Technical Report No. 4

Air Emissions Inventory for the Greater Metropolitan Region in New South Wales

Commercial Emissions Module: Results

Prepared jointly by

Department of Environment and Climate Change NSW
Pacific Air & Environment Pty Ltd

ACKNOWLEDGEMENTS

This study was carried out with the assistance of organisations and individuals who should be recognised for their efforts.

Many thanks to the NSW Environmental Trust and Commonwealth Department of the Environment and Water Resources for providing the Department of Environment and Climate Change NSW (DECC) with funding to complete the study.

The contribution made by the 493 individual businesses that participated in the commercial survey and returned questionnaires is much appreciated. Without their involvement, the depth and completeness of this inventory would not have been possible.

DECC would also like to thank a number of individuals for their efforts in either project scoping/management, developing emission estimation methodologies, collecting activity data, developing databases, estimating emissions and/or preparing this report, including: Mr. Nick Agapides (DECC); Mr. Kelsey Bawden (Pacific Air & Environment Pty Ltd); Ms. Yvonne Hong (Pacific Air & Environment); and Ms. Elaine Tam (Pacific Air & Environment).

Published by:

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In April 2007 the Department of Environment and Conservation NSW became known as the Department of Environment and Climate Change NSW.

ISBN 978 1 74122 376 7
DECC 2007/8
August 2007

EXECUTIVE SUMMARY

The Department of Environment and Climate Change NSW (DECC), in collaboration with Pacific Air & Environment (Bawden et. al., 2006) has completed a three year air emissions inventory project for commercial sources. The base year of the commercial inventory represents activities that took place during the 2003 calendar year and is accompanied by emission projections in yearly increments up to the 2031 calendar year. The area included in the study covers greater Sydney, Newcastle and Wollongong regions, known collectively as the Greater Metropolitan Region (GMR).

The study region defined as the GMR measures 210 km (east-west) by 273 km (north-south). The study region is defined in Table ES1.1 and shown in Figure ES1.1.

Table ES1.1: Definition of Greater Metropolitan, Sydney, Newcastle and Wollongong Regions

Region	South-west corner MGA [1] co-ordinates		North-east corner MGA [1] co-ordinates	
	Easting (km)	Northing (km)	Easting (km)	Northing (km)
Greater Metropolitan	210	6159	420	6432
Sydney	261	6201	360	6300
Newcastle	360	6348	408	6372
Wollongong	279	6174	318	6201

[1] MGA = Map Grid of Australia based on the Geocentric Datum of Australia 1994 (GDA94) (ICSM, 2002).

Commercial businesses include ANZSIC classes that do not hold environment protection licences under the NSW POEO Act (Protection of the Environment Operations Act 1997). The commercial emissions inventory includes emissions from 5,056 businesses. A total of 22,951 emission sources have been included in the commercial emissions inventory, consisting of 314 point sources[1] and 22,637 fugitive sources[2]. Table ES1.2 presents the number and type of emission sources included in the commercial emissions inventory for each area considered.

Table ES1.2: Emission Source Summary

Area	Point Sources	Fugitive Sources	Total Sources
Sydney	202	15,876	16,078
Newcastle	29	1,421	1,450
Wollongong	16	871	887
Non-Urban	67	4,469	4,536
GMR	314	22,637	22,951

The pollutants inventoried include criteria pollutants specified in the Air NEPM, air toxics associated with the National Pollutant Inventory and the Air Toxics NEPMs and any other pollutants associated with state specific programs, i.e. Load Based Licensing (Protection of the Environment (General) Regulation 1998 (DEC, 2002 & PCO, 1998)) and Protection of the Environment Operations (Clean Air) Regulation 2002 (PCO, 2005).

[1] Point source means air pollutant emissions, which are released via a stack or vent and are generally controlled (i.e. captured, treated and reduced in mass using control equipment and/or captured and discharged through a vent, chimney, stack, or other equivalent emission point).

[2] Fugitive source means air pollutant emissions that are not released via a stack or vent and are generally not controlled emissions.

Figure ES1.1 shows the location of all industrial emission sources that are included in the emissions inventory.

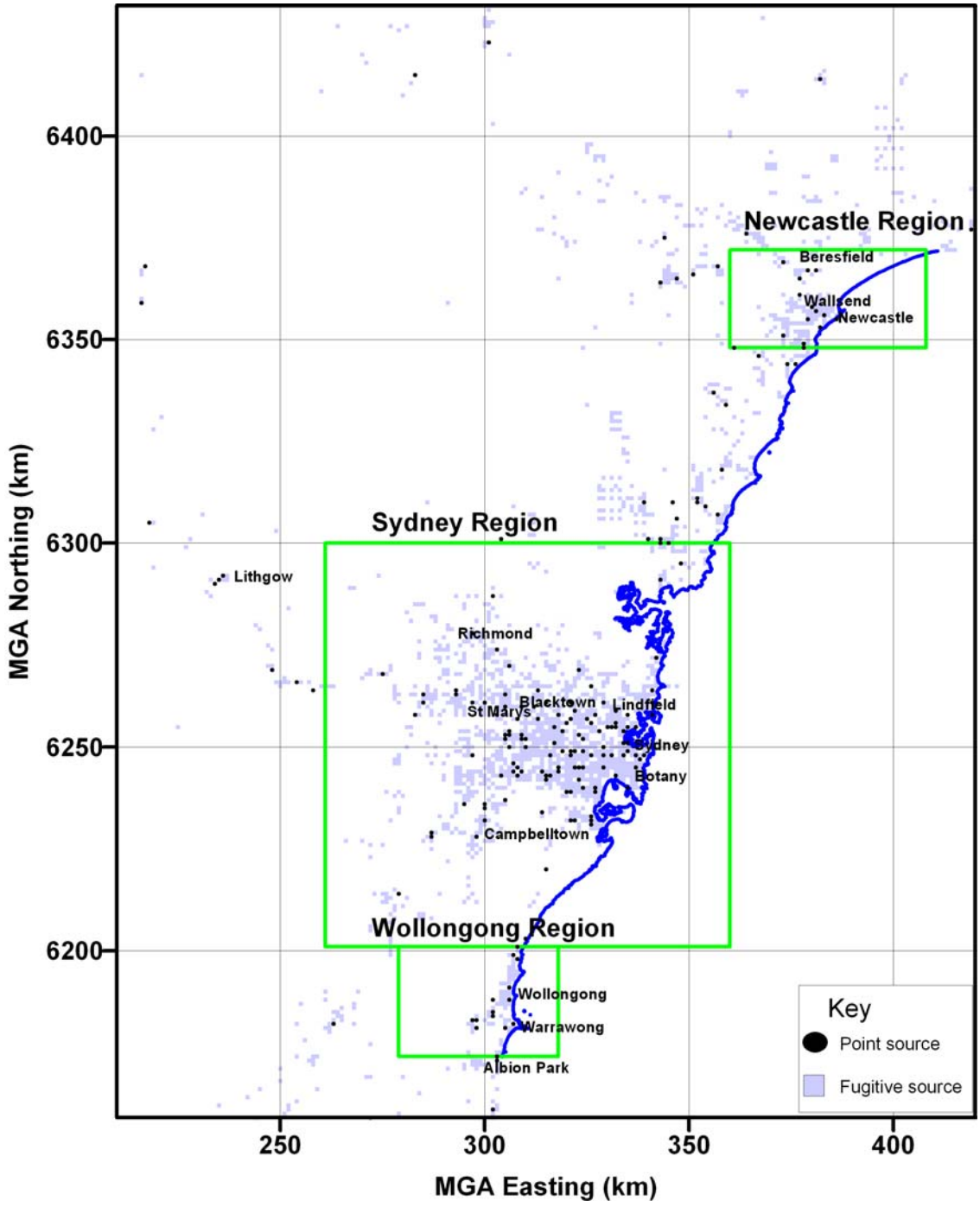

Figure ES1.1: Location of all Commercial Emission Sources

Table ES1.3 shows total estimated emissions (for selected substances) from commercial businesses in the study region (the GMR), Sydney, Newcastle and Wollongong. These substances have been selected since they are:

- The most common air pollutants found in airsheds according to the National Pollutant Inventory NEPM (NEPC, 2000);
- Referred to in National Environment Protection Measures (NEPMs) for criteria pollutants (NEPC, 2003) and air toxics (NEPC, 2004); and
- They have been classified as priority air pollutants (NEPC, 2005).

Total estimated emissions are also presented for the region defined as "Non-Urban". This region is the area of the GMR minus the combined areas of the Sydney, Newcastle and Wollongong regions.

Table ES1.3: Total Estimated Emissions from Commercial Businesses

Substance	Estimated Emissions (tonnes/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	1.33	0.21	0.06	0.32	1.93
ACETALDEHYDE	0.35	0.00002	0	0.0009	0.35
BENZENE	51.1	3.98	3.26	14.3	72.7
CARBON MONOXIDE	1,260	68.4	103	368	1,800
FORMALDEHYDE	89.2	1.1	1.41	5.2	96.9
ISOMERS OF XYLENE	325	21.5	15.3	73.5	436
LEAD & COMPOUNDS	0.19	0.0008	0.0008	0.004	0.19
OXIDES OF NITROGEN	1,870	134	132	480	2,620
PARTICULATE MATTER 10µm	2,130	173	64.3	1,660	4,030
PARTICULATE MATTER 2.5µm	721	49.1	30.6	469	1,270
PERCHLOROETHYLENE	228	12.5	9.92	35	285
POLYCYCLIC AROMATIC HYDROCARBONS	0.02	0.001	0.0009	0.004	0.03
SULFUR DIOXIDE	48.1	0.86	1.22	21	71.1
TOLUENE	1,250	84.4	60.8	220	1,620
TOTAL SUSPENDED PARTICULATES (TSP)	5,300	394	146	4185	10,000
TOTAL VOCS	9,970	799	624	2,450	13,800
TRICHLOROETHYLENE (TCE)	2.82	0.0001	0	0.02	2.83

[a] Totals may not appear additive due to rounding

Table ES1.4 shows the proportion of estimated emissions released in each region considered in the study.

Table ES1.4: Proportion of Estimated Emissions Released in Each Region Considered in the Study

Substance	Proportion of Estimated Emissions				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	69%	11%	3%	17%	100%
ACETALDEHYDE	100%	0%	0%	0%	100%
BENZENE	70%	5%	4%	20%	100%
CARBON MONOXIDE	70%	4%	6%	20%	100%
FORMALDEHYDE	92%	1%	1%	5%	100%
ISOMERS OF XYLENE	75%	5%	4%	17%	100%
LEAD & COMPOUNDS	97%	0%	0%	2%	100%
OXIDES OF NITROGEN	72%	5%	5%	19%	100%
PARTICULATE MATTER 10µm	53%	4%	2%	41%	100%
PARTICULATE MATTER 2.5µm	57%	4%	2%	37%	100%
PERCHLOROETHYLENE	80%	4%	3%	12%	100%
POLYCYCLIC AROMATIC HYDROCARBONS	81%	3%	3%	13%	100%
SULFUR DIOXIDE	67%	1%	2%	30%	100%
TOLUENE	77%	5%	4%	14%	100%
TOTAL SUSPENDED PARTICULATES (TSP)	53%	4%	1%	42%	100%
TOTAL VOCS	72%	6%	5%	18%	100%
TRICHLOROETHYLENE (TCE)	99%	0%	0%	1%	100%

[a] Totals may not appear additive due to rounding

Table ES1.5 shows the average emissions from commercial sources for a summer weekday (January weekday), summer weekend day (January weekend day), winter weekday (July week day) and winter weekend day (July weekend day).

Table ES1.5: Total Estimated Emissions from Commercial Businesses

Substance	Estimated Emissions (kg/day)			
	Summer weekday	Summer weekend day	Winter weekday	Winter weekend day
1,3 BUTADIENE	7.26	1.03	5.75	0.23
ACETALDEHYDE	0.94	0.94	0.94	0.94
BENZENE	229	149	210	140
CARBON MONOXIDE	4,850	4,820	4,850	4,820
FORMALDEHYDE	296	154	297	155
ISOMERS OF XYLENE	1,320	711	1,360	738
LEAD & COMPOUNDS	0.67	0.13	0.68	0.14
OXIDES OF NITROGEN	7,140	7,000	7,180	7,000
PARTICULATE MATTER 10µm	11,100	9,940	11,200	9,970
PARTICULATE MATTER 2.5µm	3,520	3,060	3,550	3,080
PERCHLOROETHYLENE	884	473	884	473
POLYCYCLIC AROMATIC HYDROCARBONS	0.074	0.073	0.074	0.073
SULFUR DIOXIDE	190	187	180	177
TOLUENE	5,020	2,510	5,090	2,510
TOTAL SUSPENDED PARTICULATES (TSP)	29,500	19,800	29,800	19,900
TOTAL VOCS	44,200	22,700	42,400	21,800
TRICHLOROETHYLENE (TCE)	7.61	7.61	7.61	7.61

Figure ES1.2 shows the total emissions of each criteria pollutant (NO_x (oxides of nitrogen), Total VOCs (volatile organic compounds), PM_{10} (particulate matter with an aerodynamic diameter of less than 10 µm), CO (carbon monoxide), SO_2 (sulfur dioxide)) and the proportion of total emissions in the GMR emitted in each region.

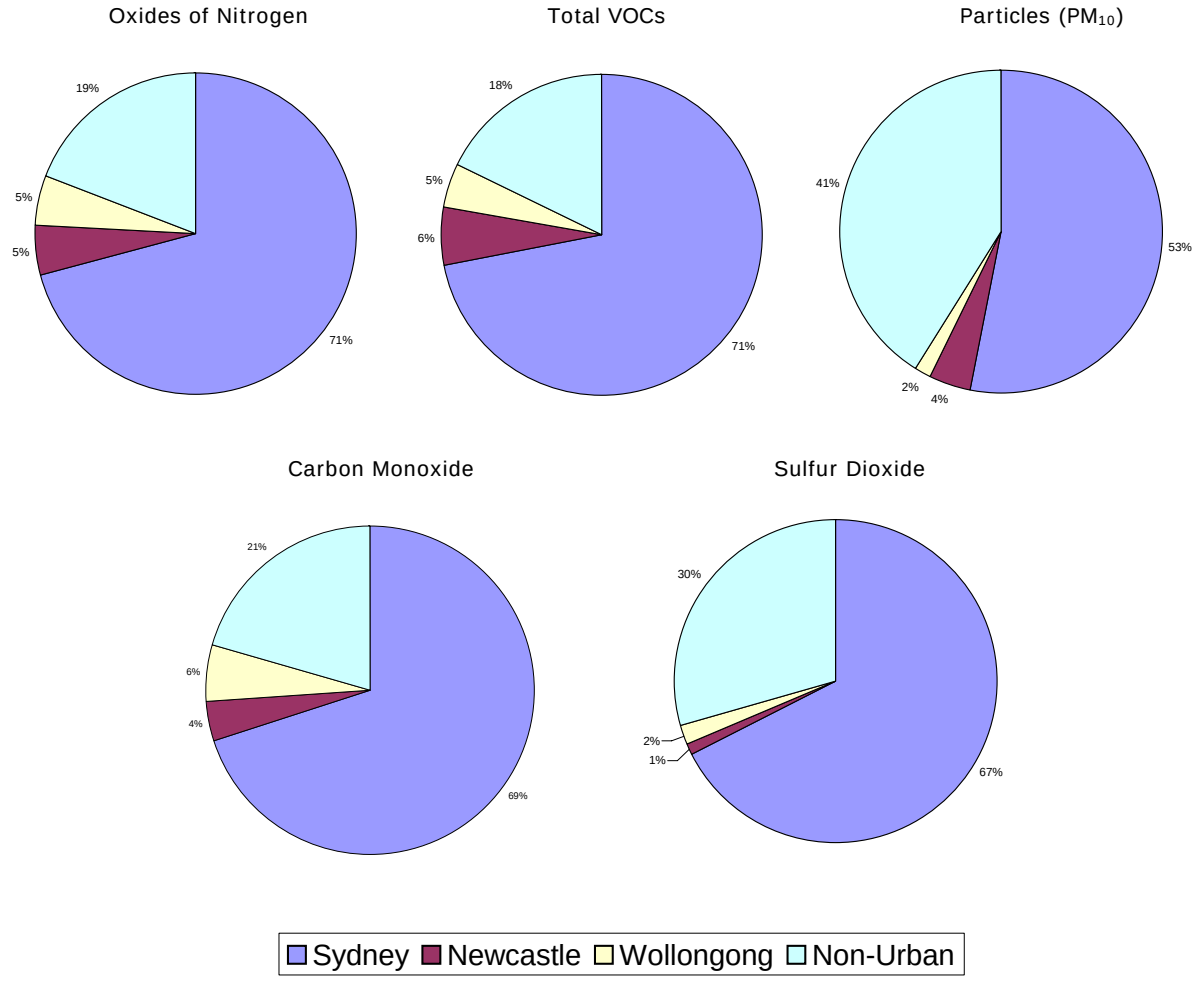

Figure ES1.2: Proportion of Total Commercial Emissions in Each Region

Total commercial emissions for each ANZSIC Class for each criteria pollutant in each region (i.e. the GMR, Sydney, Newcastle and Wollongong) are presented graphically as follows

- Figure ES1.3 to Figure ES1.7 present commercial emissions by ANZSIC Class for the entire GMR.
- Figure ES1.8 to Figure ES1.12 present commercial emissions by ANZSIC Class for the Sydney region.
- Figure ES1.13 to Figure ES1.17 present commercial emissions by ANZSIC Class for the Newcastle region
- Figure ES1.18 to Figure ES1.22 present commercial emissions by ANZSIC Class for the Wollongong region.

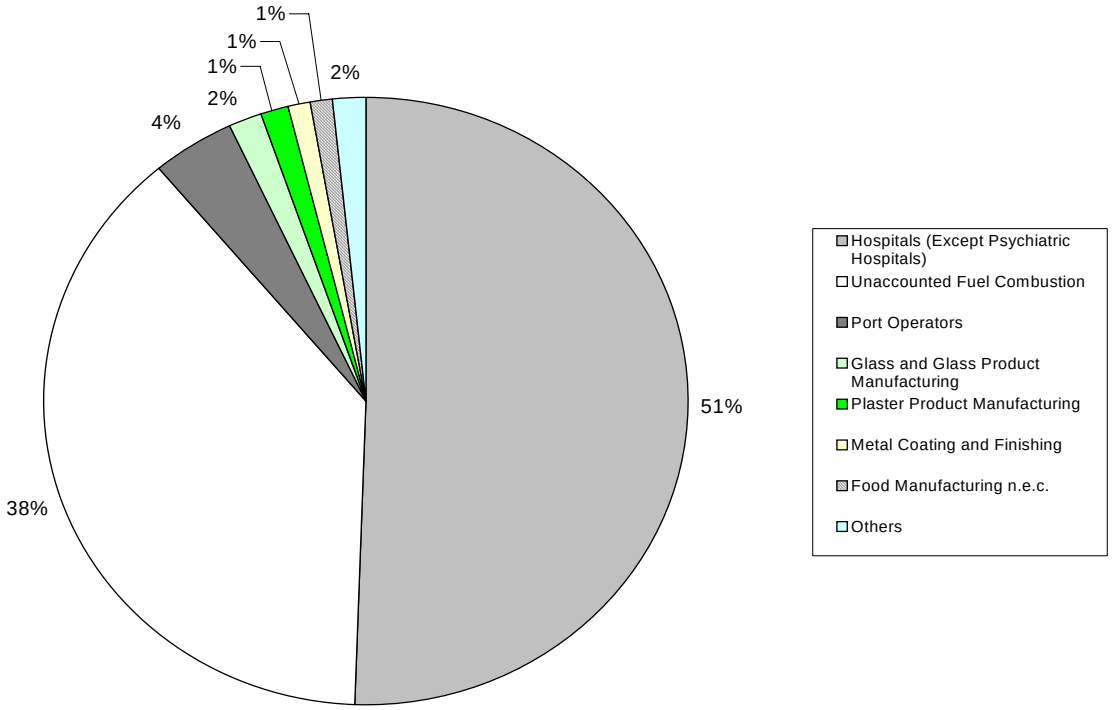

Figure ES1.3: Commercial Emissions of Oxides of Nitrogen (NO_x) by ANZSIC Class in the GMR (Total Emissions = 2,620 tonnes/year)

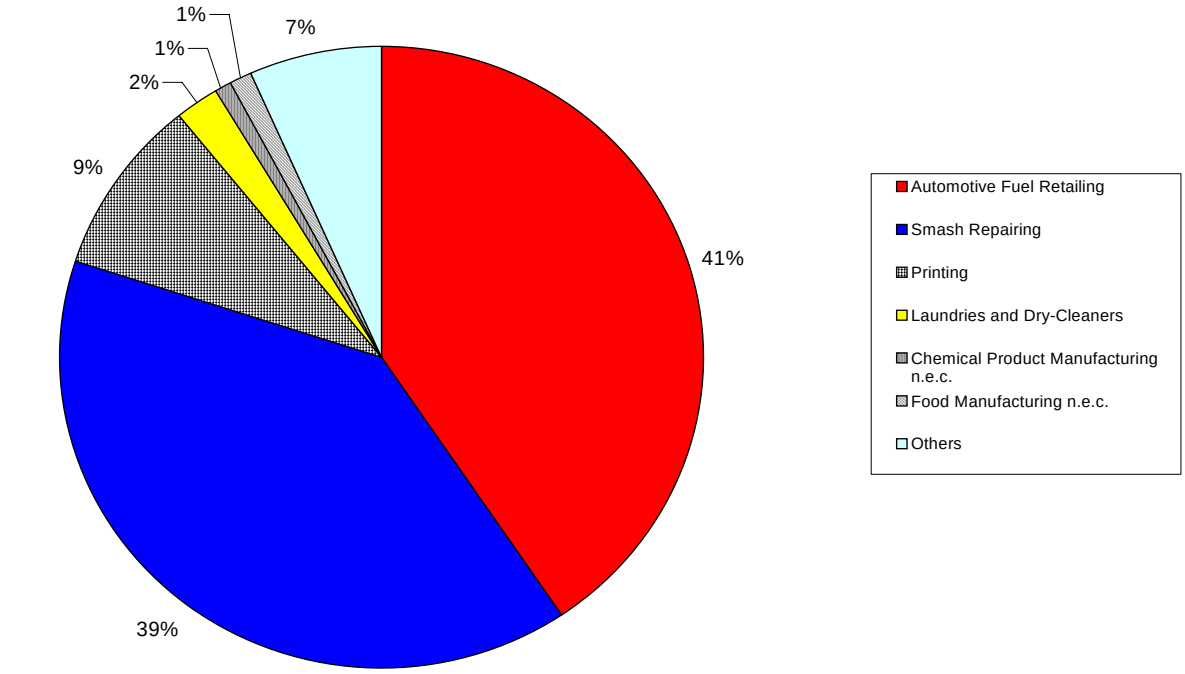

Figure ES1.4: Commercial Emissions of Total VOCs by ANZSIC Class in the GMR (Total Emissions = 13,800 tonnes/year)

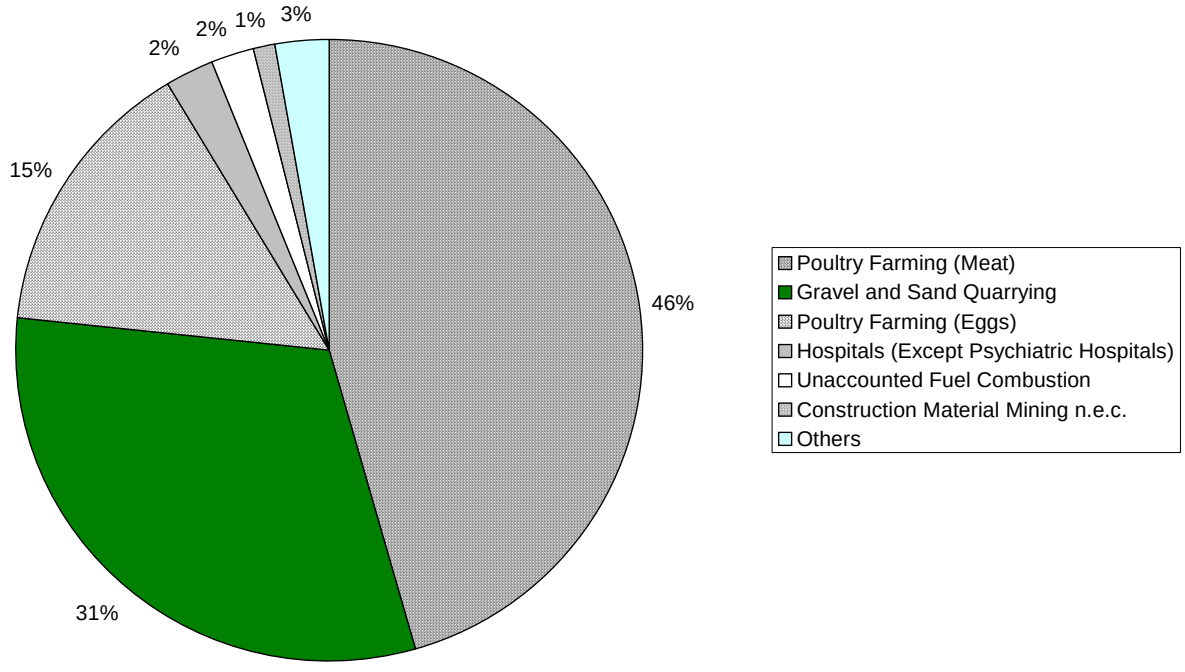

Figure ES1.5: Commercial Emissions of Particles (PM_{10}) by ANZSIC Class in the GMR (Total Emissions = 4,030 tonnes/year)

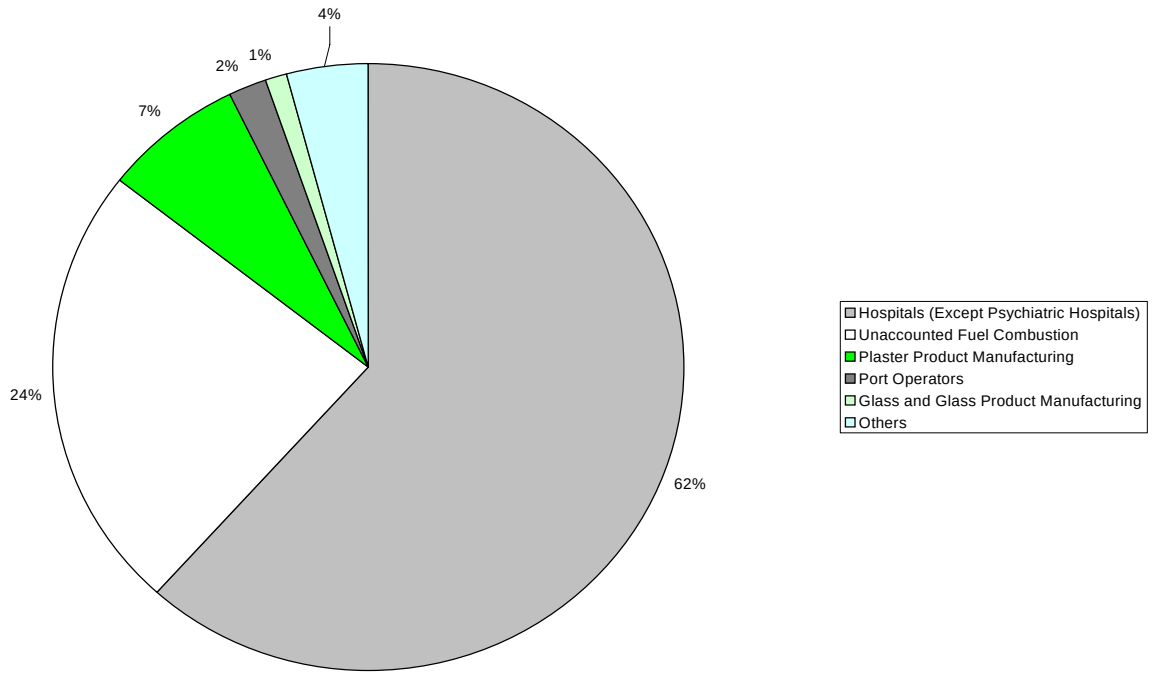

Figure ES1.6: Commercial Emissions of Carbon Monoxide (CO) by ANZSIC Class in the GMR (Total Emissions = 1,800 tonnes/year)

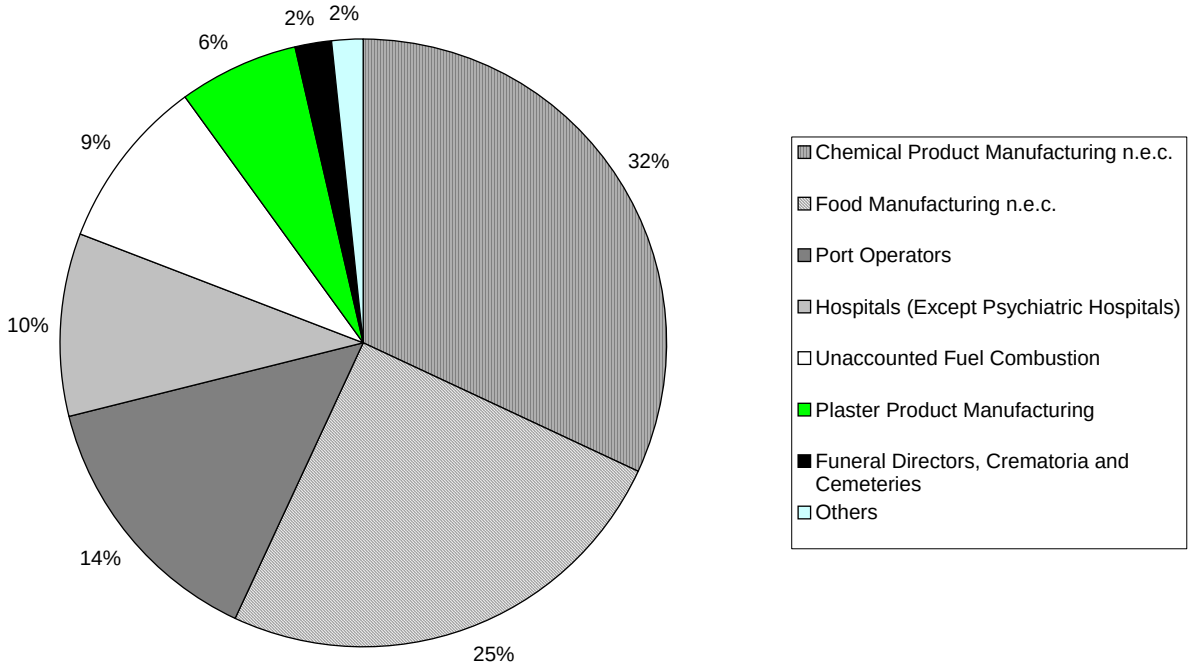

Figure ES1.7: Commercial Emissions of Sulfur Dioxide (SO_2) by ANZSIC Class in the GMR (Total Emissions = 71 tonnes/year)

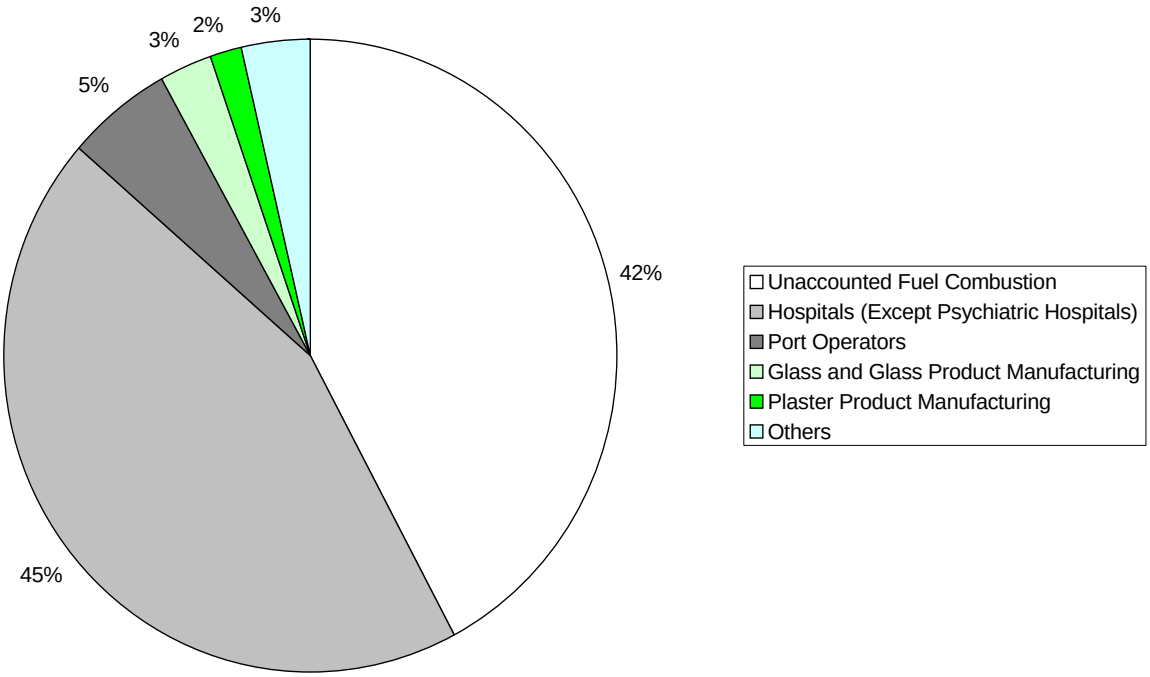

Figure ES1.8: Commercial Emissions of Oxides of Nitrogen (NO_x) by ANZSIC Class in Sydney (Total Emissions = 1,870 tonnes/year)

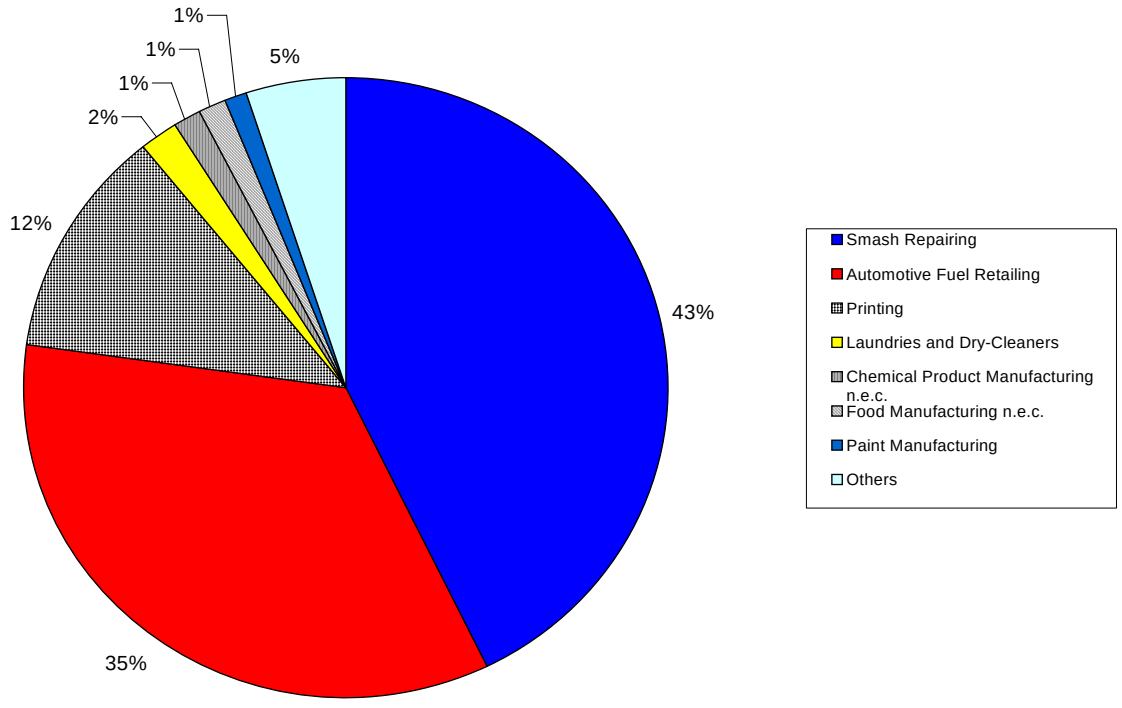

Figure ES1.9: Commercial Emissions of Total VOCs by ANZSIC Class in Sydney (Total Emissions = 9,970 tonnes/year)

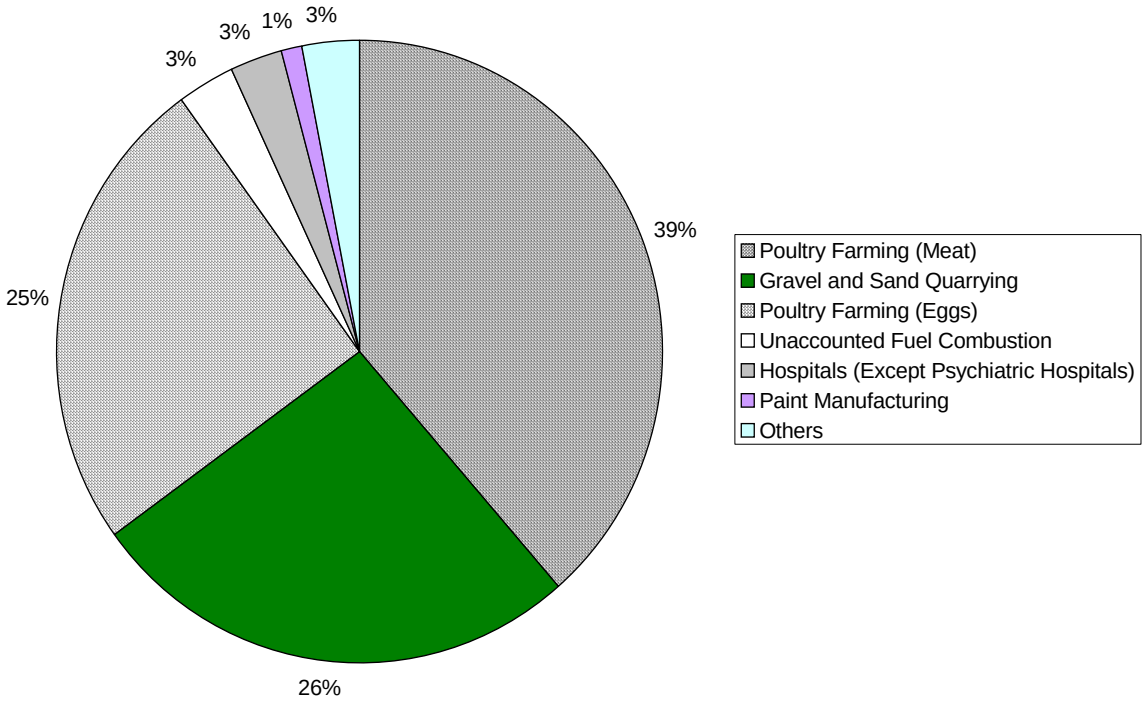

Figure ES1.10: Commercial Emissions of Particles (PM_{10}) by ANZSIC Class in Sydney (Total Emissions =2,130 tonnes/year)

