624	3.60E-01	3.62E-01	2.90E-01	2.45E-01	2.52E-01	2.62E-01
6355.424	5.81E-01	5.74E-01	4.25E-01	3.91E-01	3.97E-01	3.75E-01
6355.224	1.17E+00	1.11E+00	7.93E-01	7.55E-01	6.26E-01	4.72E-01
6355.024	4.07E+00	3.48E+00	2.25E+00	1.18E+00	7.13E-01	5.05E-01
6354.824	1.33E+01	1.51E+01	3.35E+00	1.50E+00	8.93E-01	6.21E-01
6354.624	2.73E+00	2.71E+00	2.14E+00	1.36E+00	8.43E-01	5.97E-01
6354.424	9.76E-01	8.94E-01	9.59E-01	8.94E-01	7.53E-01	5.66E-01
6354.224	5.16E-01	4.65E-01	5.31E-01	5.24E-01	5.28E-01	4.98E-01
6354.024	3.34E-01	3.04E-01	3.35E-01	3.53E-01	3.57E-01	3.73E-01
6353.824	2.43E-01	2.24E-01	2.37E-01	2.60E-01	2.65E-01	2.71E-01
6353.624	1.91E-01	1.78E-01	1.81E-01	2.01E-01	2.08E-01	2.10E-01
6353.424	1.57E-01	1.48E-01	1.46E-01	1.62E-01	1.68E-01	1.72E-01
6353.224	1.33E-01	1.27E-01	1.23E-01	1.33E-01	1.41E-01	1.44E-01
6353.024	1.16E-01	1.11E-01	1.06E-01	1.12E-01	1.21E-01	1.22E-01
6352.824	1.02E-01	9.83E-02	9.40E-02	9.59E-02	1.05E-01	1.07E-01
6352.624	9.15E-02	8.84E-02	8.45E-02	8.40E-02	9.13E-02	9.46E-02
6352.424	8.28E-02	8.02E-02	7.69E-02	7.50E-02	8.02E-02	8.49E-02

X (km):	371.602	371.802	372.002	372.202	372.402	372.602
Y (km)						
6357.224	5.55E-02	5.20E-02	5.11E-02	5.27E-02	5.62E-02	6.04E-02
6357.024	5.98E-02	5.73E-02	5.81E-02	6.16E-02	6.64E-02	7.07E-02
6356.824	6.58E-02	6.52E-02	6.84E-02	7.37E-02	7.87E-02	8.22E-02
6356.624	7.49E-02	7.73E-02	8.30E-02	8.89E-02	9.28E-02	9.45E-02
6356.424	8.93E-02	9.52E-02	1.02E-01	1.07E-01	1.09E-01	1.08E-01
6356.224	1.12E-01	1.20E-01	1.26E-01	1.27E-01	1.26E-01	1.23E-01
6356.024	1.46E-01	1.52E-01	1.54E-01	1.52E-01	1.46E-01	1.38E-01
6355.824	1.93E-01	1.94E-01	1.88E-01	1.77E-01	1.64E-01	1.49E-01
6355.624	2.59E-01	2.44E-01	2.21E-01	1.96E-01	1.71E-01	1.50E-01
6355.424	3.32E-01	2.81E-01	2.33E-01	1.98E-01	1.72E-01	1.53E-01
6355.224	3.56E-01	2.85E-01	2.40E-01	2.08E-01	1.83E-01	1.64E-01
6355.024	3.91E-01	3.20E-01	2.71E-01	2.34E-01	2.06E-01	1.84E-01
6354.824	4.69E-01	3.78E-01	3.16E-01	2.70E-01	2.36E-01	2.09E-01
6354.624	4.59E-01	3.73E-01	3.14E-01	2.71E-01	2.38E-01	2.12E-01
6354.424	4.37E-01	3.53E-01	2.96E-01	2.55E-01	2.24E-01	2.00E-01
6354.224	4.25E-01	3.48E-01	2.89E-01	2.47E-01	2.16E-01	1.92E-01
6354.024	3.66E-01	3.33E-01	2.89E-01	2.48E-01	2.15E-01	1.89E-01

6353.824	2.87E-01	2.88E-01	2.71E-01	2.44E-01	2.17E-01	1.91E-01
6353.624	2.18E-01	2.33E-01	2.36E-01	2.27E-01	2.11E-01	1.92E-01
6353.424	1.74E-01	1.83E-01	1.95E-01	2.00E-01	1.95E-01	1.84E-01
6353.224	1.46E-01	1.48E-01	1.58E-01	1.68E-01	1.73E-01	1.70E-01
6353.024	1.26E-01	1.26E-01	1.29E-01	1.38E-01	1.47E-01	1.52E-01
6352.824	1.09E-01	1.11E-01	1.11E-01	1.15E-01	1.23E-01	1.31E-01
6352.624	9.49E-02	9.78E-02	9.86E-02	9.92E-02	1.04E-01	1.11E-01
6352.424	8.46E-02	8.63E-02	8.86E-02	8.85E-02	8.97E-02	9.46E-02

X (km): 372.802

Y (km)	
6357.224	6.43E-02
6357.024	7.38E-02
6356.824	8.37E-02
6356.624	9.44E-02
6356.424	1.06E-01
6356.224	1.18E-01
6356.024	1.29E-01
6355.824	1.34E-01
6355.624	1.34E-01
6355.424	1.39E-01
6355.224	1.49E-01
6355.024	1.67E-01
6354.824	1.88E-01
6354.624	1.91E-01
6354.424	1.81E-01
6354.224	1.74E-01
6354.024	1.69E-01
6353.824	1.70E-01
6353.624	1.73E-01
6353.424	1.71E-01
6353.224	1.63E-01
6353.024	1.51E-01
6352.824	1.36E-01
6352.624	1.18E-01
6352.424	1.01E-01

Concentrations at the discrete receptors (No. : Value):

1:1.20E-01 2:1.79E-01 3:2.33E-01 4:2.07E-01 5:3.95E-01
6:9.25E-01 7:1.00E+00 8:7.72E-01
9:6.48E-01 10:3.62E-01 11:4.80E-01

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1 Peak values for the 100 worst cases (in microgram/m3)
Averaging time = 24 hours

Rank	Value	Time Recorded hour,date	Coordinates (* denotes polar)	
1	1.10E+02	24,03/08/07	(370602, 6354824,	0.0)
2	1.05E+02	24,13/05/07	(370602, 6354824,	0.0)
3	9.32E+01	24,03/04/07	(370602, 6354824,	0.0)
4	9.14E+01	24,02/09/07	(370602, 6354824,	0.0)
5	8.00E+01	24,27/05/07	(370602, 6354824,	0.0)
6	7.87E+01	24,13/09/07	(370602, 6354824,	0.0)
7	7.64E+01	24,15/03/07	(370602, 6354824,	0.0)
8	7.52E+01	24,25/06/07	(370402, 6354824,	0.0)
9	7.25E+01	24,18/10/07	(370402, 6354824,	0.0)
10	7.12E+01	24,24/07/07	(370602, 6354824,	0.0)
11	6.64E+01	24,20/02/07	(370402, 6354824,	0.0)
12	6.58E+01	24,26/07/07	(370602, 6354824,	0.0)
13	6.31E+01	24,16/08/07	(370402, 6354824,	0.0)
14	6.20E+01	24,03/06/07	(370602, 6354824,	0.0)

15	6.20E+01	24,28/08/07	(370602, 6354824,	0.0)
16	6.11E+01	24,30/08/07	(370602, 6354824,	0.0)
17	5.98E+01	24,24/09/07	(370602, 6354824,	0.0)
18	5.91E+01	24,27/07/07	(370602, 6354824,	0.0)
19	5.87E+01	24,23/10/07	(370602, 6354824,	0.0)
20	5.77E+01	24,11/01/07	(370402, 6354824,	0.0)
21	5.67E+01	24,23/05/07	(370602, 6354824,	0.0)
22	5.59E+01	24,08/02/07	(370402, 6354824,	0.0)
23	5.47E+01	24,13/11/07	(370602, 6354824,	0.0)
24	5.41E+01	24,29/08/07	(370602, 6354824,	0.0)
25	5.35E+01	24,14/02/07	(370602, 6355024,	0.0)
26	5.33E+01	24,02/04/07	(370602, 6354824,	0.0)
27	5.28E+01	24,21/05/07	(370602, 6354824,	0.0)
28	5.28E+01	24,20/05/07	(370602, 6354824,	0.0)
29	5.27E+01	24,01/01/07	(370402, 6354824,	0.0)
30	5.25E+01	24,05/05/07	(370602, 6354824,	0.0)
31	5.19E+01	24,04/05/07	(370602, 6354824,	0.0)
32	5.17E+01	24,05/10/07	(370602, 6354824,	0.0)
33	5.12E+01	24,02/07/07	(370602, 6354824,	0.0)
34	5.10E+01	24,28/03/07	(370602, 6354824,	0.0)
35	5.01E+01	24,16/05/07	(370602, 6354824,	0.0)
36	4.98E+01	24,16/04/07	(370602, 6354824,	0.0)
37	4.98E+01	24,26/01/07	(370402, 6354824,	0.0)
38	4.98E+01	24,12/01/07	(370402, 6354824,	0.0)
39	4.93E+01	24,28/02/07	(370402, 6354624,	0.0)
40	4.91E+01	24,17/03/07	(370602, 6354824,	0.0)
41	4.88E+01	24,06/06/07	(370402, 6354824,	0.0)
42	4.88E+01	24,02/08/07	(370602, 6354824,	0.0)
43	4.86E+01	24,25/07/07	(370602, 6354824,	0.0)
44	4.78E+01	24,04/12/07	(370602, 6354824,	0.0)
45	4.76E+01	24,04/01/07	(370402, 6354824,	0.0)
46	4.76E+01	24,02/01/07	(370402, 6354824,	0.0)
47	4.76E+01	24,08/08/07	(370602, 6354824,	0.0)
48	4.75E+01	24,25/08/07	(370402, 6354824,	0.0)
49	4.74E+01	24,01/07/07	(370602, 6354824,	0.0)
50	4.72E+01	24,26/05/07	(370602, 6354824,	0.0)
51	4.71E+01	24,09/08/07	(370602, 6354824,	0.0)
52	4.66E+01	24,10/01/07	(370402, 6354824,	0.0)
53	4.66E+01	24,19/05/07	(370602, 6354824,	0.0)
54	4.64E+01	24,23/07/07	(370602, 6354824,	0.0)
55	4.61E+01	24,17/07/07	(370602, 6354824,	0.0)
56	4.51E+01	24,19/12/07	(370402, 6354824,	0.0)
57	4.48E+01	24,08/07/07	(370602, 6354824,	0.0)
58	4.47E+01	24,02/02/07	(370402, 6354824,	0.0)
59	4.47E+01	24,02/05/07	(370602, 6354824,	0.0)
60	4.35E+01	24,22/05/07	(370602, 6354824,	0.0)
61	4.34E+01	24,07/12/07	(370402, 6354824,	0.0)
62	4.33E+01	24,11/09/07	(370602, 6354824,	0.0)
63	4.32E+01	24,18/02/07	(370402, 6354824,	0.0)
64	4.31E+01	24,30/09/07	(370602, 6354824,	0.0)
65	4.30E+01	24,11/10/07	(370602, 6354824,	0.0)
66	4.28E+01	24,03/02/07	(370402, 6354824,	0.0)
67	4.27E+01	24,12/08/07	(370602, 6354824,	0.0)
68	4.27E+01	24,05/02/07	(370402, 6354824,	0.0)
69	4.26E+01	24,24/12/07	(370402, 6354824,	0.0)
70	4.25E+01	24,03/11/07	(370602, 6354824,	0.0)
71	4.24E+01	24,26/12/07	(370402, 6354824,	0.0)
72	4.23E+01	24,30/06/07	(370602, 6354824,	0.0)
73	4.21E+01	24,06/07/07	(370602, 6354824,	0.0)
74	4.20E+01	24,07/07/07	(370602, 6354824,	0.0)
75	4.19E+01	24,17/08/07	(370602, 6354824,	0.0)
76	4.18E+01	24,29/04/07	(370602, 6354824,	0.0)
77	4.18E+01	24,21/02/07	(370402, 6354824,	0.0)
78	4.17E+01	24,14/04/07	(370602, 6354824,	0.0)
79	4.13E+01	24,27/02/07	(370402, 6354824,	0.0)
80	4.05E+01	24,05/04/07	(370602, 6354824,	0.0)
81	4.04E+01	24,11/06/07	(370602, 6354824,	0.0)
82	3.99E+01	24,24/01/07	(370602, 6354824,	0.0)