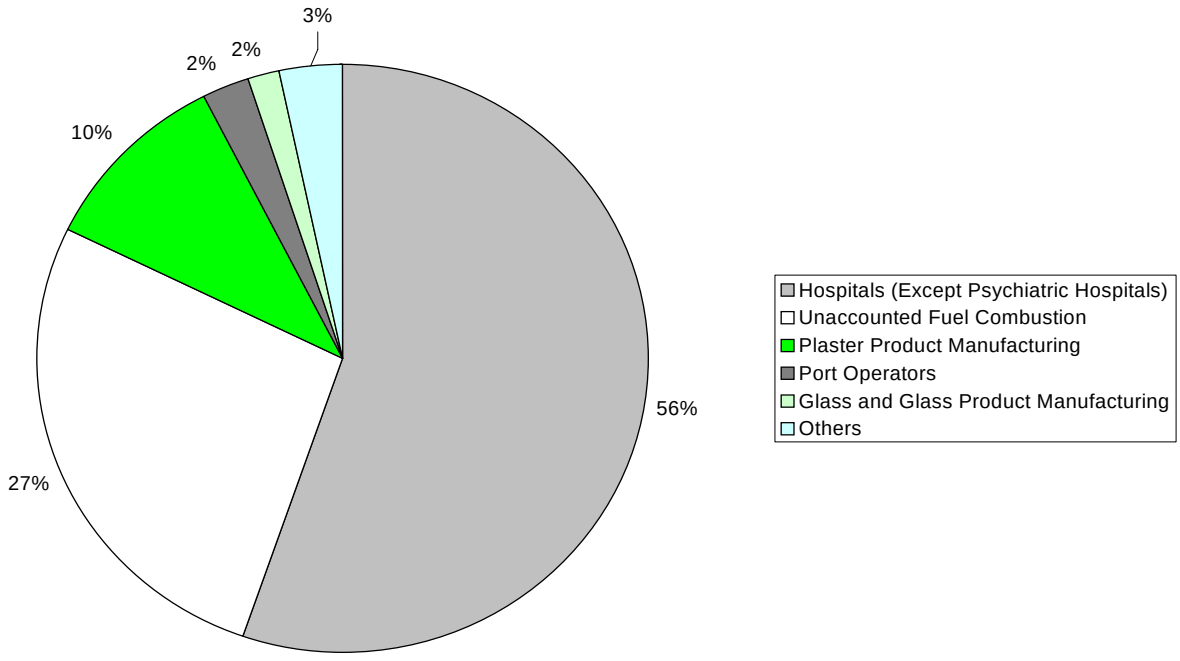

Figure ES1.11: Commercial Emissions of Carbon Monoxide (CO) by ANZSIC Class in Sydney (Total Emissions = 1,260 tonnes/year)

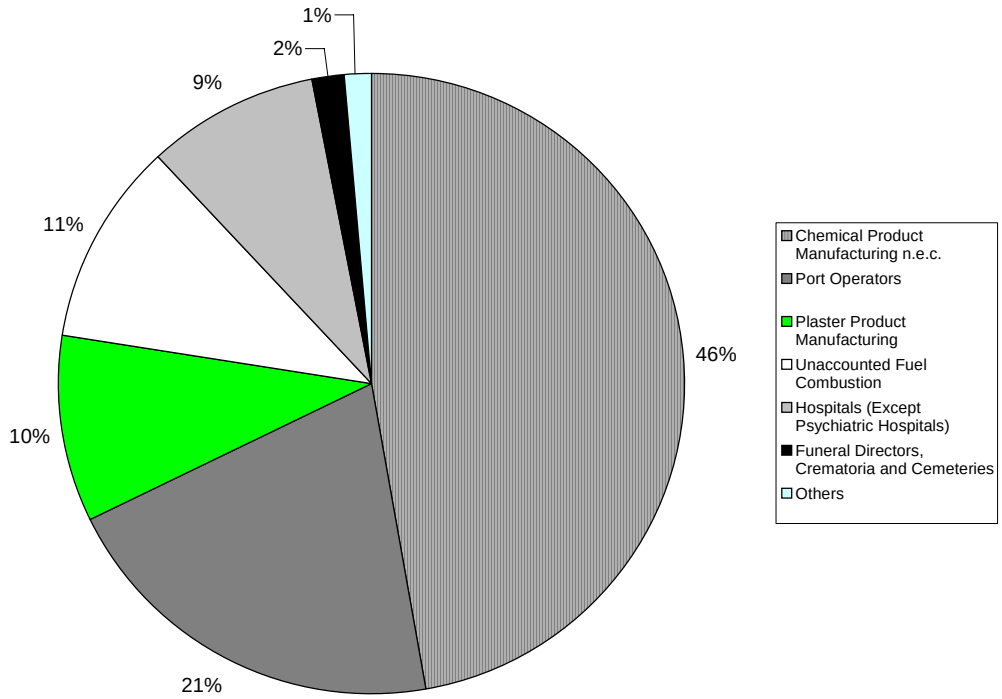

Figure ES1.12: Commercial Emissions of Sulfur Dioxide (SO_2) by ANZSIC Class in Sydney (Total Emissions = 48 tonnes/year)

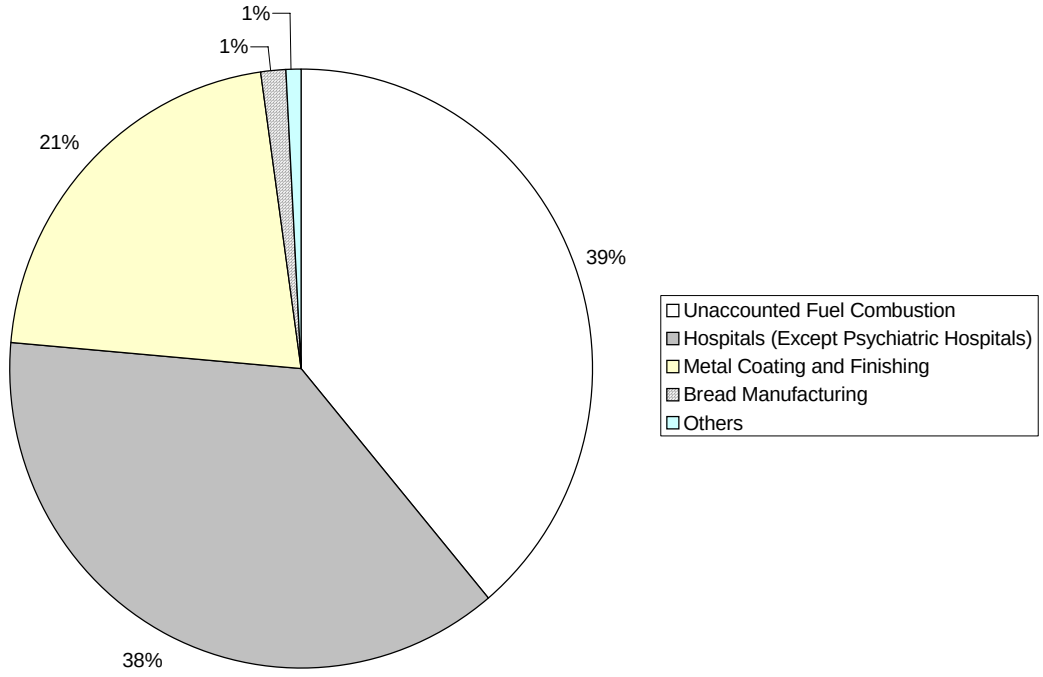

Figure ES1.13: Commercial Emissions of Oxides of Nitrogen (NO_x) by ANZSIC Class in Newcastle (Total Emissions = 134 tonnes/year)

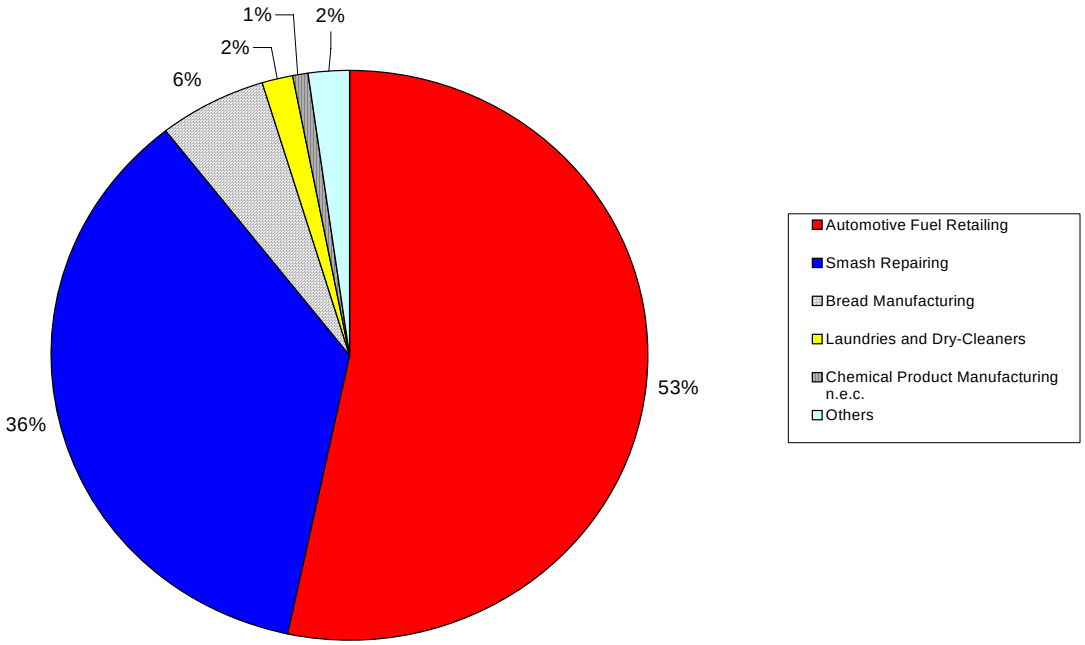

Figure ES1.14: Commercial Emissions of Total VOCs by ANZSIC Class in Newcastle (Total Emissions = 799 tonnes/year)

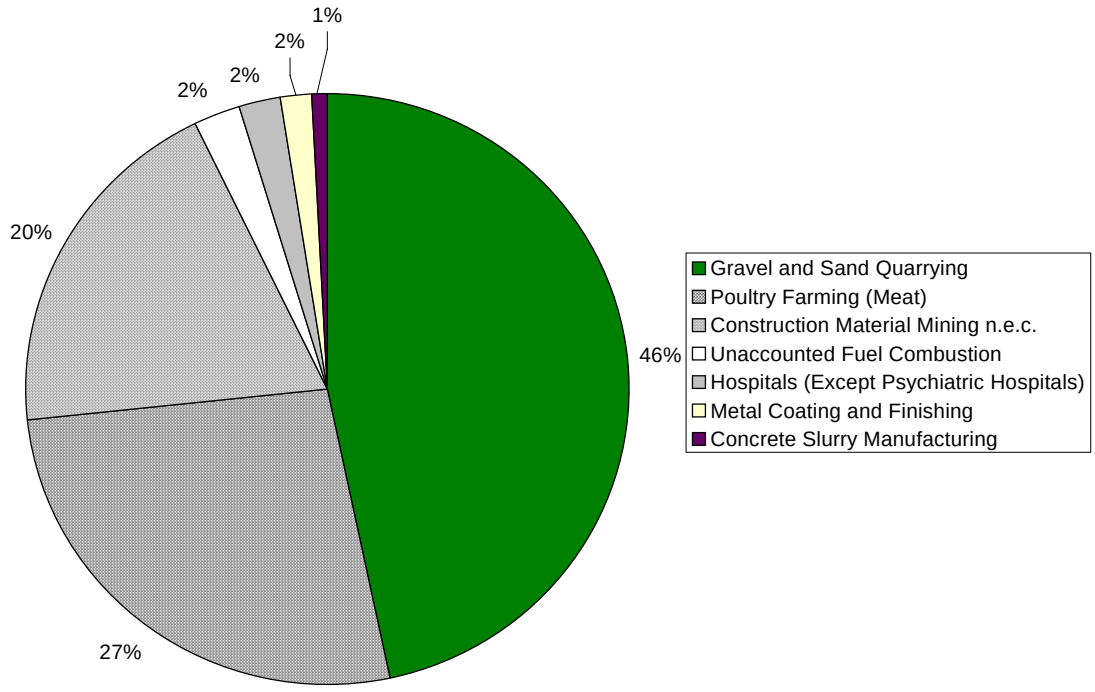

Figure ES1.15: Commercial Emissions of Particles (PM_{10}) by ANZSIC Class in Newcastle (Total Emissions = 173 tonnes/year)

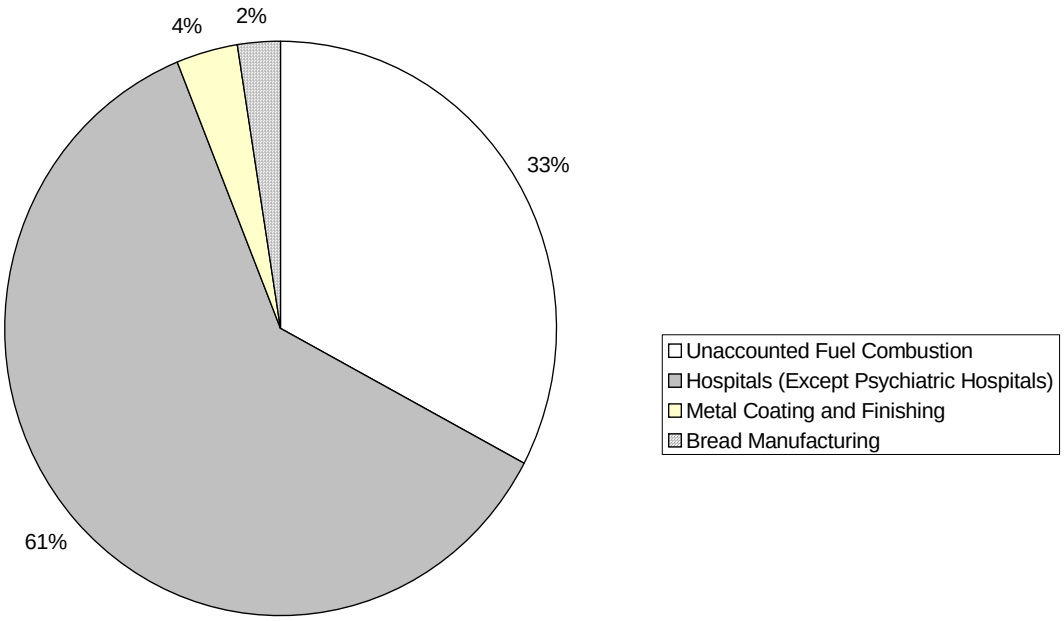

Figure ES1.16: Commercial Emissions of Carbon Monoxide (CO) by ANZSIC Class in Newcastle (Total Emissions = 68 tonnes/year)

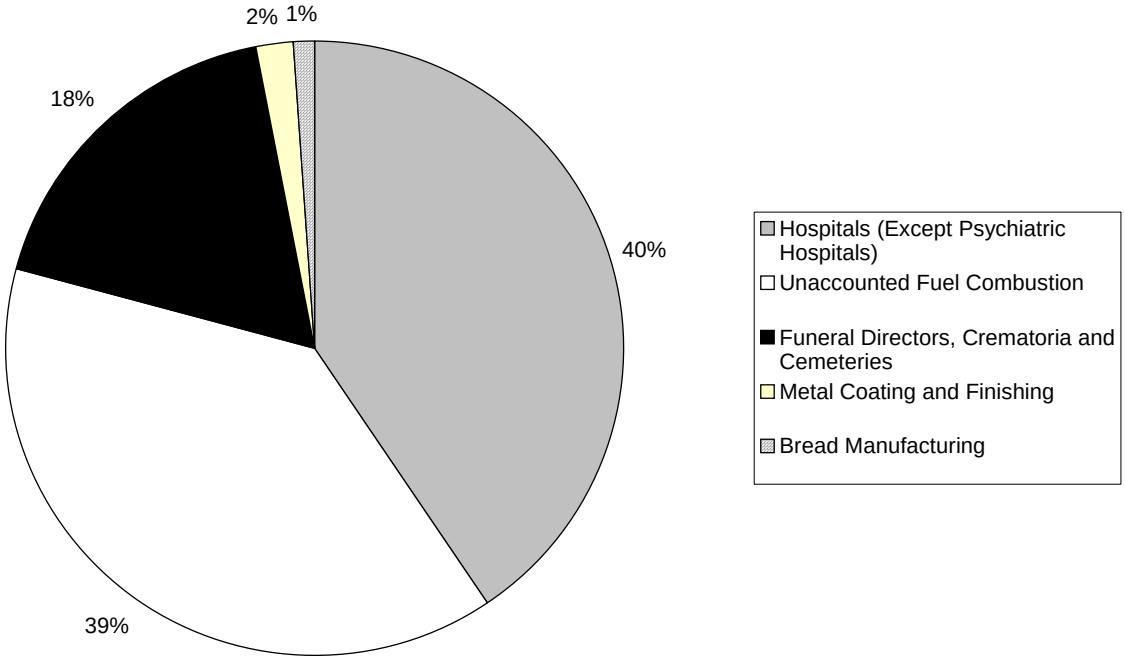

Figure ES1.17: Commercial Emissions of Sulfur Dioxide (SO_2) by ANZSIC Class in Newcastle (Total Emissions = 0.9 tonnes/year)

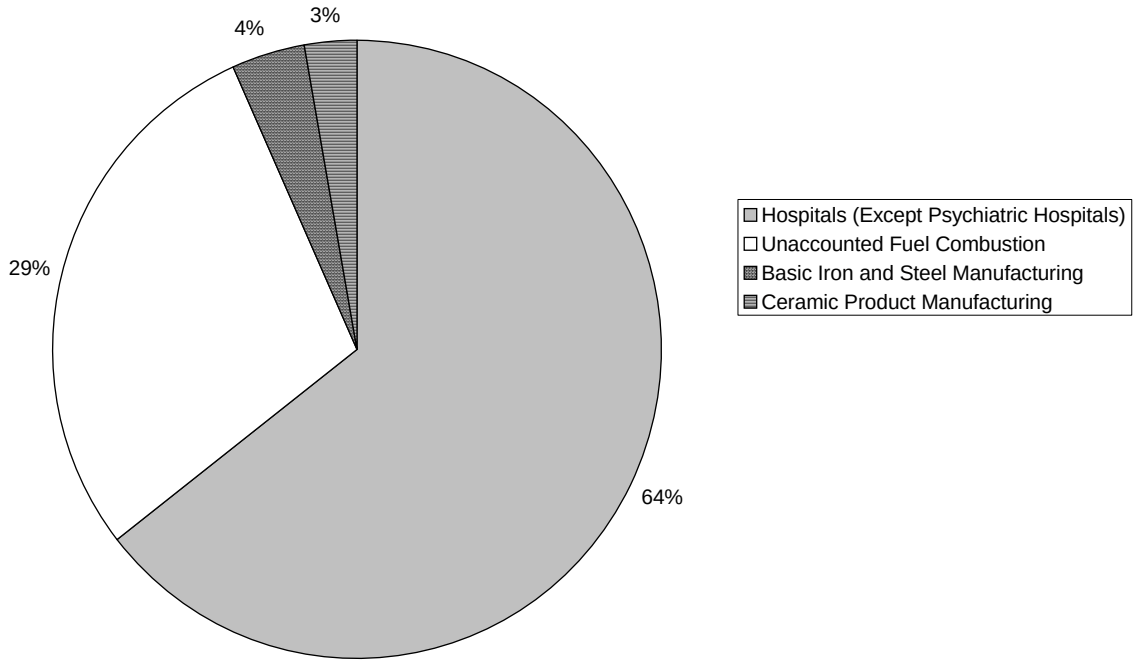

Figure ES1.18: Commercial Emissions of Oxides of Nitrogen (NO_x) by ANZSIC Class in Wollongong (Total Emissions = 132 tonnes/year)

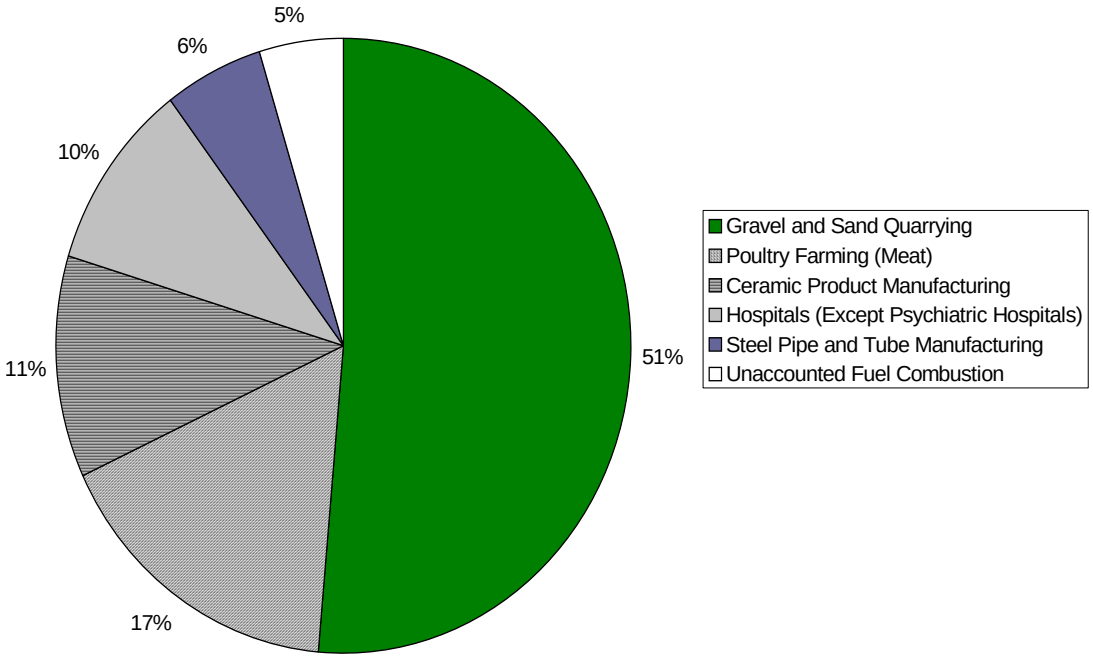

Figure ES1.19: Commercial Emissions of Particles (PM_{10}) by ANZSIC Class in Wollongong (Total Emissions = 64 tonnes/year)

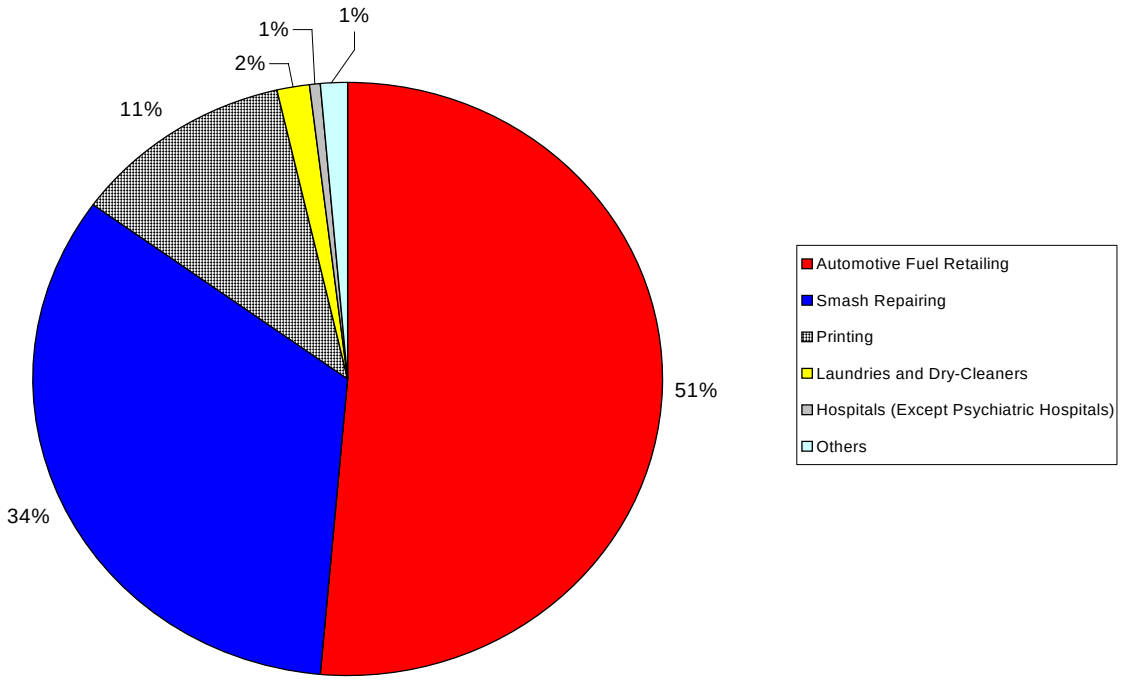

Figure ES1.20: Commercial Emissions of Total VOCs by ANZSIC Class in Wollongong (Total Emissions = 624 tonnes/year)

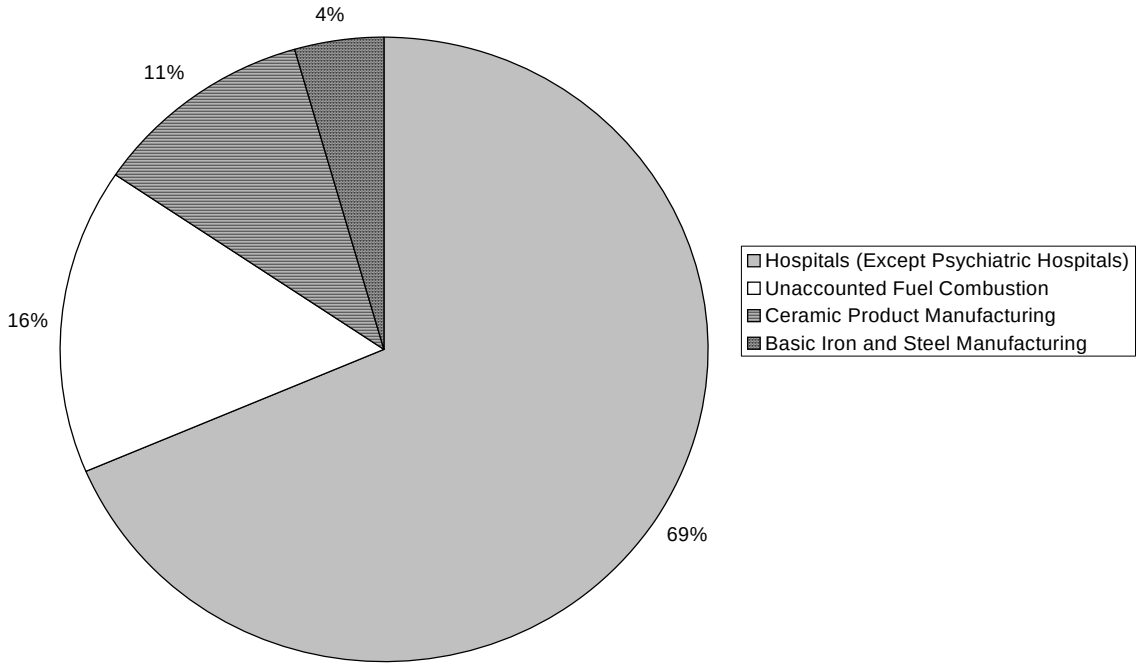

Figure ES1.21: Commercial Emissions of Carbon Monoxide (CO) by ANZSIC Class in Wollongong (Total Emissions = 103 tonnes/year)

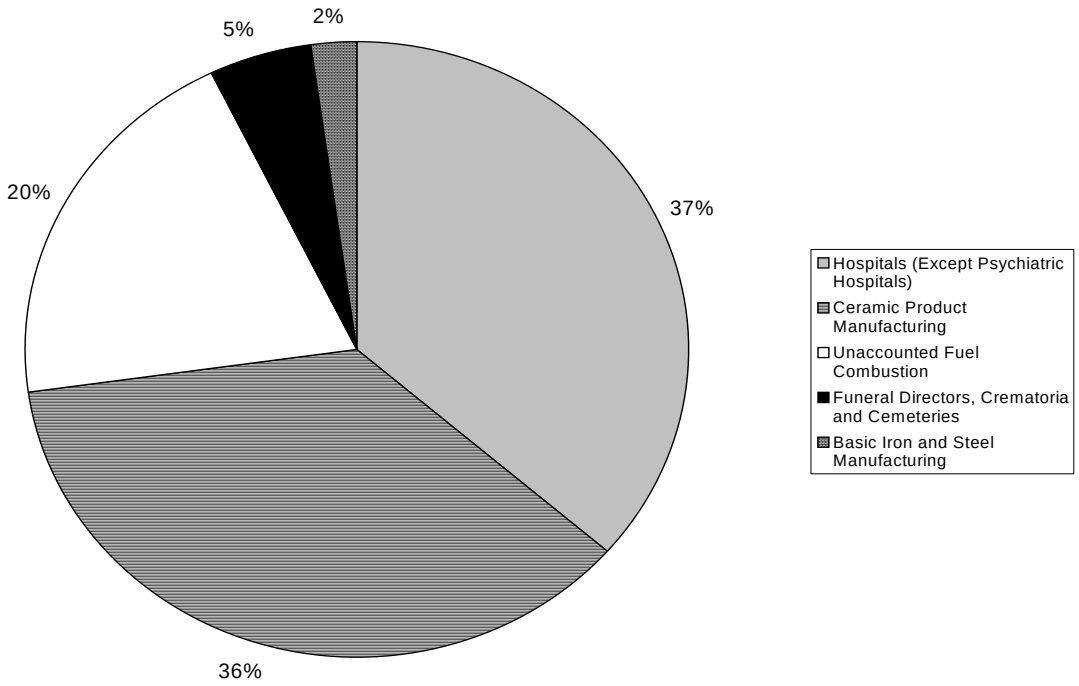

Figure ES1.22: Commercial Emissions of Sulfur Dioxide (SO_2) by ANZSIC Class in Wollongong (Total Emissions = 1.2 tonnes/year)

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1 INTRODUCTION

The Department of Environment and Climate Change NSW (DECC), in collaboration with Pacific Air & Environment (Bawden et. al., 2006) has completed a three year air emissions inventory project for commercial sources. The base year of the commercial inventory represents activities that took place during the 2003 calendar year and is accompanied by emission projections in yearly increments up to the 2031 calendar year. The area included in the study covers greater Sydney, Newcastle and Wollongong regions, known collectively as the Greater Metropolitan Region (GMR).

Bawden et. al. (2004) describes the emission estimation methodologies used for this project. This report is intended to be used in conjunction with the methodology report (Bawden et. al., 2004).

The purpose of this report is to focus on the results of the commercial emissions inventory. The information is structured as follows:

- A description of the inventory specifications (Section 2) including:
  - A description of the study region (Section 2.1);
  - A description of emission sources considered (Section 2.2);
  - A description of the pollutants evaluated (Section 2.3); and
  - A broad discussion of the methodology (Section 2.4).
- A description of each source type considered, including all businesses included in each source type and total emissions estimated from each source type (Section 3).
- An emissions summary for selected substances presented by ANZSIC class for GMR, Sydney, Newcastle and Wollongong areas (Section 4).
- A description of the emissions inventory software developed for this project to compile the commercial emissions inventory (Section 5).
- A complete list of references (Section 6).
- Sample commercial survey questionnaire used to collect data (Appendix A).
- Total commercial emissions of all substances emitted in the GMR, Sydney, Newcastle and Wollongong areas and the percentage contribution from each area to total emissions in the GMR) (Appendix B).
- A list of default organic speciation profiles used to speciate organic emissions (Appendix C)

2 INVENTORY SPECIFICATIONS

2.1 The Study Region

The study region defined as the Greater Metropolitan Region measures 210 km (east-west) by 273 km (north-south). The study region is defined in Table 2.1 and shown in Figure 2.1.

Table 2.1: Definition of Greater Metropolitan, Sydney, Newcastle and Wollongong Regions

Region	South-west corner MGA [1] co-ordinates		North-east corner MGA [1] co-ordinates	
	Easting (km)	Northing (km)	Easting (km)	Northing (km)
Greater Metropolitan	210	6159	420	6432
Sydney	261	6201	360	6300
Newcastle	360	6348	408	6372
Wollongong	279	6174	318	6201

[1] MGA = Map Grid of Australia based on the Geocentric Datum of Australia 1994 (GDA94) (ICSM, 2002).

Figure 2.1: Greater Metropolitan Region of NSW

2.2 Emission Sources Considered

The commercial sectors included in the commercial emissions inventory are outlined in Table 2.2.

Table 2.2: ANZSIC Codes Used to Classify Commercial Businesses [a]

Subdivision / Description	Group / Description	Class / Description
01/Agriculture	014/Poultry farming	0141/Poultry farming (meat)
		0142/Poultry farming (eggs)
14/Other mining	141/Construction material mining	1411/Gravel and sand quarrying
		1419/Construction material mining n.e.c.
21/Food, beverage and tobacco	212/Dairy product manufacturing	2121/Milk and cream processing
		2122/Ice cream manufacturing
		2129/Dairy product manufacturing
	213/Fruit and vegetable processing	2130/Fruit and vegetable processing
	216/Bakery product manufacturing	2161/Bread manufacturing
		2162/Cake and pastry manufacturing
		2163/Biscuit manufacturing
	217/Other food manufacturing	2172/Confectionary manufacturing
		2174/Prepared animal and bird feed manufacturing
		2179/Food manufacturing n.e.c.
	218/Beverage and malt manufacturing	2181/Soft drink, cordial and syrup manufacturing
		2182/Beer and malt manufacturing
		2183/Wine manufacturing
		2184/Spirit manufacturing
22/Textile, clothing, footwear and leather manufacturing	221/Textile, fibre, yearn and woven fabric manufacturing	2214/Wool textile manufacturing
	224/Clothing manufacturing	2249/Clothing manufacturing n.e.c.
	226/Leather and leather product manufacturing	2261/Leather tanning and fur dressing
23/Wood and paper product manufacturing	232/Other wood product manufacturing	2321/Plywood and veneer manufacturing
		2322/Fabricated wood manufacturing
		2323/Wooden structural component manufacturing
		2329/Wood product manufacturing n.e.c.
		2332/Solid paperboard container manufacturing
		2339/Paper product manufacturing n.e.c.
24/Printing, publishing and recorded media	241/Printing and services to printing	2412/Printing
25/Petroleum, coal, chemical and associated product manufacturing	252/Petroleum and coal product manufacturing n.e.c.	2520/Petroleum and coal product manufacturing n.e.c.
	253/Basic chemical manufacturing	2531/Fertiliser manufacturing
		2532/Industrial gas manufacturing
		2533/Synthetic resin manufacturing
		2534/Organic industrial chemicals manufacturing n.e.c.
		2535/Inorganic industrial chemicals manufacturing n.e.c.
	254/Other chemical product manufacturing	2541/Explosive manufacturing
		2542/Paint manufacturing
		2543/Medicinal and pharmaceutical product manufacturing
		2545/Soap and other detergent manufacturing
		2547/Ink manufacturing

Subdivision / Description	Group / Description	Class / Description
		2549/Chemical product manufacturing n.e.c.
	255/Rubber product manufacturing	2559/Rubber product manufacturing
	256/Plastic product manufacturing	2563/Plastic bag and film manufacturing
		2564/Plastic product rigid fibre reinforced manufacturing
		2566/Plastic injection moulded product manufacturing
26/Non-metallic mineral product manufacturing	261/Glass and glass product manufacturing	2610/Glass and glass product manufacturing
		2621/Clay brick manufacturing
		2622/Ceramic product manufacturing
		2623/Ceramic tile and pipe manufacturing
		2629/Ceramic product manufacturing n.e.c.
		2631/Cement and lime manufacturing
		2632/Plaster product manufacturing
		2633/Concrete slurry manufacturing
		2634/Concrete pipe and box culvert manufacturing
27/Metal product manufacturing	271/Iron and steel manufacturing	2711/Basic iron and steel manufacturing
		2712/Iron and steel casting and forging
		2713/Steel pipe and tube manufacturing
		2729/Basic non ferrous metal manufacturing
	273/Non ferrous basic metal product manufacturing	2733/Nonferrous metal casting
	274/Structural metal product manufacturing	2742/Architectural aluminium product manufacturing
		2749/Structural metal product manufacturing n.e.c.
	275/Sheet metal product manufacturing	2751/Metal container manufacturing
	276/Fabricated metal product manufacturing	2762/Spring and wire product manufacturing
		2763/But, bolt, screw and rivet manufacturing
		2764/Metal coating and finishing
		2769/Fabricated metal product manufacturing n.e.c.
28/Machinery and equipment manufacturing	281/Motor vehicle and part manufacturing	2819/Automotive component manufacturing n.e.c.
	282/Other transport equipment manufacturing	2821/Shipbuilding
		2824/Aircraft manufacturing
		2829/Transport equipment manufacturing n.e.c.
	284/Electronic equipment manufacturing	2849/Electronic equipment manufacturing n.e.c.
	285/Electrical equipment manufacturing	2852/Electric cable and wire manufacturing
		2853/Battery manufacturing
		2859/Electrical equipment manufacturing n.e.c.
	286/Industrial machinery and equipment manufacturing	2862/Mining and construction machinery manufacturing
29/Other manufacturing	292/Furniture manufacturing	2921/Wooden furniture and upholstered seat manufacturing
		2922/Sheet metal furniture manufacturing
		2929/Furniture manufacturing n.e.c.

Subdivision / Description	Group / Description	Class / Description
41/General construction	412/Non building construction	4121/Road and bridge construction
		4122/Non building construction n.e.c.
45/Mineral, metal and chemical wholesaling	452/Mineral, metal and chemical wholesaling	4521/Petroleum product wholesaling
		4523/Chemical wholesaling
53/Motor vehicle services	532/Motor vehicle services	5321/Automotive fuel retailing
		5323/Smash repairing
57/Accomodation, cafes and restaurants	573/Cafes and restaurants	5730/Cafes and restaurants
66/Services to water transport	662/Services to water transport	6622/Water transport terminals
86/Health services	861/Hospitals and nursing homes	8611/Hospitals
		8613/Nursing homes
95/Personal services	952/Other personal services	9521/Laundries and dry cleaners
		9524/Funeral directors, crematoria and cemeteries

[a] n.e.c. = not elsewhere classified

The commercial emissions inventory also includes emission estimates for unaccounted industrial and commercial fuel combustion.