83	3.98E+01	24,22/03/07	(370402, 6354824, 0.0)
84	3.96E+01	24,05/03/07	(370402, 6354824, 0.0)
85	3.94E+01	24,28/09/07	(370602, 6354824, 0.0)
86	3.94E+01	24,27/08/07	(370602, 6354824, 0.0)
87	3.91E+01	24,30/05/07	(370602, 6354824, 0.0)
88	3.86E+01	24,01/10/07	(370602, 6354824, 0.0)
89	3.85E+01	24,30/01/07	(370602, 6354824, 0.0)
90	3.85E+01	24,05/08/07	(370602, 6354824, 0.0)
91	3.84E+01	24,18/01/07	(370402, 6354824, 0.0)
92	3.84E+01	24,06/10/07	(370602, 6354824, 0.0)
93	3.83E+01	24,12/09/07	(370602, 6354824, 0.0)
94	3.80E+01	24,03/07/07	(370602, 6354824, 0.0)
95	3.79E+01	24,16/01/07	(370402, 6354824, 0.0)
96	3.77E+01	24,04/04/07	(370402, 6354824, 0.0)
97	3.77E+01	24,28/06/07	(370602, 6354824, 0.0)
98	3.75E+01	24,11/08/07	(370602, 6354824, 0.0)
99	3.74E+01	24,30/04/07	(370602, 6354824, 0.0)
100	3.72E+01	24,10/02/07	(370402, 6354824, 0.0)

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Concentration or deposition	Concentration
Emission rate units	OUV/second
Concentration units	Odour_Units
Units conversion factor	1.00E+00
Constant background concentration	0.00E+00
Terrain effects	Egan method
Smooth stability class changes?	No
Other stability class adjustments ("urban modes")	None
Ignore building wake effects?	No
Decay coefficient (unless overridden by met. file)	0.000
Anemometer height	10 m
Roughness height at the wind vane site	0.300 m
Averaging time for sigma-theta values	60 min.

DISPERSION CURVES

Horizontal dispersion curves for sources <100m high	Sigma-theta
Vertical dispersion curves for sources <100m high	Pasquill-Gifford
Horizontal dispersion curves for sources >100m high	Briggs Rural
Vertical dispersion curves for sources >100m high	Briggs Rural
Enhance horizontal plume spreads for buoyancy?	Yes
Enhance vertical plume spreads for buoyancy?	Yes
Adjust horizontal P-G formulae for roughness height?	Yes
Adjust vertical P-G formulae for roughness height?	Yes
Roughness height	0.400m
Adjustment for wind directional shear	None

PLUME RISE OPTIONS

Gradual plume rise?	Yes
Stack-tip downwash included?	Yes
Building downwash algorithm:	PRIME method.
Entrainment coeff. for neutral & stable lapse rates	0.60,0.60
Partial penetration of elevated inversions?	No
Disregard temp. gradients in the hourly met. file?	No

and in the absence of boundary-layer potential temperature gradients given by the hourly met. file, a value from the following table (in K/m) is used:

Wind Speed Category	Stability Class A	B	C	D	E	F
1	0.000	0.000	0.000	0.000	0.020	0.035
2	0.000	0.000	0.000	0.000	0.020	0.035
3	0.000	0.000	0.000	0.000	0.020	0.035
4	0.000	0.000	0.000	0.000	0.020	0.035
5	0.000	0.000	0.000	0.000	0.020	0.035
6	0.000	0.000	0.000	0.000	0.020	0.035

WIND SPEED CATEGORIES
Boundaries between categories (in m/s) are: 1.54, 3.09, 5.14, 8.23, 10.80

WIND PROFILE EXPONENTS: "Irwin Urban" values (unless overridden by met. file)

AVERAGING TIMES
1 hour

SOURCE CHARACTERISTICS

AREA SOURCE: GW

X(m)	Y(m)	Ground Elevation	Height	Side length
370452	6354819	0m	8m	43m

Emission rates by stability and wind speed, in OUV/second per square metre:

Wind speeds (m/s):	< 1.5	1.5_ 3.1	3.1_ 5.1	5.1_ 8.2	8.2_10.8	>10.8
Stability A:	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01
Stability B:	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01
Stability C:	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01
Stability D:	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01
Stability E:	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01
Stability F:	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01

No gravitational settling or scavenging.

AREA SOURCE: BP

X(m)	Y(m)	Ground Elevation	Height	Side length
370433	6354894	0m	0m	25m

Emission rates by stability and wind speed, in OUV/second per square metre:

Wind speeds (m/s):	< 1.5	1.5_ 3.1	3.1_ 5.1	5.1_ 8.2	8.2_10.8	>10.8
Stability A:	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01
Stability B:	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01
Stability C:	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01
Stability D:	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01
Stability E:	3.90E-01	3.90E-01	3.90E-01	3.90E-01	3.90E-01	3.90E-01
Stability F:	3.90E-01	3.90E-01	3.90E-01	3.90E-01	3.90E-01	3.90E-01

No gravitational settling or scavenging.

AREA SOURCE: PB1

X(m)	Y(m)	Ground Elevation	Height	Side length
370500	6354713	0m	6m	10m

Emission rates by stability and wind speed, in OUV/second per square metre:

Wind speeds (m/s):	< 1.5	1.5_ 3.1	3.1_ 5.1	5.1_ 8.2	8.2_10.8	>10.8
Stability A:	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Stability B:	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Stability C:	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Stability D:	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Stability E:	9.00E-02	9.00E-02	9.00E-02	9.00E-02	9.00E-02	9.00E-02
Stability F:	9.00E-02	9.00E-02	9.00E-02	9.00E-02	9.00E-02	9.00E-02

No gravitational settling or scavenging.

AREA SOURCE: PB2

X(m)	Y(m)	Ground Elevation	Height	Side length
370493	6354710	0m	6m	10m

Emission rates by stability and wind speed, in OUV/second per square

metre:

Wind speeds (m/s):	< 1.5	1.5_ 3.1	3.1_ 5.1	5.1_ 8.2	8.2_10.8	>10.8
Stability A:	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Stability B:	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Stability C:	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Stability D:	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Stability E:	9.00E-02	9.00E-02	9.00E-02	9.00E-02	9.00E-02	9.00E-02
Stability F:	9.00E-02	9.00E-02	9.00E-02	9.00E-02	9.00E-02	9.00E-02

No gravitational settling or scavenging.

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RECEPTOR LOCATIONS

The Cartesian receptor grid has the following x-values (or eastings):
368002.m 368202.m 368402.m 368602.m 368802.m 369002.m 369202.m
369402.m 369602.m 369802.m 370002.m 370202.m 370402.m 370602.m
370802.m 371002.m 371202.m 371402.m 371602.m 371802.m 372002.m
372202.m 372402.m 372602.m 372802.m

and these y-values (or northings):
6352424.m 6352624.m 6352824.m 6353024.m 6353224.m 6353424.m 6353624.m
6353824.m 6354024.m 6354224.m 6354424.m 6354624.m 6354824.m 6355024.m
6355224.m 6355424.m 6355624.m 6355824.m 6356024.m 6356224.m 6356424.m
6356624.m 6356824.m 6357024.m 6357224.m

DISCRETE RECEPTOR LOCATIONS (in metres)

No.	X	Y	ELEVN	HEIGHT	No.	X	Y	ELEVN	HEIGHT
1	368921	6355445	10.0	0.0	7	371109	6354555	5.0	0.0
2	369433	6354728	11.0	0.0	8	371106	6354389	2.0	0.0
3	369620	6354654	9.0	0.0	9	371086	6354314	0.0	0.0
4	369593	6355692	12.0	0.0	10	371606	6355132	10.0	0.0
5	370429	6355592	10.0	0.0	11	371592	6354737	8.0	0.0
6	371172	6354685	3.0	0.0					

METEOROLOGICAL DATA : AUSPLUME METFILE

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1 HIGHEST RECORDINGS FOR EACH RECEPTOR (in Odour_Units)

AVERAGING TIME = 1 HOUR

X (km):	368.002	368.202
Y (km)		
6357.224	6.27E-02 03,04/04/07	5.86E-02 03,04/04/07
6357.024	8.13E-02 21,06/05/07	6.70E-02 03,04/04/07
6356.824	9.49E-02 21,06/05/07	8.96E-02 21,06/05/07
6356.624	8.60E-02 21,06/05/07	1.01E-01 21,06/05/07
6356.424	7.38E-02 24,09/12/07	8.50E-02 21,06/05/07
6356.224	7.31E-02 02,29/11/07	7.46E-02 02,29/11/07
6356.024	6.89E-02 02,04/04/07	7.52E-02 02,29/11/07
6355.824	7.84E-02 20,06/05/07	8.06E-02 02,04/04/07

6355.624	1.10E-01 20,06/05/07	1.13E-01 20,06/05/07
6355.424	7.37E-02 20,06/05/07	9.50E-02 20,06/05/07
6355.224	3.77E-02 23,09/12/07	4.17E-02 07,26/09/07
6355.024	5.43E-02 23,09/12/07	5.71E-02 23,09/12/07
6354.824	1.08E-01 01,29/11/07	1.15E-01 01,29/11/07
6354.624	9.48E-02 01,29/11/07	9.62E-02 01,29/11/07
6354.424	4.96E-02 23,09/12/07	5.04E-02 23,09/12/07
6354.224	3.75E-02 21,03/11/07	4.05E-02 21,03/11/07
6354.024	3.87E-02 22,27/03/07	5.89E-02 22,27/03/07
6353.824	8.06E-02 22,27/03/07	1.02E-01 22,27/03/07
6353.624	1.04E-01 22,27/03/07	1.07E-01 22,27/03/07
6353.424	8.91E-02 22,27/03/07	7.33E-02 24,04/12/07
6353.224	6.02E-02 24,04/12/07	4.76E-02 24,04/12/07
6353.024	3.74E-02 24,04/12/07	4.20E-02 23,04/12/07
6352.824	4.35E-02 23,04/12/07	7.32E-02 23,04/12/07
6352.624	7.04E-02 23,04/12/07	8.76E-02 23,04/12/07
6352.424	8.24E-02 23,04/12/07	7.70E-02 23,04/12/07

X (km):	368.402	368.602
Y (km)		
6357.224	5.32E-02 06,04/02/07	5.19E-02 06,04/02/07
6357.024	6.24E-02 03,04/04/07	5.69E-02 06,04/02/07
6356.824	7.19E-02 03,04/04/07	6.67E-02 03,04/04/07
6356.624	9.92E-02 21,06/05/07	7.79E-02 03,04/04/07
6356.424	1.07E-01 21,06/05/07	1.11E-01 21,06/05/07
6356.224	8.85E-02 24,09/12/07	1.12E-01 21,06/05/07
6356.024	8.33E-02 02,29/11/07	9.12E-02 24,09/12/07
6355.824	7.99E-02 02,04/04/07	8.82E-02 02,29/11/07
6355.624	1.05E-01 20,06/05/07	9.41E-02 02,04/04/07
6355.424	1.17E-01 20,06/05/07	1.35E-01 20,06/05/07
6355.224	4.79E-02 20,06/05/07	7.06E-02 20,06/05/07
6355.024	6.02E-02 23,09/12/07	6.36E-02 23,09/12/07
6354.824	1.24E-01 01,29/11/07	1.34E-01 01,29/11/07
6354.624	9.69E-02 01,29/11/07	9.64E-02 01,29/11/07
6354.424	5.08E-02 23,09/12/07	5.06E-02 23,09/12/07
6354.224	4.38E-02 21,03/11/07	5.49E-02 22,27/03/07
6354.024	8.55E-02 22,27/03/07	1.15E-01 22,27/03/07
6353.824	1.19E-01 22,27/03/07	1.22E-01 22,27/03/07
6353.624	9.64E-02 22,27/03/07	7.78E-02 24,04/12/07
6353.424	6.09E-02 24,04/12/07	4.37E-02 24,04/12/07
6353.224	3.97E-02 23,04/12/07	7.88E-02 23,04/12/07
6353.024	7.60E-02 23,04/12/07	1.01E-01 23,04/12/07
6352.824	9.37E-02 23,04/12/07	8.55E-02 23,04/12/07
6352.624	8.10E-02 23,04/12/07	5.94E-02 20,16/05/07
6352.424	5.50E-02 20,16/05/07	5.61E-02 20,16/05/07