Exhaust emissions from commercial off-road vehicles and emissions of wheel generated dust are included in the off-road mobile emissions inventory (DECC, 2007a), while emissions from off-road vehicle specific processes (e.g. material loading by a front-end loader) are included in the commercial emissions inventory. Emissions from wind erosion on unpaved roads are included in the biogenic emissions inventory (DECC, 2007b).

2.3 Pollutants Evaluated

The inventory encompasses all commercial emission releases to air in the region depicted by Figure 2.1. The following pollutants have been considered:

- Substances included in the National Pollutant Inventory (NPI) National Environment Protection Measure (NEPM) (NEPC, 2000);
- Pollutants included in the Air Quality National Environment Protection Measure (NEPM) (NEPC, 2003);
- Pollutants included in the Air Toxics National Environment Protection Measure (NEPM) (NEPC, 2004);
- Pollutants associated with the Protection of the Environment Operations (Clean Air) Regulation 2002 (PCO, 2005);
- Air pollutants associated with Load Based Licensing (DEC, 2002 & PCO, 1998);
- Speciation of oxides of nitrogen for photochemical modelling (i.e. NO and NO_2)[3];
- Speciated organic compounds for photochemical modelling sourced from Carter (2003);
- Speciated particulate emissions (i.e. TSP (total suspended particulate), PM_{10} (particulate matter with an aerodynamic diameter < 10 μm) and $PM_{2.5}$ (particulate matter with an aerodynamic diameter < 2.5 μm))[4];

[3] The default NO_x speciation profile used in the inventory is 5% NO_2 (USEPA, 2005).

- Environment Protection Authority of Victoria air toxic pollutants sourced from *Hazardous Air Pollutants - A Review of Studies Performed in Australia and New Zealand* (EPAV, 1999);
- Commonwealth Government Air Toxics Program Technical Advisory Group (13 March 2000) priority air pollutants (DEH, 2001);
- U.S. Environmental Protection Agency list of 189 Hazardous Air Pollutants (USEPA, 2004a);
- Air pollutants included in the Office of Environmental Human Health Assessment (OEHHA)/Air Resources Board (ARB) 'hot spots' list (CARB, 2005);
- NSW DEC regulated pollutants with design ground level concentrations (DEC, 2005);
- USEPA priority PAHs (Keith et. al., 1979); and
- WHO97 dioxin and furans and PCBs (Van den Berg et. al., 1998).

2.4 Methodology Overview

This section contains a broad overview of the methodology used to build the commercial emissions inventory. Specific details describing the methodology can be found in the methodology report (Bawden et. al., 2004).

The methodology used to build the commercial emissions inventory involves the following steps:

1. Commercial Business Identification

Commercial businesses are those defined in Section 2.2 with the potential for air emissions in the GMR that do not hold an environment protection licence under the NSW POEO Act (Protection of the Environment Operations Act 1997).

Businesses have been identified from a number of different sources including:

- NSW WorkCover database for hazardous materials;
- NSW telephone directory;
- Service station lists from major oil distributors (BP, Shell, Caltex/Ampol and Mobil);
- NSW Department of Primary Industries;
- NSW Health Services Directory; and
- The Environmental Health Branch of the NSW Government.

Business addresses have been geocoded to obtain the spatial location for each business. The geocoding process queried calibrated street map layers to search for the postcode, suburb, street name and street number in order to return the most accurate MGA (Map Grid of Australia) coordinates for the business (the datum used is GDA94). Where the street number could not be located the street centroid coordinate was returned. Where the street name could not be found the

[4] TSP includes airborne dust of all size ranges including PM_{10} and $PM_{2.5}$. PM_{10} is a subclass of TSP and is defined as particles with an aerodynamic diameter of 10 µm or less. $PM_{2.5}$ is also a subclass of TSP and PM_{10} and is defined as particles with an aerodynamic diameter of 2.5 µm or less. Total Suspended Particulate (TSP) is normally associated with impacts on visibility and amenity values, whereas the fraction of particulate up to 10 microns in diameter (PM_{10}) has commonly been used as a measure of the potential for adverse human health impacts. Recently, however, focus has also been directed towards the $PM_{2.5}$ fraction due to its ability to penetrate deeper into the lungs.

suburb centroid was returned. The statistics from the geocoding process are presented in Table 2.3.

Table 2.3: Results from Geocoding Process

Geocoding Accuracy	Number of Businesses
Accurate to business street number	4267
Accurate to business street	512
Accurate to business suburb	1353
Total	**6132**

[a] It should be noted that not all commercial businesses identified have been included in the commercial emissions inventory

The coordinates have been used to spatially allocate emission sources unless more accurate data have been provided. Where commercial businesses provided specific coordinates for emission sources, the default coordinates generated from geocoding have been overwritten.

2. Commercial Type Specific Emission Source Identification

Once all businesses were located, all possible emission sources from each commercial type (separated into ANZSIC classes or groups) and the substances emitted from each emission source were identified.

3. Emission Estimation Technique Design

Emission estimation techniques have been designed in line with methodologies approved for National Pollutant Inventory (NPI) reporting. In this project, source emission test data have been used to estimate emissions to air in preference to default methodologies that utilise emission factors.

4. Identification of Required Data to Estimate Emissions

Based on the designed emission estimation techniques the required data to estimate emissions from each source have been identified.

5. Data Acquisition

Commercial survey questionnaires have been designed for each commercial category to obtain detailed information on manufacturing processes, speciated emissions from stacks and fugitive sources and temporal operational details.

The general objective of the commercial survey was to obtain as much site-specific information as possible. To this end, source test data and site specific emission factors (often derived for regulatory reporting) were requested in the surveys for each type of emission source at the business. All surveyed businesses were requested to identify every unit process with releases to air and provide site specific source test data, emissions estimates and a basis for these estimates using activity data (e.g. fuel consumed by the process unit). Follow up phone calls were performed to obtain the required information from businesses that did not respond to the commercial survey questionnaire and have been identified to potentially have significant emissions. Not all businesses were sent commercial survey questionnaires. Only 10% of businesses from ANZSIC classes ‘smash repairing’ and ‘laundries and dry cleaners’ were sent commercial survey questionnaires. It was estimated that information gathered from 10% of these ANZSIC classes would provide enough information to estimate emissions from all businesses within these sectors.

Businesses were asked a number of questions in the surveys in order to characterise variation in operating hours. Production has been assumed to vary with operating hours for most businesses. This was to simplify the survey (i.e. by not requesting variation of emissions for each source at each business). Generic temporal profiles have been developed for emission sources where it is clear that emissions are not related to production or operating hours (e.g. wind erosion, tank breathing loss).

In total 3,748 commercial survey questionnaires were sent out and responses were received from 493 businesses (i.e. overall response rate of 13.2%). Detailed statistics on the number of commercial survey questionnaires sent out, responses received and number of businesses included in the commercial emissions inventory are provided in Table 3.1.

Sample commercial survey questionnaires are presented in Appendix A.

6. Data Analysis & Validation

Survey results have been validated with known realistic values (based on experience) and cross-checked with calculations based on responses from other businesses. Emissions from businesses that report to the NPI have been cross-checked with inventory estimates as a validation step.

7. Deriving Commercial Specific Projection Factors

Projection factors for each commercial business type have been developed using published commercial data and population growth statistics. Projection factor surrogates for each commercial sector are presented in the methodology report (Bawden et. al., 2004). Projection factors have been derived based on either ABARE (Australian Bureau of Agricultural and Resource Economics) national or state projection data (e.g. *Australian Energy, National and State Projections to 2029/2030*, ABARE, 2005) or national or state population growth data (ABS, 2001; TPDC, 2004).

Projection factors have been developed for every year from 2004 to 2031 (emissions for the base year 2003 are based on responses to the commercial survey questionnaire and emission estimation techniques). Projection factors are provided to the year 2031.

The projection factors for each source are used to estimate emissions in future annual periods using the following formula:

$$E_{i,j,k,n} = E_{i,j,k,2003} \times PF_{j,k,n}$$

where:

$E_{i,j,k,n}$	=	Emission of substance i from location j for source type k for year n	(kg/year)
$E_{i,j,k,2003}$	=	Emission of substance i from location j for source type for the base year, 2003	(kg/year)
$PF_{j,k,n}$	=	Projection factor for location j for source type k for year n (relative to the base year)	(tonnes/year)

The projection methodology for each commercial sector is presented in Section 3.

8. Emissions Estimation

The estimation approach adopted for the development of the commercial emissions inventory was driven by the requirements of the inventory and the practical constraints of the project.

Emissions from each commercial sector have been estimated using one of the following approaches:

- Bottom up – i.e. estimation of releases from individual sources, on a business-specific level.
- Top down – i.e. estimation of emissions on a regional-level allocated to businesses based on a surrogate parameter such as population or employment in a specific sector. Emissions have been allocated to each commercial business location based on the business address.
- Hybrid – i.e. the hybrid emission estimation approach involves a bottom up and top down emission estimation approach to characterise the emissions from commercial sectors. The bottom up component involves using data supplied in returned commercial survey questionnaires and the top-down component involves gathering regional level data and determining the difference in regional data and data provided in returned commercial survey questionnaires to derive emission estimates from non-respondent businesses.

The commercial emissions inventory generally uses the bottom up approach for emissions estimation. However, for some commercial sectors a top down or a hybrid top-down/bottom up approach has been used to estimate emissions. The specific commercial sectors and the general estimation technique employed are described in Section 3 for each commercial sector.

Air emissions have been estimated using emission factors sourced from manuals published for NPI, USEPA or CARB documents. Specific details can be found in the methodology report (Bawden et. al., 2004).

3 RESULTS

Emissions have been calculated based on information supplied in the returned commercial survey questionnaires, other data available from industry personnel, USEPA, CARB and NPI emission factors for various engineering and combustion processes. Where monitoring data or stack test data are available, this has been used in preference to literature emission rates. All emissions are calculated by a specifically designed database which stores business details and emission sources and uses NPI, USEPA and NPI emission factors to estimate emission loads.

In this section the term "combustion products" is intended to include TSP, PM_{10}, $PM_{2.5}$, SO_2, CO, NO_x and VOCs (total and speciated). The term "particulate matter" refers to TSP, PM_{10} and $PM_{2.5}$.

In this section total emissions are presented for each ANZSIC class for the GMR, Sydney, Newcastle and Wollongong regions in all cases and emissions released in the "Non-Urban" region for ANZSIC classes where emissions in this area are significant. The "Non-Urban" region is defined as the area within the GMR that is not bounded by Sydney, Newcastle or Wollongong regions. In this section emissions are presented for the following pollutants only:

- 1,3 butadiene (1,3-BUT)
- Acetaldehyde (ACET)
- Benzene (BENZ)
- Carbon monoxide (CO)
- Formaldehyde (HCHO)
- Isomers of xylene (XYLE)
- Lead & compounds (Pb)
- Oxides of nitrogen (NO_x)
- Particulate matter < 10 µm (PM_{10})
- Particulate matter < 2.5 µm ($PM_{2.5}$)
- Perchloroethylene (PERC)
- Polycyclic aromatic hydrocarbons (PAHs)
- Sulfur dioxide (SO_2)
- Toluene (TOLU)
- Total suspended particulates (TSP)
- Total VOCS (VOCs)
- Trichloroethylene (TCE)

These substances have been selected since they are:

- The most common air pollutants found in airsheds according to the National Pollutant Inventory NEPM (NEPC, 2000);
- Referred to in National Environment Protection Measures (NEPMs) for criteria pollutants (NEPC, 2003) and air toxics (NEPC, 2004); and
- They have been classified as priority air pollutants (NEPC, 2005).

Emissions from all ANZSIC classes and substances considered in this study are presented in Appendix B.

Aspects common to all sectors are described here:

Emission Sources

Many commercial businesses include combustion, wastewater treatment, fuel and organic liquid storage and handling operations, process fugitives and surface coating operations. All surveys have been designed to collect this information and where indicated in returned surveys, emissions have been included in the inventory for each business.

Activity Data and Assumptions

Data provided in the returned commercial survey questionnaires allowed for the estimation of emissions from all sources. Default speciation profiles used to estimate speciated emissions of organics are provided in Appendix C. NPI emission factors have been used to estimate emissions of metals. All emission factors are stored and referenced within the database.

If stack parameters have been not provided and could not be determined in consultation with each business the following assumptions have been made:

- Stack emissions of combustion products:
  - Diameter = 0.5 m
  - Temperature = 423 K
  - Velocity = 10 m/s
- Stack emissions of non-combustion products:
  - Diameter = 0.5 m
  - Temperature = 298 K
  - Velocity = 10 m/s

Where stack height was not provided, each business was contacted and requested to provide an estimate.

Temporal Variation

Process emissions have been assumed to vary in direct proportion to the change in production rates over a typical year which has been supplied in returned commercial survey questionnaires. The temporal variation in emissions includes hourly, weekday, weekend day and monthly. This data is stored in the commercial inventory database.

Temporal variations of evaporative emissions from fuel tanks have been calculated using the USEPA TANKS program (USEPA, 2004b).

In total, individual business emissions represented by 96 commercial ANZSIC classes are included in the commercial emissions inventory. However, over 96% of businesses (i.e. 4,857 businesses) are within the following 11 ANZSIC classes:

- Automotive Fuel Retailing (5321)
- Smash Repairing (5323)
- Laundries & Dry Cleaners (9521)
- Poultry Farming (014)
- Hospitals (8611)
- Wine Manufacturing (2183)
- Construction Material Mining (141)
- Funeral Directors, Crematoria & Cemeteries (9524)
- Printing, Publishing and Recorded Media (24)
- Plastic Product Rigid Fibre Reinforced Manufacturing (2564)
- Concrete Product Manufacturing (2633, 2634)

Emissions from these 11 ANZSIC classes are presented separately in this section along with emissions from all ANZSIC classes that have been identified to be significant commercial contributors to emissions of criteria pollutants (i.e. NO_x, Total VOCs, PM_{10}, CO or SO_2). The ANZSIC classes that have been identified to be significant contributors to emissions of criteria pollutants are:

- Basic Iron and Steel Manufacturing (2711)
- Bread Manufacturing (2161)
- Ceramic Product Manufacturing (2622)
- Chemical Product Manufacturing n.e.c. (2549)
- Food Product Manufacturing n.e.c. (2179)
- Port Operators (6623)
- Plaster Product Manufacturing (2632)
- Glass and Glass Product Manufacturing (2610)
- Paint Manufacturing (2542)
- Steel Pipe and Tube Manufacturing (2713)
- Metal Coating and Finishing (2764)

Summary emissions for the remaining 49 ANZSIC classes are presented in Section 3.23.

Table 3.1 outlines the summary statistics from the commercial survey questionnaire process.

Table 3.1: Summary Statistics for Commercial Survey Questionnaires and Responses

ANZSIC Class	Number of Businesses Identified	Number of Businesses Surveyed	Number of Businesses Responded	Number of Non-Respondent NPI Businesses	Number of Businesses Included in the Inventory	Percentage of Businesses Included in the Inventory
Automotive Fuel Retailing (5321)	2,089	2,089	239	0	2,089	100%
Smash Repairing (5323)	1,258	126	3	0	1,258	100%
Laundries & Dry Cleaners (9521)	561	56	5	0	561	100%
Poultry Farming (014)	374	0	0	0	374	100%
Hospitals (8611)	146	146	43	0	146	100%
Wine Manufacturing (2183)	129	129	12	0	129	100%
Construction Material Mining (141)	64	64	4	0	64	100%
Funeral Directors, Crematoria & Cemeteries (9524)	21	21	9	0	21	100%
Printing, Publishing and Recorded Media (24)	70	70	11	0	70	100%
Plastic Product Rigid Fibre Reinforced Manufacturing (2564)	87	87	8	0	87	100%
Concrete Product Manufacturing (2633, 2634)	57	57	2	0	57	100%
Aircraft Manufacturing (2824)	6	6	0	1	1	17%
Architectural Aluminium Product Manufacturing (2742)	3	3	0	0	0	0%
Automotive Component Manufacturing n.e.c. (2819)	11	11	4	0	4	36%
Basic Iron and Steel Manufacturing (2711)	10	10	5	1	6	60%
Basic Non-Ferrous Metal Manufacturing (2729)	5	5	2	0	2	40%
Battery Manufacturing (2853)	4	4	1	0	1	25%
Biscuit Manufacturing (2163)	2	2	0	2	2	100%
Bread Manufacturing (2161)	6	6	1	2	3	50%
Cake and Pastry Manufacturing (2162)	2	2	1	0	1	50%
Ceramic Product Manufacturing (2622)	4	4	0	2	2	50%
Ceramic Product Manufacturing n.e.c. (2629)	7	7	1	0	1	14%
Ceramic Tile and Pipe Manufacturing (2623)	2	2	0	0	0	0%
Chemical Product Manufacturing n.e.c. (2549)	69	69	12	2	14	20%
Chemical Wholesaling (4523)	27	27	3	0	3	11%
Clay Brick Manufacturing (2621)	4	4	0	0	0	0%

ANZSIC Class	Number of Businesses Identified	Number of Businesses Surveyed	Number of Businesses Responded	Number of Non-Respondent NPI Businesses	Number of Businesses Included in the Inventory	Percentage of Businesses Included in the Inventory
Clothing Manufacturing n.e.c. (2249)	4	4	0	0	0	0%
Confectionery Manufacturing (2172)	5	5	3	0	3	60%
Corrugated Paperboard Container Manufacturing (2333)	1	1	0	1	1	100%
Dairy Product Manufacturing n.e.c. (2129)	1	1	0	0	0	0%
Electric Cable and Wire Manufacturing (2852)	2	2	1	0	1	50%
Electrical Equipment Manufacturing (2859)	20	20	3	0	3	15%
Electronic Equipment Manufacturing n.e.c. (2849)	4	4	1	0	1	25%
Explosive Manufacturing (2541)	3	3	0	0	0	0%
Fabricated Metal Product Manufacturing n.e.c. (2769)	32	32	7	1	8	25%
Fabricated Wood Manufacturing (2322)	1	1	0	0	0	0%
Fertiliser Manufacturing (2531)	1	1	0	0	0	0%
Food Manufacturing n.e.c. (2179)	58	58	6	3	9	16%
Fruit and Vegetable Processing (2130)	3	3	1	1	2	67%
Furniture Manufacturing n.e.c. (2929)	38	38	4	0	4	11%
Gas Supply (3620)	6	6	0	6	6	100%
Glass & Glass Product Manufacturing (2610)	5	5	1	1	2	40%
Ice Cream Manufacturing (2122)	1	1	1	0	1	100%
Industrial Gas Manufacturing (2532)	10	10	2	0	2	20%
Ink Manufacturing (2549)	7	7	2	0	2	29%
Inorganic Industrial Chemicals Manufacturing n.e.c. (2535)	1	1	0	0	0	0%
Iron and Steel Casting and Forging (2712)	1	1	0	0	0	0%
Leather Tanning and Fur Dressing (2261)	2	2	0	0	0	0%
Lifting and Material Handling Equipment Manufacturing (2865)	1	1	1	0	1	100%
Medicinal and Pharmaceutical Product Manufacturing (2543)	15	15	3	0	3	20%
Metal Coating and Finishing (2764)	96	96	19	0	19	20%
Metal Container Manufacturing (2751)	3	3	0	0	0	0%
Milk and Cream Processing (2121)	1	1	1	0	1	100%

ANZSIC Class	Number of Businesses Identified	Number of Businesses Surveyed	Number of Businesses Responded	Number of Non-Respondent NPI Businesses	Number of Businesses Included in the Inventory	Percentage of Businesses Included in the Inventory
Mining and Construction Machinery Manufacturing (2862)	9	9	2	0	2	22%
Non-Building Construction n.e.c. (4122)	13	13	2	0	2	15%
Non-Ferrous Metal Casting (2733)	1	1	1	0	1	100%
Nursing Homes (8613)	373	0	0	0	0	0%
Organic Industrial Chemical Manufacturing n.e.c. (2534)	1	1	0	0	0	0%
Paint Manufacturing (2542)	23	23	5	0	5	22%
Paper Product Manufacturing n.e.c. (2339)	5	5	2	1	3	60%
Petroleum and Coal Product Manufacturing n.e.c. (2520)	1	1	1	0	1	100%
Petroleum Product Wholesaling (4521)	80	80	7	14	21	26%
Plaster Product Manufacturing (2632)	2	2	1	0	1	50%
Plastic Bag and Film Manufacturing (2563)	10	10	3	0	3	30%
Plastic Injection Moulded Product Manufacturing (2566)	153	153	11	1	12	8%
Port Operators (6623)	1	1	1	0	1	100%
Prepared Animal and Bird Feed Manufacturing (2174)	3	3	1	1	2	67%
Rail Transport (6200)	1	1	1	0	1	100%
Road and Bridge Construction (4121)	23	23	6	0	6	26%
Rubber Product Manufacturing (2559)	8	8	6	0	6	75%
Shipbuilding (2821)	1	1	0	0	0	0%
Soap and Other Detergent Manufacturing (2545)	7	7	2	0	2	29%
Soft Drink, Cordial and Syrup Manufacturing (2181)	3	3	0	2	2	67%
Solid Paperboard Container Manufacturing (2332)	3	3	2	0	2	67%
Spirit Manufacturing (2184)	3	3	1	0	1	33%
Spring and Wire Product Manufacturing (2762)	13	13	5	1	6	46%
Steel Pipe and Tube Manufacturing (2713)	7	7	3	0	3	43%
Structural Metal Product Manufacturing n.e.c. (2749)	3	3	2	0	2	67%
Structural Steel Fabricating (2741)	1	1	1	0	1	100%
Synthetic Resin Manufacturing (2533)	3	3	1	0	1	33%

ANZSIC Class	Number of Businesses Identified	Number of Businesses Surveyed	Number of Businesses Responded	Number of Non-Respondent NPI Businesses	Number of Businesses Included in the Inventory	Percentage of Businesses Included in the Inventory
Transport Equipment Manufacturing (2829)	1	1	0	0	0	0%
Water Transport Terminals (6622)	2	2	0	0	0	0%
Wood Product Manufacturing n.e.c. (2329)	13	13	2	0	2	15%
Wooden Furniture and Upholstered Seat Manufacturing (2921)	11	11	1	0	1	9%
Wooden Structural Component Manufacturing (2323)	14	14	1	0	1	7%
Total	**6,132**	**3,748**	**493**	**42**	**5,056**	**82%**

3.1 Automotive Fuel Retailing (5321)

3.1.1 Emission Sources and Associated Releases to Air

Service stations have been identified using the following sources:

- NSW WorkCover database for hazardous materials;
- NSW telephone directory; and
- Service station lists from major oil distributors (BP, Shell, Caltex/Ampol and Mobil).

From these sources a total of 2,342 service stations have been identified to be within the GMR.

The emissions sources and associated releases to air from service stations are outlined in Table 3.2.

Table 3.2: Service Stations – Emission Sources

Process	Emissions to Air
Loading storage tanks with petrol	VOCs
Petrol vehicle refuelling	VOCs
Spillage of petrol	VOCs
Petrol storage tank breathing losses	VOCs
Emissions from diesel transfer and storage operations	VOCs

The locations of service stations within the GMR are shown in Figure 3.1.

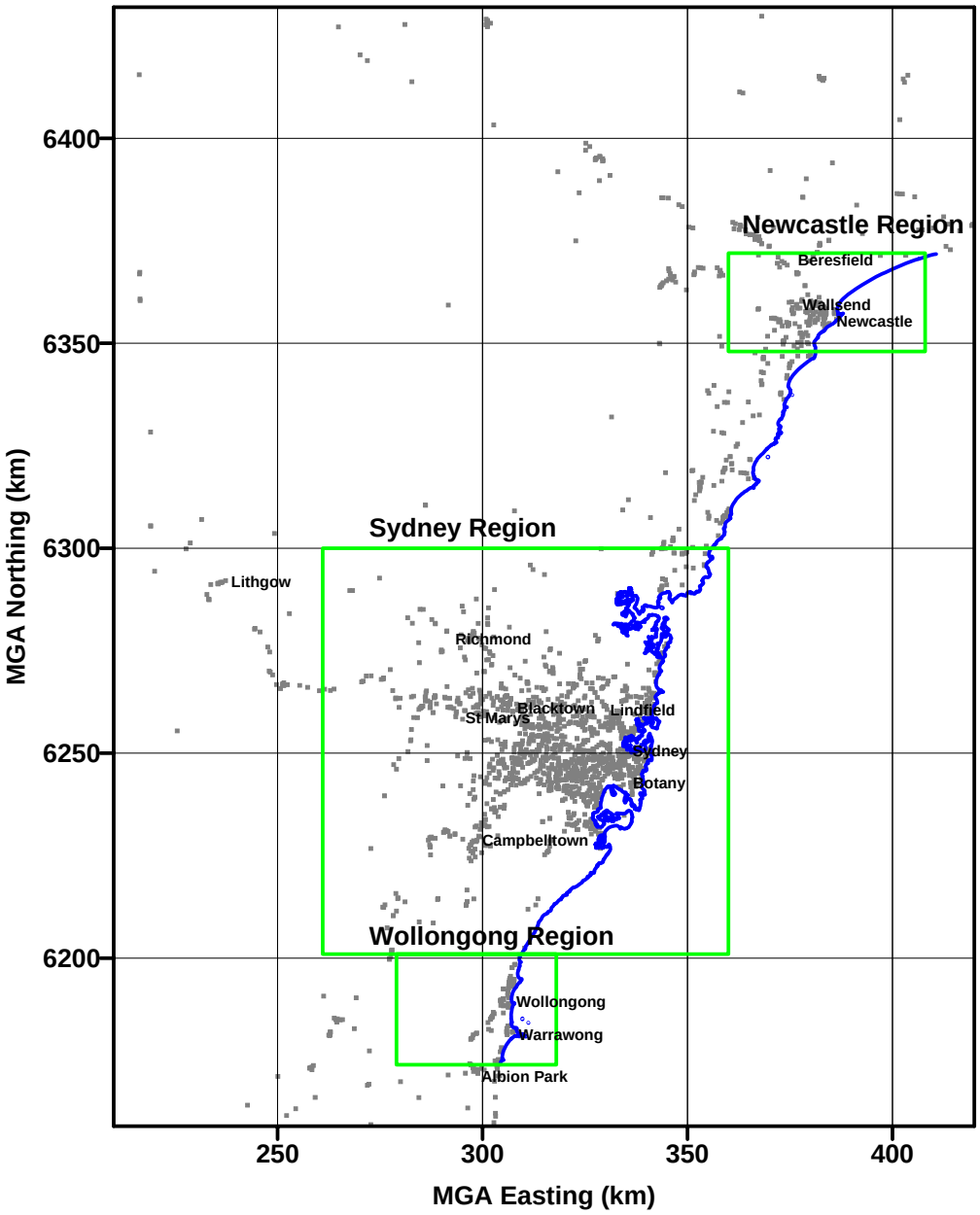

Figure 3.1: Locations of Service Stations Within the GMR

3.1.2 Emissions Estimation Methodology

Emissions from service stations have been estimated using techniques provided in the following documents:

- *NPI Emission Estimation Technique (EET) Manual for Aggregated Emissions from Service Stations* (Environment Australia, 1999a); and
- *NPI EET Manual for Petroleum Refining* (Environment Australia, 1999b).

Emissions from petrol and diesel vapours emitted from service stations have been estimated using vapour phase speciation profiles supplied by BP. The vapour phase speciation profiles used to

estimate speciated organic emissions from petrol and diesel emission from service stations are shown in Table 3.3 and Table 3.4 respectively.

Table 3.3: Petrol Vapour Phase Organic Speciation Profile [a]

Substance	Mass fraction (kg i/kg Total Organic Compound)
ISOMERS OF PENTANE	0.4955
N-BUTANE	0.1333
2-METHYLPENTANE	0.0478
2-METHYL-2-BUTENE	0.0443
2-METHYLPROPANE; ISOBUTANE	0.0305
TRANS-2-PENTENE	0.0294
TRANS-2-BUTENE	0.0283
3-METHYLPENTANE	0.0234
TOLUENE	0.0190
CIS-2-PENTENE	0.0162
2-METHYL-1-BUTENE	0.0113
2,3-DIMETHYLBUTANE	0.0081
BENZENE	0.0078
3-METHYLHEXANE	0.0063
1-PENTENE	0.0055
2-METHYLHEXANE	0.0051
2,2,4-TRIMETHYLPENTANE	0.0049
1-BUTENE	0.0046
N-HEPTANE	0.0039
M-XYLENE	0.0033
CIS-2-BUTENE	0.0030
METHYLCYCLOPENTANE	0.0029
N-HEXANE	0.0022
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0022
2,3-DIMETHYLPENTANE	0.0018
2,4-DIMETHYLPENTANE	0.0016
2,2-DIMETHYLBUTANE	0.0015
2-METHYLHEPTANE	0.0015
CIS-1-2-DIMETHYLCYCLOPENTANE	0.0014
2,4-DIMETHYLHEXANE	0.0014
CIS-1,CIS-2,4-TRIMETHYLCYCLOPENTANE	0.0014
3-METHYLHEPTANE	0.0014
P-XYLENE	0.0012
1,4-PENTADIENE	0.0010
3-ETHYLPENTANE	0.0010
ETHYLBENZENE	0.0010
O-XYLENE	0.0010
2,3-DIMETHYLHEXANE	0.0008
4-METHYLHEPTANE	0.0008
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0007
2,5-DIMETHYLHEXANE	0.0007
3,3-DIMETHYLPENTANE	0.0006
M-ETHYLTOLUENE	0.0006
2,2-DIMETHYLPENTANE	0.0005
CYCLOHEXANE	0.0005
TRANS-1-2-DIMETHYLCYCLOPENTANE	0.0005
2,3,4-TRIMETHYLPENTANE	0.0005
2,3,3-TRIMETHYLPENTANE	0.0005
TRANS-1,CIS-2,3-TRIMETHYLCYCLOPENTANE	0.0004
3-METHYL-1-BUTENE	0.0003

Substance	Mass fraction (kg i/kg Total Organic Compound)
CYCLOPENTENE	0.0003
ETHYLCYCLOPENTANE	0.0003
TRANS-1,2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0003
TRANS-2-ETHYLMETHYLCYCLOPENTANE	0.0003
P-ETHYLTOLUENE	0.0003
1,2,4-TRIMETHYLBENZENE	0.0003
2,2,3-TRIMETHYLBUTANE	0.0002
2,2-DIMETHYLHEXANE	0.0002
3-METHYLOCTANE	0.0002
N-PROPYLBENZENE	0.0002
2,2,3,TRIMETHYLHEXANE	0.0001
4-METHYLOCTANE	0.0001
2-METHYLOCTANE	0.0001
TRANS 1-METHYL-4-ETHYLCYCLOHEXANE	0.0001
N-NONANE	0.0001
2-METHYLNONANE	0.0001
N-DECANE	0.0001

[a] pers. comm. Peter Jones, BP Bulwer Refinery (2001) Average Petrol Vapour Concentration from petrol produced at BP refineries around Australia

Table 3.4: Diesel Vapour Phase Organic Speciation Profile [a]

Substance	Mass fraction (kg i/kg Total Organic Compound)
P-ETHYLTOLUENE	0.1976
1,2,3-TRIMETHYLBENZENE	0.1402
M-ETHYLTOLUENE	0.1200
1,3,5-TRIMETHYLBENZENE	0.1056
O-ETHYLTOLUENE	0.1031
1,2,4-TRIMETHYLBENZENE	0.0752
N-PROPYLBENZENE	0.0613
CUMENE (1-METHYLETHYLBENZENE)	0.0504
O-XYLENE	0.0469
M-XYLENE	0.0433
TOLUENE	0.0277
N-DODECANE	0.0082
ETHYLBENZENE	0.0059
N-TRIDECANE	0.0055
N-TETRADECANE	0.0040
N-UNDECANE	0.0027
N-PENTADECANE	0.0014
HEXADECANE	0.0003
N-HEPTADECANE	0.0001

[a] pers. comm. Peter Jones, BP Bulwer Refinery (2001) Average Diesel Vapour Concentration from diesel produced at BP refineries around Australia

More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.1.3 Activity Data and Assumptions

All 2,342 service stations were sent commercial survey questionnaires to collect site-specific activity data. Responses received indicate that 252 identified businesses in the initial list were either not service stations or located outside of the GMR, leaving a total of 2,089 service stations in the commercial emission inventory. 239 responses were received from service stations with useful information (i.e. a response rate of approximately 11%).

Total petroleum product sale data by state have been obtained from the Department of Industry, Tourism and Resources (DITR, 2005). Data obtained from DITR includes:

- Total petrol fuel sold in 2003 in NSW (to petrol retailers) = 4,756,831 kL;
- Total diesel fuel sold in 2003 in NSW = 967,332 kL; and
- Total LPG fuel sold in 2003 in NSW = 431,348 kL.

The total fuel sold in the GMR has been estimated using population of NSW and the GMR assuming that petrol throughput is proportional to population. The total population of the GMR accounts for approximately 75% of the total population of NSW. Therefore the estimated amounts of fuel types sold in the GMR are:

- Total petrol sold in 2003 = 3,733,100 kL;
- Total diesel fuel sold in 2003 = 723,000 kL; and
- Total LPG fuel sold in 2003 = 337,400 kL.

Analysis of the responses received from surveyed service stations shows that the total fuel sold from respondent businesses accounts for:

- 974,400 kL or 27% of total petrol sold in the GMR;
- 167,900 kL or 23% of total diesel sold in the GMR; and
- 56,900 kL or 18% of total LPG sold in the GMR.

Therefore, on average, the businesses that responded to the commercial survey have above average fuel throughput and respondent businesses account for approximately 27% of total emissions from automotive fuel retailing.

The total annual petrol throughput at service stations that is unaccounted for by survey responses is 2,581,000 kL. To distribute this petrol throughput to the 1,851 service stations that did not respond to the survey, the petrol throughput data suppled in returned surveys have been analysed to derive a distribution of petrol throughput. Businesses have been separated into size categories of:

- < 3000 kL petrol throughput;
- 3,001 – 6,000 kL petrol throughput;
- 6,001 – 9,000 kL petrol throughput;
- 9,001 – 12,000 kL petrol throughput; and
- > 12,000 kL petrol throughput.

The percentage of service stations in each category and the average petrol throughput has been derived from the survey responses. Using the derived percentage of service stations in each

category, businesses that did not respond to the commercial survey have been randomly allocated a size category and corresponding petrol throughput amount, ensuring that the distribution of service stations in each size category is consistent with respondent businesses. However, as survey responses were received from service stations that have an above average fuel throughput, this resulted in an overestimation of total petrol throughput in the GMR. Therefore, the estimated petrol throughput for non-respondent businesses has been adjusted consistently so that the total petrol throughput for non-respondent businesses is equal to 2,581,000 kL.

Stage 1 vapour recovery (VR1) is the control of petrol vapour displaced from petrol storage tanks during filling operations. Currently, stage one vapour recovery (VR1) is mandated for service stations within the Sydney Metropolitan Area (SMA), with the exception of the Hawkesbury local government area (LGA). A survey of 101 service stations within the SMA indicates that 97% of service stations within the SMA have VR1 equipment. Therefore, it has been assumed that 97% of service stations within the SMA have VR1 controls when filling underground storage tanks with petrol. A 95% control efficiency has been assumed for VR1 control. Further, it has been assumed that all service stations located outside of the SMA do not have VR1 controls.

The total annual diesel throughput at service stations that is unaccounted for by survey responses is 555,100 kL. Diesel throughput has been distributed to non-respondent businesses evenly by dividing the number of non-respondent businesses by the total diesel fuel unaccounted in survey responses. Therefore, the estimated diesel throughput for each business that did not submit a survey response is 300 kL/year.

LPG loss at service stations is estimated to be 0.04 kg/ML (Environment Australia, 1999a). Therefore, the total estimated emissions from LPG distribution at service stations in the GMR are 13.5 kg/year or 0.006 kg per business per year. Consequently, emissions from LPG distribution at service stations are deemed to be negligible in this study.

3.1.4 Temporal Variation of Emissions

Loading Storage Tanks With Petrol

Monthly temporal factors have been determined based on the difference in petrol Reid Vapour Pressure (RVP) and fuel temperature between summer and winter in Sydney (assuming fuel temperature in summer equals 22°C and fuel temperature in winter equals 12°C). The derived monthly temporal factors for petrol fuel loading are shown in Table 3.5.

Table 3.5: Temporal Factors for Loading Storage Tanks with Petrol

Month	Temporal Factor
January	1.11
February	1.11
March	1.03
April	0.94
May	0.94
June	0.94
July	0.94
August	0.94
September	0.94
October	0.94
November	1.03
December	1.11

Emissions resulting from the transfer of petrol to storage tanks are generally dependent on delivery schedules of tankers. Data provided in returned commercial survey questionnaires have been analysed to determine the delivery times of tankers for service stations. While there are no set times restricted for tankers to deliver fuel to service stations, there are common time phases at which tankers delivered fuel to service stations determined from returned commercial survey questionnaires.

Results from the analysis shows that:

- 72% of deliveries occur between the hours of 12 am and 12 pm with 50% of these deliveries occurring between 12 am and 4 am;
- 4% of deliveries occur between the hours of 12 pm and 6 pm; and
- 24% of deliveries occur between the hours of 6 pm and 12 am with 82% of these deliveries occurring between the hours of 9 pm and 12 am.

This analysis allows for the derivation of the diurnal temporal profile shown in Table 3.6.

Table 3.6: Diurnal Temporal Factors from the Loading of Fuel to Storage Tanks at Service Stations

Time Phase	Time of the Day	Temporal Factor
Morning	12 am – 1 am	1.00
	1 am – 2 am	1.00
	2 am – 3 am	1.00
	3 am – 4 am	1.00
	4 am – 5 am	0.46
	5 am – 6 am	0.46
	6 am – 7 am	0.46
	7 am – 8 am	0.46
	8 am – 9 am	0.46
	9 am – 10 am	0.46
	10 am – 11 am	0.46
	11 am – 12 pm	0.46
Afternoon	12 pm – 1 pm	0.07
	1 pm – 2 pm	0.07
	2 pm – 3 pm	0.07
	3 pm – 4 pm	0.07
	4 pm – 5 pm	0.07
	5 pm – 6 pm	0.07
Evening	6 pm – 7 pm	0.15
	7 pm – 8 pm	0.15
	8 pm – 9 pm	0.15
	9 pm – 10 pm	0.70
	10 pm – 11 pm	0.70
	11 pm – 12 am	0.70

Loading of fuel to storage tanks from delivery tankers have been determined to occur approximately 3 to 4 times a week, with the ratio between weekday and weekend being approximately 4:1. The variation of emissions by day of week are provided in Table 3.7

Table 3.7: Weekly Temporal Factors for Service Station Fuel Loading

Day Type	Temporal Factor
Weekday	5
Weekend	0.5

Due to the fact that emissions from the transfer of diesel to storage tanks are significantly lower than petrol, temporal variation of emissions for diesel transfer has been assumed to remain constant throughout the day and year.

Petrol Storage Tank Breathing Losses

Breathing losses from petrol storage tanks vary according to temperature fluctuation of tanks and pressure differences in the atmosphere. As storage tanks at service stations are located underground, fluctuation of temperature inside the tanks has been assumed to be minimal. Hence emissions have been assumed to emit at a steady state throughout the day and year.

Petrol Vehicle Refuelling

Monthly temporal factors have been determined based on the difference in petrol Reid Vapour Pressure (RVP) and temperature between summer and winter in Sydney. The derived monthly temporal factors are shown in Table 3.8.

Table 3.8: Temporal Factors for Vehicle Refuelling

Month	Temporal Factor
January	1.10
February	1.10
March	1.02
April	0.95
May	0.95
June	0.95
July	0.95
August	0.95
September	0.95
October	0.95
November	1.02
December	1.10

The distribution of vehicles travelling by time of the day on weekdays and weekends for 2001 in *Car Travel in Sydney: Changes in the Last Decade* (TPDC, 2005) has been used to derive temporal factors of vehicle travel. It has been assumed that emissions from petrol vehicle refuelling are proportional to the relative VKT for any hour in a day. The derived temporal factors for petrol vehicle refuelling are provided in Table 3.9. It has been assumed that all petrol stations operate 24 hours per day as emissions between 10 pm and 6 am account for only 5% of total petrol vehicle refuelling emissions.

Table 3.9: Temporal Factors Describing Diurnal Emission Variation from Petrol Vehicle Refuelling

Time	Weekday Temporal Factor	Weekend Temporal Factor
12 am – 1 am	0.12	0.31
1 am – 2 am	0.08	0.15
2 am – 3 am	0.05	0.11
3 am – 4 am	0.12	0.11
4 am - 5 am	0.61	0.31
5 am – 6 am	2.43	0.77
6 am – 7 am	4.86	1.70
7 am – 8 am	8.01	3.25
8 am – 9 am	8.26	5.42
9 am – 10 am	5.46	8.75
10 am – 11 am	5.10	8.68
11 am – 12 pm	5.16	8.68
12 pm – 1 pm	5.22	8.21
1 pm – 2 pm	5.10	7.59
2 pm – 3 pm	4.98	6.51
3 pm – 4 pm	7.29	6.51
4 pm – 5 pm	8.14	6.66
5 pm – 6 pm	7.29	6.35
6 pm – 7 pm	7.89	5.97
7 pm – 8 pm	4.86	4.65
8 pm – 9 pm	3.16	3.10
9 pm – 10 pm	2.19	2.01
10 pm – 11 pm	1.82	1.70
11 pm – 12 am	1.21	1.55

Weekly temporal factors have been estimated based on weekday versus weekend traffic flow. It has been estimated that weekend traffic is approximately half the traffic flow of a weekday. The temporal factors for weekday and weekend day for vehicle refuelling are provided in Table 3.10.

Table 3.10: Weekly Temporal Factors for Service Station Petrol Vehicle Refuelling

Day Type	Temporal factor
Weekday	5
Weekend	1

Spillage of Petrol

As spillages are often associated with nozzle drip and spit back during vehicle refuelling, temporal variation of emissions from spillage of petrol are assumed to be proportional to the relative VKT for any hour in a day (i.e. the same diurnal and 'week day/weekend day' temporal factors as petrol vehicle refuelling). The derived diurnal temporal factors are provided in Table 3.9 and Table 3.10.

It has been assumed that the monthly vehicle travel is consistent throughout the year. Therefore, monthly emissions (per day) from the spillage of petrol have been assumed to be constant.

Diesel Emissions

Emissions from diesel transfer and storage operations have been estimated using a constant emission factor from the *NPI EET Manual for Aggregated Emissions from Service Stations* (Environment Australia, 1999a). The default emission factor estimates emissions from tank filling, vehicle refuelling losses and tank breathing. Each diesel emission source would have a different temporal profile and contribute different amounts to total diesel emissions. Further, diesel is much

less volatile than petrol and generally accounts for less than 5% of total VOC emissions from a service station. Therefore, it has been assumed that diesel emissions are constant, seven days per week, 24 hours per day.

3.1.5 Emissions Estimation

Estimated emissions from service station businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.11.

Table 3.11: Estimated Emissions from Service Stations

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	27,200	3,380	2,550	11,400	44,500
CARBON MONOXIDE	0	0	0	0	0
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	27,400	3,130	2,170	10,100	42,800
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0	0
PARTICULATE MATTER 10µm	0	0	0	0	0
PARTICULATE MATTER 2.5µm	0	0	0	0	0
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	68,700	8,460	6,320	28,300	112,000
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	0	0
TOTAL VOCS	3,458,000	427,000	320,000	1,433,000	5,600,000
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.1.6 Projection Factors

Projection factors for emissions from service stations have been derived based on population projections provided by the Transport and Population Data Centre (ABS, 2001; TPDC, 2004), NSW Department of Planning. TPDC provided population data on a 1 km by 1 km resolution for the entire GMR for the years 2001, 2006, 2011, 2016, 2021, 2026 and 2031. Projection factors have been derived for each year by interpolating the population data for the GMR between each year provided. Comparisons between population projections and projections for petrol fuel demand in NSW for the years 2004 to 2013 provided in *NSW Transport Facts* (Apelbaum, 2005) have been made to validate the approach. Comparisons show that projections based on population growth vary less than 5% when compared to projections provided in Apelbaum (2005) for the period 2004 to 2013. Projected population data are available for the period 2004 to 2031, therefore, this surrogate has been chosen over the data set for NSW petrol fuel demand.

The total population for the GMR provided by TPDC and the interpolated population for every year is shown in Figure 3.2

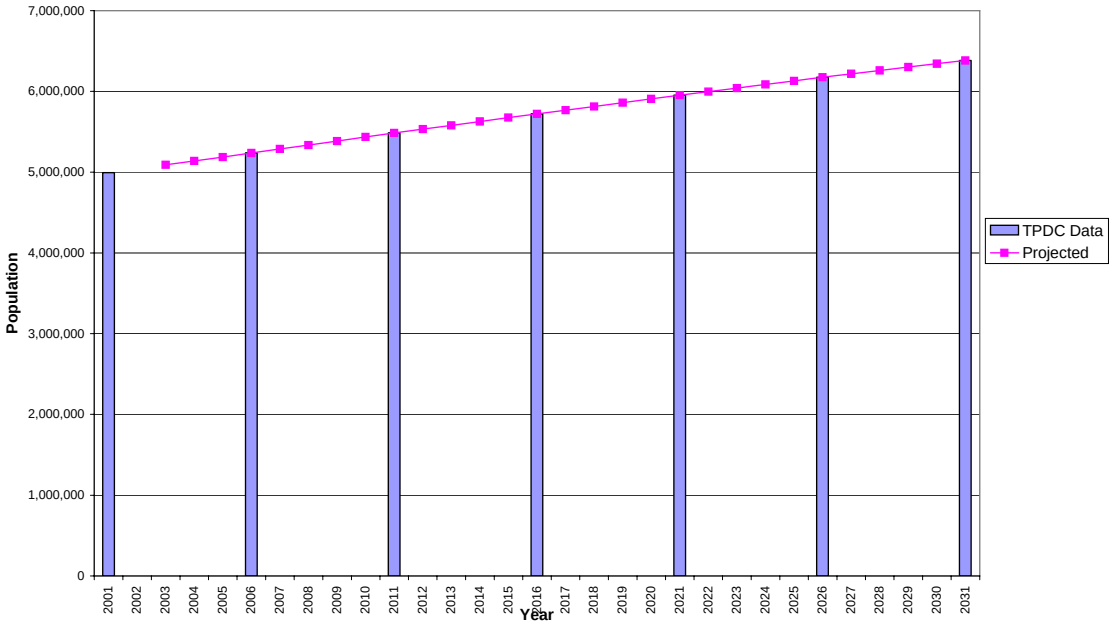

Figure 3.2: Total Population Data and Derived Projected Population for the GMR

The projection factors for service stations for every year are provided in Table 3.12

Table 3.12: Projection Factors Based on Population Growth in the GMR

Year	Population	Projection Factor
2003	5,091,366	1.0000
2004	5,139,643	1.0095
2005	5,187,921	1.0190
2006	5,236,198	1.0284
2007	5,286,032	1.0382
2008	5,335,865	1.0480
2009	5,385,699	1.0578
2010	5,435,532	1.0676
2011	5,485,366	1.0774
2012	5,532,565	1.0867
2013	5,579,765	1.0959
2014	5,626,964	1.1052
2015	5,674,164	1.1145
2016	5,721,363	1.1237
2017	5,767,510	1.1328
2018	5,813,657	1.1419
2019	5,859,804	1.1509
2020	5,905,950	1.1600
2021	5,952,097	1.1691
2022	5,996,685	1.1778
2023	6,041,272	1.1866
2024	6,085,860	1.1953
2025	6,130,448	1.2041
2026	6,175,035	1.2128
2027	6,216,713	1.2210
2028	6,258,391	1.2292
2029	6,300,068	1.2374
2030	6,341,746	1.2456
2031	6,383,424	1.2538

[a] Source: Transport and Population Data Centre, NSW Department of Planning (ABS, 2001; TPDC, 2004)

3.2 Smash Repairing (5323)

3.2.1 Emission Sources and Associated Releases to Air

Smash repair businesses have been identified using the following sources:

- NSW WorkCover database for hazardous materials; and
- NSW telephone directory.

The businesses have been cross checked against a list of approved smash repairers provided by the Motor Vehicle Repair Industry Authority (MVRIA). In total, 1,258 smash repair businesses have been identified to be within the GMR.

Emissions from smash repair businesses are generally due to the use of automotive surface coatings of namely primer, lacquers, paint, thinners, adhesives and enamel.

The emission sources and associated releases to air for smash repairing are outlined in Table 3.13

Table 3.13: Smash Repairing - Emission Sources

Operation	Emissions to Air
Motor vehicle refinishing	VOCs

The locations of smash repairers within the GMR are shown in Figure 3.3.

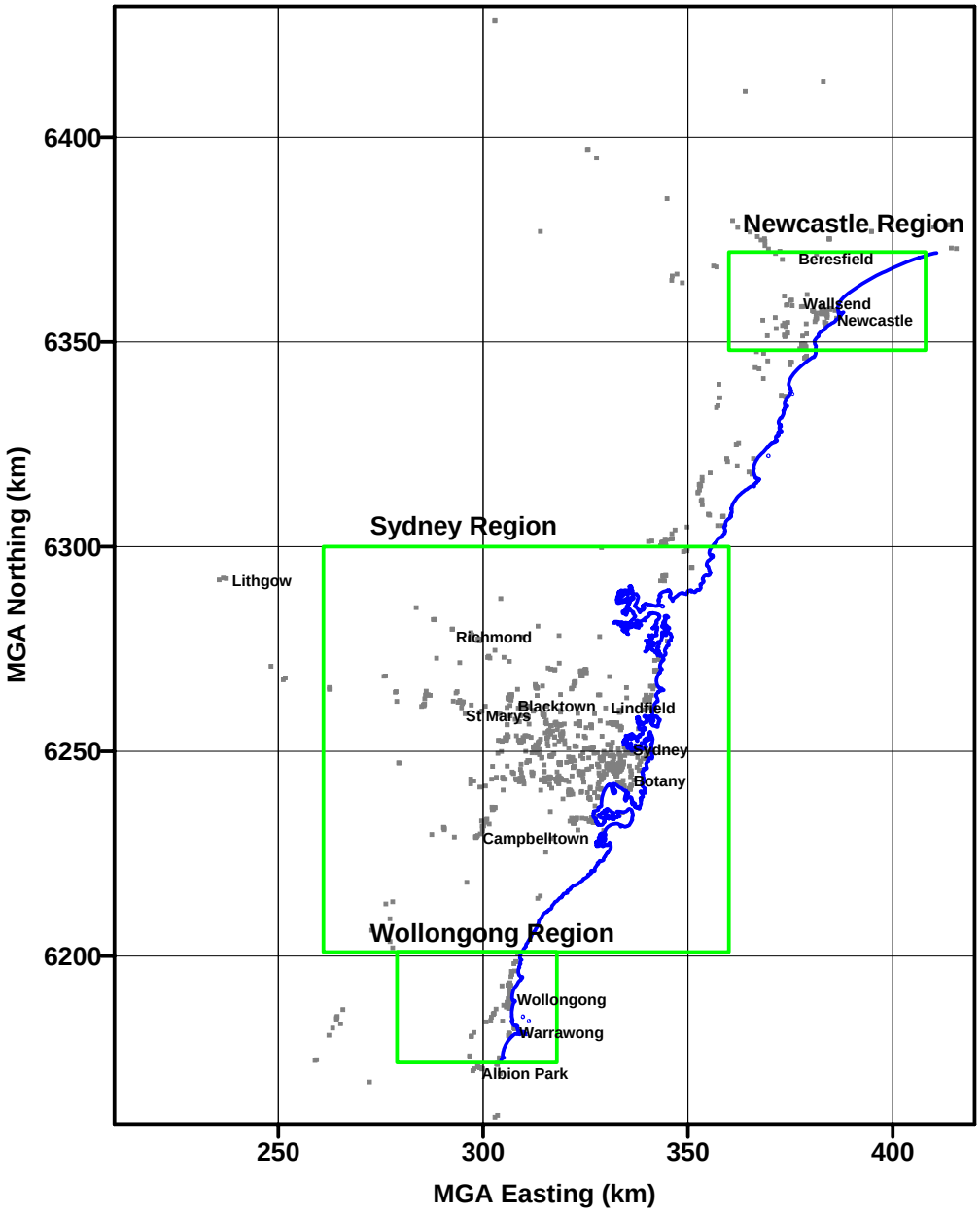

Figure 3.3: Locations of Smash Repairers Within the GMR

3.2.2 Emissions Estimation Methodology

Emissions from each source have been estimated using techniques outlined in the *NPI EET Manual for Aggregated Emissions from Motor Vehicle Refinishing* (Environment Australia, 1999c). More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.2.3 Activity Data and Assumptions

10% of smash repair businesses (i.e. 126 businesses) identified were selected at random and sent commercial survey questionnaires to collect activity data to estimate the average surface coating usage by a smash repair business. However, responses were received from only 3 businesses (a response rate of approximately 2%). This response rate was not enough to determine typical surface coating consumption by a smash repair business. Therefore, the total consumption of surface coatings consumed by the smash repair industry was sourced from the Australian Paint Manufactures Federation (APMF, 2005) for NSW for the year 2003. The consumption of surface coating within the GMR was estimated to be proportional to the population of NSW and the GMR. The estimated consumption of surface coating within the GMR and the consumption data provided for NSW by the APMF are shown in Table 3.14.

Table 3.14: Annual Consumption of Automotive Surface Coatings by the Smash Repair Industry in the NSW and GMR Regions

Coating Type	VOC Content (kg/Litre) [a]	NSW	GMR
		Usage [b] (Litres)	Estimated Usage [c] (Litres)
Primer	0.792	953,862	715,296
Lacquers	0.732	1,341,400	1,006,050
Enamels	0.420	1,921,785	1,441,339
Thinners	0.883	3,385,989	2,539,492
Paint (solvent based)	0.672	1,812,516	1,359,387
Adhesive	0.528	951,238	713,428

[a] Source: *NPI EET Manual for Aggregated Emissions from Motor Vehicle Refinishing* (Environment Australia, 1999c)
[b] Source: APMF (2005)
[c] The rate of consumption in the GMR is assumed to be proportional to population. The population of the GMR is approximately 75% the population of NSW

Surface coating usage has been spatially allocated to each business in proportion to the population in each local government area (LGA) compared with the total population in the GMR. The total surface coating usage in each LGA has been divided by the total number of smash repairers in each LGA to estimate the amount of surface coating usage for each business.

3.2.4 Temporal Variation of Emissions

Emissions from surface coatings and solvents are generally emitted during the application and drying phase of the process. The typical operating hours of smash repairers have been determined from a number of smash repairing businesses provided in the Auto Repairs Directory of Sydney (Sydney Auto Repairers Directory, 2005). The temporal variation of emissions based on operating hours have been assumed to be constant on weekdays from 7.30 am to 5.30 pm and only Saturdays from 7.30 am to 1 pm. No monthly variations in emissions are assumed to occur during the year.

3.2.5 Emissions Estimation

Estimated emissions from smash repairing businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.15.

Table 3.15: Estimated Emissions from Smash Repairing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0	0	0	0
CARBON MONOXIDE	0	0	0	0	0
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	265,000	17,900	13,000	41,900	337,000
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0	0
PARTICULATE MATTER 10µm	0	0	0	0	0
PARTICULATE MATTER 2.5µm	0	0	0	0	0
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	1,093,000	73,900	53,800	173,000	1,394,000
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	0	0
TOTAL VOCS	4,266,000	289,000	210,000	676,000	5,440,000
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.2.6 Projection Factors

Projection factors for smash repair businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that growth in the smash repair sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.3 Laundries & Dry Cleaners (9521)

3.3.1 Emission Sources and Associated Releases to Air

Laundry and dry cleaning businesses have been identified using the following sources:

- NSW WorkCover database for hazardous materials; and
- NSW telephone directory.

A total of 561 businesses have been identified to be within the GMR.

The emission sources and associated releases to air for dry cleaning are outlined in Table 3.16.

Table 3.16: Dry Cleaning – Emission Sources

Operation	Emissions to Air
Dry cleaning	VOCs

The locations of laundries and dry cleaning businesses are shown in Figure 3.4.

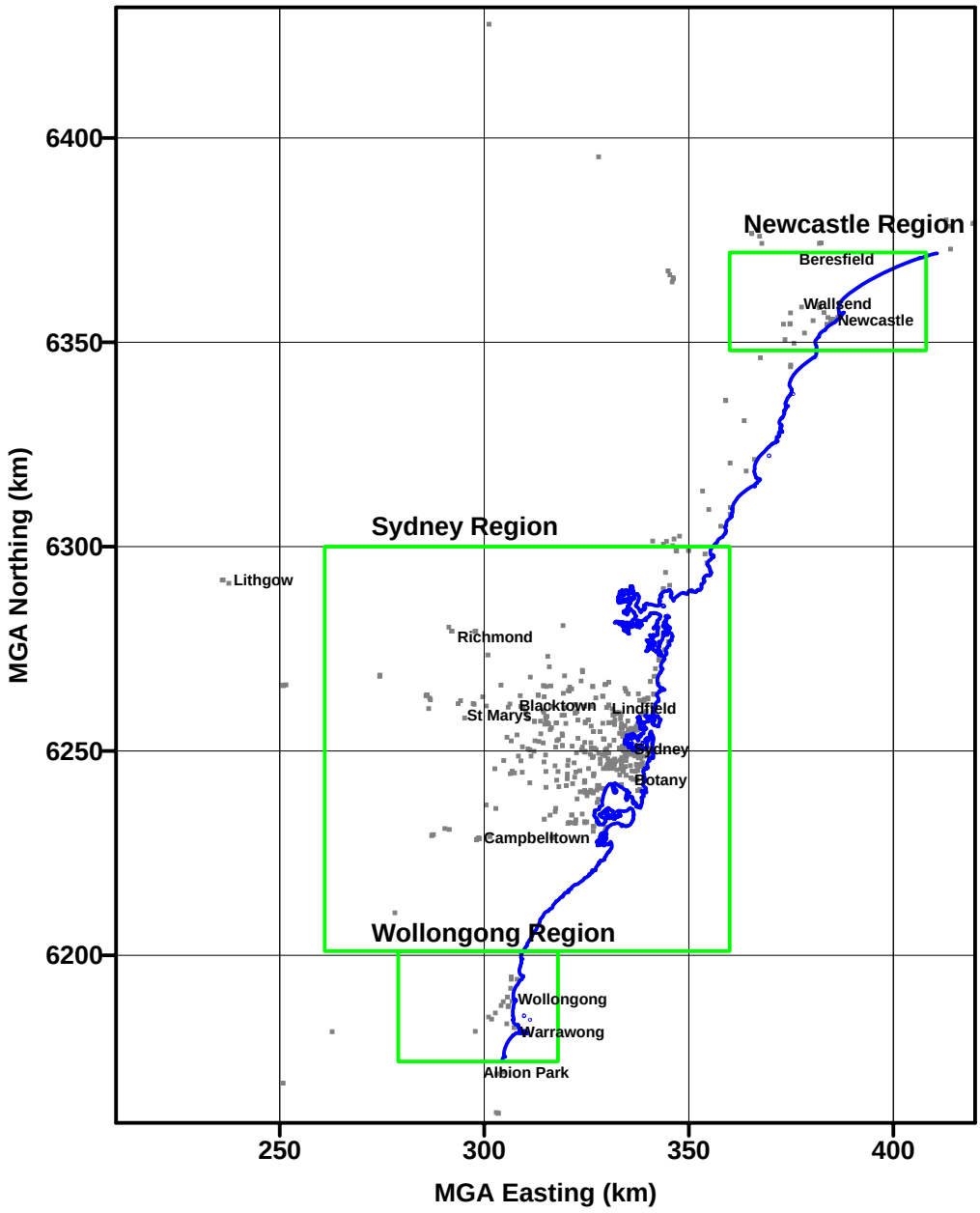

Figure 3.4: Locations of Dry Cleaners Within the GMR

3.3.2 Emissions Estimation Methodology

Emissions from dry cleaning businesses have been estimated using techniques outlined in the *NPI EET Manual for Aggregated Emissions from Dry Cleaning* (Environment Australia, 1999d). More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.3.3 Activity Data and Assumptions

10% of laundry and dry cleaning businesses (i.e. 56 businesses) identified were selected at random and sent commercial survey questionnaires to collect activity data to estimate the average solvent usage by a business. However, responses were received from only 5 businesses (i.e. a response rate of approximately 9%). This response rate was not enough to determine typical solvent usage by a dry cleaning business. Therefore, the total consumption of perchloroethylene solvent of 350 tonnes per year for the NSW region was sourced from Stelco Chemicals (pers. comm. A Bradley, 17/03/2005) and used to calculate emissions. The amount of perchloroethylene used in the GMR was estimated to be 263 tonnes/year (the population of the GMR accounts for approximately 75% of the population of NSW). Data on white solvent usage were not available from the Dry Cleaning Association of Australia or from Stelco Chemicals. Therefore, the ratio of perchloroethylene usage to white solvent usage presented in the 1992 NSW Metropolitan Air Quality Study (Carnovale et. al., 1997) was used to estimate the usage of white solvent within the GMR. Therefore, it was estimated that 13.4 tonnes per year of white solvent is consumed within the GMR.

Solvent usage has been spatially allocated to each business in proportion to the population in each local government area (LGA) compared with the total population in the GMR. The total solvent usage in each LGA has been divided by the number of laundries and dry cleaners in each LGA to estimate the amount of solvent usage for each business.

3.3.4 Temporal Variation of Emissions

VOC emissions from solvents to air are generally emitted during the washing and drying operations of the dry cleaning business. The typical operating hours of dry cleaning businesses have been determined from respondent businesses. The temporal variation of emissions based on operating hours have been assumed to be constant on weekdays from 8 am to 6 pm and only Saturday from 8 am to 1 pm. No monthly variations in emissions are assumed to occur during the year.

3.3.5 Emissions Estimation

Estimated emissions from dry cleaning businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.17.

Table 3.17: Estimated Emissions from Dry Cleaning

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	2.70	0	0	0	2.70
CARBON MONOXIDE	453	0	0	0	453
FORMALDEHYDE	5.39	0	0	0	5.39
ISOMERS OF XYLENE	473	24	19.0	67.1	583
LEAD & COMPOUNDS	0.0027	0	0	0	0.0027
OXIDES OF NITROGEN	539	0	0	0	539
PARTICULATE MATTER 10µm	41	0	0	0	41
PARTICULATE MATTER 2.5µm	41	0	0	0	41
PERCHLOROETHYLENE	205,000	12,500	9,920	34,900	262,000
POLYCYCLIC AROMATIC HYDROCARBONS	0.0037	0	0	0	0.0037
SULFUR DIOXIDE	2.82	0	0	0	2.82
TOLUENE	63.2	3.14	2.49	8.78	77.6
TOTAL SUSPENDED PARTICULATES (TSP)	41	0	0	0	41
TOTAL VOCS	217,000	13,200	10,400	36,700	277,000
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.3.6 Projection Factors

Projection factors for dry cleaning businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that growth in the laundries and dry cleaning sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.4 Poultry Farming (014)

3.4.1 Emission Sources and Associated Releases to Air

NSW Department of Primary Industries (DPI) and Australian Egg Corporation Limited (AECL) provided a list of contracted poultry farming businesses for meat chicken (broiler), laying hens and turkey (pers. comm. G Bolla, 14/03/2005 (DPI) and pers. comm. J Kellaway 17/03/2005 (AECL)). These businesses have been included in the emissions inventory.

The emission sources considered from poultry farming and associated releases to air are outlined in Table 3.18.

Table 3.18: Poultry Farming - Emission Sources

Process	Emissions to Air
Poultry shed	PM, NH_3

The locations of poultry farming businesses within the GMR are shown in Figure 3.5.

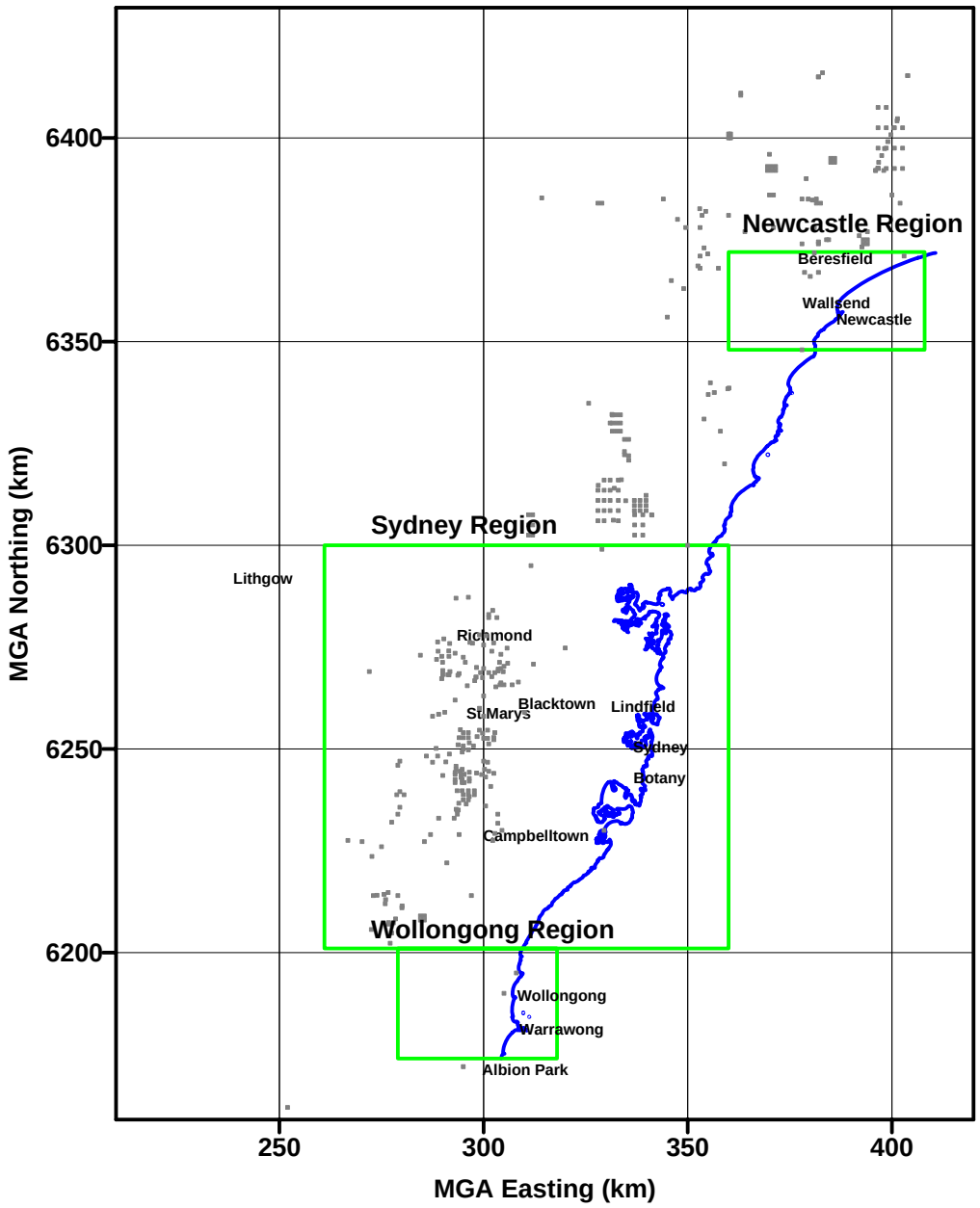

Figure 3.5: Locations of Poultry Farms Within the GMR

3.4.2 Emissions Estimation Methodology

Emissions from each source have been estimated using techniques provided in the *NPI EET Manual for Intensive Livestock – Poultry Raising v1.0* (Environment Australia, 2002a). More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.4.3 Activity Data and Assumptions

Data provided by DPI and AECL for each poultry farming business includes:

- The shed floor space per farm for broiler and turkey raising businesses;
- An average stocking density of 15 birds per square metre for meat chicken farms; and
- The number of birds per egg layer chicken businesses.

Where no data are available, the average number of birds per farm has been used. The total number of farms and total number of birds by stock type are provided in Table 3.19.

Table 3.19: Total Number of Birds and Poultry Farms [a]

Poultry Farm Type	Number of Farms Identified	Number of Birds
Broiler	272	18,272,700
Turkey	52	2,580,300
Laying hens	50	6,755,000

[a] Data provided by DPI

3.4.4 Temporal Variation of Emissions

Ammonia and particulate emissions from poultry raising are assumed to be constant throughout the day and year.

3.4.5 Emission Estimation

Estimated emissions from poultry farming for the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.20.

Table 3.20: Estimated Emissions from Poultry Farms[a]

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [b]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0	0	0	0
CARBON MONOXIDE	0	0	0	0	0
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	0	0	0	0	0
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0	0
PARTICULATE MATTER 10µm	1,359,000	46,200	10,600	1,019,000	2,435,000
PARTICULATE MATTER 2.5µm	388,400	13,200	3,041	291,000	696,000
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	0	0	0	0	0
TOTAL SUSPENDED PARTICULATES (TSP)	2,774,000	94,300	21,700	2,080,000	4,970,000
TOTAL VOCS	0	0	0	0	0
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] All emissions estimated from broiler, turkey and egg chicken poultry farms
[b] Totals may not appear additive due to rounding

It should be noted that the age of turkeys and laying hens have been assumed to be greater than 7 months and 18 weeks respectively as no data are available on chicken size. This provides ammonia emission from poultry raising to be estimated using the highest emission rate provided in the NPI for worst case emission estimation.

3.4.6 Projection Factors

Projection factors for poultry farms have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that growth in the poultry farming sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.5 Hospitals (8611)

3.5.1 Emission Sources and Associated Releases to Air

Hospitals in the GMR have been identified using the NSW Health Services Directory provided by NSW Health (NSW Health, 2005). A total of 146 hospitals have been identified to be within the GMR.

The emission sources and associated releases to air from hospitals are outlined in Table 3.21

Table 3.21: Hospitals – Emission Sources

Operation	Emissions to Air
Combustion	Combustion products
Solvent usage	VOCs

The locations of hospitals within the GMR are shown in Figure 3.6.

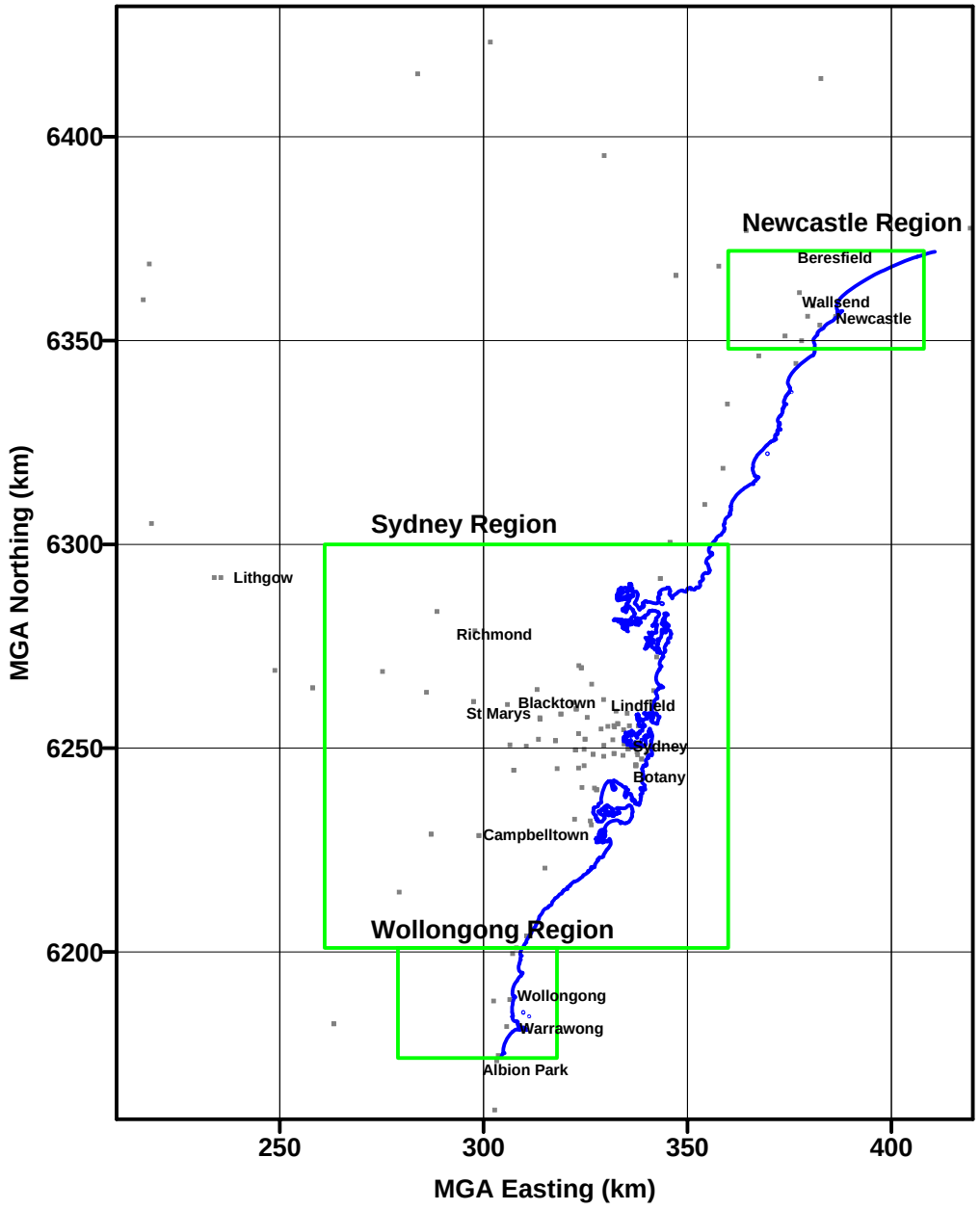

Figure 3.6: Locations of Hospitals Within the GMR

3.5.2 Emissions Estimation Methodology

Emissions from each source have been estimated using techniques outlined in the following documents:

- *NPI EET Manual for Combustion Engines v2.3* (DEH, 2003); and
- *NPI EET Manual for Combustion in Boilers v1.2* (Environment Australia, 2003a).

More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.5.3 Activity Data and Assumptions

All hospitals were sent a commercial survey questionnaire to collect activity data. Reponses were received from 43 hospitals (i.e. a response rate of 30%). Data provided in returned commercial survey questionnaires have been used to estimate site-specific emissions from the 43 hospitals. Analysis of the returned commercial survey questionnaires shows that the number of hospitals with natural gas combustion, diesel combustion and LPG combustion is 22, 3 and 1 respectively. Some hospitals have no fuel usage and hence no air emissions.

Activity data for the 103 hospitals that did not respond to the commercial survey questionnaire have been estimated based on data provided in the returned commercial survey questionnaires.

It has been assumed that all non-respondent hospitals combust natural gas. Based on the data provided, natural gas consumption per bed has been estimated for five size ranges of hospitals as provided in Table 3.22.

Table 3.22: Estimated Natural Gas Consumption per Bed for Hospitals

Number of Beds	Estimated Natural Gas Combusted per Bed (Mm^3/bed/year)
≤ 76	2.7×10^{-7}
77 - 114	4.4×10^{-6}
115 - 146	6.1×10^{-4}
147 - 180	6.2×10^{-3}
≥ 181	6.2×10^{-2}

The number of beds at each non-respondent hospital business have been obtained from the NSW Health Services Directory. Bed data are available for 74 hospitals that did not respond to the commercial survey questionnaire. Where bed data are not available from the NSW Health Services Directory, it has been assumed that the hospital has 215 beds. This is equivalent to the 95th percentile of hospitals with bed data available.

It has been assumed that emissions are released from stacks from non-respondent hospitals with the following stack parameters:

- Stack height = 15 m
- Stack diameter = 0.2 m
- Exit velocity = 10 m/s
- Exit temperature = 423 K

These have been assumed based on typical values supplied in returned commercial survey questionnaires.

3.5.4 Temporal Variation of Emissions

Temporal variation of emissions are assumed to remain constant throughout the day and year.

3.5.5 Emissions Estimation

Estimated emissions from hospitals within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.23

Table 3.23: Estimated Emissions from Hospitals

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0.04	8.3	0	1.68	10.1
ACETALDEHYDE	0	0	0	0	0
BENZENE	4,140	250	420	1,800	6,620
CARBON MONOXIDE	695,000	41,500	71,100	302,600	1,110,000
FORMALDEHYDE	8,275	490	847	3,600	13,200
ISOMERS OF XYLENE	0	0	0	0	0
LEAD & COMPOUNDS	4.1	0.2	0.4	1.8	6.6
OXIDES OF NITROGEN	827,000	50,400	84,700	361,000	1,323,000
PARTICULATE MATTER 10µm	62,900	3,820	6,440	27,400	101,000
PARTICULATE MATTER 2.5µm	62,900	3,820	6,440	27,400	101,000
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	5.69	0.39	0.58	2.49	9.15
SULFUR DIOXIDE	4,320	351	442	1,900	7,020
TOLUENE	2,070	122	212	900	3,300
TOTAL SUSPENDED PARTICULATES (TSP)	62,900	3,830	6,440	27,400	100,500
TOTAL VOCS	45,500	2,800	4,660	19,800	72,800
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.5.6 Projection Factors

Projection factors for hospitals have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that growth in the hospital sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.6 Wine Manufacturing (2183)

3.6.1 Emission Sources and Associated Releases to Air

Wine manufacturers have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 129 wine manufacturers have been identified from these sources to be within the GMR.