X (km):	368.802	369.002
Y (km)		
6357.224	8.26E-02 22,06/05/07	1.02E-01 22,06/05/07
6357.024	5.45E-02 06,04/02/07	1.02E-01 22,06/05/07
6356.824	6.11E-02 06,04/02/07	7.28E-02 22,06/05/07
6356.624	7.19E-02 03,04/04/07	6.61E-02 06,04/02/07
6356.424	8.71E-02 21,06/05/07	7.82E-02 03,04/04/07
6356.224	1.24E-01 21,06/05/07	1.00E-01 21,06/05/07
6356.024	1.15E-01 21,06/05/07	1.40E-01 21,06/05/07
6355.824	9.68E-02 02,29/11/07	1.16E-01 24,09/12/07
6355.624	9.59E-02 02,04/04/07	1.08E-01 02,29/11/07
6355.424	1.41E-01 20,06/05/07	1.24E-01 20,06/05/07
6355.224	1.02E-01 20,06/05/07	1.42E-01 20,06/05/07
6355.024	6.75E-02 23,09/12/07	7.16E-02 23,09/12/07
6354.824	1.47E-01 01,29/11/07	1.62E-01 01,29/11/07
6354.624	9.40E-02 01,29/11/07	8.88E-02 01,29/11/07
6354.424	5.11E-02 21,03/11/07	5.73E-02 21,03/11/07
6354.224	8.89E-02 22,27/03/07	1.33E-01 22,27/03/07

6354.024	1.40E-01 22,27/03/07	1.42E-01 22,27/03/07
6353.824	1.04E-01 22,27/03/07	8.05E-02 24,04/12/07
6353.624	5.89E-02 24,04/12/07	8.33E-02 23,04/12/07
6353.424	8.14E-02 23,04/12/07	1.21E-01 23,04/12/07
6353.224	1.10E-01 23,04/12/07	9.60E-02 23,04/12/07
6353.024	9.05E-02 23,04/12/07	7.02E-02 20,16/05/07
6352.824	6.45E-02 20,16/05/07	7.31E-02 22,12/04/07
6352.624	5.86E-02 20,16/05/07	9.84E-02 22,12/04/07
6352.424	7.94E-02 22,12/04/07	1.03E-01 22,12/04/07

X (km):	369.202	369.402
Y (km)		
6357.224	8.44E-02 01,10/12/07	1.02E-01 23,06/05/07
6357.024	9.68E-02 22,06/05/07	1.14E-01 23,06/05/07
6356.824	1.18E-01 22,06/05/07	9.73E-02 01,10/12/07
6356.624	1.01E-01 22,06/05/07	1.22E-01 22,06/05/07
6356.424	7.18E-02 06,04/02/07	1.32E-01 22,06/05/07
6356.224	8.59E-02 03,04/04/07	8.24E-02 22,06/05/07
6356.024	1.17E-01 21,06/05/07	9.55E-02 03,04/04/07
6355.824	1.58E-01 21,06/05/07	1.41E-01 21,06/05/07
6355.624	1.23E-01 24,09/12/07	1.76E-01 21,06/05/07
6355.424	1.21E-01 02,04/04/07	1.39E-01 02,29/11/07
6355.224	1.80E-01 20,06/05/07	1.92E-01 20,06/05/07
6355.024	7.60E-02 23,09/12/07	9.29E-02 20,06/05/07
6354.824	1.82E-01 01,29/11/07	2.08E-01 01,29/11/07
6354.624	8.86E-02 23,09/12/07	9.33E-02 23,09/12/07
6354.424	8.65E-02 22,27/03/07	1.55E-01 22,27/03/07
6354.224	1.72E-01 22,27/03/07	1.71E-01 22,27/03/07
6354.024	1.11E-01 24,04/12/07	8.02E-02 23,04/12/07
6353.824	8.35E-02 23,04/12/07	1.53E-01 23,04/12/07
6353.624	1.35E-01 23,04/12/07	1.08E-01 23,04/12/07
6353.424	1.02E-01 23,04/12/07	8.80E-02 22,12/04/07
6353.224	7.63E-02 20,16/05/07	1.28E-01 22,12/04/07
6353.024	9.85E-02 22,12/04/07	1.26E-01 22,12/04/07
6352.824	1.16E-01 22,12/04/07	9.49E-02 22,12/04/07
6352.624	1.06E-01 22,12/04/07	5.93E-02 22,12/04/07
6352.424	7.93E-02 22,12/04/07	4.72E-02 08,28/02/07

X (km):	369.602	369.802
Y (km)		
6357.224	8.06E-02 05,24/12/07	7.22E-02 05,05/02/07
6357.024	9.26E-02 05,24/12/07	6.79E-02 05,05/02/07
6356.824	1.11E-01 23,06/05/07	8.47E-02 05,24/12/07
6356.624	1.34E-01 23,06/05/07	1.04E-01 05,24/12/07
6356.424	1.16E-01 01,10/12/07	1.21E-01 05,24/12/07
6356.224	1.55E-01 22,06/05/07	1.64E-01 23,06/05/07
6356.024	1.31E-01 22,06/05/07	1.46E-01 01,10/12/07
6355.824	1.08E-01 03,04/04/07	1.95E-01 22,06/05/07
6355.624	1.76E-01 21,06/05/07	1.27E-01 06,04/02/07
6355.424	1.86E-01 21,06/05/07	2.33E-01 21,06/05/07
6355.224	1.68E-01 02,04/04/07	2.02E-01 02,29/11/07
6355.024	1.69E-01 20,06/05/07	2.82E-01 20,06/05/07
6354.824	2.43E-01 01,29/11/07	2.93E-01 01,29/11/07
6354.624	1.15E-01 22,10/03/07	1.72E-01 22,27/03/07
6354.424	2.29E-01 22,27/03/07	2.12E-01 22,27/03/07
6354.224	1.20E-01 24,04/12/07	2.17E-01 23,04/12/07
6354.024	1.79E-01 23,04/12/07	1.30E-01 20,16/05/07
6353.824	1.13E-01 23,04/12/07	1.89E-01 22,12/04/07
6353.624	1.32E-01 22,12/04/07	1.54E-01 22,12/04/07
6353.424	1.54E-01 22,12/04/07	8.26E-02 22,12/04/07
6353.224	1.18E-01 22,12/04/07	6.65E-02 08,28/02/07
6353.024	6.92E-02 22,12/04/07	7.52E-02 19,25/05/07
6352.824	5.51E-02 08,28/02/07	8.20E-02 19,25/05/07
6352.624	5.26E-02 08,28/02/07	8.29E-02 19,25/05/07

6352.424	6.05E-02 19,25/05/07	7.98E-02 19,25/05/07

X (km):	370.002	370.202
Y (km)		
6357.224	9.27E-02 05,05/02/07	8.06E-02 05,05/02/07
6357.024	9.71E-02 05,05/02/07	8.97E-02 05,05/02/07
6356.824	1.00E-01 05,05/02/07	1.00E-01 05,05/02/07
6356.624	1.01E-01 05,05/02/07	1.12E-01 05,05/02/07
6356.424	9.83E-02 05,05/02/07	1.26E-01 05,05/02/07
6356.224	1.14E-01 05,24/12/07	1.42E-01 05,05/02/07
6356.024	1.48E-01 05,24/12/07	1.57E-01 05,05/02/07
6355.824	2.12E-01 23,06/05/07	1.67E-01 05,05/02/07
6355.624	2.25E-01 22,06/05/07	1.83E-01 05,24/12/07
6355.424	1.85E-01 22,06/05/07	3.00E-01 23,06/05/07
6355.224	3.39E-01 21,06/05/07	4.28E-01 22,06/05/07
6355.024	3.15E-01 20,06/05/07	5.85E-01 21,06/05/07
6354.824	3.71E-01 01,29/11/07	6.12E-01 24,24/11/07
6354.624	3.62E-01 22,27/03/07	4.78E-01 23,02/06/07
6354.424	2.78E-01 23,04/12/07	3.87E-01 22,12/04/07
6354.224	2.07E-01 22,12/04/07	1.85E-01 22,26/05/07
6354.024	2.23E-01 22,12/04/07	1.78E-01 19,25/05/07
6353.824	1.02E-01 22,12/04/07	1.54E-01 19,25/05/07
6353.624	1.01E-01 19,25/05/07	1.21E-01 19,25/05/07
6353.424	1.11E-01 19,25/05/07	9.22E-02 19,25/05/07
6353.224	1.08E-01 19,25/05/07	7.02E-02 19,25/05/07
6353.024	9.77E-02 19,25/05/07	5.56E-02 06,15/11/07
6352.824	8.51E-02 19,25/05/07	4.83E-02 06,15/11/07
6352.624	7.25E-02 19,25/05/07	4.21E-02 06,15/11/07
6352.424	6.10E-02 19,25/05/07	3.69E-02 06,15/11/07

X (km):	370.402	370.602
Y (km)		
6357.224	6.21E-02 02,10/12/07	6.84E-02 02,05/12/07
6357.024	6.67E-02 02,10/12/07	7.54E-02 02,05/12/07
6356.824	7.22E-02 02,10/12/07	8.37E-02 02,05/12/07
6356.624	7.89E-02 02,10/12/07	9.37E-02 02,05/12/07
6356.424	8.72E-02 02,10/12/07	1.06E-01 02,05/12/07
6356.224	9.77E-02 02,10/12/07	1.21E-01 02,05/12/07
6356.024	1.12E-01 02,10/12/07	1.40E-01 02,05/12/07
6355.824	1.35E-01 05,05/02/07	1.64E-01 02,05/12/07
6355.624	1.76E-01 05,05/02/07	1.92E-01 02,05/12/07
6355.424	2.48E-01 05,05/02/07	2.15E-01 02,05/12/07
6355.224	4.28E-01 05,14/02/07	3.60E-01 03,05/12/07
6355.024	1.44E+00 03,11/11/07	6.34E-01 05,26/09/07
6354.824	1.87E+00 01,25/11/07	1.23E+00 04,13/11/07
6354.624	9.36E-01 05,03/03/07	7.14E-01 01,09/05/07
6354.424	3.85E-01 01,16/05/07	3.57E-01 05,15/12/07
6354.224	2.11E-01 01,22/04/07	3.26E-01 23,12/04/07
6354.024	1.37E-01 01,22/04/07	2.66E-01 23,12/04/07
6353.824	1.04E-01 20,08/03/07	2.03E-01 23,12/04/07
6353.624	9.23E-02 20,08/03/07	1.56E-01 23,12/04/07
6353.424	8.31E-02 20,08/03/07	1.23E-01 20,25/05/07
6353.224	7.56E-02 20,08/03/07	1.11E-01 20,25/05/07
6353.024	6.96E-02 20,08/03/07	9.93E-02 20,25/05/07
6352.824	6.45E-02 20,08/03/07	8.91E-02 20,25/05/07
6352.624	6.01E-02 20,08/03/07	8.02E-02 20,25/05/07
6352.424	5.64E-02 20,08/03/07	7.25E-02 20,25/05/07

X (km):	370.802	371.002
Y (km)		
6357.224	8.22E-02 02,05/12/07	7.24E-02 02,05/12/07
6357.024	8.78E-02 02,05/12/07	7.20E-02 02,05/12/07