The emission sources and associated releases to air from wine manufacturing are outlined in Table 3.24.

Table 3.24: Wine Manufacturing – Emission Sources

Process	Operation	Emissions to Air
Red wine production	Pomace screening	VOCs
	Pomace pressing	VOCs
	Fermentation	VOCs
	Bottling	VOCs
White wine production	Fermentation	VOCs
	Bottling	VOCs
Wastewater vaporisation		VOCs
Fuel storage		VOCs

The locations of wine manufacturers within the GMR are shown in Figure 3.7.

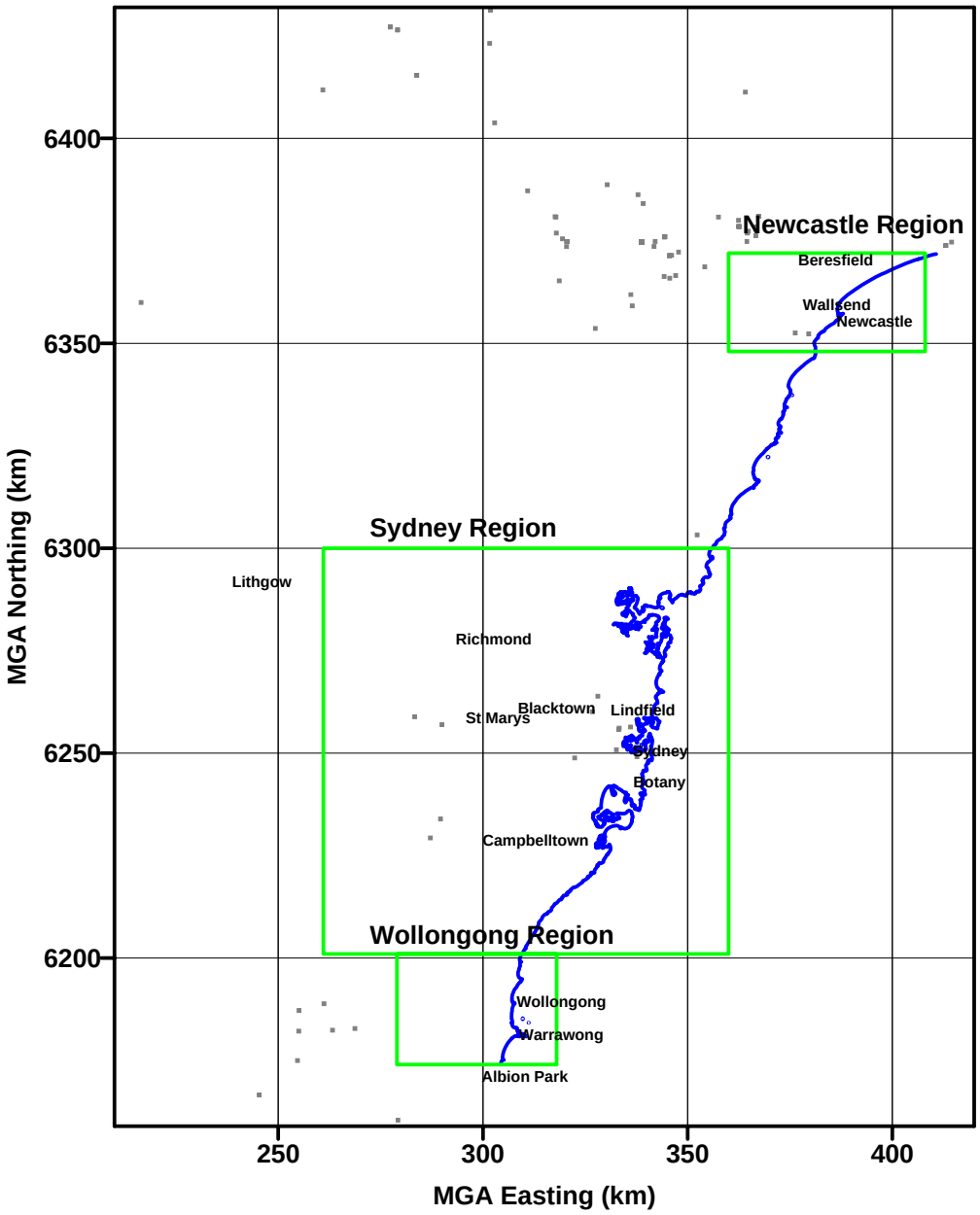

Figure 3.7: Locations of Wine Manufacturers Within the GMR

3.6.2 Emissions Estimation Methodology

Emissions from wine manufacturing have been estimated using data supplied in returned commercial survey questionnaires and techniques provided in the following documents:

- *NPI EET Manual for Wine and Spirits Manufacturing v1.1* (DEH, 2005);
- *NPI EET Manual for Fuel and Organic Liquid Storage, v2.4* (DEH, 2004); and
- *Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks 2002 – Waste* (NGGIC, 2004).

More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.6.3 Activity Data and Assumptions

Site specific data supplied in the returned commercial survey questionnaires have been used for emissions estimation when provided. Completed commercial survey questionnaires were received from sixteen businesses. However, only twelve businesses provided usable data. The number of wine manufacturers identified in the GMR and the number of respondent businesses are provided in Table 3.25.

Table 3.25: Number of Wine Manufacturing Businesses in the GMR and the Number of Respondent Businesses

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Response Rate (%)
Wine manufacturing (2183)	129	12	9.3

Emissions from non-respondent businesses have been estimated by using an average production rate for each business. The total production rate of wine from non-respondent businesses has been determined by estimating total wine production in the GMR and subtracting the amount of wine produced by respondent businesses. The average wine production rate for each non-respondent business is then determined by dividing this value by the number of non-respondent businesses.

The following assumptions and source data have been included in the estimate:

- The annual wine production in NSW is approximately 396,155 kL for 2003 (ABS, 2005a);
- It has been assumed that wineries in the GMR produce 60% of the wines in NSW (Grape and Wine Research Development Corporation, 2004). Therefore, the annual wine production in the GMR is estimated to be 237,700 kL/year;
- Total wine produced by respondent businesses from returned commercial survey questionnaires is approximately 5,960 kL. Therefore, it is estimated that 231,700 kL/year of wine are produced by non-respondent businesses;
- It has been assumed that each business produces the same amount of wine. Therefore, it is estimated that the amount of wine produced per non-respondent business is 1980 kL/year; and
- It has been assumed that the split between red and white wine production is approximately 30:70, determined from the wine manufactures in the Hunter Valley for 2003/2004 (Grape and Wine Research Development Corporation, 2004).

The estimated amount of wine produced per winery by non-respondent businesses are presented in Table 3.26.

Table 3.26: Amount of Wine Produced per Winery by Non-Respondent Businesses

Wine Type	Amount of Wine Produced per Winery (L/year)
Red	595,000
White	1,385,000
Total	**1,980,000**

Although some businesses do not manufacture wine but are grape growers, it has been assumed that these grapes are pressed and fermented within the GMR. Based on data provided by respondent businesses, it has been assumed that all wine manufacturing businesses treat wastewater. The average capacity is assumed to be 1,600 m^3/year. Data used to estimate emissions from non-respondent wine manufacturing businesses are presented in Table 3.27.

Table 3.27: Emission Sources and Estimation Data Used for Non–Respondent Wine Manufacturing Businesses

Emission Sources	Inputs for Emission Estimation
Pomace screening (red grapes)	595,000 L/year
Pomace pressing (red grapes)	595,000 L/year
Fermentation (red grapes)	595,000 L/year
Bottling (red grapes)	595,000 L/year
Fermentation (white grapes)	1,385,000 L/year
Bottling (white grapes)	1,385,000 L/year
Wastewater vaporisation	1600 m^3/year

[a] Biological oxygen demand of wastewater is assumed to be 35 kg/m^3 (National Greenhouse Gas Inventory Committee, 1996)

3.6.4 Temporal Variation of Emissions

Temporal variation of emissions has been estimated based on data provided in returned commercial survey questionnaires. It has been assumed that emissions remain constant throughout the operating hours of the business from 6 am to 3 pm each day, for 7 days a week. Monthly temporal factors are provided in Table 3.28.

Table 3.28: Temporal Variation of Emissions by Month[a]

Month	Proportion
January	0.50
February	1.66
March	1.67
April	1.67
May	0.75
June	0.75
July	0.50
August	0.50
September	0.50
October	0.50
November	0.50
December	0.50

[a] Temporal variation of emissions provided by Tamburlain Wines

3.6.5 Emissions Estimation

Estimated emissions from wine manufacturing within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.29.

Table 3.29: Estimated Emissions from Wine Manufacturing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0.08	0.01	0	0.82	0.9
BENZENE	0.3	0.04	0	2.65	3.0
CARBON MONOXIDE	0.2	0	0	0	0.2
FORMALDEHYDE	0.5	0.08	0	4.6	5.1
ISOMERS OF XYLENE	3.7	0.7	0	37.7	42
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	1.8	0	0	0	1.8
PARTICULATE MATTER 10µm	0.05	0	0	0	0.05
PARTICULATE MATTER 2.5µm	0.05	0	0	0	0.05
PERCHLOROETHYLENE	5.3	1.0	0	54.5	61
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	3.14	0.6	0	31.4	35
TOTAL SUSPENDED PARTICULATES (TSP)	0.06	0	0	0	0.06
TOTAL VOCS	7,740	1,400	0	75,100	84,290
TRICHLOROETHYLENE (TCE)	0.7	0.1	0	6.66	7.4

[a] Totals may not appear additive due to rounding

3.6.6 Projection Factors

Projection factors for wine manufacturing have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that growth in the wine manufacturing sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.7 Construction Material Mining (141)

3.7.1 Emission Sources and Associated Releases to Air

Construction material mines have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 64 commercial construction material mines have been identified from these sources to be within the GMR. The emission sources and associated releases to air for construction material mining are outlined in Table 3.30.

Table 3.30: Construction Material Mining - Emission Sources

Operation	Process	Emissions to Air
Drilling and blasting	Drilling	PM
	Blasting	PM
Miscellaneous transfers	Miscellaneous transfers	PM
Crushing	Primary	PM
	Secondary	PM
	Tertiary	PM
Screening	Primary, secondary and tertiary screening	PM
Fuel storage		VOCs
Wind erosion	Exposed areas & stockpiles	PM

The locations of commercial construction material mining businesses are shown in Figure 3.8.

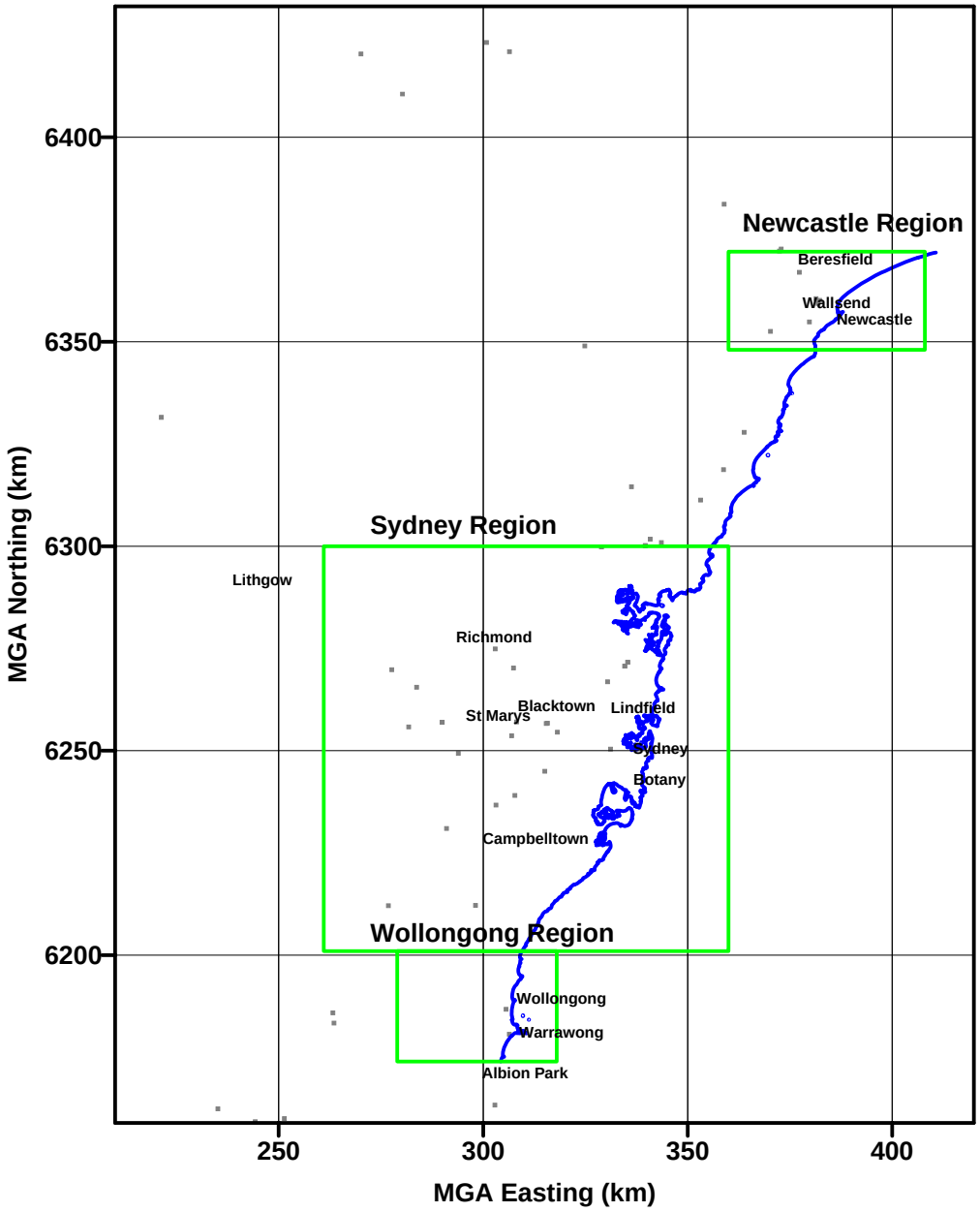

Figure 3.8: Locations of Commercial Construction Material Mines Within the GMR

3.7.2 Emissions Estimation Methodology

Emissions from each source have been estimated using techniques provided in the *NPI EET Manual for Mining v2.3* (Environment Australia, 2001a). More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.7.3 Activity Data and Assumptions

All 64 identified construction material mining businesses were sent commercial surveys. The number of respondent businesses is provided in Table 3.31.

Table 3.31: Number of Construction Material Mining Businesses in the GMR and the Number of Respondent Businesses

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Response Rate (%)
Gravel and sand quarrying (1411)	60	3	5.0
Construction material mining (1419)	2	1	50
Total	**64**	**4**	**6.5**

Site specific data supplied in the returned commercial survey questionnaires from respondent businesses have been used for emissions estimation when provided. Further, air emissions reported to the NPI have also been included from non-respondent commercial construction material mining businesses.

Activity data for non-respondent commercial construction material mining businesses have been estimated based on data extracted from the following references:

- *New South Wales Industrial Minerals Database*, NSW Department of Mineral Resources (DMR, 2003);
- *Supply and Demand for Construction Sand in the Sydney Planning Region*, NSW Department of Mineral Resources (DMR, 2001a);
- *Structural Clay/Shale Resources of the Sydney Region*, NSW Department of Mineral Resources (DMR, 2001b); and
- *Supply and Demand for Coarse Aggregate in the Sydney Planning Region*, NSW Department of Mineral Resources (DMR, 2000).

These references have been queried to retrieve business and annual production data for all material extraction sites located within the GMR. The business list was cross-checked with licensed premises and all licensed (i.e. industrial) businesses have been removed. Further, businesses that ceased production before 2003 have been removed.

If no data were available from the DMR references, it has been assumed that each business has the air emission sources detailed in Table 3.32. Furthermore, if no production data were available from the DMR references it has been assumed that the annual production at each business is equal to the median value of all identified non-licensed material extraction sites. The median production quantity from all non-licensed sites has been determined from the *New South Wales Industrial Minerals Database* (DMR, 2003) to be 17,500 tonnes per year. The activity data assumed in order to estimate emissions from each emission source are provided in Table 3.32.

Table 3.32: Emission Sources and Estimation Data Used for Non–Respondent Businesses

Emission Source	Inputs for Emission Estimation
Drilling	260 holes/year
Blasting [a,b,c]	431 m^2 /blast
Stockpile loading	17,500 tonnes/year
Stockpile unloading	17,500 tonnes/year
Primary crushing	17,500 tonnes/year
Secondary crushing	17,500 tonnes/year
Tertiary crushing	17,500 tonnes/year
Screening	17,500 tonnes/year
Material loaded onto trucks	17,500 tonnes/year
Fuel storage (diesel)	1.8 kg VOCs/year
Wind erosion (exposed area) [d,e]	30,000 m^2
Wind erosion (stockpiles) [d,e]	7725 m^2

[a] Moisture content of material was estimated to be 2% (Environment Australia, 2003c)
[b] Average depth of blast was assumed to be 20 m
[c] Number of blasts per year was assumed to be 10
[d] Silt content was assumed to be 15%

3.7.4 Temporal Variation of Emissions

Data provided in returned commercial survey questionnaires have been used to estimate temporal variation of emissions for respondent businesses. Temporal variation of emission sources from construction material mining businesses have been assumed to remain constant throughout the operating hours of the businesses. Monthly variations have been assumed to vary directly in proportion to production variations provided in returned commercial survey questionnaires. Temporal variation of emission sources from non-respondent businesses have been estimated based on the response provided for a typical 'small to medium' sized quarry which indicates that the typical operating hours are from 6 am to 4 pm on weekdays.

3.7.5 Emissions Estimation

Estimated emissions from commercial construction material mining businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.33.

Table 3.33: Estimated Emissions from Construction Material Mining

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0	0	0	0
CARBON MONOXIDE	0	0	0	0	0
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	4.31	1.19	0.32	4.34	10.2
LEAD & COMPOUNDS	1.50	0.27	0.073	1.30	3.14
OXIDES OF NITROGEN	0	0	0	0	0
PARTICULATE MATTER 10µm	560,000	114,500	32,700	594,400	1,300,300
PARTICULATE MATTER 2.5µm	136,000	24,480	7,370	137,690	306,300
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	1.32	0.37	0.010	1.33	3.12
TOTAL SUSPENDED PARTICULATES (TSP)	2,280,000	284,000	97,600	2,048,900	4,716,000
TOTAL VOCS	47.7	13.2	3.6	48.1	113
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.7.6 Projection Factors

Projection factors for construction material mining have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. Population was chosen as an ideal surrogate to estimate the growth in the construction material mining sector as historical data show that over long periods (i.e. > 10 years), consumption of coarse aggregate and construction sand per capita in the Sydney region has remained relatively constant (DMR, 2000; DMR, 2001a). The projection factors are described in Section 3.1.6.

3.8 Funeral Directors, Crematoria & Cemeteries (9524)

3.8.1 Emission Sources and Associated Releases to Air

Twenty-one crematoria businesses have been identified within the NSW GMR region through consultation with the Environmental Health Branch of the NSW Government. Commercial survey questionnaires were sent to crematoria businesses to collect activity data and responses were received from 9 businesses (representing a response rate of 42.9%).

The emission source and associated release to air from funeral directors and cemeteries is outlined in Table 3.34.

Table 3.34: Funeral Directors and Cemeteries – Emission Sources

Operation	Emissions to Air
Crematory	Combustion products

The locations of crematoria businesses within the GMR are shown in Figure 3.9.

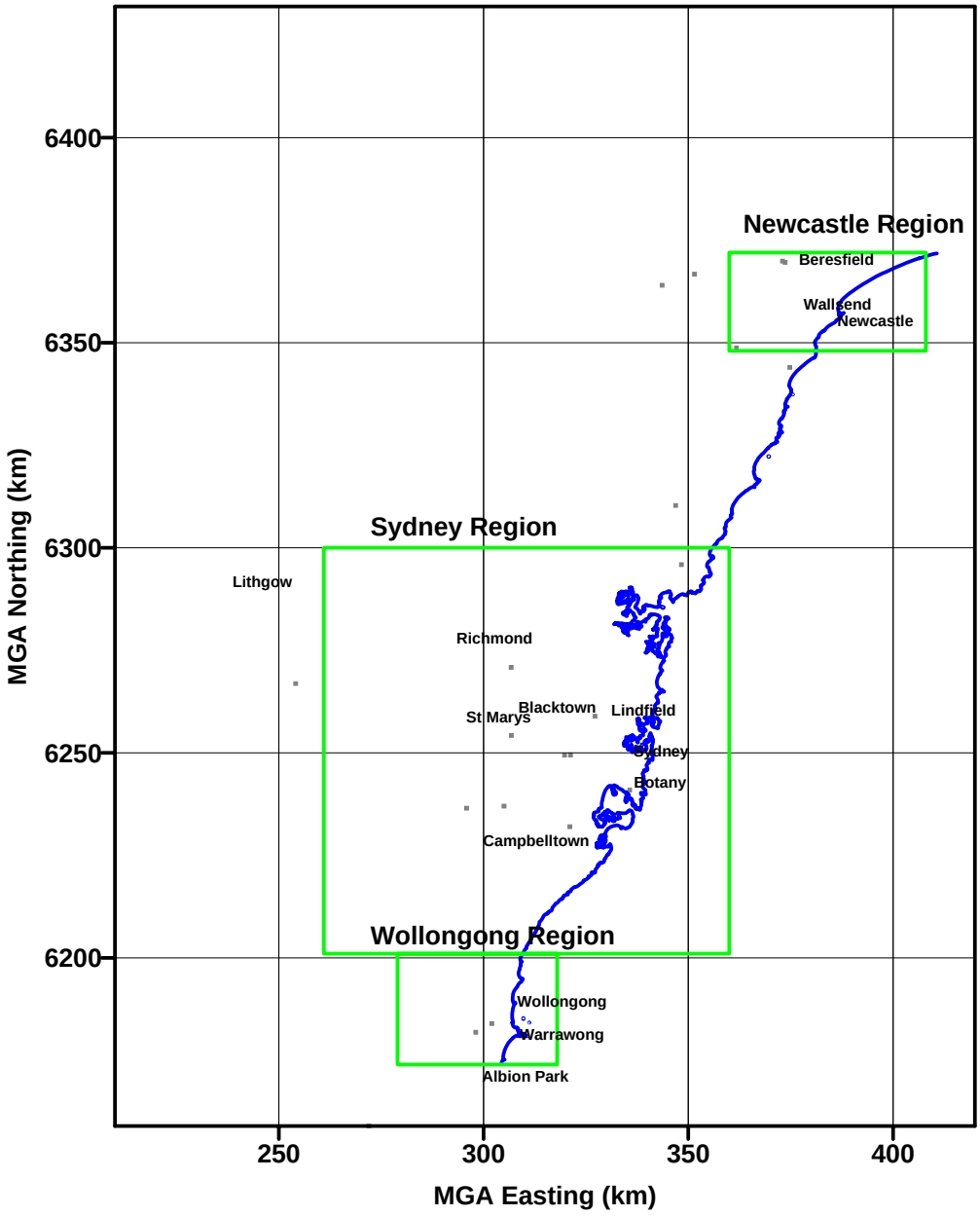

Figure 3.9: Locations of Crematoria Within the GMR

3.8.2 Emissions Estimation Methodology

Emissions from crematoria businesses have been estimated using techniques outlined in *Evaluation Test on Two Propane Fired Crematories at Camellia Memorial Lawn Cemetery* (CARB, 1992). More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.8.3 Activity Data and Assumptions

Data received in returned commercial survey questionnaires have been used to estimate emissions from these businesses.

Emissions from non respondent businesses have been estimated using the following methodology:

- The number of deaths in 2003 in NSW is approximately 46,061 (NSW Registry of Births Deaths and Marriages, 2005). The number of deaths that occurred within the GMR has been estimated by assuming that the rate of death is proportional to population (i.e. approximately 75% of NSW population are in the GMR). Therefore, the number of deaths in the GMR is estimated to be 34,546 in 2003.
- Based on information from the Parliament of NSW it is estimated that 70% of Sydneysiders are cremated after death (Parliament of NSW, 1995). Therefore, it is estimated that 24,182 cremations occur per year in the GMR. The number of cremations performed by the respondent businesses is 15,245 per year. Therefore, it is estimated that 8,937 cremations occur at non-respondent businesses at an average rate of 745 deaths cremated per year per business.

The stack parameters have been estimated based on average stack parameters provided in returned commercial survey questionnaires from respondent businesses. The assumed stack parameters are:

- Stack height = 8 m
- Stack diameter = 0.7 m
- Exit velocity = 15.4 m/s
- Exit temperature = 635 K

3.8.4 Temporal Variation of Emissions

Emissions are assumed to be constant during normal operating hours for crematoria businesses. Data provided in returned commercial survey questionnaires have been used to estimate temporal variation of emissions. Typical operating hours of crematoria have been assumed to be weekdays from 7 am to 5 pm and 9 am to 1 pm on Saturday. No monthly variations in emissions have been assumed to occur during the year.

3.8.5 Emissions Estimation

Estimated emissions from funeral directors, crematoria and cemeteries within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.35.

Table 3.35: Estimated Emissions from Funeral Directors, Crematoria and Cemeteries

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0	0	0	0
CARBON MONOXIDE	2,040	400	152	795	3,390
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	0	0	0	0	0
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	4,490	880	334	1,750	7,450
PARTICULATE MATTER 10µm	0.37	0.07	0.03	0.14	0.61
PARTICULATE MATTER 2.5µm	0.25	0.05	0.02	0.1	0.41
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	791	155	59	308	1,310
TOLUENE	0	0	0	0	0
TOTAL SUSPENDED PARTICULATES (TSP)	1.23	0.24	0.09	0.48	2.04
TOTAL VOCS	0	0	0	0	0
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.8.6 Projection Factors

Projection factors for crematoria businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that the number of cremations per year is proportional to population. The projection factors are described in Section 3.1.6.

3.9 Printing, Publishing and Recorded Media (24)

3.9.1 Emission Sources and Associated Releases to Air

Printing, publishing and recorded media businesses have been identified using the following sources:

- NSW WorkCover database for hazardous materials; and
- NSW telephone directory.

A total of 70 commercial businesses have been identified to be within the GMR.

The emission sources and associated releases to air for printing and graphical arts are outlined in Table 3.36.

Table 3.36: Printing and Graphical Arts - Emission Sources

Operation	Processes	Emissions to Air
Printing operations	Presses Cleaning operations Ink mixing operations Ink storage tanks Storage tanks to store inks, solvents and other organic substances such as fuel	VOCs
Combustion		Combustion products

The locations of printing businesses within the GMR are shown in Figure 3.10.

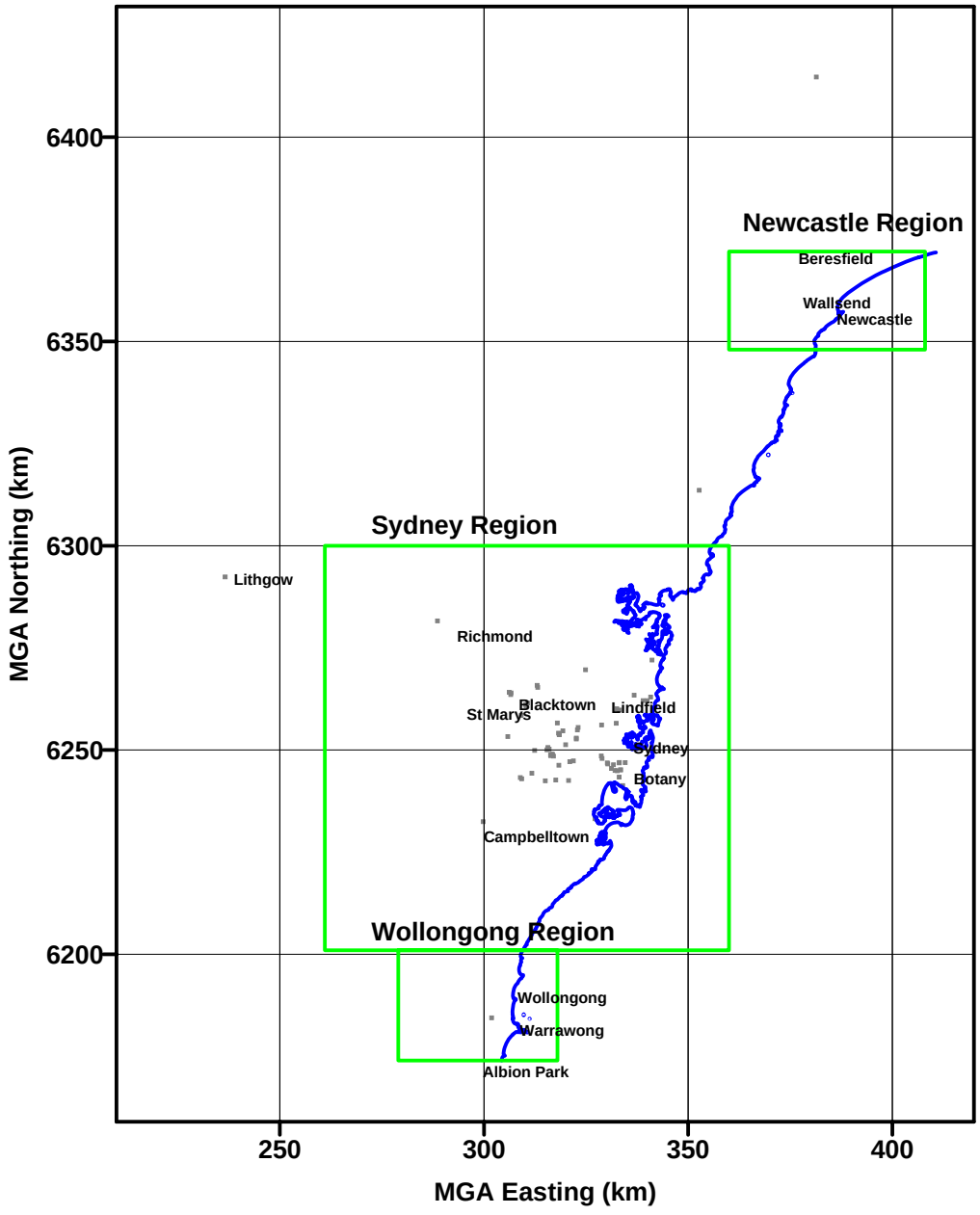

Figure 3.10: Locations of Printing Businesses Within the GMR

3.9.2 Emissions Estimation Methodology

Emissions from each source have been estimated using techniques outlined in the *NPI EET Manual for Aggregated Emissions from Printing and Graphical Arts* (Environment Australia, 1999e). More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.9.3 Activity Data and Assumptions

Emissions from respondent businesses have been estimated based on data provided in returned commercial survey questionnaires. Emissions reported to the NPI have also been included in the emissions inventory.

Emissions from non-respondent businesses have been included in the inventory using the following methodology:

- Total VOC emissions from the printing and graphical arts sector have been estimated using the emission factor presented in the *NPI EET Manual for Aggregated Emissions from Printing and Graphic Arts* (Environment Australia, 1999e) of 169 kg VOCs per employee per year;
- A total of 88,600 full time persons are employed in Australia in the printing, publishing and recorded media sector (ANZSIC class 24) for 2004 (ABS, 2005b);
- 39% of printing businesses in Australia are located in New South Wales (PIAA, 2001);
- It is assumed that the number of businesses is proportional to the number of employees in the industry. Therefore, it is estimated that 34,554 persons are employed in NSW by the printing, publishing and recorded media industries;
- The printing, publishing and recorded media ANZSIC subdivision includes the following classes:
  - 2411 Paper stationery manufacturing
  - 2412 Printing
  - 2413 Services to printing
  - 2421 Newspaper printing or publishing
  - 2422 Other periodical publishing
  - 2423 Book and other publishing
  - 2430 Recorded media mfg and publishing

  The ANZSIC class 2430 does not perform printing activities and comprise 15.2% of all businesses in the printing, publishing and recorded media industries (ABS, 2005b). Assuming that each business employs the same number of people, the estimated number of employees involved in the printing industry in NSW is 29,288;
- The population of the GMR is approximately 75% of the total population of NSW. Therefore, it is estimated that 22,000 people are employed in the printing industry in the GMR;
- Using the employee based emission factor of 169 kg VOC per employee per year provides an estimated VOC emission of 3,712,592 kg per year for the entire printing industry.

However, emissions from printing already included in the industrial emissions inventory account for 2,418,029 kg VOC per year from the printing and recorded media sector. Therefore, emissions from commercial businesses involved in printing, publishing and recorded media have been estimated to be 1,294,563 kg VOCs/year;

- Emissions from respondent commercial printing businesses account for 164,691 kg per year. Therefore, emissions from non-respondent printing businesses have been estimated to account for 1,129,872 kg VOCs per year; and
- Emissions have been spatially allocated to each business in proportion to the population in each local government area (LGA) compared with the total population in the GMR. The total emissions in each LGA have been divided by the total number of printing businesses in each LGA to estimate the site specific emissions.

Other assumptions included in the estimation of emissions from the printing industry are outlined as follows:

- All emissions from proofing presses, cleaning, ink storage and ink mixing for non-respondent businesses are assumed to be accounted for in the employee based EET;
- All VOCs contained in inks are assumed to escape to the atmosphere and no emission control technologies are used by all businesses; and
- Non-heat set inks are assumed to be used by respondent businesses that did not provide the ink type used in the returned commercial survey questionnaire. Non-heat set inks have the highest emission rate, therefore, this technique is a worst case approach to emissions estimation.

3.9.4 Temporal Variation of Emissions

VOC emissions from the use of ink and solvent emitted during the application, clean up and drying phases have been assumed to be constant throughout the operating hours of the business from 6 am to 6 pm from Monday to Saturday.

3.9.5 Emissions Estimation

Estimated emissions from printing businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.37.

Table 3.37: Estimated Emissions from Printing, Publishing and Recorded Media

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	21.5	0	0	0	21.5
CARBON MONOXIDE	3,020	0	0	0.03	3,020
FORMALDEHYDE	42,400	0	0	175	42,500
ISOMERS OF XYLENE	0	0	0	0	0
LEAD & COMPOUNDS	0.02	0	0	0	0.02
OXIDES OF NITROGEN	4,690	0	0	0.04	4,690
PARTICULATE MATTER 10µm	327	0	0	0.003	327
PARTICULATE MATTER 2.5µm	327	0	0	0.003	327
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.03	0	0	0	0.03
SULFUR DIOXIDE	22.5	0	0	0	22.5
TOLUENE	10.8	0	0	0	10.8
TOTAL SUSPENDED PARTICULATES (TSP)	327	0	0	0.003	327
TOTAL VOCS	1,169,000	0	70,600	55,500	1,295,000
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.9.6 Projection Factors

Projection factors for printing businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that growth in printing sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.10 Plastic Product Rigid Fibre Reinforced Manufacturing (2564)

3.10.1 Emission Sources and Associated Releases to Air

Plastic product rigid fibre reinforced manufacturing (fibreglass) businesses have been identified using the following sources:

- NSW WorkCover database for hazardous materials; and
- NSW telephone directory.

A total of 87 commercial businesses have been identified to be within the GMR.

The emission sources and associated releases to air for fibreglass manufacturing are summarised in Table 3.38.

Table 3.38: Plastic Product Rigid Fibre Reinforced Manufacturing – Emission Sources

Source	Emissions to Air
Resin application	VOCs
Gel coat application	VOCs
Filament winding	VOCs
Spray booth	VOCs
Gel coat oven	VOCs
Mixing tanks	VOCs
Curing oven	VOCs
Grinding/sanding	PM
Storage of organic chemicals	VOCs
Equipment and tool clean up	VOCs

The locations of fibreglass manufacturing businesses are shown in Figure 3.11.

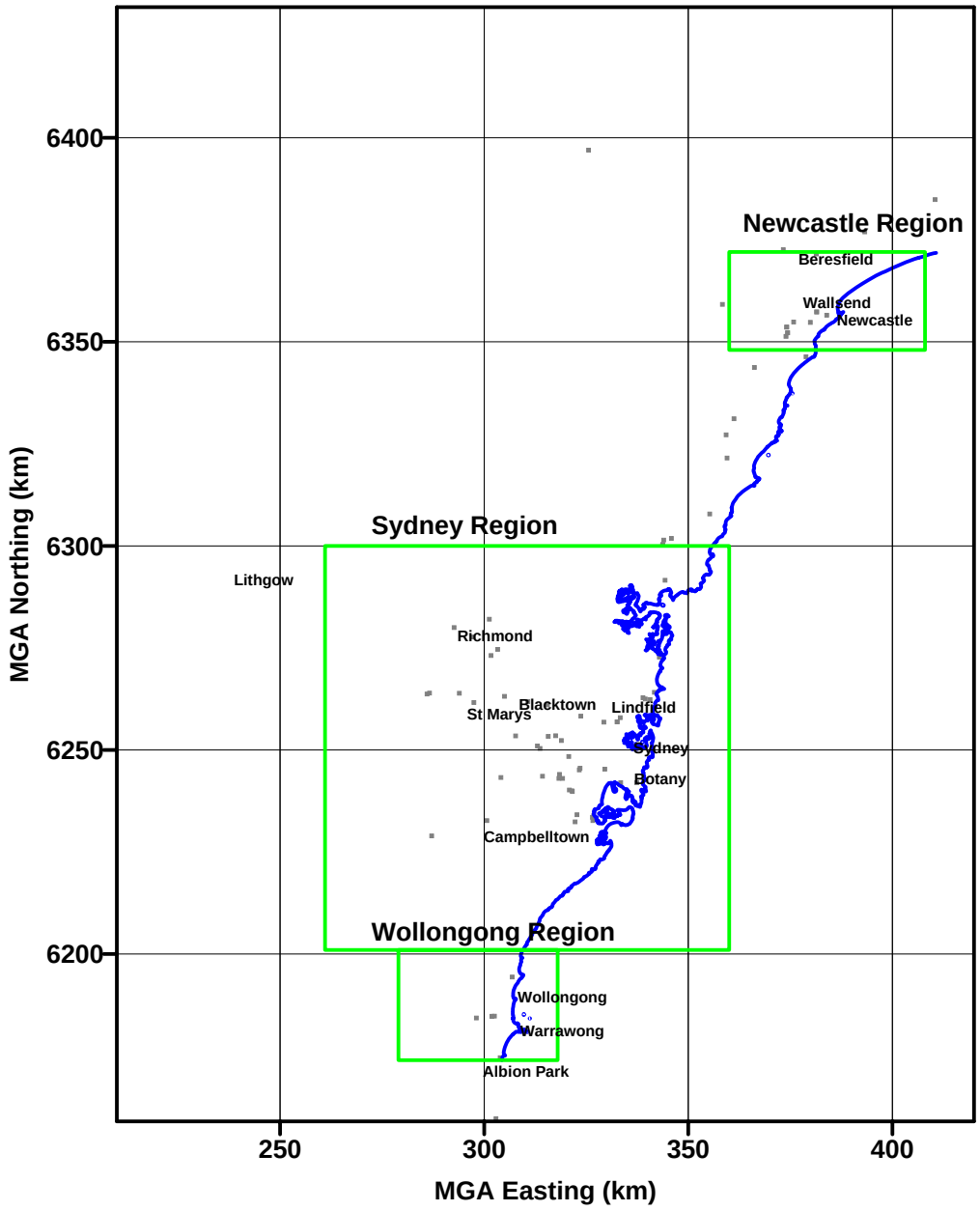

Figure 3.11: Locations of Fibreglass Manufacturers Within the GMR

3.10.2 Emissions Estimation Methodology

Emissions from each source have been estimated using techniques outlined in the following documents:

- *NPI EET Manual for Fibreglass Product Manufacturing* (Environment Australia, 1999f); and
- *NPI EET Manual for Surface Coating* (Environment Australia, 1999g).