6356.824	9.35E-02 02,05/12/07	7.00E-02 02,05/12/07
6356.624	9.89E-02 02,05/12/07	1.04E-01 03,05/12/07
6356.424	1.03E-01 02,05/12/07	1.46E-01 03,05/12/07
6356.224	1.05E-01 02,05/12/07	1.44E-01 03,05/12/07
6356.024	1.34E-01 03,05/12/07	1.31E-01 03,10/12/07
6355.824	2.10E-01 03,05/12/07	1.28E-01 03,10/12/07
6355.624	1.82E-01 03,10/12/07	1.07E-01 01,14/03/07
6355.424	1.73E-01 01,14/03/07	1.82E-01 07,15/08/07
6355.224	2.54E-01 07,15/08/07	2.80E-01 22,26/10/07
6355.024	3.89E-01 22,26/10/07	2.38E-01 05,13/11/07
6354.824	4.30E-01 04,13/11/07	3.02E-01 04,13/11/07
6354.624	4.30E-01 22,16/05/07	2.99E-01 04,21/03/07
6354.424	2.96E-01 19,05/05/07	2.92E-01 21,01/06/07
6354.224	3.03E-01 20,01/06/07	2.40E-01 19,05/05/07
6354.024	1.71E-01 04,02/09/07	2.11E-01 20,01/06/07
6353.824	1.55E-01 04,02/09/07	1.95E-01 20,01/06/07
6353.624	1.59E-01 23,12/04/07	1.18E-01 20,01/06/07
6353.424	1.63E-01 23,12/04/07	1.16E-01 04,02/09/07
6353.224	1.55E-01 23,12/04/07	1.07E-01 04,02/09/07
6353.024	1.41E-01 23,12/04/07	1.02E-01 23,12/04/07
6352.824	1.25E-01 23,12/04/07	1.12E-01 23,12/04/07
6352.624	1.10E-01 23,12/04/07	1.14E-01 23,12/04/07
6352.424	9.56E-02 23,12/04/07	1.12E-01 23,12/04/07

X (km):	371.202	371.402
Y (km)		
6357.224	8.54E-02 03,05/12/07	9.37E-02 03,05/12/07
6357.024	1.13E-01 03,05/12/07	8.12E-02 03,10/12/07
6356.824	1.22E-01 03,05/12/07	8.74E-02 03,10/12/07
6356.624	9.58E-02 03,05/12/07	8.55E-02 03,10/12/07
6356.424	1.04E-01 03,10/12/07	7.63E-02 01,14/03/07
6356.224	1.02E-01 03,10/12/07	6.75E-02 01,14/03/07
6356.024	8.98E-02 01,14/03/07	8.09E-02 07,15/08/07
6355.824	8.64E-02 07,15/08/07	1.21E-01 07,15/08/07
6355.624	1.44E-01 07,15/08/07	1.28E-01 07,15/08/07
6355.424	1.73E-01 22,26/10/07	2.03E-01 22,26/10/07
6355.224	2.05E-01 22,26/10/07	1.02E-01 05,15/08/07
6355.024	2.57E-01 05,13/11/07	2.12E-01 05,13/11/07
6354.824	2.41E-01 04,13/11/07	2.02E-01 04,13/11/07
6354.624	2.24E-01 18,03/06/07	2.21E-01 18,03/06/07
6354.424	2.38E-01 04,14/05/07	2.05E-01 04,14/05/07
6354.224	2.12E-01 21,01/06/07	2.03E-01 22,16/05/07
6354.024	2.00E-01 19,05/05/07	1.50E-01 21,01/06/07
6353.824	1.37E-01 20,01/06/07	1.71E-01 19,05/05/07
6353.624	1.72E-01 20,01/06/07	9.13E-02 20,01/06/07
6353.424	1.44E-01 20,01/06/07	1.36E-01 20,01/06/07
6353.224	9.57E-02 20,01/06/07	1.40E-01 20,01/06/07
6353.024	9.24E-02 04,02/09/07	1.15E-01 20,01/06/07
6352.824	8.97E-02 04,02/09/07	8.06E-02 20,01/06/07
6352.624	8.36E-02 04,02/09/07	7.64E-02 04,02/09/07
6352.424	7.57E-02 04,02/09/07	7.66E-02 04,02/09/07

X (km):	371.602	371.802
Y (km)		
6357.224	7.60E-02 03,10/12/07	5.96E-02 03,10/12/07
6357.024	7.42E-02 03,10/12/07	5.60E-02 01,14/03/07
6356.824	6.65E-02 01,14/03/07	4.97E-02 01,14/03/07
6356.624	6.15E-02 01,14/03/07	4.57E-02 07,15/08/07
6356.424	5.17E-02 01,14/03/07	7.00E-02 07,15/08/07
6356.224	7.52E-02 07,15/08/07	9.27E-02 07,15/08/07
6356.024	1.05E-01 07,15/08/07	1.00E-01 07,15/08/07
6355.824	1.12E-01 07,15/08/07	1.26E-01 22,26/10/07
6355.624	1.64E-01 22,26/10/07	1.52E-01 22,26/10/07
6355.424	1.41E-01 22,26/10/07	8.41E-02 06,15/08/07

6355.224	1.26E-01 05,13/11/07	1.50E-01 05,13/11/07
6355.024	1.78E-01 04,15/05/07	1.43E-01 04,15/05/07
6354.824	1.75E-01 04,13/11/07	1.55E-01 04,13/11/07
6354.624	1.96E-01 18,03/06/07	1.72E-01 05,14/05/07
6354.424	1.86E-01 04,21/03/07	1.55E-01 04,21/03/07
6354.224	1.76E-01 04,14/05/07	1.62E-01 03,21/03/07
6354.024	1.60E-01 21,01/06/07	1.57E-01 22,16/05/07
6353.824	1.09E-01 21,01/06/07	1.50E-01 21,01/06/07
6353.624	1.50E-01 19,05/05/07	9.61E-02 06,15/03/07
6353.424	7.11E-02 19,05/05/07	1.34E-01 19,05/05/07
6353.224	1.03E-01 20,01/06/07	7.56E-02 19,05/05/07
6353.024	1.23E-01 20,01/06/07	7.80E-02 20,01/06/07
6352.824	1.17E-01 20,01/06/07	1.02E-01 20,01/06/07
6352.624	9.55E-02 20,01/06/07	1.09E-01 20,01/06/07
6352.424	6.97E-02 20,01/06/07	1.00E-01 20,01/06/07

X (km):	372.002	372.202
Y (km)		
6357.224	4.70E-02 01,14/03/07	3.31E-02 04,20/10/07
6357.024	4.04E-02 01,14/03/07	4.42E-02 07,15/08/07
6356.824	4.51E-02 07,15/08/07	6.14E-02 07,15/08/07
6356.624	6.54E-02 07,15/08/07	7.64E-02 07,15/08/07
6356.424	8.36E-02 07,15/08/07	8.28E-02 07,15/08/07
6356.224	9.06E-02 07,15/08/07	7.49E-02 07,15/08/07
6356.024	9.51E-02 22,26/10/07	1.20E-01 22,26/10/07
6355.824	1.40E-01 22,26/10/07	1.20E-01 22,26/10/07
6355.624	1.07E-01 22,26/10/07	7.13E-02 06,15/08/07
6355.424	6.00E-02 06,20/10/07	8.42E-02 05,13/11/07
6355.224	1.53E-01 05,13/11/07	1.41E-01 05,13/11/07
6355.024	1.35E-01 04,13/11/07	1.30E-01 04,13/11/07
6354.824	1.39E-01 04,13/11/07	1.27E-01 04,13/11/07
6354.624	1.58E-01 05,14/05/07	1.42E-01 05,14/05/07
6354.424	1.31E-01 18,03/06/07	1.34E-01 18,03/06/07
6354.224	1.30E-01 04,21/03/07	1.38E-01 04,21/03/07
6354.024	1.42E-01 04,14/05/07	1.35E-01 03,21/03/07
6353.824	1.38E-01 22,16/05/07	1.23E-01 22,16/05/07
6353.624	1.31E-01 21,01/06/07	1.11E-01 22,16/05/07
6353.424	8.75E-02 06,15/03/07	1.11E-01 21,01/06/07
6353.224	1.21E-01 19,05/05/07	8.05E-02 06,15/03/07
6353.024	7.74E-02 19,05/05/07	1.11E-01 19,05/05/07
6352.824	5.92E-02 20,01/06/07	7.76E-02 19,05/05/07
6352.624	8.34E-02 20,01/06/07	4.99E-02 21,26/08/07
6352.424	9.70E-02 20,01/06/07	6.72E-02 20,01/06/07

X (km):	372.402	372.602
Y (km)		
6357.224	4.31E-02 07,15/08/07	5.47E-02 07,15/08/07
6357.024	5.79E-02 07,15/08/07	6.56E-02 07,15/08/07
6356.824	7.05E-02 07,15/08/07	7.09E-02 07,15/08/07
6356.624	7.63E-02 07,15/08/07	6.75E-02 07,15/08/07
6356.424	7.12E-02 07,15/08/07	8.12E-02 22,26/10/07
6356.224	9.94E-02 22,26/10/07	1.09E-01 22,26/10/07
6356.024	1.18E-01 22,26/10/07	9.84E-02 22,26/10/07
6355.824	8.64E-02 22,26/10/07	6.21E-02 06,15/08/07
6355.624	5.65E-02 06,20/10/07	4.74E-02 10,15/06/07
6355.424	1.02E-01 05,13/11/07	1.11E-01 05,13/11/07
6355.224	1.24E-01 05,13/11/07	1.19E-01 04,15/05/07
6355.024	1.24E-01 04,13/11/07	1.19E-01 04,13/11/07
6354.824	1.16E-01 04,13/11/07	1.08E-01 04,13/11/07
6354.624	1.27E-01 05,14/05/07	1.13E-01 05,14/05/07
6354.424	1.31E-01 18,03/06/07	1.23E-01 18,03/06/07
6354.224	1.21E-01 04,21/03/07	9.45E-02 04,21/03/07
6354.024	1.10E-01 04,14/05/07	1.10E-01 04,21/03/07
6353.824	1.20E-01 04,14/05/07	1.15E-01 03,21/03/07

6353.624	1.20E-01 22,16/05/07	9.93E-02 22,16/05/07
6353.424	1.11E-01 21,01/06/07	1.07E-01 22,16/05/07
6353.224	9.29E-02 21,01/06/07	1.06E-01 21,01/06/07
6353.024	7.46E-02 06,15/03/07	7.78E-02 21,01/06/07
6352.824	1.03E-01 19,05/05/07	7.10E-02 19,05/05/07
6352.624	7.67E-02 19,05/05/07	9.56E-02 19,05/05/07
6352.424	4.72E-02 20,01/05/07	7.53E-02 19,05/05/07

X (km): 372.802

Y (km)		
6357.224	6.15E-02 07,15/08/07	
6357.024	6.64E-02 07,15/08/07	
6356.824	6.42E-02 07,15/08/07	
6356.624	6.61E-02 22,26/10/07	
6356.424	9.63E-02 22,26/10/07	
6356.224	1.01E-01 22,26/10/07	
6356.024	7.23E-02 22,26/10/07	
6355.824	5.18E-02 06,20/10/07	
6355.624	6.23E-02 05,13/11/07	
6355.424	1.12E-01 05,13/11/07	
6355.224	1.10E-01 04,15/05/07	
6355.024	1.13E-01 04,13/11/07	
6354.824	1.01E-01 04,13/11/07	
6354.624	1.00E-01 05,14/05/07	
6354.424	1.14E-01 18,03/06/07	
6354.224	9.55E-02 18,03/06/07	
6354.024	1.12E-01 04,21/03/07	
6353.824	1.01E-01 03,21/03/07	
6353.624	1.05E-01 04,14/05/07	
6353.424	1.03E-01 22,16/05/07	
6353.224	9.01E-02 22,16/05/07	
6353.024	9.76E-02 21,01/06/07	
6352.824	6.52E-02 21,01/06/07	
6352.624	6.79E-02 19,05/05/07	
6352.424	8.95E-02 19,05/05/07	

At the discrete receptors:

1: 1.24E-01 @Hr20,06/05/07	7: 2.70E-01 @Hr04,14/05/07
2: 1.73E-01 @Hr01,29/11/07	8: 2.54E-01 @Hr22,16/05/07
3: 1.17E-01 @Hr22,10/03/07	9: 2.37E-01 @Hr21,01/06/07
4: 1.39E-01 @Hr21,06/05/07	10: 1.88E-01 @Hr05,13/11/07
5: 1.60E-01 @Hr02,10/12/07	11: 1.76E-01 @Hr05,14/05/07
6: 2.77E-01 @Hr18,03/06/07	

1 SECOND-HIGHEST RECORDINGS FOR EACH RECEPTOR (in Odour_Units)

AVERAGING TIME = 1 HOUR

X (km): 368.002 368.202

Y (km)		
6357.224	5.82E-02 04,25/02/07	5.03E-02 05,04/02/07
6357.024	6.52E-02 04,25/02/07	6.25E-02 04,25/02/07
6356.824	6.94E-02 24,09/12/07	6.99E-02 05,04/02/07
6356.624	7.86E-02 24,09/12/07	7.71E-02 24,09/12/07
6356.424	6.48E-02 02,29/11/07	8.39E-02 24,09/12/07
6356.224	5.55E-02 24,09/12/07	7.31E-02 24,09/12/07
6356.024	6.26E-02 02,29/11/07	6.23E-02 02,04/04/07
6355.824	7.58E-02 02,04/04/07	5.98E-02 20,06/05/07
6355.624	5.92E-02 02,04/04/07	7.22E-02 02,04/04/07
6355.424	4.53E-02 07,26/09/07	4.97E-02 07,26/09/07

6355.224	3.70E-02 07,26/09/07	4.14E-02 19,06/05/07
6355.024	5.13E-02 01,29/11/07	5.14E-02 01,29/11/07
6354.824	6.41E-02 23,09/12/07	6.84E-02 23,09/12/07
6354.624	7.57E-02 21,27/03/07	8.00E-02 21,27/03/07
6354.424	4.27E-02 21,27/03/07	3.75E-02 21,03/11/07
6354.224	3.27E-02 23,09/12/07	3.21E-02 19,16/05/07
6354.024	3.83E-02 21,03/11/07	5.27E-02 24,04/12/07
6353.824	6.56E-02 24,04/12/07	8.08E-02 24,04/12/07
6353.624	8.25E-02 24,04/12/07	8.87E-02 24,04/12/07
6353.424	7.92E-02 24,04/12/07	7.27E-02 22,27/03/07
6353.224	5.33E-02 22,27/03/07	3.41E-02 22,27/03/07
6353.024	2.76E-02 19,01/06/07	2.83E-02 19,01/06/07
6352.824	2.63E-02 19,01/06/07	2.79E-02 06,08/02/07
6352.624	2.65E-02 06,08/02/07	3.69E-02 20,16/05/07
6352.424	3.41E-02 20,16/05/07	4.62E-02 20,16/05/07

X (km):	368.402	368.602
Y (km)		
6357.224	4.89E-02 03,04/04/07	3.67E-02 01,10/12/07
6357.024	5.39E-02 06,04/02/07	5.10E-02 03,04/04/07
6356.824	6.87E-02 21,06/05/07	5.83E-02 06,04/02/07
6356.624	7.53E-02 05,04/02/07	7.69E-02 21,06/05/07
6356.424	8.58E-02 24,09/12/07	8.17E-02 05,04/02/07
6356.224	8.13E-02 21,06/05/07	9.56E-02 24,09/12/07
6356.024	6.94E-02 24,09/12/07	8.22E-02 02,29/11/07
6355.824	7.19E-02 02,29/11/07	7.18E-02 02,04/04/07
6355.624	8.47E-02 02,04/04/07	8.38E-02 20,06/05/07
6355.424	5.67E-02 02,04/04/07	7.45E-02 02,04/04/07
6355.224	4.73E-02 07,26/09/07	5.38E-02 07,26/09/07
6355.024	5.11E-02 01,29/11/07	5.01E-02 01,29/11/07
6354.824	7.35E-02 23,09/12/07	7.95E-02 23,09/12/07
6354.624	8.39E-02 21,27/03/07	8.70E-02 21,27/03/07
6354.424	4.14E-02 21,03/11/07	4.58E-02 21,03/11/07
6354.224	3.60E-02 19,16/05/07	5.25E-02 24,04/12/07
6354.024	7.11E-02 24,04/12/07	9.20E-02 24,04/12/07
6353.824	9.43E-02 24,04/12/07	1.02E-01 24,04/12/07
6353.624	8.79E-02 24,04/12/07	7.27E-02 22,27/03/07
6353.424	4.98E-02 22,27/03/07	3.64E-02 23,04/12/07
6353.224	3.29E-02 24,04/12/07	3.15E-02 06,08/02/07
6353.024	2.96E-02 06,08/02/07	4.40E-02 20,16/05/07
6352.824	4.01E-02 20,16/05/07	5.55E-02 20,16/05/07
6352.624	5.04E-02 20,16/05/07	5.22E-02 23,04/12/07
6352.424	5.25E-02 23,04/12/07	3.88E-02 22,12/04/07

X (km):	368.802	369.002
Y (km)		
6357.224	5.98E-02 01,10/12/07	7.99E-02 01,10/12/07
6357.024	5.14E-02 22,06/05/07	7.27E-02 01,10/12/07
6356.824	5.32E-02 03,04/04/07	5.87E-02 01,10/12/07
6356.624	6.37E-02 06,04/02/07	5.54E-02 03,04/04/07
6356.424	8.52E-02 03,04/04/07	7.02E-02 06,04/02/07
6356.224	8.92E-02 05,04/02/07	9.44E-02 03,04/04/07
6356.024	1.06E-01 24,09/12/07	1.04E-01 24,09/12/07
6355.824	9.00E-02 24,09/12/07	1.13E-01 21,06/05/07
6355.624	8.50E-02 02,29/11/07	8.54E-02 02,04/04/07
6355.424	9.46E-02 02,04/04/07	1.13E-01 02,04/04/07
6355.224	6.15E-02 07,26/09/07	7.05E-02 07,26/09/07
6355.024	5.31E-02 20,27/03/07	5.88E-02 20,14/05/07
6354.824	8.69E-02 23,09/12/07	9.62E-02 23,09/12/07
6354.624	8.84E-02 21,27/03/07	8.69E-02 21,27/03/07
6354.424	4.95E-02 23,09/12/07	5.61E-02 23,10/03/07
6354.224	7.68E-02 24,04/12/07	1.07E-01 24,04/12/07
6354.024	1.11E-01 24,04/12/07	1.21E-01 24,04/12/07
6353.824	9.85E-02 24,04/12/07	6.82E-02 22,27/03/07

6353.624	4.26E-02 22,27/03/07	4.12E-02 23,02/06/07
6353.424	3.46E-02 19,01/06/07	5.46E-02 20,16/05/07
6353.224	4.87E-02 20,16/05/07	6.91E-02 20,16/05/07
6353.024	6.16E-02 20,16/05/07	4.90E-02 23,04/12/07
6352.824	5.11E-02 23,04/12/07	6.06E-02 20,16/05/07
6352.624	5.34E-02 22,12/04/07	5.20E-02 19,26/08/07
6352.424	4.77E-02 20,16/05/07	5.18E-02 19,26/08/07

X (km):	369.202	369.402
Y (km)		
6357.224	8.32E-02 23,06/05/07	8.78E-02 05,24/12/07
6357.024	9.00E-02 01,10/12/07	8.77E-02 05,24/12/07
6356.824	8.76E-02 01,10/12/07	9.39E-02 23,06/05/07
6356.624	7.50E-02 01,10/12/07	1.03E-01 01,10/12/07
6356.424	5.73E-02 03,04/04/07	9.59E-02 01,10/12/07
6356.224	7.86E-02 06,04/02/07	7.84E-02 06,04/02/07
6356.024	1.06E-01 03,04/04/07	8.96E-02 06,04/02/07
6355.824	1.23E-01 24,09/12/07	1.22E-01 03,04/04/07
6355.624	1.15E-01 02,29/11/07	1.48E-01 24,09/12/07
6355.424	1.05E-01 02,29/11/07	1.18E-01 24,09/12/07
6355.224	1.02E-01 02,04/04/07	1.40E-01 02,04/04/07
6355.024	6.90E-02 20,14/05/07	8.77E-02 24,27/12/07
6354.824	1.08E-01 23,09/12/07	1.24E-01 23,09/12/07
6354.624	8.06E-02 21,27/03/07	8.13E-02 22,10/03/07
6354.424	8.01E-02 24,04/12/07	1.29E-01 24,04/12/07
6354.224	1.38E-01 24,04/12/07	1.50E-01 24,04/12/07
6354.024	1.10E-01 22,27/03/07	7.62E-02 24,04/12/07
6353.824	5.09E-02 24,04/12/07	7.20E-02 20,16/05/07
6353.624	6.21E-02 20,16/05/07	9.10E-02 20,16/05/07
6353.424	7.86E-02 20,16/05/07	8.26E-02 20,16/05/07
6353.224	5.83E-02 22,12/04/07	6.69E-02 19,26/08/07
6353.024	6.16E-02 20,16/05/07	6.40E-02 19,26/08/07
6352.824	5.86E-02 19,26/08/07	5.46E-02 19,26/08/07
6352.624	5.46E-02 19,26/08/07	4.69E-02 08,28/02/07
6352.424	4.67E-02 19,26/08/07	4.08E-02 23,21/09/07

X (km):	369.602	369.802
Y (km)		
6357.224	4.37E-02 19,03/11/07	5.54E-02 03,22/03/07
6357.024	7.06E-02 23,06/05/07	6.72E-02 05,24/12/07
6356.824	1.02E-01 05,24/12/07	6.10E-02 05,05/02/07
6356.624	1.04E-01 05,24/12/07	6.07E-02 23,06/05/07
6356.424	1.08E-01 23,06/05/07	1.18E-01 23,06/05/07
6356.224	1.21E-01 01,10/12/07	1.29E-01 05,24/12/07
6356.024	1.02E-01 01,10/12/07	1.42E-01 22,06/05/07
6355.824	1.05E-01 06,04/02/07	1.45E-01 01,10/12/07
6355.624	1.46E-01 03,04/04/07	1.24E-01 03,04/04/07
6355.424	1.78E-01 24,09/12/07	1.82E-01 03,04/04/07
6355.224	1.42E-01 20,06/05/07	1.99E-01 24,09/12/07
6355.024	1.16E-01 24,27/12/07	1.74E-01 24,11/05/07
6354.824	1.48E-01 23,09/12/07	1.83E-01 23,09/12/07
6354.624	1.14E-01 23,10/03/07	1.62E-01 23,10/03/07
6354.424	1.85E-01 24,04/12/07	1.99E-01 24,04/12/07
6354.224	1.04E-01 22,27/03/07	1.13E-01 21,26/05/07
6354.024	8.61E-02 20,16/05/07	1.15E-01 23,04/12/07
6353.824	1.07E-01 20,16/05/07	9.75E-02 19,26/08/07
6353.624	8.79E-02 20,16/05/07	8.40E-02 19,26/08/07
6353.424	7.75E-02 19,26/08/07	6.91E-02 08,28/02/07
6353.224	6.59E-02 19,26/08/07	6.24E-02 05,15/11/07
6353.024	5.57E-02 08,28/02/07	6.63E-02 05,15/11/07
6352.824	4.64E-02 23,21/09/07	6.56E-02 04,15/11/07
6352.624	5.22E-02 05,15/11/07	6.15E-02 04,15/11/07
6352.424	5.40E-02 05,15/11/07	5.48E-02 04,15/11/07