More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.10.3 Activity Data and Assumptions

Commercial survey questionnaires were sent to all fibreglass businesses to collect activity data and responses were received from 8 businesses (i.e. representing a response rate of 9%).

Data provided in returned commercial survey questionnaires is quite similar indicating that the emission sources and estimation data for fibreglass manufacturing businesses that did not respond to the commercial survey questionnaire would likely be similar to the businesses that provided a response. Therefore, emissions from non-respondent businesses have been estimated based on the data provided by a medium size fibreglass manufacturing business identified within the returned commercial survey questionnaires.

The derived emission sources and estimation data used to estimate the emissions from non-respondent businesses are provided in Table 3.39.

Table 3.39: Emission Sources and Data Used for Non-Respondent Fibreglass Manufacturing Businesses

Emission Source	Input data for Emissions Estimation
Solvent usage (acetone)	220 L/year
Fibreglass manual resin application (non-vapour suppressed)	440 kg/year
Fibreglass gel coat application	120 kg/year
Surface coating usage (hardener)	10 L/year

3.10.4 Temporal Variation of Emissions

Temporal variation of emissions have been estimated based on data provided in returned commercial survey questionnaires. Temporal variation of emissions from non-respondent businesses have been assumed to be constant during normal operating hours for fibreglass businesses. Typical operating hours provided by a medium size fibreglass manufacturing business are 8 am and 4 pm on week days and no emissions on weekends.

3.10.5 Emissions Estimation

Estimated emissions from fibreglass manufacturing businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.40.

Table 3.40: Estimated Emissions from Plastic Product Rigid Fibre Reinforced Manufacturing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	1,330	202	63.7	319	1,920
ACETALDEHYDE	0	0	0	0	0
BENZENE	242	35.3	11.1	55.9	344
CARBON MONOXIDE	1,400	0	0	0	1,400
FORMALDEHYDE	16.7	0	0	0	16.7
ISOMERS OF XYLENE	80.9	0	0	0	80.9
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	1,700	0	0	0	1,700
PARTICULATE MATTER 10µm	127	0	0	0	127
PARTICULATE MATTER 2.5µm	127	0	0	0	127
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.01	0	0	0	0.01
SULFUR DIOXIDE	8.7	0	0	0	8.7
TOLUENE	515	3.12	1.50	4.78	524
TOTAL SUSPENDED PARTICULATES (TSP)	127	0	0	0	127
TOTAL VOCS	20,400	5,310	1,390	4,350	31,400
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.10.6 Projection Factors

Projection factors for fibreglass manufacturing businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that activity data growth in the plastic product rigid fibre reinforced manufacturing sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.11 Concrete Product Manufacturing (2633, 2634)

3.11.1 Emission Sources and Associated Releases to Air

Concrete product manufacturing businesses have been identified using the following sources:

- NSW WorkCover database for hazardous materials; and
- NSW telephone directory.

A total of 57 commercial businesses have been identified to be within the GMR.

The emission sources and associated releases to air for concrete manufacturing businesses are outlined in Table 3.41.

Table 3.41: Concrete Batching - Emission Sources

Operation	Process	Emissions to Air
Aggregate Transfer	Truck delivery to ground storage	PM
	Transfer to weigh bins	PM
	Transfer from bins to conveyor	PM
	Conveyor transfer to elevated storage	PM
Sand transfer	Truck delivery to ground storage	PM
	Transfer to weigh bins	PM
	Transfer from bins to conveyor	PM
	Conveyor transfer to elevated storage	PM
Cement transfer	Cement unloading to elevated storage (pneumatic or bucket elevator) silo	PM
Fly ash transfer	Fly ash transfer to elevated storage silo	PM
Mixer loading (central mix)		PM
Truck loading (truck mix)		PM
Fuel storage		VOCs
Wind erosion of exposed areas		PM

The locations of commercial concrete product manufacturing businesses are shown in Figure 3.12.

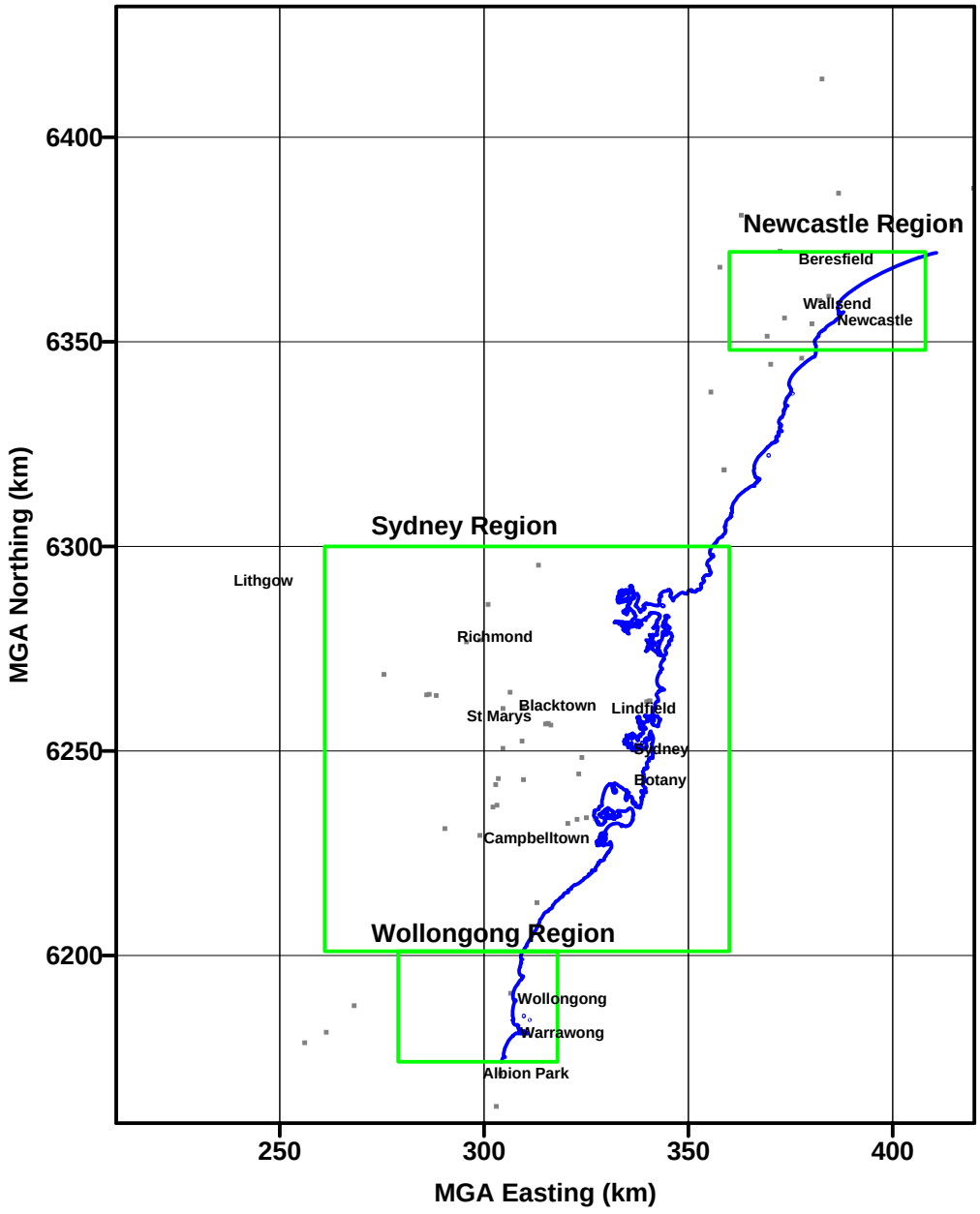

Figure 3.12: Locations of Concrete Product Manufacturers Within the GMR

3.11.2 Emissions Estimation Methodology

Emissions from each source have been estimated using techniques outlined in the following documents:

- USEPA AP-42, Chapter 11.12 *Concrete Batching* (USEPA, 2001); and
- *NPI EET Manual for Concrete Batching and Concrete Product Manufacturing* (Environment Australia, 1999h).

More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.11.3 Activity Data and Assumptions

Commercial survey questionnaires were sent to all commercial concrete product manufacturing businesses to collect activity data and responses were received from 2 businesses (i.e. representing a response rate of 3.5%). The commercial survey questionnaire response rate did not provide enough data to perform emission estimates for the commercial concrete product manufacturing sector. Therefore, it was proposed to obtain the amount of concrete produced from Australian Bureau of Statistics and subtract the amount of concrete produced by licensed concrete batching businesses within the GMR to determine the total amount of concrete produced by commercial businesses.

The total concrete produced in the NSW GMR region, obtained from Cement Concrete and Aggregates Australia (CCAA) is 5,889,100 m³ for 2004 (pers. comm. J Turton, 05/04/2005). This was derived as the sum of the amounts produced by major regions in the GMR as presented in Table 3.42

Table 3.42: Amount of Concrete Produced in the GMR by Major Regions

Region in the GMR	Amount of Concrete Produced (m^3/year)	Amount of Concrete Produced[a] (tonnes/year)
Sydney	4,410,000	10,584,000
Gosford/Wyong	322,500	774,000
Hunter	653,300	1,567,920
Illawarra	503,300	1,207,920
Total	**5,889,100**	**14,133,840**

[a] Density of concrete was assumed to be 2.4 tonnes/m^3

Industrial survey questionnaire responses indicate that 15,482,880 tonnes of concrete are produced in the NSW GMR region by industrial businesses. As can be seen from the statistics the amount of concrete produced by industrial businesses using the industrial survey questionnaire responses is greater than the amount of concrete produced in the NSW GMR using the ABS statistics. Therefore, another method was required to estimate emissions from the commercial concrete product manufacturing sector.

Concrete product manufacturing businesses that produce pre-mixed concrete or concrete products and have an intended production capacity of more than 30,000 tonnes per year require an environment protection licence. Therefore, it has been assumed that all commercial concrete product manufacturing businesses produce 25,000 tonnes of concrete product per year (10,417 m³ concrete assuming a density of 2.4 t/m³). The amount of other raw materials used, required for emission estimation calculations, have been estimated based on proportions of raw materials used that have been provided in completed industrial survey questionnaires. The proportions of raw materials used to estimate activity data are provided in Table 3.43.

Table 3.43: Proportions of Raw Materials Used for Emissions Estimation for Non0respondent Businesses

Material Type	Proportion Usage Factor (tonne raw material/m³ concrete produced)	Estimated Commercial Business Usage (tonnes/year)
Cement	0.24	2,500
Fly ash	0.75	7,813
Aggregate	1	10,417
Sand	0.78	8,125

Based on these assumptions, the commercial concrete slurry manufacturing sector produces 1,425,000 tonnes of concrete per year which equates to 8% of all concrete produced in the GMR.

It was further assumed that the businesses are equipped with standard emissions controls. The emission sources and control methods and efficiencies assumed for concrete product manufacturing are presented in Table 3.44.

Table 3.44: Emission Sources and Estimation Data Used for Non–Respondent Concrete Product Manufacturing Businesses

Emission Source	Control Technologies Utilised	Particulate Control Efficiency
Cement unloading to elevated storage	Baghouse	98%
Conveyor transfer to elevated storage (aggregate)	Wind breaks equipped on conveyors	30%
Conveyor transfer to elevated storage (sand)	Wind breaks equipped on conveyor	30%
Fly ash transfer to elevated storage	Baghouse	98%
Mixer loading (central mix)	Enclosed bins	90%
Transfer from bins to conveyor (aggregate)	Enclosed bins	90%
Transfer from bins to conveyor (sand)	Enclosed bins	90%
Transfer to weigh bins (aggregate)	Enclosed bins	90%
Transfer to weigh bins (sand)	Enclosed bins	90%
Truck delivery to ground storage (aggregate)	No control	0%
Truck delivery to ground storage (sand)	No control	0%
Wind erosion (stockpiles)[a,b,c]	Stockpiles enclosed on three sides	75%

[a] Silt content was assumed to be 10%

[b] Number of rainfall days was assumed to be 138 days provided by the Bureau of Meteorology for Sydney

[c] Frequency of wind speed that exceeds 5.4 m/s was approximately 30%

It should be noted that estimated emissions from concrete slurry manufacturing takes account of all emissions emitted from concrete pipe and box culvert manufacturing (ANZSIC class 2634).

3.11.4 Temporal Variation of Emission

Since most commercial concrete batching businesses are small concrete batching plants, it was assumed that they operate only on weekdays for 9 hours a day. Emissions have been assumed to be constant between 9 am to 6 pm with monthly variation of emissions provided in Table 3.45.

Table 3.45: Temporal Variation of Emission by Month

Monthly	Proportion
January	5.0
February	8.8
March	8.8
April	8.8
May	8.8
June	8.8
July	8.8
August	8.8
September	8.8
October	8.8
November	8.8
December	7.0

3.11.5 Emissions Estimation

Estimated emissions from concrete product manufacturing businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.46

Table 3.46: Estimated Emissions from Concrete Product Manufacturing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0	0	0	0
CARBON MONOXIDE	0	0	0	0	0
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	0	0	0	0	0
LEAD & COMPOUNDS	0.02	0	0	0.01	0.03
OXIDES OF NITROGEN	0	0	0	0	0
PARTICULATE MATTER 10µm	9,130	1,590	261	4,440	15,400
PARTICULATE MATTER 2.5µm	1,390	242	40	673	2,340
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	0	0	0	0	0
TOTAL SUSPENDED PARTICULATES (TSP)	22,600	3,820	642	10,900	38,000
TOTAL VOCS	0	0	0	0	0
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.11.6 Projection Factors

Projection factors for concrete product manufacturing businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that activity data growth in the concrete product manufacturing sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.12 Basic Iron & Steel Manufacturing (2711)

3.12.1 Emission Sources and Associated Releases to Air

Basic iron and steel manufacturing businesses have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 10 commercial basic iron and steel manufacturing businesses have been identified from these sources to be within the GMR.

Commercial businesses within the GMR that are included in the emissions inventory under this category are outlined in Table 3.47.

Table 3.47: Commercial Businesses Included in the Emissions Inventory

Business	Business ID	Business Street	Business Suburb	Business Post Code
BISALLOY STEELS PTY LTD	3571	LOT 14 RESOLUTION DR	UNANDERRA	2526
FLAME-CUT P/L	3572	68 ELIZABETH ST	WETHERILL PARK	2164
SERVICE POWDER COATING P/L	3575	30 HARLEY CR	CONDELL PARK	2200
QUALITY CASTINGS P/L	3576	42 VIOLET ST	REVESBY	2212
ONESTEEL OIL & GAS KEMBLA GRANGE	3580	WEST DAPTO ROAD	KEMBLA GRANGE	2530
ONESTEEL REINFORCING VILLAWOOD	3581	33 SHADDOCK AVENUE	VILLAWOOD	2163

The emission sources and associated releases to air from basic iron and steel manufacturing are outlined in Table 3.48.

Table 3.48: Basic Iron and Steel Manufacturing – Emission Sources

Operation	Process	Emissions to Air
Scrap preparation and handling		PM
Iron making furnaces		PM, CO, SO_2, NO_x, VOCs
Ancillary operations for iron production	Magnesium treatment	PM
	Refining	PM
	Pouring and cooling	PM
	Shakeout	PM
	Cleaning, finishing	PM
	Sand handling	PM
	Core making	PM
Steel making furnaces		PM, NO_x
Ancillary operations for steel production	Sand handling	PM
	Core ovens	PM
	Pouring and casting	PM
	Casting cleaning	PM
	Charge handling	PM
	Casting cooling	PM
	Core making	PM
Combustion		Combustion products

The locations of commercial basic iron and steel manufacturing businesses are shown in Figure 3.13.

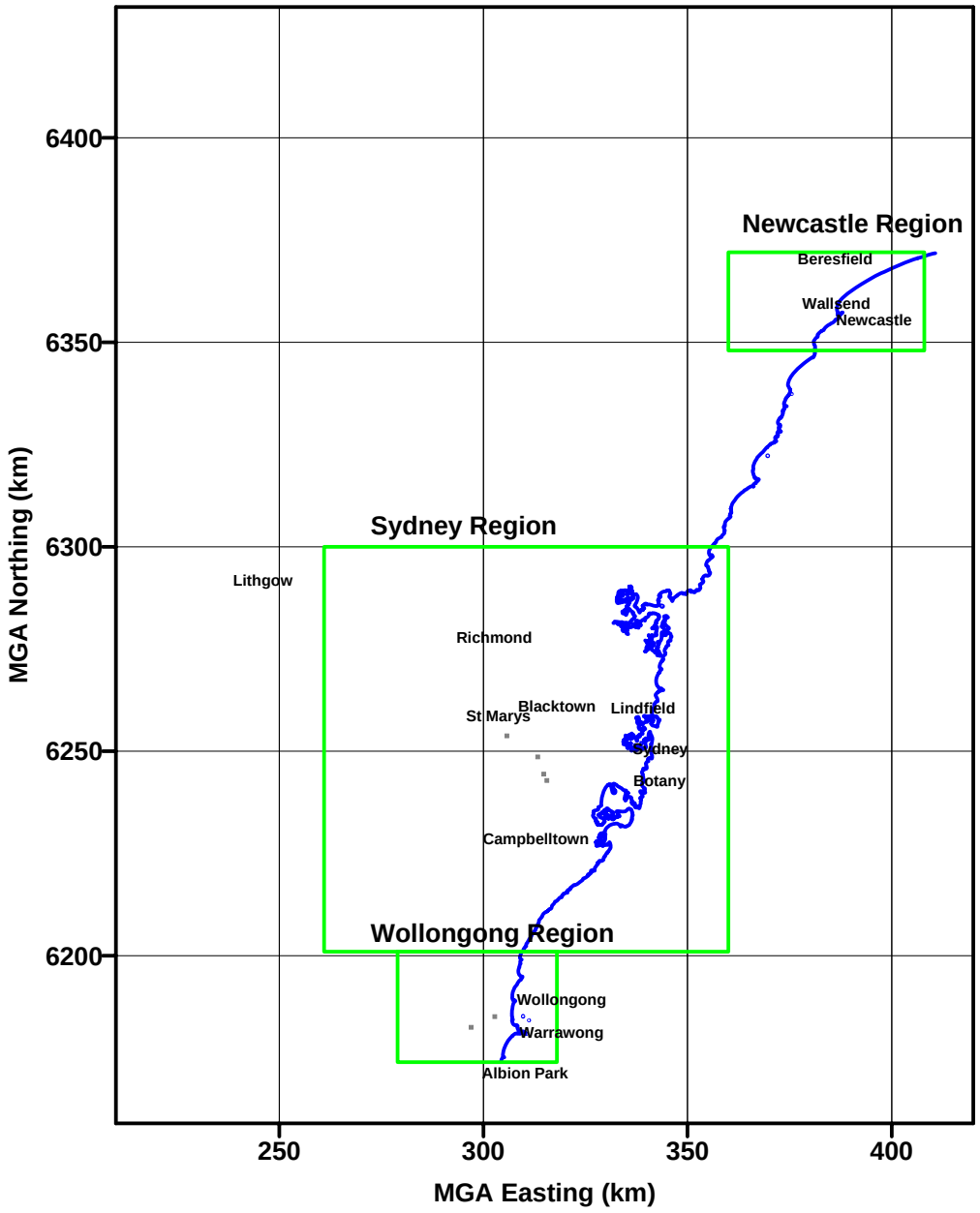

Figure 3.13: Locations of Basic Iron and Steel Manufacturers Within the GMR

3.12.2 Emissions Estimation Methodology

Emissions from basic iron and steel manufacturing businesses have been estimated using techniques outlined in USEPA AP-42, Chapter 12.10 *Grey Iron Foundries* (USEPA, 2003) and data supplied in commercial survey questionnaires. More detailed information on the methodology employed is described in methodology report (Bawden et. al., 2004).

3.12.3 Activity Data and Assumptions

Site specific data supplied in the returned commercial survey questionnaire from one respondent business are available and have been used for emissions estimation. Two non-respondent businesses that reported emissions to the NPI but did not respond to the commercial survey have also been included in the emissions inventory.

Site specific data supplied in the returned commercial survey questionnaires from respondent businesses have been used for emissions estimation when provided. One business that reported emissions to the NPI but did not respond to the commercial survey was also included in the emissions inventory.

The number of respondent and non-respondent businesses in the GMR is provided in Table 3.49.

Table 3.49: Number of Basic Iron and Steel Manufacturing Businesses in the GMR

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Number of Non-Respondent NPI Businesses
Basic Iron and Steel Manufacturing (2711)	10	5	1

3.12.4 Temporal Variation of Emissions

Data provided in returned commercial survey questionnaires have been used to estimate temporal variation of emissions. Monthly variations have been accounted for if data have been provided. It has been assumed that emissions remain constant throughout the operating hours of the business. Businesses with emissions estimated using reported NPI emissions have been assumed to operate 24 hours a day.

3.12.5 Emissions Estimation

Estimated emissions from basic iron and steel manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.50.

Table 3.50: Estimated Emissions from Basic Iron and Steel Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR [a]
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	3.84	0	27.2	31
CARBON MONOXIDE	645	0	4,570	5,210
FORMALDEHYDE	7.68	0	54.4	62.1
ISOMERS OF XYLENE	6,320	0	2.89	6,330
LEAD & COMPOUNDS	4.82	0	0.03	4.84
OXIDES OF NITROGEN	2,920	0	5,440	8,360
PARTICULATE MATTER 10µm	7,080	0	413	7,490
PARTICULATE MATTER 2.5µm	6,230	0	413	6,650
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.005	0	0.04	0.04
SULFUR DIOXIDE	4.01	0	28.4	32.4
TOLUENE	7270	0	27	7,300
TOTAL SUSPENDED PARTICULATES (TSP)	10,300	0	413	10,700
TOTAL VOCS	47,000	0	334	47,300
TRICHLOROETHYLENE (TCE)	0	0	0	0

[a] Totals may not appear additive due to rounding

3.12.6 Projection Factors

Projection factors for basic iron and steel manufacturing have been derived based on ABARE projected final energy consumption by the iron and steel sector in NSW (*Total Final Energy Consumption by Industry and Fuel, New South* Wales, Australian Energy Statistics, ABARE, 2006). The projection factors are provided Table 3.51.

Table 3.51: Projection Factors for Basic Iron and Steel Manufacturing

Year	Final Energy Consumption[a] (PJ/year)	Projection Factor
2003	55.8	1.0000
2004	55.7	0.9969
2005	56.2	1.0064
2006	56.7	1.0152
2007	57.2	1.0237
2008	57.6	1.0321
2009	58.1	1.0404
2010	58.8	1.0532
2011	59.5	1.0659
2012	60.3	1.0791
2013	61.0	1.0924
2014	61.8	1.1062
2015	62.6	1.1201
2016	63.4	1.1344
2017	64.2	1.1489
2018	65.0	1.1636
2019	65.8	1.1784
2020	66.7	1.1935
2021	67.5	1.2088
2022	68.4	1.2242
2023	69.2	1.2399
2024	70.1	1.2557
2025	71.0	1.2718
2026	71.9	1.2881
2027	72.9	1.3046
2028	73.8	1.3213
2029	74.7	1.3382
2030		1.3551
2031		1.3720

[a] Source: *Total Final Energy Consumption – Iron & Steel, Total Final Energy Consumption by Industry and Fuel, New South Wales,* Australian Energy Statistics (ABARE, 2006)

3.13 Bread Manufacturing (2161)

3.13.1 Emission Sources and Associated Releases to Air

Bread manufacturing businesses have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 6 commercial bread manufacturing businesses have been identified from these sources to be within the GMR.

Commercial businesses within the GMR that are included in the emissions inventory under this category are outlined in Table 3.52.

Table 3.52: Commercial Businesses Included in the Emissions Inventory

Business	Business ID	Business Street	Business Suburb	Business Post Code
TIP TOP BAKERIES NEWCASTLE	2720	31 OAKDALE RD	GATESHEAD	2290
QUALITY BAKERS AUSTRALIA LIVERPOOL	2722	GATE 2, HOMEPRIDE AVENUE	LIVERPOOL	2170
QUALITY BAKERS AUSTRALIA MOOREBANK PLANT	2723	MOOREBANK AVENUE	MOOREBANK	2170

The emission sources and associated releases to air for bread manufacturing are outlined in Table 3.53.

Table 3.53: Bread Manufacturing – Emission Sources

Operation	Emissions to Air
Oven	Combustion products
Baking	VOCs

The locations of commercial bread manufacturing businesses are shown in Figure 3.14.

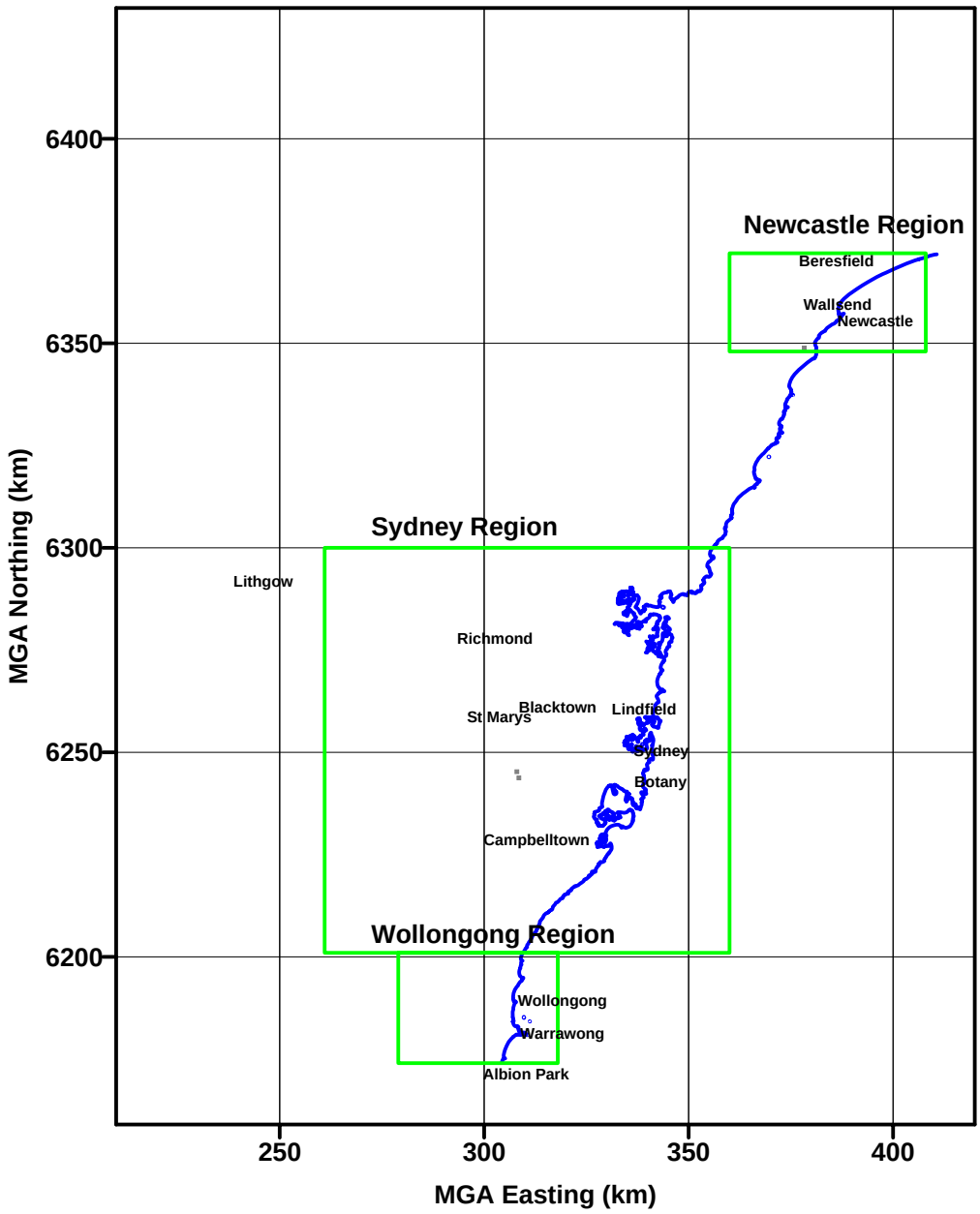

Figure 3.14: Locations of Bread Manufacturers Within the GMR

3.13.2 Emissions Estimation Methodology

Emissions from bread manufacturing businesses have been estimated using techniques outlined in *NPI EET Manual for Bread Manufacturing v1.1* (Environment Australia, 2003b). More detailed information on the methodology employed is described in Bawden et. al. (2004).

3.13.3 Activity Data and Assumptions

Site specific data supplied in the returned commercial survey questionnaire from one respondent business are available and have been used for emissions estimation. Two non-respondent businesses that reported emissions to the NPI but did not respond to the commercial survey have also been included in the emissions inventory. The number of respondent businesses is provided in Table 3.54.

Table 3.54: Number of Bread Manufacturing Businesses in the GMR

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Number of Non-Respondent NPI Businesses
Bread Manufacturing (2161)	6	1	2

No emission estimates have been performed for non-respondent businesses that do not report to the NPI as there are no relevant sources of estimation data available in the public arena.

3.13.4 Temporal Variation of Emissions

Data provided in returned commercial survey questionnaires have been used to estimate temporal variation of emissions for respondent businesses. Process emissions have been assumed to vary in direct proportion to the change in production rates over a typical year which was supplied in the returned commercial survey questionnaire. Businesses with emissions estimated using reported NPI emissions have been assumed to operate 24 hours a day.

3.13.5 Emissions Estimation

Estimated emissions from commercial bread manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.55

Table 3.55: Estimated Emissions from Bread Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR [a]
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	33.5	10.4	0	44
CARBON MONOXIDE	4,380	1,680	0	6,060
FORMALDEHYDE	67	20	0	87.1
ISOMERS OF XYLENE	0	0.469	0	0.469
LEAD & COMPOUNDS	0.03	0.01	0	0.04
OXIDES OF NITROGEN	2,560	2,000	0	4,560
PARTICULATE MATTER 10µm	510	304	0	814
PARTICULATE MATTER 2.5µm	510	304	0	814
PERCHLOROETHYLENE	0	0.02	0	0.02
POLYCYCLIC AROMATIC HYDROCARBONS	0.05	0.01	0	0.06
SULFUR DIOXIDE	35	10.5	0	45.5
TOLUENE	16.8	6.12	0	22.9
TOTAL SUSPENDED PARTICULATES (TSP)	510	304	0	814
TOTAL VOCS	52,400	46,100	0	98,400
TRICHLOROETHYLENE (TCE)	0	0.003	0	0.003

[a] Totals may not appear additive due to rounding

3.13.6 Projection Factors

Projection factors for bread manufacturing businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. The methodology assumes that activity data growth in the bread manufacturing sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.14 Ceramic Product Manufacturing (2622)

3.14.1 Emission Sources and Associated Releases to Air

Ceramic product manufacturing businesses have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 4 commercial ceramic product manufacturing businesses have been identified from these sources to be within the GMR.

Commercial businesses within the GMR that are included in the emissions inventory under this category are outlined in Table 3.56.

Table 3.56: Commercial Businesses Included in the Emissions Inventory

Business	Business ID	Business Street	Business Suburb	Business Post Code
SHINAGAWA THERMAL CERAMICS BERKELEY ROAD	3402	231-235 BERKELEY ROAD	UNANDERRA	2526
SHINAGAWA THERMAL CERAMICS GLASTONBURY AVENUE	3403	23 GLASTONBURY AVENUE	UNANDERRA	2526

The emission sources and associated releases to air for ceramic product manufacturing (excluding Glass) processes are outlined in Table 3.57.

Table 3.57: Ceramic Product Manufacturing (excluding Glass) – Emission Sources

Operation	Emissions to Air
Raw materials crushing and screening	PM
Dryer	PM
Cooler	PM
Granulation	PM
Ceramic glaze spray booth	PM, lead
Forming tape casters	VOCs
Combustion	Combustion products

The locations of commercial ceramic product manufacturing businesses are shown in Figure 3.15.

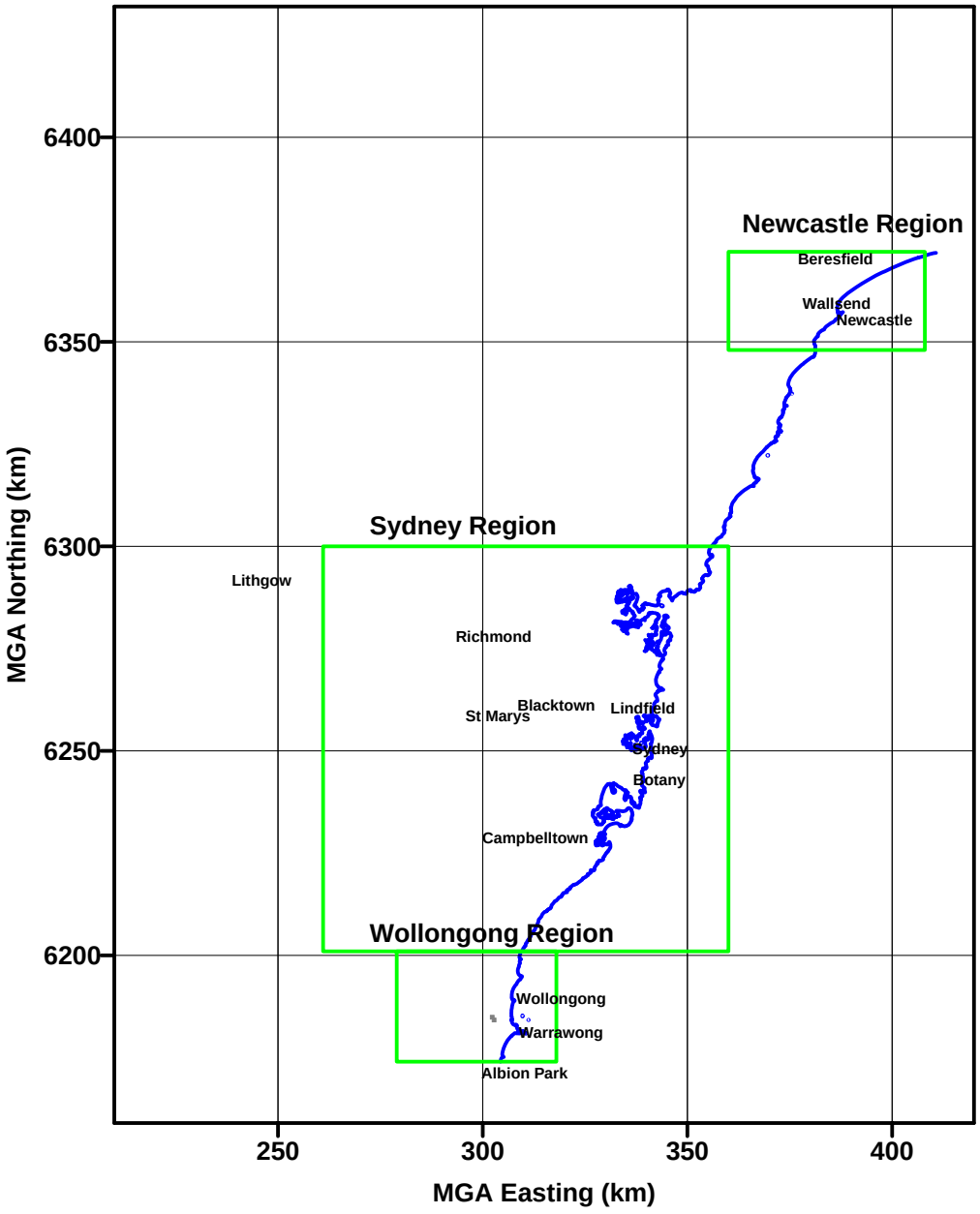

Figure 3.15: Locations of Ceramic Product Manufacturers Within the GMR

3.14.2 Emissions Estimation Methodology

Emissions from ceramic product manufacturing businesses have been estimated using techniques outlined in *NPI EET Manual for Bricks, Ceramics and Clay Product Manufacturing* (Environment Australia, 1998a) and data supplied in commercial survey questionnaires. More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.14.3 Activity Data and Assumptions

Commercial survey questionnaires were sent to 4 ceramic product manufacturing businesses located within the GMR, however none were returned. Two non-respondent businesses that reported emissions to the NPI but did not respond to the commercial survey are available and have also been included in the emissions inventory. The number of respondent businesses is provided in Table 3.58.

Table 3.58: Number of Ceramic Product Manufacturing Businesses within the GMR

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Number of Non-Respondent NPI Businesses
Ceramic Product Manufacturing (2622)	4	0	2

No emission estimates have been performed for non-respondent businesses that do not report to the NPI as there are no relevant sources of estimation data available in the public arena.

3.14.4 Temporal Variation of Emissions

Businesses with emissions estimated using reported NPI emissions have been assumed to operate 24 hours a day.

3.14.5 Emissions Estimation

Estimated emissions from ceramic product manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.59.