X (km):	370.002	370.202
Y (km)		
6357.224	6.70E-02 03,22/03/07	6.59E-02 02,10/12/07
6357.024	7.05E-02 03,22/03/07	7.00E-02 02,10/12/07
6356.824	7.35E-02 03,22/03/07	7.46E-02 02,10/12/07
6356.624	7.55E-02 03,22/03/07	8.20E-02 03,22/03/07
6356.424	8.40E-02 05,24/12/07	9.15E-02 03,22/03/07
6356.224	8.94E-02 05,05/02/07	1.02E-01 03,22/03/07
6356.024	1.14E-01 23,06/05/07	1.14E-01 03,22/03/07
6355.824	1.73E-01 05,24/12/07	1.24E-01 03,22/03/07
6355.624	2.02E-01 01,10/12/07	1.61E-01 05,05/02/07
6355.424	1.64E-01 01,10/12/07	2.72E-01 05,24/12/07
6355.224	2.55E-01 24,09/12/07	3.40E-01 01,10/12/07
6355.024	2.83E-01 02,04/04/07	5.17E-01 24,09/12/07
6354.824	2.81E-01 24,24/11/07	5.82E-01 01,29/11/07
6354.624	3.02E-01 24,04/12/07	4.31E-01 04,16/11/07
6354.424	1.98E-01 23,02/06/07	2.76E-01 01,19/04/07
6354.224	1.60E-01 20,16/05/07	1.56E-01 19,25/05/07
6354.024	1.18E-01 19,26/08/07	1.34E-01 04,15/11/07
6353.824	9.25E-02 08,28/02/07	1.02E-01 04,15/11/07
6353.624	8.86E-02 05,15/11/07	8.34E-02 06,15/11/07
6353.424	8.64E-02 04,15/11/07	7.36E-02 06,15/11/07
6353.224	7.66E-02 04,15/11/07	6.41E-02 06,15/11/07
6353.024	6.35E-02 04,15/11/07	5.38E-02 19,25/05/07
6352.824	5.50E-02 06,15/11/07	4.16E-02 19,25/05/07
6352.624	5.25E-02 06,15/11/07	3.74E-02 21,28/01/07
6352.424	4.92E-02 06,15/11/07	3.56E-02 23,10/04/07

X (km):	370.402	370.602
Y (km)		
6357.224	4.68E-02 06,05/02/07	6.43E-02 06,05/02/07
6357.024	5.17E-02 05,05/02/07	6.98E-02 06,05/02/07
6356.824	5.83E-02 05,05/02/07	7.64E-02 06,05/02/07
6356.624	6.65E-02 05,05/02/07	8.43E-02 06,05/02/07
6356.424	7.69E-02 05,05/02/07	9.38E-02 06,05/02/07
6356.224	9.04E-02 05,05/02/07	1.06E-01 06,05/02/07
6356.024	1.09E-01 05,05/02/07	1.20E-01 06,05/02/07
6355.824	1.31E-01 02,10/12/07	1.39E-01 06,05/02/07
6355.624	1.59E-01 02,10/12/07	1.62E-01 06,05/02/07
6355.424	2.16E-01 05,14/02/07	1.96E-01 04,11/11/07
6355.224	4.10E-01 05,05/02/07	3.22E-01 03,10/12/07
6355.024	1.20E+00 05,05/02/07	5.55E-01 01,18/04/07
6354.824	1.87E+00 24,24/11/07	1.13E+00 06,13/11/07
6354.624	7.96E-01 01,16/05/07	6.81E-01 20,01/06/07
6354.424	3.59E-01 01,22/04/07	3.35E-01 04,02/09/07
6354.224	2.08E-01 01,16/05/07	2.21E-01 19,20/05/07
6354.024	1.35E-01 03,12/11/07	1.85E-01 19,20/05/07
6353.824	9.83E-02 01,13/11/07	1.44E-01 20,25/05/07
6353.624	7.72E-02 01,13/11/07	1.35E-01 20,25/05/07
6353.424	6.28E-02 01,13/11/07	1.23E-01 18,20/05/07
6353.224	5.45E-02 23,10/04/07	1.10E-01 18,20/05/07
6353.024	4.93E-02 23,10/04/07	9.86E-02 18,20/05/07
6352.824	4.50E-02 23,10/04/07	8.79E-02 18,20/05/07
6352.624	4.15E-02 23,10/04/07	7.85E-02 18,20/05/07
6352.424	3.85E-02 23,10/04/07	7.04E-02 18,20/05/07

X (km):	370.802	371.002
Y (km)		
6357.224	6.98E-02 06,05/02/07	6.07E-02 06,05/02/07
6357.024	7.40E-02 06,05/02/07	6.10E-02 06,05/02/07
6356.824	7.84E-02 06,05/02/07	6.03E-02 06,05/02/07
6356.624	8.27E-02 06,05/02/07	7.37E-02 02,02/03/07

6356.424	8.66E-02 06,05/02/07	8.77E-02 02,02/03/07
6356.224	8.92E-02 06,05/02/07	1.09E-01 03,10/12/07
6356.024	1.02E-01 02,05/12/07	1.11E-01 01,14/03/07
6355.824	1.31E-01 03,10/12/07	1.20E-01 01,14/03/07
6355.624	1.55E-01 01,14/03/07	1.03E-01 05,26/09/07
6355.424	1.73E-01 03,10/12/07	1.26E-01 01,12/03/07
6355.224	2.02E-01 03,12/05/07	1.90E-01 06,15/08/07
6355.024	3.23E-01 04,11/03/07	1.87E-01 03,15/05/07
6354.824	3.87E-01 06,13/11/07	2.47E-01 06,13/11/07
6354.624	3.95E-01 04,14/05/07	2.78E-01 04,14/05/07
6354.424	2.53E-01 04,03/04/07	2.37E-01 22,16/05/07
6354.224	2.17E-01 07,15/04/07	1.70E-01 20,05/05/07
6354.024	1.54E-01 20,01/06/07	1.33E-01 21,16/05/07
6353.824	1.31E-01 23,12/04/07	1.45E-01 06,15/04/07
6353.624	1.27E-01 04,02/09/07	1.17E-01 04,02/09/07
6353.424	1.10E-01 19,20/05/07	8.51E-02 07,03/06/07
6353.224	1.09E-01 19,20/05/07	8.64E-02 07,03/06/07
6353.024	9.85E-02 19,20/05/07	9.36E-02 04,02/09/07
6352.824	8.39E-02 19,20/05/07	8.01E-02 04,02/09/07
6352.624	7.06E-02 20,25/05/07	7.64E-02 19,20/05/07
6352.424	7.19E-02 20,25/05/07	7.87E-02 19,20/05/07

X (km):	371.202	371.402
Y (km)		
6357.224	5.96E-02 02,02/03/07	7.06E-02 03,10/12/07
6357.024	6.84E-02 02,02/03/07	6.84E-02 01,14/03/07
6356.824	7.68E-02 03,10/12/07	7.47E-02 01,14/03/07
6356.624	9.32E-02 03,10/12/07	7.80E-02 01,14/03/07
6356.424	8.88E-02 01,14/03/07	7.26E-02 03,10/12/07
6356.224	9.39E-02 01,14/03/07	5.81E-02 04,20/10/07
6356.024	8.02E-02 03,10/12/07	5.39E-02 24,11/03/07
6355.824	7.18E-02 01,14/03/07	8.65E-02 01,12/03/07
6355.624	1.02E-01 01,12/03/07	1.11E-01 22,26/10/07
6355.424	1.48E-01 07,15/08/07	1.44E-01 06,15/08/07
6355.224	1.71E-01 06,15/08/07	1.02E-01 06,15/08/07
6355.024	2.36E-01 03,15/05/07	1.97E-01 04,15/05/07
6354.824	1.95E-01 06,13/11/07	1.65E-01 06,13/11/07
6354.624	2.20E-01 04,21/03/07	1.87E-01 23,16/05/07
6354.424	2.20E-01 22,16/05/07	2.03E-01 03,21/03/07
6354.224	1.64E-01 01,11/04/07	1.48E-01 02,21/03/07
6354.024	1.38E-01 20,05/05/07	1.31E-01 01,11/04/07
6353.824	9.79E-02 21,16/05/07	1.16E-01 20,05/05/07
6353.624	1.17E-01 07,15/04/07	8.02E-02 21,26/08/07
6353.424	1.13E-01 06,15/04/07	8.61E-02 19,01/05/07
6353.224	9.09E-02 06,15/04/07	9.92E-02 07,15/04/07
6353.024	6.38E-02 21,16/05/07	9.32E-02 06,15/04/07
6352.824	6.88E-02 07,03/06/07	7.76E-02 06,15/04/07
6352.624	6.79E-02 07,03/06/07	5.60E-02 21,16/05/07
6352.424	7.45E-02 23,12/04/07	5.38E-02 07,03/06/07

X (km):	371.602	371.802
Y (km)		
6357.224	6.50E-02 01,14/03/07	5.92E-02 01,14/03/07
6357.024	6.73E-02 01,14/03/07	4.86E-02 03,10/12/07
6356.824	6.55E-02 03,10/12/07	4.44E-02 04,20/10/07
6356.624	5.07E-02 04,20/10/07	4.03E-02 01,14/03/07
6356.424	4.75E-02 04,20/10/07	4.62E-02 24,11/03/07
6356.224	4.98E-02 24,11/03/07	6.73E-02 01,12/03/07
6356.024	7.55E-02 01,12/03/07	7.53E-02 02,14/03/07
6355.824	8.24E-02 02,14/03/07	8.17E-02 05,20/10/07
6355.624	1.08E-01 06,15/08/07	1.13E-01 06,15/08/07
6355.424	1.22E-01 06,15/08/07	8.30E-02 05,15/08/07
6355.224	9.38E-02 03,15/05/07	1.33E-01 03,15/05/07
6355.024	1.60E-01 20,03/06/07	1.41E-01 20,03/06/07

6354.824	1.44E-01 06,13/11/07	1.28E-01 06,13/11/07
6354.624	1.87E-01 23,16/05/07	1.68E-01 18,03/06/07
6354.424	1.30E-01 04,14/05/07	1.18E-01 18,03/06/07
6354.224	1.52E-01 03,21/03/07	1.61E-01 04,14/05/07
6354.024	1.49E-01 22,16/05/07	1.20E-01 04,14/05/07
6353.824	1.07E-01 01,11/04/07	1.12E-01 02,21/03/07
6353.624	1.01E-01 06,15/03/07	8.95E-02 01,11/04/07
6353.424	7.10E-02 20,01/05/07	9.03E-02 06,15/03/07
6353.224	7.05E-02 21,16/05/07	6.41E-02 20,01/05/07
6353.024	8.11E-02 07,15/04/07	6.10E-02 21,26/08/07
6352.824	8.48E-02 07,15/04/07	6.59E-02 19,01/05/07
6352.624	8.01E-02 06,15/04/07	7.50E-02 07,15/04/07
6352.424	6.82E-02 06,15/04/07	7.37E-02 07,15/04/07

X (km):	372.002	372.202
Y (km)		
6357.224	4.06E-02 04,20/10/07	3.31E-02 01,14/03/07
6357.024	3.84E-02 04,20/10/07	3.05E-02 24,11/03/07
6356.824	3.22E-02 04,20/10/07	4.16E-02 01,12/03/07
6356.624	4.32E-02 01,12/03/07	5.59E-02 01,12/03/07
6356.424	6.09E-02 01,12/03/07	6.27E-02 02,14/03/07
6356.224	6.86E-02 02,14/03/07	7.25E-02 22,26/10/07
6356.024	7.86E-02 07,15/08/07	7.75E-02 06,15/08/07
6355.824	9.53E-02 06,15/08/07	9.31E-02 06,15/08/07
6355.624	9.56E-02 06,15/08/07	7.00E-02 05,15/08/07
6355.424	6.00E-02 10,15/06/07	6.24E-02 19,03/06/07
6355.224	1.46E-01 03,15/05/07	1.36E-01 03,15/05/07
6355.024	1.24E-01 20,03/06/07	1.10E-01 20,03/06/07
6354.824	1.16E-01 06,13/11/07	1.06E-01 06,13/11/07
6354.624	1.42E-01 18,03/06/07	1.20E-01 18,03/06/07
6354.424	1.08E-01 04,21/03/07	1.02E-01 23,16/05/07
6354.224	1.21E-01 04,14/05/07	8.15E-02 04,14/05/07
6354.024	1.24E-01 03,21/03/07	1.34E-01 04,14/05/07
6353.824	1.03E-01 02,21/03/07	1.07E-01 04,14/05/07
6353.624	9.39E-02 01,11/04/07	1.10E-01 21,01/06/07
6353.424	8.13E-02 19,05/05/07	8.63E-02 01,11/04/07
6353.224	8.19E-02 06,15/03/07	7.78E-02 19,05/05/07
6353.024	6.06E-02 20,05/05/07	7.51E-02 06,15/03/07
6352.824	5.55E-02 21,26/08/07	6.04E-02 20,05/05/07
6352.624	5.67E-02 19,01/05/07	4.95E-02 20,01/05/07
6352.424	6.22E-02 07,15/04/07	4.88E-02 21,16/05/07

X (km):	372.402	372.602
Y (km)		
6357.224	2.96E-02 24,11/03/07	3.85E-02 01,12/03/07
6357.024	4.01E-02 01,12/03/07	4.82E-02 01,12/03/07
6356.824	5.17E-02 01,12/03/07	5.31E-02 02,14/03/07
6356.624	5.76E-02 02,14/03/07	4.74E-02 02,14/03/07
6356.424	5.59E-02 22,26/10/07	5.79E-02 05,20/10/07
6356.224	6.23E-02 05,20/10/07	7.24E-02 06,15/08/07
6356.024	8.38E-02 06,15/08/07	7.94E-02 06,15/08/07
6355.824	7.95E-02 06,15/08/07	6.09E-02 05,15/08/07
6355.624	5.40E-02 05,15/08/07	4.64E-02 05,13/11/07
6355.424	8.40E-02 03,15/05/07	1.01E-01 03,15/05/07
6355.224	1.21E-01 04,15/05/07	1.06E-01 05,13/11/07
6355.024	9.76E-02 20,03/06/07	8.75E-02 20,03/06/07
6354.824	9.83E-02 06,13/11/07	9.16E-02 06,13/11/07
6354.624	1.01E-01 18,03/06/07	8.87E-02 02,23/07/07
6354.424	1.15E-01 23,16/05/07	1.18E-01 23,16/05/07
6354.224	7.72E-02 18,03/06/07	8.86E-02 18,03/06/07
6354.024	1.09E-01 03,21/03/07	8.19E-02 04,14/05/07
6353.824	1.06E-01 03,21/03/07	1.15E-01 04,14/05/07
6353.624	7.57E-02 04,14/05/07	9.65E-02 04,14/05/07
6353.424	9.08E-02 02,21/03/07	8.13E-02 02,21/03/07

6353.224	7.87E-02 01,11/04/07	7.78E-02 02,21/03/07
6353.024	7.43E-02 19,05/05/07	7.15E-02 01,11/04/07
6352.824	6.96E-02 06,15/03/07	6.96E-02 06,15/03/07
6352.624	5.93E-02 20,05/05/07	6.50E-02 06,15/03/07
6352.424	4.47E-02 21,26/08/07	5.76E-02 20,05/05/07

X (km): 372.802

Y (km)		
6357.224	4.53E-02 01,12/03/07	
6357.024	4.92E-02 02,14/03/07	
6356.824	4.67E-02 02,14/03/07	
6356.624	5.44E-02 07,15/08/07	
6356.424	6.13E-02 06,15/08/07	
6356.224	7.44E-02 06,15/08/07	
6356.024	6.85E-02 06,15/08/07	
6355.824	4.94E-02 05,15/08/07	
6355.624	4.96E-02 23,26/10/07	
6355.424	1.08E-01 03,15/05/07	
6355.224	9.33E-02 20,03/06/07	
6355.024	7.89E-02 20,03/06/07	
6354.824	8.59E-02 06,13/11/07	
6354.624	8.25E-02 02,23/07/07	
6354.424	1.13E-01 23,16/05/07	
6354.224	7.03E-02 06,14/04/07	
6354.024	5.77E-02 04,14/05/07	
6353.824	9.94E-02 04,14/05/07	
6353.624	9.26E-02 03,21/03/07	
6353.424	7.28E-02 04,14/05/07	
6353.224	8.38E-02 21,01/06/07	
6353.024	6.77E-02 01,11/04/07	
6352.824	6.51E-02 01,11/04/07	
6352.624	6.54E-02 06,15/03/07	
6352.424	6.10E-02 06,15/03/07	

At the discrete receptors:

1: 1.08E-01 @Hr02,04/04/07	7: 2.61E-01 @Hr03,21/03/07
2: 1.38E-01 @Hr21,27/03/07	8: 2.33E-01 @Hr21,01/06/07
3: 1.12E-01 @Hr23,10/03/07	9: 1.87E-01 @Hr01,11/04/07
4: 1.38E-01 @Hr03,04/04/07	10: 1.76E-01 @Hr03,15/05/07
5: 1.56E-01 @Hr05,05/02/07	11: 1.43E-01 @Hr18,03/06/07
6: 2.42E-01 @Hr23,16/05/07	

1 Peak values for the 100 worst cases (in Odour_Units)
Averaging time = 1 hour

Rank	Value	Time Recorded hour,date	Coordinates (* denotes polar)
1	1.87E+00	01,25/11/07	(370402, 6354824, 0.0)
2	1.87E+00	24,24/11/07	(370402, 6354824, 0.0)
3	1.87E+00	24,11/05/07	(370402, 6354824, 0.0)
4	1.87E+00	24,10/03/07	(370402, 6354824, 0.0)
5	1.86E+00	05,10/01/07	(370402, 6354824, 0.0)
6	1.83E+00	23,17/04/07	(370402, 6354824, 0.0)
7	1.83E+00	05,11/01/07	(370402, 6354824, 0.0)
8	1.83E+00	05,30/12/07	(370402, 6354824, 0.0)
9	1.83E+00	23,09/12/07	(370402, 6354824, 0.0)
10	1.77E+00	21,14/05/07	(370402, 6354824, 0.0)
11	1.77E+00	01,28/12/07	(370402, 6354824, 0.0)
12	1.75E+00	22,26/05/07	(370402, 6354824, 0.0)
13	1.67E+00	07,26/09/07	(370402, 6354824, 0.0)
14	1.67E+00	01,30/08/07	(370402, 6354824, 0.0)

15	1.66E+00	23,10/03/07	(370402, 6354824, 0.0)
16	1.64E+00	23,01/03/07	(370402, 6354824, 0.0)
17	1.64E+00	02,30/08/07	(370402, 6354824, 0.0)
18	1.58E+00	06,10/01/07	(370402, 6354824, 0.0)
19	1.56E+00	20,14/05/07	(370402, 6354824, 0.0)
20	1.56E+00	23,24/11/07	(370402, 6354824, 0.0)
21	1.56E+00	04,10/01/07	(370402, 6354824, 0.0)
22	1.56E+00	24,27/12/07	(370402, 6354824, 0.0)
23	1.56E+00	01,29/11/07	(370402, 6354824, 0.0)
24	1.55E+00	20,06/05/07	(370402, 6354824, 0.0)
25	1.55E+00	04,11/01/07	(370402, 6354824, 0.0)
26	1.55E+00	21,25/09/07	(370402, 6354824, 0.0)
27	1.55E+00	22,17/04/07	(370402, 6354824, 0.0)
28	1.54E+00	24,01/04/07	(370402, 6354824, 0.0)
29	1.51E+00	23,13/03/07	(370402, 6354824, 0.0)
30	1.50E+00	05,30/01/07	(370402, 6354824, 0.0)
31	1.50E+00	22,10/03/07	(370402, 6354824, 0.0)
32	1.48E+00	02,04/04/07	(370402, 6354824, 0.0)
33	1.48E+00	18,26/08/07	(370402, 6354824, 0.0)
34	1.44E+00	01,05/12/07	(370402, 6354824, 0.0)
35	1.44E+00	03,11/11/07	(370402, 6355024, 0.0)
36	1.44E+00	02,19/04/07	(370402, 6354824, 0.0)
37	1.35E+00	24,15/09/07	(370402, 6354824, 0.0)
38	1.34E+00	03,25/02/07	(370402, 6354824, 0.0)
39	1.34E+00	22,18/08/07	(370402, 6354824, 0.0)
40	1.34E+00	03,10/01/07	(370402, 6354824, 0.0)
41	1.34E+00	23,21/09/07	(370402, 6354824, 0.0)
42	1.34E+00	24,06/06/07	(370402, 6354824, 0.0)
43	1.34E+00	23,11/05/07	(370402, 6354824, 0.0)
44	1.33E+00	01,04/04/07	(370402, 6354824, 0.0)
45	1.33E+00	21,27/03/07	(370402, 6354824, 0.0)
46	1.33E+00	19,06/06/07	(370402, 6354824, 0.0)
47	1.33E+00	21,06/06/07	(370402, 6354824, 0.0)
48	1.32E+00	22,01/04/07	(370402, 6354824, 0.0)
49	1.32E+00	04,03/03/07	(370402, 6354824, 0.0)
50	1.31E+00	02,25/06/07	(370402, 6354824, 0.0)
51	1.31E+00	20,06/06/07	(370402, 6354824, 0.0)
52	1.31E+00	01,11/11/07	(370402, 6354824, 0.0)
53	1.30E+00	23,18/08/07	(370402, 6354824, 0.0)
54	1.30E+00	03,11/01/07	(370402, 6354824, 0.0)
55	1.30E+00	22,09/03/07	(370402, 6354824, 0.0)
56	1.30E+00	22,12/04/07	(370402, 6354824, 0.0)
57	1.29E+00	07,11/01/07	(370402, 6354824, 0.0)
58	1.27E+00	03,25/06/07	(370402, 6354824, 0.0)
59	1.26E+00	04,15/02/07	(370402, 6354824, 0.0)
60	1.25E+00	23,27/12/07	(370402, 6354824, 0.0)
61	1.24E+00	02,12/11/07	(370402, 6354824, 0.0)
62	1.24E+00	21,09/03/07	(370402, 6354824, 0.0)
63	1.23E+00	04,13/11/07	(370602, 6354824, 0.0)
64	1.22E+00	17,25/08/07	(370402, 6354824, 0.0)
65	1.21E+00	24,02/06/07	(370402, 6354824, 0.0)
66	1.20E+00	20,13/10/07	(370402, 6354824, 0.0)
67	1.20E+00	05,05/02/07	(370402, 6355024, 0.0)
68	1.18E+00	01,19/04/07	(370402, 6354824, 0.0)
69	1.18E+00	02,29/11/07	(370402, 6354824, 0.0)
70	1.17E+00	22,10/04/07	(370402, 6354824, 0.0)
71	1.17E+00	05,19/12/07	(370402, 6354824, 0.0)
72	1.17E+00	04,08/12/07	(370402, 6354824, 0.0)
73	1.17E+00	22,24/06/07	(370402, 6354824, 0.0)
74	1.17E+00	21,18/08/07	(370402, 6354824, 0.0)
75	1.17E+00	06,19/12/07	(370402, 6354824, 0.0)
76	1.17E+00	18,25/08/07	(370402, 6354824, 0.0)
77	1.17E+00	02,10/01/07	(370402, 6354824, 0.0)
78	1.17E+00	21,03/11/07	(370402, 6354824, 0.0)
79	1.17E+00	19,06/05/07	(370402, 6354824, 0.0)
80	1.17E+00	22,06/06/07	(370402, 6354824, 0.0)
81	1.17E+00	23,06/06/07	(370402, 6354824, 0.0)
82	1.17E+00	20,28/01/07	(370402, 6354824, 0.0)

83	1.17E+00	05,08/12/07	(370402, 6354824, 0.0)
84	1.17E+00	18,06/06/07	(370402, 6354824, 0.0)
85	1.17E+00	03,13/01/07	(370402, 6354824, 0.0)
86	1.16E+00	22,11/05/07	(370402, 6354824, 0.0)
87	1.16E+00	21,10/03/07	(370402, 6354824, 0.0)
88	1.16E+00	22,24/11/07	(370402, 6354824, 0.0)
89	1.16E+00	06,08/12/07	(370402, 6354824, 0.0)
90	1.16E+00	20,25/09/07	(370402, 6354824, 0.0)
91	1.16E+00	01,07/06/07	(370402, 6354824, 0.0)
92	1.14E+00	02,26/11/07	(370402, 6354824, 0.0)
93	1.14E+00	04,04/02/07	(370402, 6354824, 0.0)
94	1.14E+00	24,13/03/07	(370402, 6354824, 0.0)
95	1.13E+00	06,13/11/07	(370602, 6354824, 0.0)
96	1.12E+00	24,19/10/07	(370402, 6354824, 0.0)
97	1.12E+00	06,11/01/07	(370402, 6354824, 0.0)
98	1.12E+00	02,25/02/07	(370402, 6354824, 0.0)
99	1.11E+00	20,26/10/07	(370402, 6354824, 0.0)
100	1.11E+00	03,15/11/07	(370402, 6354824, 0.0)