Table 3.59: Estimated Emissions from Ceramic Product Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR [a]
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	52.5	52.5
CARBON MONOXIDE	0	0	11,600	11,600
FORMALDEHYDE	0	0	105	105
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0	0	0.03	0.03
OXIDES OF NITROGEN	0	0	3,500	3,500
PARTICULATE MATTER 10µm	0	0	7,300	7,300
PARTICULATE MATTER 2.5µm	0	0	6,730	6,730
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	442	442
TOLUENE	0	0	26.2	26.2
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	12,700	12,700
TOTAL VOCS	0	0	587	587
TRICHLOROETHYLENE (TCE)	0	0	0	0

[a] Totals may not appear additive due to rounding

3.14.6 Projection Factors

Projection factors for ceramic production businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that activity data growth in the ceramic product manufacturing sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.15 Chemical Product Manufacturing (2549)

3.15.1 Emission Sources and Associated Releases to Air

Chemical product manufacturing businesses have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 69 commercial chemical product manufacturing businesses have been identified from these sources to be within the GMR.

Commercial businesses within the GMR that are included in the emissions inventory under this category are outlined in Table 3.60.

Table 3.60: Commercial Businesses Included in the Emissions Inventory

Business	Business ID	Business Street	Business Suburb	Business Post Code
RUAKURA PTY LIMITED	3018	UNIT 2/12 BLACKMORE RD	NARELLAN	2567
INTERNATIONAL ANIMAL HEALTH PRODUCTS PTY LTD	3031	18 HEALEY CCT	HUNTINGWOOD	2148
HURST AUSTRALIA PTY LTD	3050	10 BELLONA AVE	REGENTS PARK	2143
LO-CHLOR CHEMICALS	3061	86 MEEKS RD	MARRICKVILLE	2204
A J BLACKWOOD PTY LTD	3066	53-55 RALPH ST	ALEXANDRIA	2015
DEGUSSA CATALYSTS & INITIATORS PTY LIMITED	3075	20-22 MCPHERSON ST	BANKSMEADOW	2019
BOTANY INDUSTRIAL PARK PTY LTD	3076	MCPHERSON ST	BANKSMEADOW	2019
CARSON ADHESIVES P/L	3078	57 MITCHELL RD	BROOKVALE	2100
GLASON GROUP CLEANING PRODUCTS	3081	UNIT 4 16-17 MERINEE RD	GOSFORD WEST	2250
APPLIED PRODUCTS AUSTRALIA	3085	11 GAMMA CL	BERESFIELD	2322
ALUMINATES (NSW) PTY LTD	3091	PO BOX 241	WYONG	2259
MAURI YEAST AUSTRALIA	3093	15 GRAND AVENUE	CAMELLIA	2142
ZENECA PHARMACEUTICALS AUST PTY LTD	3096	CHRISTINA ROAD	VILLAWOOD	2163
TOWN & COUNTRY CHEMICALS PTY LTD	4098	UNIT 5 / 6 CATAMARAN DR	BERKELEY VALE	2261

The emission sources and associated releases to air for chemical product manufacturing are outlined in Table 3.61.

Table 3.61: Emission sources from Chemical Product Manufacturing

Process	Emissions to Air
Process emissions	PM, VOCs
Solvent storage	VOCs

The locations of commercial chemical product manufacturing businesses are shown in Figure 3.16.

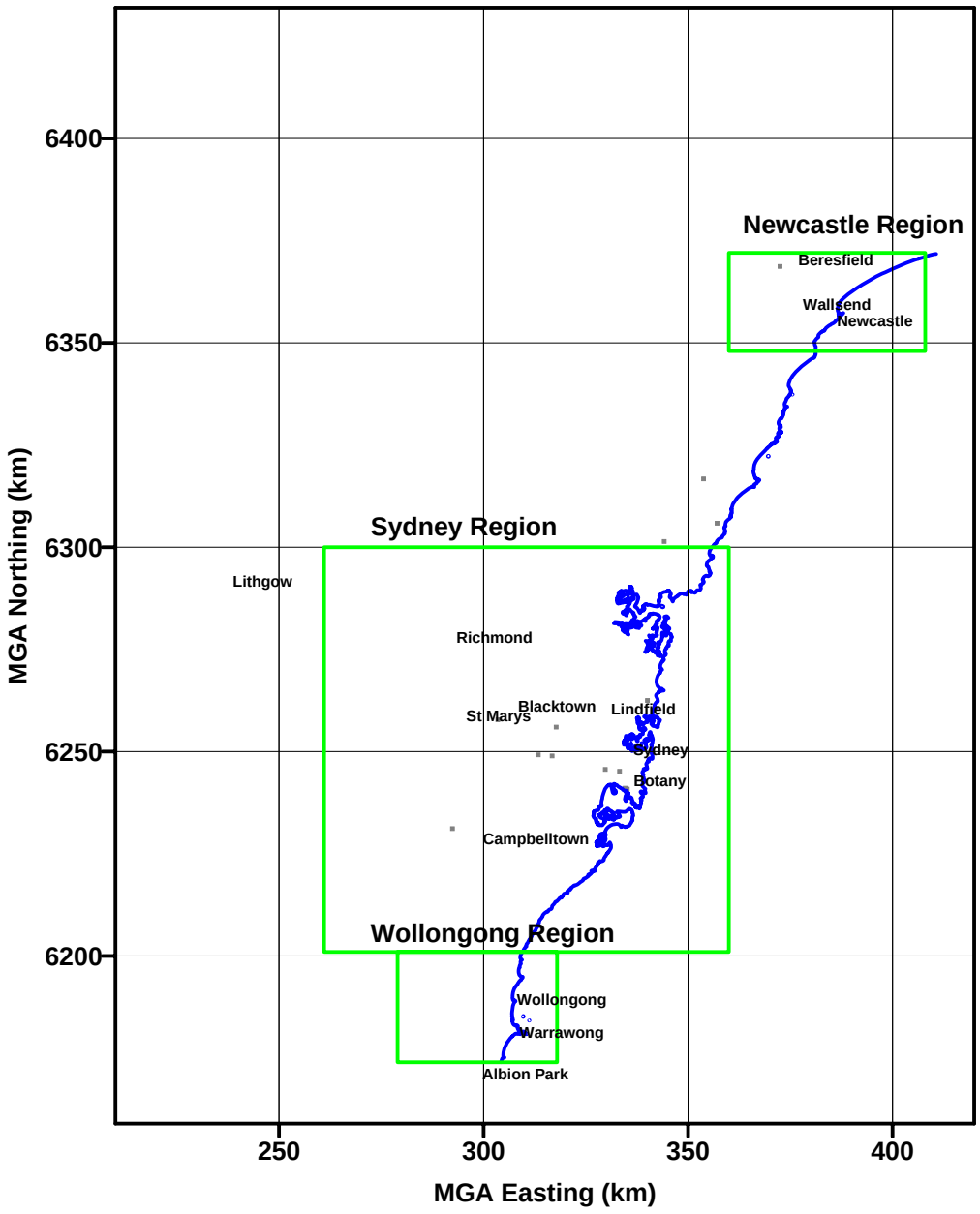

Figure 3.16: Locations of Chemical Product Manufacturers Within the GMR

3.15.2 Emissions Estimation Methodology

Emissions from each source have been estimated using techniques outlined in the following documents:

- *NPI EET Fuel and Organic Liquid Storage v2.5* (DEH, 2004); and
- *NPI EET Manual for Petroleum Refining* (Environment Australia, 1999b).

More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.15.3 Activity Data and Assumptions

Site specific data supplied in the returned commercial survey questionnaires from respondent businesses have been used for emissions estimation when provided. Businesses that reported emissions to the NPI but did not respond to the commercial survey have also been included in the emissions inventory. No emission estimates have been performed for non-respondent businesses that do not report to the NPI as there are no relevant sources of estimation data available in the public arena.

The number of respondent businesses is provided in Table 3.62.

Table 3.62: Number of Chemical Product Manufacturing Businesses in the GMR

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Number of Non-Respondent NPI Businesses
Chemical Product Manufacturing n.e.c. (2549)	69	12	2

It should be noted that in processing the returned commercial survey questionnaires, seven businesses have been determined to have no emission sources in the operation of the business. Hence, these businesses have been estimated to emit zero air emissions.

3.15.4 Temporal Variation of Emissions

Data provided in returned commercial survey questionnaires have been used to estimate temporal variation of emissions. Monthly variations have been accounted for if data have been provided. It was assumed that emissions remain constant throughout the operating hours of the business. Businesses with emissions estimated using reported NPI emissions have been assumed to operate 24 hours a day.

3.15.5 Emissions Estimation

Estimated emissions from chemical product manufacturing businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.63.

Table 3.63: Estimated Emissions from Chemical Product Manufacturing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0.933	0	0	0	0.933
BENZENE	11,900	0	0	0	11,900
CARBON MONOXIDE	1460	0	0	0	1460
FORMALDEHYDE	23,800	0	0	0	23,800
ISOMERS OF XYLENE	122	0	0	33.5	155
LEAD & COMPOUNDS	0.009	0	0	0	0.009
OXIDES OF NITROGEN	1,740	0	0	0	1740
PARTICULATE MATTER 10µm	133	0	0	5	138
PARTICULATE MATTER 2.5µm	133	0	0	5	138
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.01	0	0	0	0.01
SULFUR DIOXIDE	22,700	0	0	0	22,700
TOLUENE	6,080	0	0	71.9	6,150
TOTAL SUSPENDED PARTICULATES (TSP)	133	0	0	5	138
TOTAL VOCS	132,000	6340	0	4,060	142,000
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.15.6 Projection Factors

Projection factors for chemical product manufacturing businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that activity data growth in the chemical product manufacturing sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.16 Food Manufacturing n.e.c. (2179)

3.16.1 Emission Sources and Associated Releases to Air

Food manufacturing businesses have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 58 commercial food manufacturing businesses have been identified from these sources to be within the GMR.

Commercial businesses within the GMR that are included in the emissions inventory under this category are outlined in Table 3.64.

Table 3.64: Commercial Businesses Included in the Emissions Inventory

Business	Business ID	Business Street	Business Suburb	Business Post Code
GENERAL MILLS AUSTRALIA PTY LIMITED	2746	16 KELLOGG RD	ROOTY HILL	2766
ARNOTTS SNACK FOODS	2760	15-21 BRITTON ST	SMITHFIELD	2164
GIVAUDAN AUSTRALIA PTY LTD	2771	9 CAROLYN ST	SILVERWATER	2141
FROZEN FOOD PACKERS P/L	2772	59-61 DERBY ST	SILVERWATER	2128
BIG SISTER FOODS PTY LTD	2778	44A WHARF RD	ERMINGTON	2115
SARA LEE COFFEE & TEA (AUSTRALIA) PTY LTD	2782	18 FORRESTER ST	KINGSGROVE	2208
AUSTRALIAN HEALTH & NUTRITION ASSOCIATION LTD	2797	LOT 13 2 SANITARIUM DR	BERKELEY VALE	2261
EFFEM FOODS WYONG	2801	4 CORELLA CLOSE	WYONG	2259
SANITARIUM HEALTH FOOD COMPANY	6981	FREEMANS DR	COORANBONG	2265

The emission sources and associated releases to air from food manufacturing outlined in Table 3.65.

Table 3.65: Food Manufacturing – Emission Sources

Process	Type	Operation	Emissions to Air
Handling and storage of raw material			PM
Combustion			Combustion products
Confectionary manufacturing	Salted and roasted nuts/seeds (roasting)		PM, VOCs
	Snack chip deep fat frying (deep frying)		PM, VOCs
Food manufacturing n.e.c.	Coffee roasting	Roasting	PM, VOCs, CO
		Cooling	PM
		Screening	PM
		Handling	PM
		Storage	PM

The locations of commercial food manufacturing n.e.c. businesses are shown in Figure 3.17.

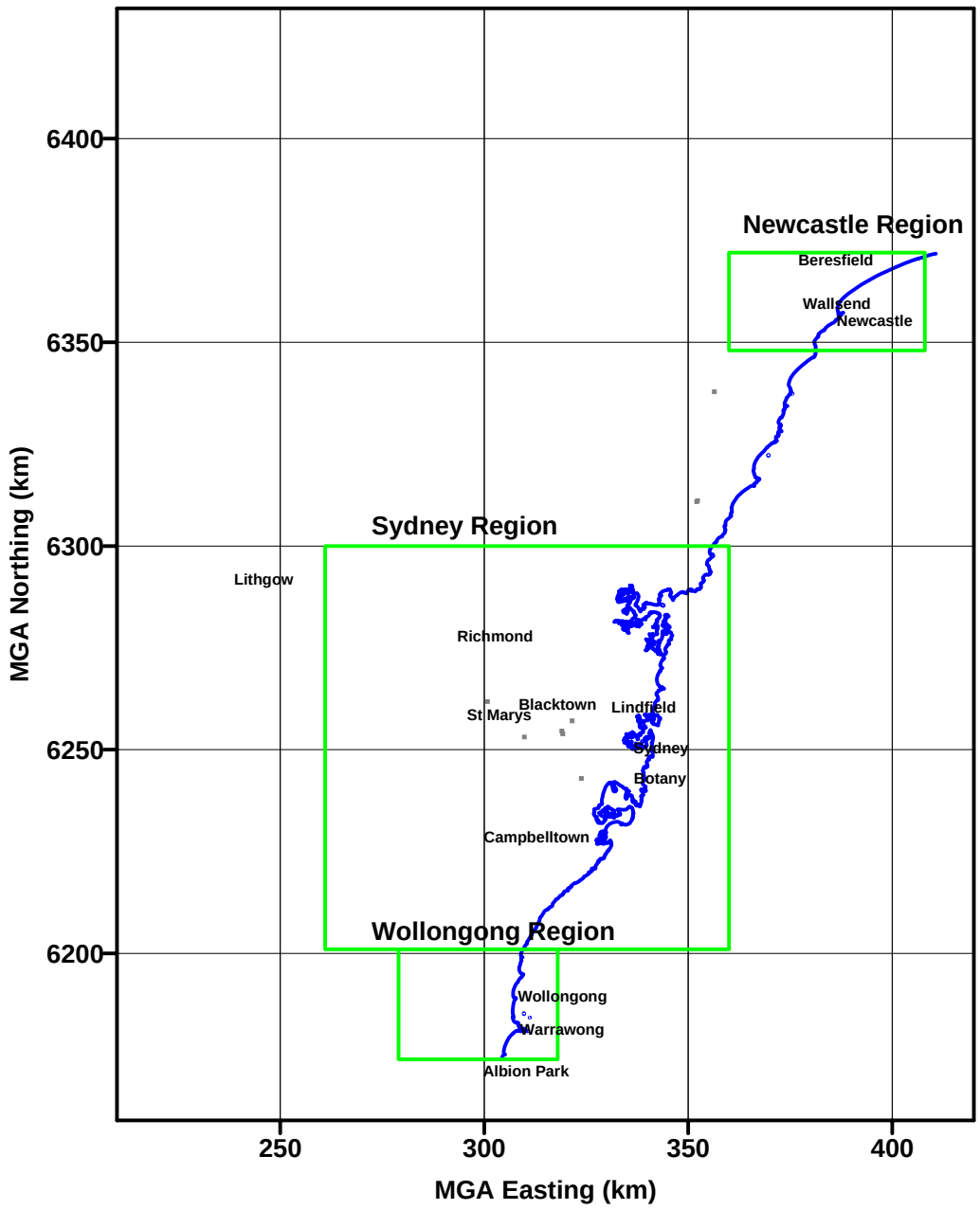

Figure 3.17: Locations of Food Manufacturing n.e.c. Businesses Within the GMR

3.16.2 Emissions Estimation Methodology

Emissions from each source have been estimated using techniques outlined in the following documents:

- *NPI EET Manual for Bread Manufacturing v1.1* (Environment Australia, 2003b);
- USEPA AP-42, *Chapter 9.10.2 Salted and Roasted Nuts and Seeds* (USEPA, 1994);
- *NPI EET Manual for Snack Foods Roasting and Frying Industry* (Environment Australia, 1999i);

- *NPI EET Manual for Animal and Bird Feed Manufacture* (Environment Australia, 1999j); and
- *NPI EET Manual for Coffee Roasting* (Environment Australia, 1999k).

More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.16.3 Activity Data and Assumptions

Site specific data supplied in the returned commercial survey questionnaires from respondent businesses have been used for emissions estimation when provided. Businesses that reported emissions to the NPI but did not respond to the commercial survey have also been included in the emissions inventory. The number of respondent businesses is provided in Table 3.66.

Table 3.66: Number of Food Manufacturing Businesses in the GMR

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Number of Non-Respondent NPI Businesses
Food manufacturing n.e.c. (2179)	58	6	3

No emission estimates have been performed for non-respondent businesses that do not report to the NPI as there are no relevant sources of estimation data available in the public arena.

3.16.4 Temporal Variation of Emissions

Data provided in returned commercial survey questionnaires have been used to estimate temporal variation of emissions for respondent businesses. Process emissions have been assumed to vary in direct proportion to the change in production rates over a typical year which was supplied in returned commercial survey questionnaires. Businesses with emissions estimated using reported NPI emissions have been assumed to operate 24 hours a day.

3.16.5 Emissions Estimation

Estimated emissions from commercial food manufacturing businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.67.

Table 3.67: Estimated Emissions from the Food Manufacturing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	329	0	0	0.03	330
BENZENE	1,030	0	0	17.12	1,050
CARBON MONOXIDE	6,900	0	0	3,870	10,800
FORMALDEHYDE	1,850	0	0	35.9	1,890
ISOMERS OF XYLENE	15,000	0	0	28.2	15,000
LEAD & COMPOUNDS	0.04	0	0	0.042	0.461
OXIDES OF NITROGEN	8,220	0	0	18,400	26,600
PARTICULATE MATTER 10µm	624	0	0	770	1,390
PARTICULATE MATTER 2.5µm	624	0	0	502	1,130
PERCHLOROETHYLENE	21,800	0	0	2.07	21,800
POLYCYCLIC AROMATIC HYDROCARBONS	0.06	0	0	0.04	0.1
SULFUR DIOXIDE	42.9	0	0	17,800	17,800
TOLUENE	12,400	0	0	12.8	12,400
TOTAL SUSPENDED PARTICULATES (TSP)	624	0	0	1,420	2,040
TOTAL VOCS	127,000	0	0	346	127,000
TRICHLOROETHYLENE (TCE)	2,660	0	0	0.25	2,660

3.16.6 Projection Factors

Projection factors for food manufacturing businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that activity data growth in the food manufacturing sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.17 Port Operators (6623)

3.17.1 Emission Sources and Associated Releases to Air

One commercial port operating business has been identified within the GMR using the NSW WorkCover database for hazardous materials and the telephone directory for NSW.

The commercial business within the GMR that is included in the emissions inventory under this category is outlined in Table 3.68.

Table 3.68: Commercial Businesses Included in the Emissions Inventory

Business	Business ID	Business Street	Business Suburb	Business Post Code
P&O PORTS PORT BOTANY TERMINAL	5430	42 FRIENDSHIP ROAD	MATRAVILLE	2036

The emission sources and associated releases to air from port operators are outlined in Table 3.69.

Table 3.69: Port Operator – Emission Sources

Source	Emissions to Air
Combustion	Combustion products

The location of the commercial port operator is shown in Figure 3.18.

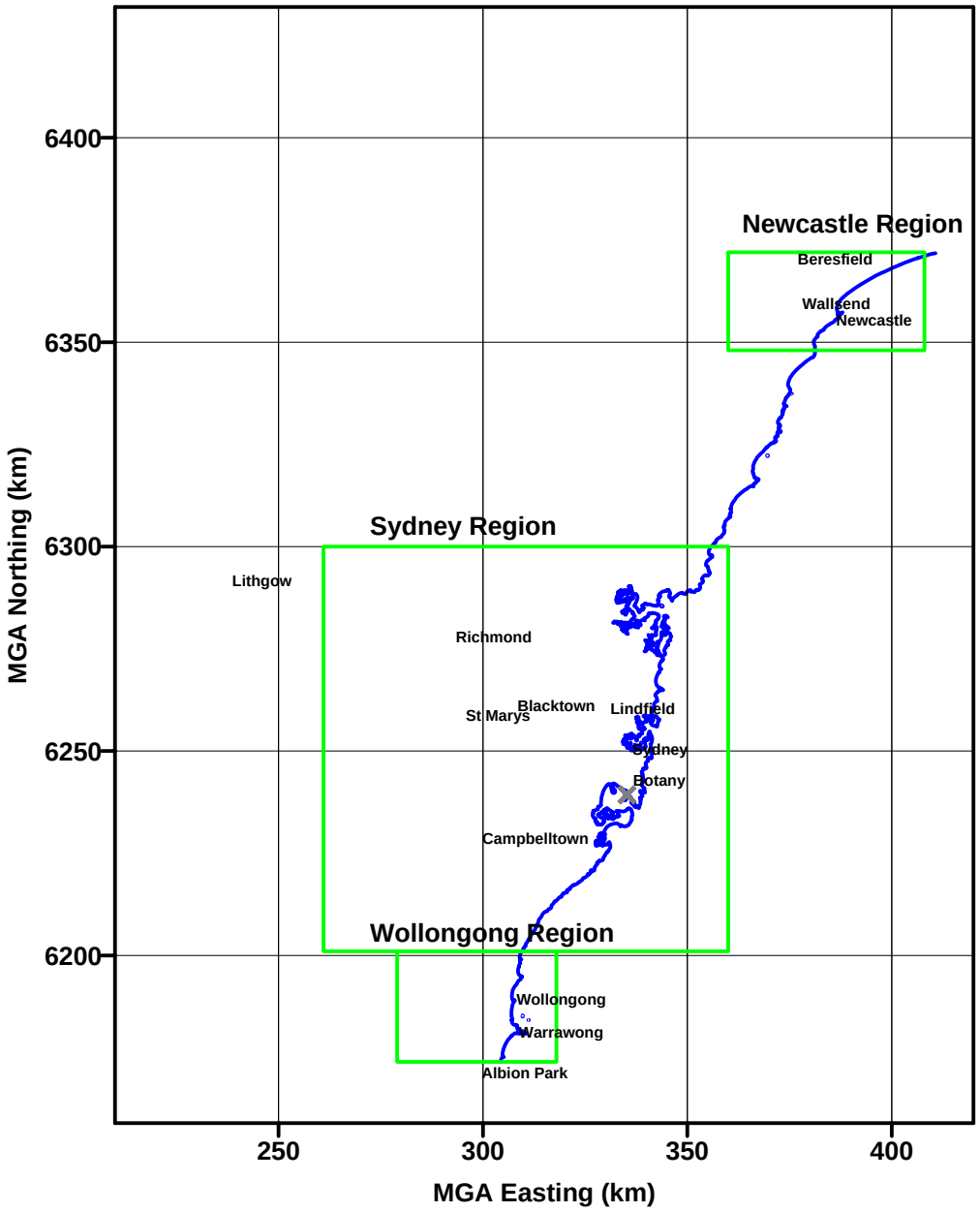

Figure 3.18: Location of Port Operators Within the GMR

3.17.2 Emissions Estimation Methodology

Emissions from the port operating business have been estimated using information published by the NPI and data supplied in the commercial survey questionnaire. More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.17.3 Activity Data and Assumptions

Site specific data supplied in the returned commercial survey questionnaire from the respondent business have been used for emissions estimation.

3.17.4 Temporal Variation of Emissions

Data provided in the returned commercial survey questionnaire was used to estimate temporal variation of the emissions. It was assumed that emissions remain constant throughout the operating hours of the business.

3.17.5 Emissions Estimation

Estimated emissions from commercial port operators within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.70

Table 3.70: Estimated Emissions from Port Operators

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR [a]
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	1,250	0	0	1,250
CARBON MONOXIDE	31,300	0	0	31,300
FORMALDEHYDE	2,500	0	0	2,500
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0.4	0	0	0.4
OXIDES OF NITROGEN	102,000	0	0	102,000
PARTICULATE MATTER 10µm	8,950	0	0	8,950
PARTICULATE MATTER 2.5µm	8,950	0	0	8,950
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.38	0	0	0.38
SULFUR DIOXIDE	9,940	0	0	9,940
TOLUENE	624	0	0	624
TOTAL SUSPENDED PARTICULATES (TSP)	8,950	0	0	8,950
TOTAL VOCS	13,700	0	0	13,700
TRICHLOROETHYLENE (TCE)	0	0	0	0

[a] Totals may not appear additive due to rounding

3.17.6 Projection Factors

Projection factors for port operators have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that activity data growth of the identified port operator is proportional to population growth. The projection factors are described in Section 3.1.6.

3.18 Plaster Product Manufacturing (2632)

3.18.1 Emission Sources and Associated Releases to Air

Plaster product manufacturing businesses have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 2 commercial plaster product manufacturing businesses have been identified from these sources to be within the GMR.

The commercial business within the GMR that is included in the emissions inventory under this category is outlined in Table 3.71.

Table 3.71: Commercial Businesses Included in the Emissions Inventory

Business	Business ID	Business Street	Business Suburb	Business Post Code
CSR GYPROCK & FIBRE CEMENT	3416	376-394 VICTORIA ST	WETHERILL PARK	2164

The emission sources and associated releases to air from plaster product manufacturing activities are outlined in Table 3.72.

Table 3.72: Emission Sources of Plaster Product Manufacturing:

Process	Operation	Emissions to Air
Combustion		Combustion products
Stock piling	Wind erosion	PM
Raw material and product handling		PM
Plaster mill processes	Ore drying	PM
	Milling	PM
	Calciner	PM
Board plant processes	Plaster mixing	PM
	Board forming	PM
	Board drying kiln	PM

The locations of commercial plaster product manufacturing businesses are shown in Figure 3.19.

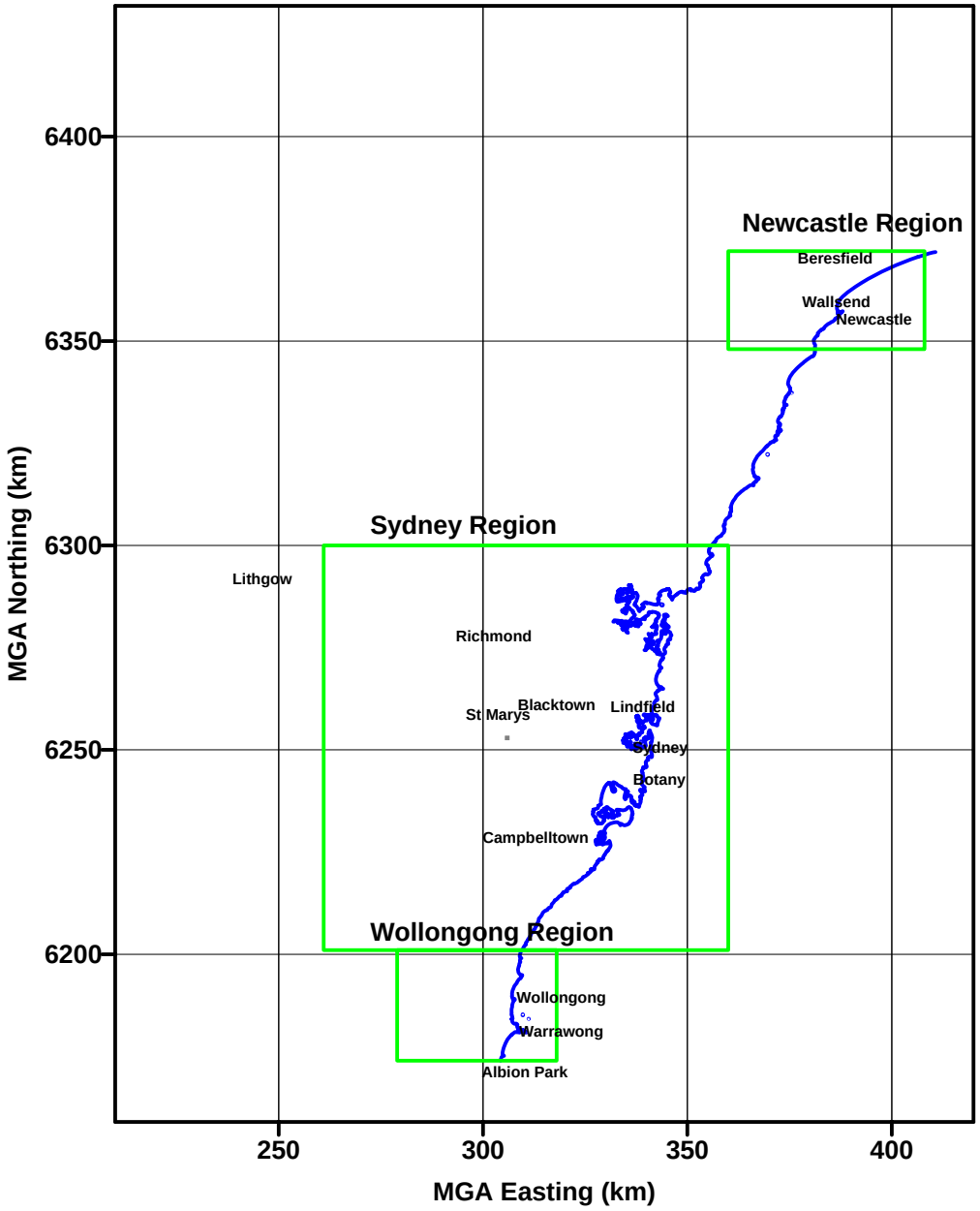

Figure 3.19: Locations of Plaster Product Manufacturers Within the GMR

3.18.2 Emissions Estimation Methodology

Emissions from plaster product manufacturing businesses have been estimated using techniques outlined in *NPI EET Manual for Plaster Board and Plaster Manufacturing Version 1.1* (Environment Australia, 2002b) and data supplied in commercial survey questionnaires. More detailed information on the methodology employed is described in Bawden et. al. (2004).

3.18.3 Activity Data and Assumptions

Site specific data supplied in the returned commercial survey questionnaire from one respondent business are available and have been used for emissions estimation.

The number of respondent businesses is provided in Table 3.73.

Table 3.73: Number of Plaster Product Manufacturing Businesses in the GMR

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Number of Non-Respondent NPI Businesses
Plaster product manufacturing (2632)	2	1	0

No emission estimates have been performed for the non-respondent business as there are no relevant sources of estimation data available in the public arena.

3.18.4 Temporal Variation of Emissions

Data provided in the returned commercial survey questionnaire have been used to estimate temporal variation of emissions. Monthly variations have been accounted for if data have been provided. It has been assumed that emissions remain constant throughout the operating hours of the business.

3.18.5 Emissions Estimation

Estimated emissions from plaster product manufacturing businesses within the GMR, Sydney, Newcastle, Wollongong and non-urban regions are provided in Table 3.74.

Table 3.74: Estimated Emissions from Plaster Product Manufacturing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	229	0	0	0	229
CARBON MONOXIDE	132,000	0	0	0	132,000
FORMALDEHYDE	1150	0	0	0	1150
ISOMERS OF XYLENE	0	0	0	0	0
LEAD & COMPOUNDS	12.6	0	0	0	12.6
OXIDES OF NITROGEN	36,100	0	0	0	36,100
PARTICULATE MATTER 10µm	14,400	0	0	0	14,400
PARTICULATE MATTER 2.5µm	8,640	0	0	0	8,640
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	10.2	0	0	0	10.2
SULFUR DIOXIDE	4,600	0	0	0	4,600
TOLUENE	114	0	0	0	114
TOTAL SUSPENDED PARTICULATES (TSP)	17,000	0	0	0	17,000
TOTAL VOCS	3,410	0	0	0	3,410
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.18.6 Projection Factors

Projection factors for plaster product manufacturing businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that activity data growth in the plaster product manufacturing sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.19 Glass & Glass Product Manufacturing (2610)

3.19.1 Emission Sources and Associated Releases to Air

Glass and glass product manufacturing businesses have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 5 commercial glass and glass product manufacturing businesses have been identified from these sources to be within the GMR.

Commercial businesses within the GMR that are included in the emissions inventory under this category are outlined in Table 3.75.

Table 3.75: Commercial Businesses Included in the Emissions Inventory

Business	Business ID	Business Street	Business Suburb	Business Post Code
OGISHI CRAFT CENTRE	3394	LOT 2 DP 842313 BRANXTON RD	ROTHBURY	2320
CSR BRADFORD INSULATION	3395	55 STENNETT ROAD	INGLEBURN	2565

The emission sources and associated releases to air from glass and glass product manufacturing are outlined in Table 3.76.

Table 3.76: Glass Product Manufacturing – Emission Sources

Operation	Emissions
Melting furnace	PM, SO_2, NO_x, CO, VOCs
Pressed & blown	PM, SO_2, NO_x, CO, VOCs
Forming & finishing	VOCs
Lead glass manufacture	Pb
Combustion	Combustion products

The locations of commercial glass and glass product manufacturing businesses are shown in Figure 3.20.

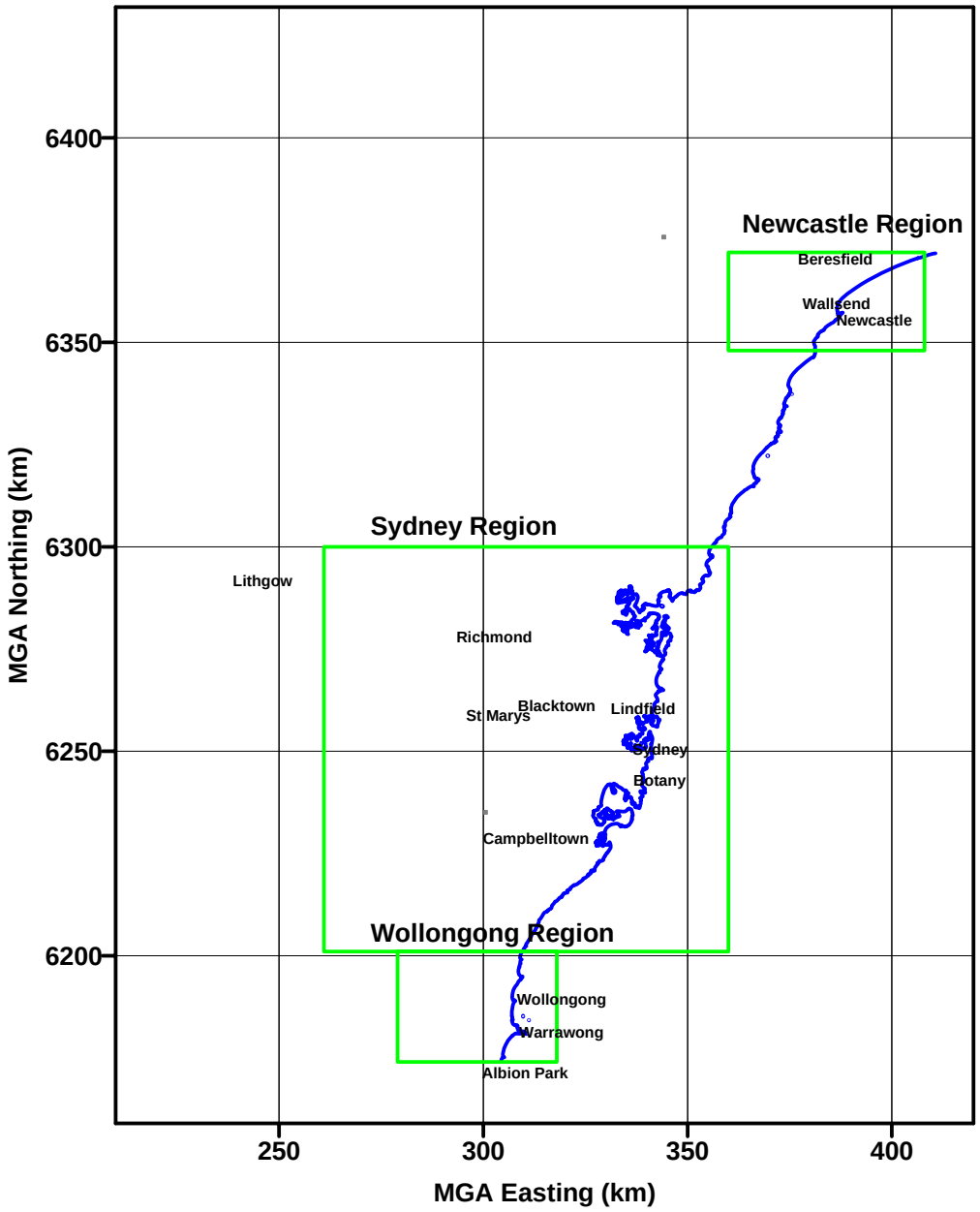

Figure 3.20: Locations of Glass and Glass Product Manufacturers Within the GMR

3.19.2 Emissions Estimation Methodology

Emissions from glass and glass product manufacturing businesses have been estimated using techniques outlined in *NPI EET Manual for Glass and Glass Fibre Manufacturing* (Environment Australia, 1998b) and data supplied in commercial survey questionnaires. More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.19.3 Activity Data and Assumptions

Site specific data supplied in the returned commercial survey questionnaire from one respondent business were available and have been used for emissions estimation. One non-respondent business that reported emissions to the NPI but did not respond to the commercial survey has also been included in the emissions inventory. The number of respondent businesses is provided in Table 3.77.

Table 3.77: Number of Glass and Glass Product Manufacturing Businesses in the GMR

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Number of Non-Respondent NPI Businesses
Glass & glass product manufacturing (2610)	5	1	1

No emission estimates have been performed for non-respondent businesses that do not report to the NPI as there are no relevant sources of estimation data available in the public arena.

3.19.4 Temporal Variation of Emissions

Data provided in the returned commercial survey questionnaire have been used to estimate temporal variation of emissions. Monthly variations have been accounted for where data has been provided. The business with emissions estimated using reported NPI emissions has been assumed to operate 24 hours a day. It has been assumed that emissions remain constant throughout the operating hours of the business.

3.19.5 Emissions Estimation

Estimated emissions from glass and glass product manufacturing businesses within the GMR, Sydney, Newcastle, Wollongong and non-urban regions are provided in Table 3.78.

Table 3.78: Estimated Emissions from Glass and Glass Product Manufacturing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	532	0	0	0.01	532
CARBON MONOXIDE	20,700	0	0	4.42	20,700
FORMALDEHYDE	320	0	0	0.004	320
ISOMERS OF XYLENE	0	0	0	0	0
LEAD & COMPOUNDS	18.8	0	0	0.01	18.8
OXIDES OF NITROGEN	48,900	0	0	35.6	48,900
PARTICULATE MATTER 10µm	7,730	0	0	8.95	7,740
PARTICULATE MATTER 2.5µm	7,600	0	0	1.96	7,600
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	150	0	0	2.8	153
TOLUENE	145	0	0	0	145
TOTAL SUSPENDED PARTICULATES (TSP)	7,890	0	0	9.14	7,900
TOTAL VOCS	15,100	0	0	0.96	15,100
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.19.6 Projection Factors

Projection factors for glass product manufacturing businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that activity data growth in the glass and glass product manufacturing sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.20 Paint Manufacturing (2542)

3.20.1 Emission Sources and Associated Releases to Air

Paint manufacturing businesses have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 23 commercial paint manufacturing businesses have been identified from these sources to be within the GMR.