Appendix E

Emissions Inventory

Appendix E Emissions Inventory

Teralba Sustainable Materials Facility

PROPOSED OPERATIONS

DUST

The following dust emitting activites are assumed:

1 Wind erosion - stockpiles
2 Wheel generated dust
3 Loading
4 Unloading
5 Front end loader - stockpile management
6 Materials Processing

screening plant 1	150 tph
screening plant 2	150 tph
pug mill (ARAN Modumix 11)	400 tph capacity
concrete batching plant	5,000 tonne per year capacity
concrete batching silo	5,000 tonne per year capacity
feed stockpiles	8 m height
end product stockpiles	8 m height
product storage bays	7 m x 10 m
loaders	up to 400 tph
water cart	10,000 L capacity

ASSUMPTIONS

Deliveries (assume delivery + stockpiling) occur 7 am - 6 pm Mon - Fri, 7 am - 1 pm Saturdays; 8 am - 5 pm Sundays/public holidays

Crushing/processing and product stockpiling occurs 7 am - 6 pm Mon - Fri, 7 am - 1 pm Saturdays; no work Sundays

operating hours - 90% of time will process materials between 7 am and 4 pm (Michael Hale, 30/3/10)

Wind erosion - 24/7

store 600 - 700 tonnes of new sealing aggregate and 500 tonnes recovered aggregate at any time; 5000 tonnes reclaimed asphalt pavement at any time; 5000 m3 mulch per year

1 **Wind erosion - stockpiles**			
Area	12427	m2	
	1.2427	ha	
length	111	m	
width	111	m	
height of stockpile	8	m	
initial horizontal	25.8	m	US EPA ISC3 User Guide 1995; Table 3.1
initial vertical	3.721	m	US EPA ISC3 User Guide 1995; Table 3.1
Hours	24		
Days	365		
PM10 EF	0.2	kg/ha/hour	from the EET for Mining; more conservative than the concrete batching EET factor or 3.9 kg/ha/day
PM10 emissions	0.25	kg/hour	
	248.5	g/hour	
	0.069	g/s	
TSP EF	0.4		there is no EF for TSP for concrete and aggregate stockpiles in the concrete batching EET; use of mining ones is conservative
TSP emissions	0.138	g/s	these are from mining
Reduction factors - control measures			
wind breaks	0.700		
water sprays	0.500		aggregate stockpiles probably won't be watered; surface crusting agents can be used, which reduce
combined mitigation	0.350		emissions by 80 %; treating all material as if watered is conservative.
CONTROLLED EMISSION RATES			
PM10	**0.024**	**g/s**	Table 7, EET for Concrete Batching and Concrete Product Manufacturing, 1999
TSP	**0.048**	**g/s**	Table 7, EET for Concrete Batching and Concrete Product Manufacturing, 1999

2	**Wheel generated dust**			
	Length of road	0.65	km	
	Road width	8	m	
	Road area	5200	m2	
	number of volume sources	8		
	distance between centres of sources	81.25	m	line source represented by separate volumes
	initial horizontal	37.79	m	centre to centre distance US EPA ISC3 User Guide 1995; Table 3.1
	initial vertical	0.47	m	= height of source (whee US EPA ISC3 User Guide 1995; Table 3.1
	operational hours	continuous	hours/day	
	Number of truck circuits	114	day	one circuit = movement in + movement out
	Total distance	74.1	km/day	
	PM10 EF	1.5	kg/VKT	Table 7, EET for Concrete Batching and Concrete Product Manufacturing, 1999
	PM10	48.165	kg/day	
		48165	g/day	
	PM10 total	**0.5575**	**g/s**	
	Reduction factors - control measures			
	wind breaks	0.700		Table 7, EET for Concrete Batching and Concrete Product Manufacturing, 1999
	water sprays	0.250		Table 7, EET for Concrete Batching and Concrete Product Manufacturing, 1999
	combined mitigation	**0.175**		
	PM10 total	**0.10**	**g/s**	
	CONTROLLED EMISSION RATES - PER VOLUME SOURCE			
	PM10	**0.01**	**g/s**	

Operating hours - crushing/processing and stockpiling	61	hours/week	
	52	weeks/year	worst case
	3172	hours/year	

						assuming 120,000 tonnes concrete feedstock; 30,000 t recycled asphalt pavement; 10,000 t mulch; 2,000 t aggregate; 40,000 t miscellaneous; 16,000 t sealing aggregate
	Stockpiling					
	total throughput		218,000	tpa	maximum throughput including mulch	
	height		8	m	stockpiles will be 2-3 m under easement; maximum of 8 m high (Michael Hale, 30/3/10)	
	area			10 m2		
3		**Loading**	continuous			
		PM10 EF	0.0017	kg/t		Table 1, EET for Mining v2.3
		TSP EF	0.004	kg/t	0.42 x PM10	Table 1, EET for Mining v2.4
		PM10	370.6	kg/year		
			0.12	kg/hour		
			116.83	g/hour		
		PM10	**0.032**	**g/s**		
		TSP	872.0	kg/year		
			0.275	kg/hour		
			274.9	g/hour		
		TSP	**0.076**	**g/s**		
	Reduction factors - control measures					
	wind breaks		0.700			
	water sprays		0.500			
	combined mitigation		0.350			
	CONTROLLED EMISSION RATES - LOADING					
	PM10		**0.011**	**g/s**		
	TSP		**0.027**	**g/s**		
4		**Unloading**				
		PM10 EF	0.013	kg/t		
		TSP EF	0.03	kg/t		
		PM10	2834	kg/year		
			0.89	kg/hour		
			893.44	g/hour		
		PM10	**0.248**	**g/s**		
		TSP	6540.0	kg/year		
			2.062	kg/hour		
			2061.79	g/hour		
			0.57	**g/s**		
	Reduction factors - control measures					
	wind breaks		0.700		Table 7, EET Concrete Batching and Table 3, Minig	
	water sprays		0.500		Table 7, EET Concrete Batching	
	combined mitigation		0.350			
	CONTROLLED EMISSION RATES - UNLOADING					
	PM10		**0.087**	**g/s**		
	TSP		**0.200**	**g/s**		
	Model on an 11 hour day to be conservative					

5-7 **Front end loader - stockpile management** 3 loaders operating on site

used factors for FEL on overburden - coal mining EET			
3 FELs - assume each moves 1/3 of total materials on site per year			
model consecutively			
Material moved per FEL	72666.67	tpa	400 tph
PM10 EF	0.012	kg/t	FEL on overburden, Mining V 2.3
TSP EF	0.025	kg/t	FEL on overburden, Mining V 2.3
Emissions			
PM10	872	kg/year	
	872000	g/year	
	274.91	g/hour	
PM10	**0.076**	**g/s**	
TSP	1816.67	kg/year	
	1816667	g/year	
	572.72	g/hour	
	0.159	**g/s**	
Reduction factors - control measures			
wind breaks	0.700		
water sprays	0.500		
combined mitigation	0.350		
CONTROLLED EMISSION RATES - LOADING			
PM10	**0.027**	**g/s**	
TSP	**0.056**	**g/s**	

8 **Materials Processing** **refer to concrete batching sheet for calculations**

Concrete Batching			
Concrete batching plant	2,000	tpa	provided by Michael Hale, telephone 30/3/10
Concrete batching silo	2,000	tpa	most batches 6 - 7 tonnes each; maximum 3 m3 = 3 x 2.5 = 7.5 tonnes
PM10 emissions			
Sand and aggregate transfer to bin			
Activity rate	8	tonnes/hour	
Overall control efficiency	65	%	assumed water sprays and wind breaks
Emissions	0.0	kg/hour	
Cement unloading to elevated storage silo			assumed pneumatic
Activity rate	8	tonnes/hour	
Overall control efficiency	65	%	assumed water sprays and wind breaks
Emissions	0.4	kg/hour	
Weigh hopper loading			
Activity rate	8	tonnes/hour	
Overall control efficiency	65	%	assumed water sprays and wind breaks
Emissions	0.0	kg/hour	
Mixer loading			
Activity rate	8	tonnes/hour	
Overall control efficiency	65	%	assumed water sprays and wind breaks
Emissions	0.1	kg/hour	
Truck loading			
Activity rate	8	tonnes/hour	
Overall control efficiency	65	%	assumed water sprays and wind breaks
Emissions	0.0	kg/hour	
Total emissions	0.5	kg/hour	assumed all activities happen in the same hour
	515.2	g/hour	
PM10	**0.143**	**g/s**	

9 **Pugmill**

Capacity	400	tph	maximum	Pug mill (ARAN Modumix 11, with a full capacity of 400 tonne/ hour, but expected to routinely operate at around half this capacity).
PM10 EF	0.0002	kg/tonne	raw material crushing, fabric filters (closest to dust extractors)	
	0.080	kg/hour		
	80.000	g/hour		
	0.022	**g/s**		

Crusher
Fully enclosed - therefore, no emissions expected.

	Dust Sources	Hours of Operation	Source Type	Source Area (m^2)	PM_{10} (g/s)	PM10 (g/s/m2)	TSP (g/s)	Hours of operation	Notes
1	Wind erosion - stockpiles	24	area	12,427	0.024	0.000002	0.048	continuous	assuming water sprays; area measured using Google Earth Pro
2	Wheel generated dust	11	volume		0.01		0.01	continuous	worst case scenario; PER SOURCE EMISSIONS - 8 sources in total
3	Loading	11	volume	10	0.011		0.027	continuous	worst case scenario
4	Unloading	11	volume	10	0.087		0.200	7 am - 6 pm	worst case scenario
5	FEL1	11	volume	10	0.027		0.056	7 am - 6 pm	worst case scenario
6	FEL2	11	volume	10	0.027		0.056	7 am - 6 pm	worst case scenario
7	FEL3	11	volume	10	0.027		0.056	7 am - 6 pm	worst case scenario
8	Materials Processing	1 (assumed maximum of one load per day)	volume	625	0.143		0.143	7 am	worst case scenario - worst met conditions early in morning;
9	Pugmill	11	volume	9	0.022		0.022	7 am - 6 pm	worst case scenario

Odour Sources	Source Type	Source Area (m2)	SOER (OU/s/m2)	(OER - OU/s)	Near field peak to mean ratios - area sources* Stability class A - D (convective)	Stability Class E & F (stable)	
Greenwaste stockpile	area	1763	0.134	236.242	0.34	0.31	
Bioretention pond	area	450	0.1701	76.545	0.43	0.39	assumed to be a leachate pond in aerobic condition
Product bin 1	area	70	0.0402	2.814	0.10	0.09	The soil ratio estimate is 70% soil, 30% organic matter; therefore, emission rate assumed to
Product bin 2	area	70	0.0402	2.814	0.10	0.09	The soil ratio estimate is 70% soil, 30% organic matter; therefore, emission rate assumed to

* From Approved Methods, Table 6.1: factors for estimating peak concentrations in flat terrain.
They represent the ratio of peak 1-second average concentrations to mean 1-hour concentrations

Source Coordinates	Eastings	Northings	Elevation*	Height (m)	
Road volume sources					
VS1	370445	6354736	7	1	
VS2	370478	6354817	7	1	
VS3	370446	6354859	7	1	
VS4	370484	6354935	7	1	
VS5	370557	6354882	7	1	
VS6	370513	6354778	7	1	
VS7	370425	6354807	7	1	
VS8	370420	6354752	7	1	
Stockpile			7	8	
Centre (centre of site)	370498	6354854	7	4	taken to be half the total height of the stockpile
Asphalt recycler	370477	6354886	7		
Concrete batching plant	370532	6354877	7	10 m high, 3 m wide	
Pug mill	370576	6374864	7	??	
Greenwaste stockpile	370452	6354819	7	8	41 x 43 m
Bioretention pond	370433	6354894	7	0	18 x 25 m
Product bin 1	370500	6354713	7	6	10 x 7 m
Product bin 2	370493	6354710	7	6	10 x 7 m

* assumed fill level