Commercial businesses within the GMR that are included in the emissions inventory under this category are outlined in Table 3.79.

Table 3.79: Commercial Businesses Included in the Emissions Inventory

Business	Business ID	Business Street	Business Suburb	Business Post Code
ROBERTSON'S PAINTS	2964	6 CHRISTIE ST & POWER ST	ST MARYS	2760
LACNAM PAINTS AUST	2970	78-80 MANDOON RD	GIRRAWEEN	2145
BARLOWORLD COATINGS (AUST) PTY LTD	2971	11-13 POWERS RD	SEVEN HILLS	2147
AUSTRALIAN PRINTERS SUPPLIES PTY LTD	2972	77 GOVERNOR MACQUARIE DR	CHIPPING NORTON	2170
AMERON COATINGS	2985	183 PROSPECT HIGHWAY	SEVEN HILLS	2147

The emission sources and associated releases to air from paint manufacturing are outlined in Table 3.80.

Table 3.80: Paint Manufacturing – Emission Sources

Process	Operation	Emissions to Air
Solvent reclamation	Storage tank vent	VOCs
	Condenser vent	VOCs
	Incinerator stack	PM, VOCs
	Spillage	VOCs
	Loading	VOCs
Grinding and mixing	Pigments grinding and mixing	PM
	Other grindings and mixings	VOCs
Combustion	Fuel burning activities	Combustion products

The locations of commercial paint manufacturing businesses are shown in Figure 3.21.

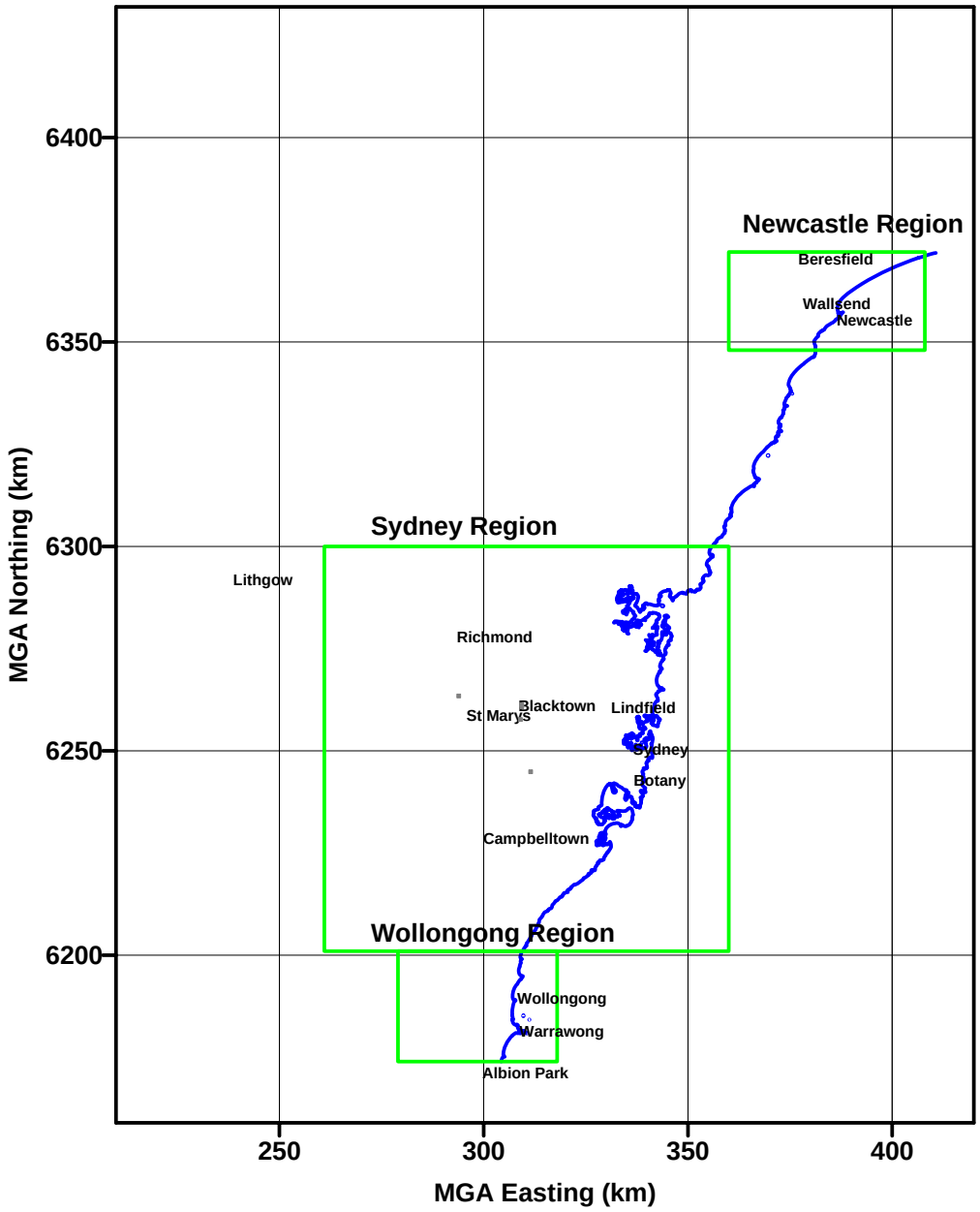

Figure 3.21: Locations of Paint Manufacturers Within the GMR

3.20.2 Emissions Estimation Methodology

Emissions from each source have been estimated using techniques outlined in the following documents:

- *NPI EET Manual for Paint and Ink Manufacturing* (Environment Australia, 1998c); and
- *NPI EET Fuel and Organic Liquid Storage v2.4* (DEH, 2004).

More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.20.3 Activity Data and Assumptions

Site specific data supplied in the returned commercial survey questionnaires from respondent businesses have been used for emissions estimation when provided. No emission estimates have been performed for non-respondent businesses as there are no relevant sources of estimation data available in the public arena.

The number of respondent businesses is provided in Table 3.81.

Table 3.81: Number of Paint Manufacturing Businesses in the GMR

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Number of Non-Respondent NPI Businesses
Paint Manufacturing (2542)	23	5	0

3.20.4 Temporal Variation of Emissions

Data provided in returned commercial survey questionnaires have been used to estimate temporal variation of emissions. Monthly variations have been accounted for if data have been provided. It has been assumed that emissions remain constant throughout the operating hours of the business.

3.20.5 Emissions Estimation

Estimated emissions from paint manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.82.

Table 3.82: Estimated Emissions from Paint Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR [a]
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	4410	0	0	4410
LEAD & COMPOUNDS	138	0	0	138
OXIDES OF NITROGEN	0	0	0	0
PARTICULATE MATTER 10µm	21,700	0	0	21,700
PARTICULATE MATTER 2.5µm	21,400	0	0	21,400
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	32,500	0	0	32,500
TOTAL SUSPENDED PARTICULATES (TSP)	24,100	0	0	24,100
TOTAL VOCS	113,000	0	0	113,000
TRICHLOROETHYLENE (TCE)	0	0	0	0

[a] Totals may not appear additive due to rounding

3.20.6 Projection Factors

Projection factors for paint manufacturing businesses have been derived based on population projections provided by the Transport and Population Data Centre (TPDC), NSW Department of Planning. This methodology assumes that activity data growth in the paint manufacturing sector is proportional to population growth. The projection factors are described in Section 3.1.6.

3.21 Steel Pipe and Tube Manufacturing (2713)

3.21.1 Emission Sources and Associated Releases to Air

Steel pipe and tube manufacturing businesses have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 7 commercial steel pipe and tube manufacturing businesses have been identified from these sources to be within the GMR.

Commercial businesses within the GMR that are included in the emissions inventory under this category are outlined in Table 3.83.

Table 3.83: Commercial Businesses Included in the Emissions Inventory

Business	Business ID	Business Street	Business Suburb	Business Post Code
ONESTEEL TRADING PTY LIMITED	3586	WEST DAPTO RD	KEMBLA GRANGE	2526
ROLADUCT SPIRAL TUBING PL	3587	1820-1880 ELIZABETH DRIVE	KEMPS CREEK	2171
AAP DISTRIBUTORS P/L	3591	31 MONRO AVE	SUTHERLAND	2232

The emission sources and associated releases to air from steel pipe and tube manufacturing are outlined in Table 3.84.

Table 3.84: Steel Pipe and Tube Manufacturing – Emission Sources

Operation	Process	Emissions to Air
Scrap preparation and handling		PM
Steel making furnaces		PM, NO_x
Ancillary operations for steel production	Sand handling	PM
	Core ovens	PM
	Pouring and casting	PM
	Casting cleaning	PM
	Charge handling	PM
	Casting cooling	PM
	Core making	PM
Combustion		Combustion products

The locations of commercial steel pipe and tube manufacturing businesses are shown in Figure 3.22.

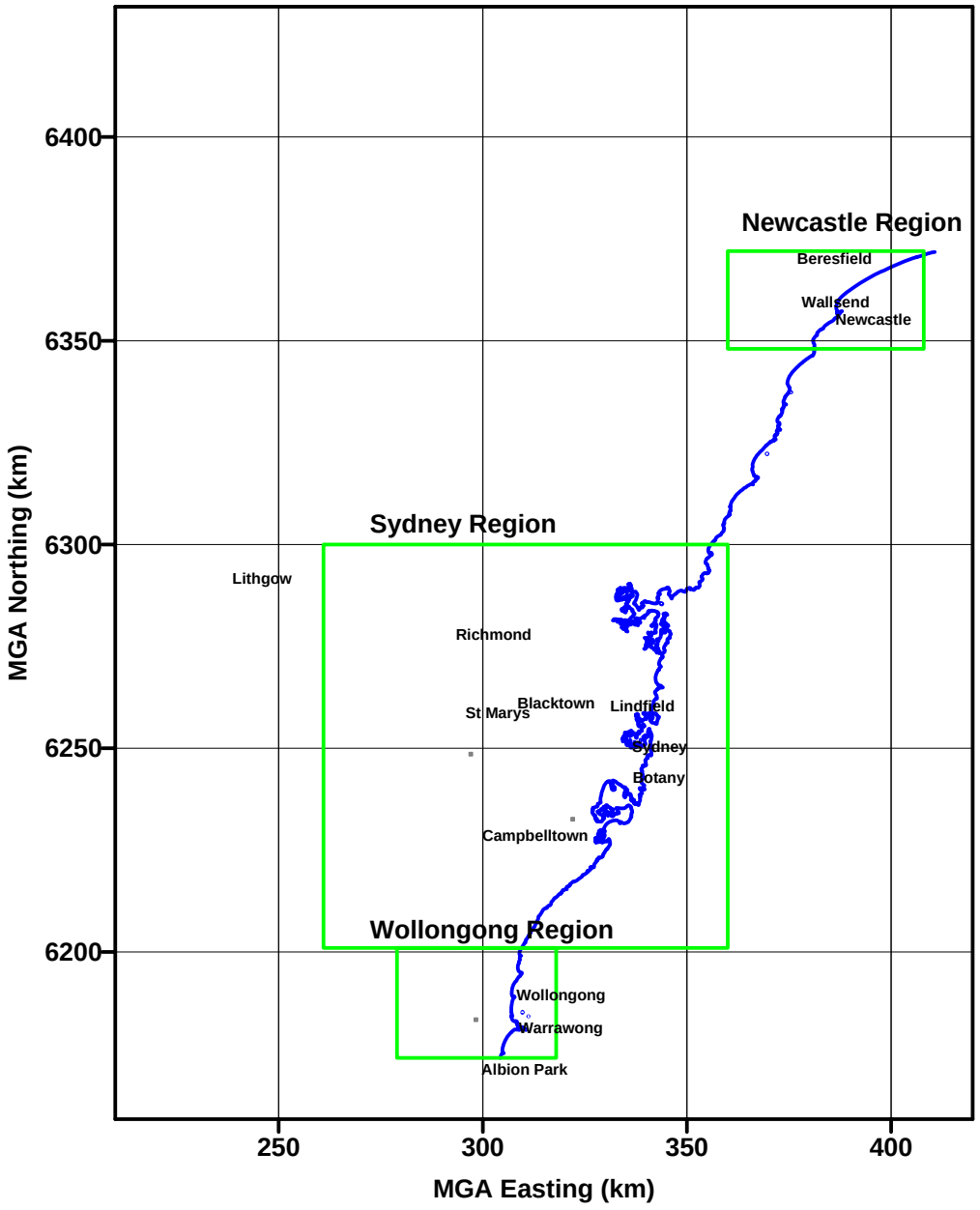

Figure 3.22: Locations of Steel Pipe and Tube Manufacturers Within the GMR

3.21.2 Emissions Estimation Methodology

Emissions from steel pipe and tube manufacturing businesses have been estimated using techniques outlined in USEPA AP-42, Chapter 12.10 *Grey Iron Foundries* (USEPA, 2003) and data supplied in commercial survey questionnaires. More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.21.3 Activity Data and Assumptions

Site specific data supplied in the returned commercial survey questionnaires from respondent businesses have been used for emissions estimation when provided. No emission estimates have been performed for non-respondent businesses as there are no relevant sources of estimation data available in the public arena.

The number of respondent businesses is provided in Table 3.85.

Table 3.85: Number of Iron and Steel Manufacturing Businesses in the GMR

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Number of Non-Respondent NPI Businesses
Steel pipe and tube manufacturing (2713)	7	3	0

3.21.4 Temporal Variation of Emissions

Data provided in returned commercial survey questionnaires have been used to estimate temporal variation of emissions. Monthly variations have been accounted for if data has been provided. It has been assumed that emissions remain constant throughout the operating hours of the business.

3.21.5 Emissions Estimation

Estimated emissions from steel pipe and tube manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.86.

Table 3.86: Estimated Emissions from Steel Pipe and Tube Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR [a]
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0.003	0	0	0.003
BENZENE	0.01	0	0	0.01
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	0.02	0	0	0.02
ISOMERS OF XYLENE	0.145	0	0	0.145
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	744	0	0	744
PARTICULATE MATTER 10µm	1,020	0	3,500	4,530
PARTICULATE MATTER 2.5µm	1,020	0	3,500	4,530
PERCHLOROETHYLENE	0.212	0	0	0.212
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	0.12	0	0	0.12
TOTAL SUSPENDED PARTICULATES (TSP)	1,020	0	3,900	4,900
TOTAL VOCS	1.23	0	0	1.23
TRICHLOROETHYLENE (TCE)	0.03	0	0	0.03

[a] Totals may not appear additive due to rounding

3.21.6 Projection Factors

Projection factors for steel pipe and tube manufacturing have been derived based on ABARE projected final energy consumption for the manufacturing and construction sector in NSW (*Total Final Energy Consumption by Industry and Fuel, New South* Wales, Australian Energy Statistics, ABARE, 2006).

The projection factors are provided in Table 3.87.

Table 3.87: Projection Factors for Steel Pipe and Tube Manufacturing

Year	Final Energy Consumption (PJ/year) [a]	Projection Factor
2003	272.1	1.0000
2004	273.6	1.0053
2005	277.2	1.0186
2006	280.2	1.0297
2007	283.1	1.0403
2008	285.8	1.0503
2009	288.6	1.0604
2010	291.7	1.0718
2011	294.6	1.0826
2012	297.7	1.0939
2013	301.1	1.1064
2014	304.5	1.1190
2015	307.9	1.1316
2016	311.5	1.1445
2017	315.0	1.1576
2018	318.6	1.1709
2019	322.3	1.1844
2020	326.0	1.1980
2021	329.7	1.2117
2022	333.5	1.2255
2023	337.3	1.2394
2024	341.1	1.2536
2025	345.0	1.2678
2026	348.9	1.2821
2027	352.8	1.2965
2028	356.8	1.3110
2029	360.7	1.3256
2030		1.3403
2031		1.3549

[a] Source: *Total Final Energy Consumption – Manufacturing & Construction, Total Final Energy Consumption by Industry and Fuel, New South Wales,* Australian Energy Statistics (ABARE, 2006)

3.22 Metal Coating and Finishing (2764)

3.22.1 Emission Sources and Associated Releases to Air

Metal coating and finishing businesses have been identified using the NSW WorkCover database for hazardous materials and the telephone directory for NSW. A total of 96 commercial metal coating and finishing businesses have been identified from these sources to be within the GMR.

Commercial businesses within the GMR that are included in the emissions inventory under this category are outlined in Table 3.88.

Table 3.88: Commercial Businesses Included in the Emissions Inventory

Business	Business ID	Business Street	Business Suburb	Business Post Code
N/A	3630	LYTTON RD & LACKEY RD	MOSS VALE	2577
THE BRONZING STUDIO	3644	UNIT 40 / 5 ANELLA AVENUE	CASTLE HILL	2154
GOWS HEAT TREATMENT P/L	3646	18 DAISY ST	REVESBY	2212
URETHANE COATINGS P/L	3658	10 POWELLS RD	BROOKVALE	2100
SANKEY AUSTRALIA P/L	3663	INGALL ST	MAYFIELD	2304
A-1 HARD CHROME PTY LTD	3665	14 WETHERILL ST	LIDCOMBE	2141
BLU-CHROME PTY LTD	3676	137 ELDRIDGE RD	BANKSTOWN	2200
CAPRAL ALUMINIUM MILPERRA	3680	61 ASHFORD AVENUE	MILPERRA	2214
CHROME FACTORY	3687	64 WOODFIELD BLV	CARINGBAH	2229
DIAMOND HARD CHROME PTY LTD	3691	27 COSGROVE RD	ENFIELD	2136
GONINAN PLATERS	3702	2 GEORGETOWN RD	GEORGETOWN	2298
GONINAN PLATERS PTY LTD	3703	7 COORABAN RD	MILPERRA	2214
HUNTER GALVANIZING PTY LTD	3705	13 OLD PUNT RD	TOMAGO	2322
INDUSTRIAL GALVANIZERS	3709	312 PACIFIC HWY	HEXHAM	2322
INDUSTRIAL HARDCHROME PTY LTD	3712	41 EGERTON ST	SILVERWATER	2128
RACK ZINC PLATING PTY LTD	3720	113 WOODPARK RD	SMITHFIELD	2164
ROLL SURFACE TECHNOLOGIES PTY LIMITED	3723	SPRINGHILL RD	WOLLONGONG	2500
SEC PLATING PTY LTD	3724	105 LAKEMBA ST	BELMORE	2192
SWIFT ELECTROPLATERS	3732	53 VORE ST	SILVERWATER	2128
SYDNEY GALVANIZING PTY LTD	3733	2/12 ASH RD	PRESTONS	2170

The emission sources and associated releases to air from metal coating and finishing are outlined in Table 3.89.

Table 3.89: Metal Coating and Finishing – Emission Sources

Source	Emissions to Air
Melting and die casting	PM, Combustion products
Cutting	Metal fume, NOx
Welding and soldering	PM, NOx
Galvanizing (zinc)	PM, Zinc
Electroplating	PM
Chromic acid anodising	PM
Wastewater treatment	VOCs
Painting and solvent usage	VOCs
Combustion	Combustion products
Fuel and organic liquid storage	VOCs

The locations of commercial metal coating and finishing businesses are shown in Figure 3.22.

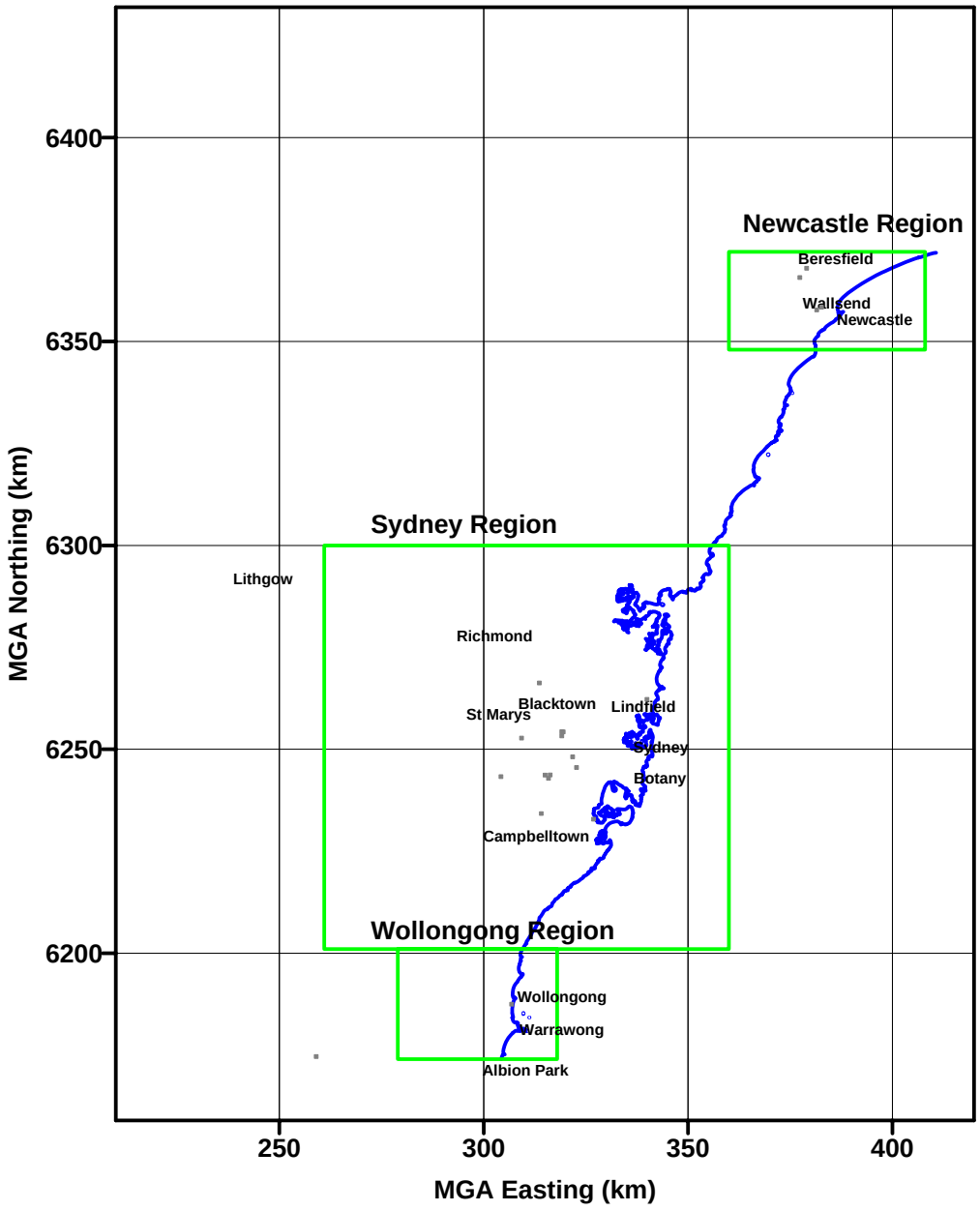

Figure 3.23: Locations of Metal Coating and Finishing Businesses Within the GMR

3.22.2 Emissions Estimation Methodology

Emissions from each source have been estimated using techniques outlined in the following documents:

- *NPI EET Manual for Iron and Steel Production* (Environment Australia, 1999l);
- *NPI EET Manual for Structural and Fabricated Metal Product Manufacturing* (Environment Australia, 1999m);
- *NPI EET Manual for Fugitive Emissions* (Environment Australia, 1999n);

- *NPI EET Manual for Galvanizing v1.1* (Environment Australia, 2001b);
- *NPI EET Manual for Electroplating and Anodising* (Environment Australia, 1999o); and
- USEPA AP-42, Chapter 4.2.2.12, *Metal Furniture Surface Coating* (USEPA, 1983)).

More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.22.3 Activity Data and Assumptions

Site specific data supplied in the returned commercial survey questionnaires from respondent businesses have been used for emissions estimation when provided. One non-respondent business that reported emissions to the NPI but did not respond to the commercial survey has also been included in the emissions inventory.

The number of respondent businesses is provided in Table 3.90.

Table 3.90: Number of Metal Coating and Finishing Businesses in the GMR

ANZSIC Class	Number of Businesses Identified	Number of Businesses Responded	Number of Non-Respondent NPI Businesses
Metal coating and finishing (2764)	96	19	1

It should be noted that in processing the returned commercial survey questionnaires, two businesses have been determined to have no emission sources n the operation of the business. Hence, these businesses have been estimated to emit zero air emissions.

No emission estimates have been performed for non-respondent businesses that do not report to the NPI as there are no relevant sources of estimation data available in the public arena.

3.22.4 Temporal Variation of Emissions

Data provided in returned commercial survey questionnaires have been used to estimate temporal variation of emissions. Monthly variations have been accounted for if data has been provided. The business with emissions estimated using reported NPI emissions has been assumed to operate 24 hours a day. It has been assumed that emissions remain constant throughout the operating hours of the business.

3.22.5 Emissions Estimation

Estimated emissions from metal coating and finishing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.91.

Table 3.91: Estimated Emissions from Metal Coating and Finishing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR [a]
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	17.9	0	0	17.9
BENZENE	61.1	14.6	0	75.8
CARBON MONOXIDE	1,260	2,460	0	3,720
FORMALDEHYDE	114	29.3	0	143
ISOMERS OF XYLENE	821	77.8	0	899
LEAD & COMPOUNDS	0.008	0.01	0	0.02
OXIDES OF NITROGEN	1,690	28,600	0	30,300
PARTICULATE MATTER 10µm	616	2,690	0	3,310
PARTICULATE MATTER 2.5µm	616	2,680	0	3,300
PERCHLOROETHYLENE	1,180	0.005	0	1,180
POLYCYCLIC AROMATIC HYDROCARBONS	0.01	0.02	0	0.03
SULFUR DIOXIDE	7.84	15.3	0	23.1
TOLUENE	724	94.2	0	818
TOTAL SUSPENDED PARTICULATES (TSP)	617	2,720	0	3,340
TOTAL VOCS	7,130	590	0	7,720
TRICHLOROETHYLENE (TCE)	144	0	0	144

[a] Totals may not appear additive due to rounding

3.22.6 Projection Factors

Projection factors for metal coating and finishing have been derived based on ABARE projected final energy consumption for the manufacturing and construction sector in NSW (*Total Final Energy Consumption by Industry and Fuel, New South* Wales, Australian Energy Statistics, ABARE, 2006). The projection factors are provided in Table 3.87.

3.23 Other ANZSIC Classes

Emissions from other ANZSIC classes have been estimated using the methodologies outlined in the methodology report (Bawden et. al., 2004) and data provided in returned commercial survey questionnaires. All commercial businesses that did not respond to the commercial survey questionnaire that report annual emissions to the NPI have also been included in the inventory.

3.23.1 Emission Sources and Associated Releases to Air

Businesses have been identified using the following sources:

- NSW WorkCover database for hazardous materials; and
- NSW telephone directory.

Summary statistics for each ANZSIC Class included in this section are presented in Table 3.92.

Table 3.92: Summary Statistics for Businesses included in "Other ANZSIC Classes"

ANZSIC Class	Number of Businesses Identified	Number of Businesses Surveyed	Number of Businesses Responded	Number of Non-Respondent NPI Businesses	Number of Businesses Included in Inventory	Percentage of Businesses Included in Inventory
Aircraft manufacturing (2824)	6	6	0	1	1	17%
Automotive component manufacturing n.e.c. (2819)	11	11	4	0	4	36%
Basic non-ferrous metal manufacturing (2729)	5	5	2	0	2	40%
Battery manufacturing (2853)	4	4	1	0	1	25%
Biscuit manufacturing (2163)	2	2	0	2	2	100%
Cake and pastry manufacturing (2162)	2	2	1	0	1	50%
Ceramic product manufacturing n.e.c. (2629)	7	7	1	0	1	14%
Chemical wholesaling (4523)	27	27	3	0	3	11%
Confectionery manufacturing (2172)	5	5	3	0	3	60%
Corrugated paperboard container manufacturing (2333)	1	1	0	1	1	100%
Electric cable and wire manufacturing (2852)	2	2	1	0	1	50%
Electrical equipment manufacturing (2859)	20	20	3	0	3	15%
Electronic equipment manufacturing n.e.c. (2849)	4	4	1	0	1	25%
Fabricated metal product manufacturing n.e.c. (2769)	32	32	7	1	8	25%
Fruit and vegetable processing (2130)	3	3	1	1	2	67%
Furniture manufacturing n.e.c. (2929)	38	38	4	0	4	11%
Gas supply (3620)	6	6	0	6	6	100%
Ice cream manufacturing (2122)	1	1	1	0	1	100%
Industrial gas manufacturing (2532)	10	10	2	0	2	20%
Ink manufacturing (2549)	7	7	2	0	2	29%
Lifting and material handling equipment manufacturing (2865)	1	1	1	0	1	100%
Medicinal and pharmaceutical product manufacturing (2543)	15	15	3	0	3	20%
Milk and cream processing (2121)	1	1	1	0	1	100%
Mining and construction machinery manufacturing (2862)	9	9	2	0	2	22%
Non-building construction n.e.c. (4122)	13	13	2	0	2	15%
Non-ferrous metal casting (2733)	1	1	1	0	1	100%
Paper product manufacturing n.e.c. (2339)	5	5	2	1	3	60%

ANZSIC Class	Number of Businesses Identified	Number of Businesses Surveyed	Number of Businesses Responded	Number of Non-Respondent NPI Businesses	Number of Businesses Included in Inventory	Percentage of Businesses Included in Inventory
Petroleum and coal product manufacturing n.e.c. (2520)	1	1	1	0	1	100%
Petroleum product wholesaling (4521)	80	80	7	14	21	26%
Plastic bag and film manufacturing (2563)	10	10	3	0	3	30%
Plastic injection moulded product manufacturing (2566)	153	153	11	1	12	8%
Prepared animal and bird feed manufacturing (2174)	3	3	1	1	2	67%
Rail transport (6200)	1	1	1	0	1	100%
Road and bridge construction (4121)	23	23	6	0	6	26%
Rubber product manufacturing (2559)	8	8	6	0	6	75%
Soap and other detergent manufacturing (2545)	7	7	2	0	2	29%
Soft drink, cordial and syrup manufacturing (2181)	3	3	0	2	2	67%
Solid paperboard container manufacturing (2332)	3	3	2	0	2	67%
Spirit manufacturing (2184)	3	3	1	0	1	33%
Spring and wire product manufacturing (2762)	13	13	5	1	6	46%
Structural metal product manufacturing n.e.c. (2749)	3	3	2	0	2	67%
Structural steel fabricating (2741)	1	1	1	0	1	100%
Synthetic resin manufacturing (2533)	3	3	1	0	1	33%
Wood product manufacturing n.e.c. (2329)	13	13	2	0	2	15%
Wooden furniture and upholstered seat manufacturing (2921)	11	11	1	0	1	9%
Wooden structural component manufacturing (2323)	14	14	1	0	1	7%

The emission sources and associated releases to air for each ANZSIC Class are presented in the methodology document (Bawden et. al., 2004).

The locations of all businesses included in "Other ANZSIC Classes" are shown in Figure 3.24.

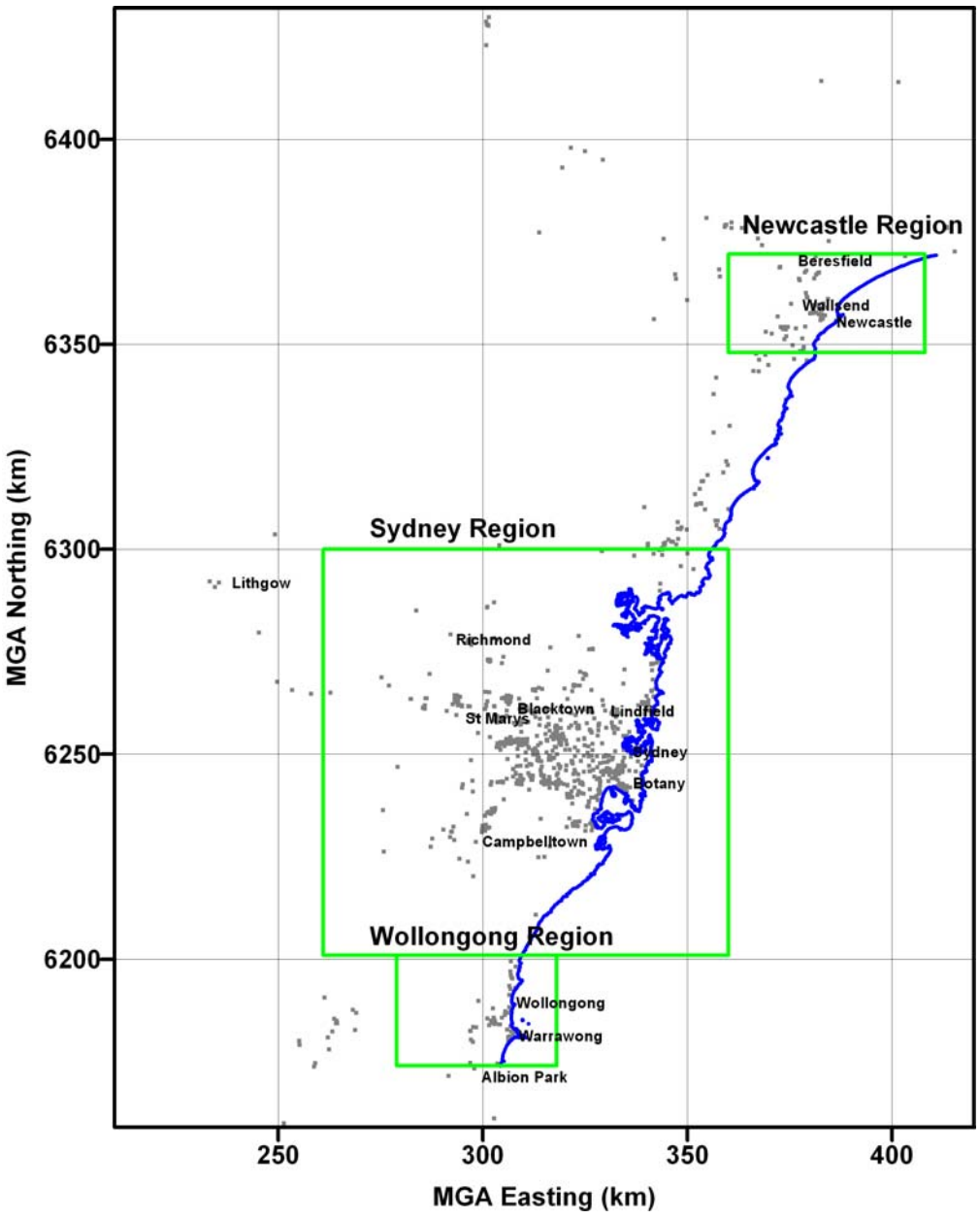

Figure 3.24: Locations of Commercial Businesses included in "Other ANZSIC Classes" Within the GMR

3.23.2 Emissions Estimation Methodology

The methodology used to estimate emissions from each source is described in the methodology report (Bawden et. al., 2004).

3.23.3 Activity Data and Assumptions

Activity data provided in returned commercial survey questionnaires have been used to estimate emissions from all sources. Businesses that did not respond to the commercial survey questionnaire that report emissions to the NPI have also been included in the commercial emissions inventory.

3.23.4 Temporal Variation of Emission

Process emissions have been assumed to vary in direct proportion to the change in production rates over a typical year which was supplied in returned commercial survey questionnaires. Temporal variations of evaporative emissions from fuel tanks have been calculated using the USEPA TANKS program (USEPA, 2004b).

3.23.5 Emissions Estimation

Estimated emissions from aircraft manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.93.

Table 3.93: Estimated Emissions from Aircraft Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	14	0	0	14
CARBON MONOXIDE	2,350	0	0	2,350
FORMALDEHYDE	28	0	0	28
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0.014	0	0	0.014
OXIDES OF NITROGEN	2,800	0	0	2,800
PARTICULATE MATTER 10µm	213	0	0	213
PARTICULATE MATTER 2.5µm	213	0	0	213
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.02	0	0	0.02
SULFUR DIOXIDE	14.6	0	0	14.6
TOLUENE	7	0	0	7
TOTAL SUSPENDED PARTICULATES (TSP)	213	0	0	213
TOTAL VOCS	154	0	0	154
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from automotive component manufacturing n.e.c. businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.94.

Table 3.94: Estimated Emissions from Automotive Component Manufacturing n.e.c.

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0.007	0	0	0	0.007
BENZENE	1.26	0	0.02	0	1.27
CARBON MONOXIDE	208	0	2.69	0	210
FORMALDEHYDE	2.51	0	0.03	0	2.55
ISOMERS OF XYLENE	768	0	66.7	29.6	864
LEAD & COMPOUNDS	0.001	0	0	0	0.001
OXIDES OF NITROGEN	247	0	3.2	0	251
PARTICULATE MATTER 10µm	21.7	0	0.243	0	21.9
PARTICULATE MATTER 2.5µm	21.7	0	0.243	0	21.9
PERCHLOROETHYLENE	0.471	0	0	0	0.471
POLYCYCLIC AROMATIC HYDROCARBONS	0.002	0	0	0	0.002
SULFUR DIOXIDE	1.29	0	0.02	0	1.31
TOLUENE	3,000	0	309	140	3,450
TOTAL SUSPENDED PARTICULATES (TSP)	21.7	0	0.243	0	21.9
TOTAL VOCS	12,700	0	807	429	14,000
TRICHLOROETHYLENE (TCE)	0.06	0	0	0	0.06

[a] Totals may not appear additive due to rounding

Estimated emissions from basic non-ferrous metal manufacturing n.e.c. businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.95.

Table 3.95: Estimated Emissions from Basic Non-Ferrous Metal Manufacturing n.e.c.

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0.523	0	0	0.523
CARBON MONOXIDE	87.8	0	0	87.8
FORMALDEHYDE	1.05	0	0	1.05
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	3.7	0	0	3.7
OXIDES OF NITROGEN	105	0	0	105
PARTICULATE MATTER 10µm	9,970	0	0	9,970
PARTICULATE MATTER 2.5µm	7,470	0	0	7,470
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	129	0	0	129
TOLUENE	0.261	0	0	0.261
TOTAL SUSPENDED PARTICULATES (TSP)	15,700	0	0	15,700
TOTAL VOCS	5.75	0	0	5.75
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from biscuit manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.96.

Table 3.96: Estimated Emissions from Biscuit Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	47	0	0	47
CARBON MONOXIDE	7,890	0	0	7,890
FORMALDEHYDE	7.1	0	0	7.1
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0.05	0	0	0.05
OXIDES OF NITROGEN	9,400	0	0	9,400
PARTICULATE MATTER 10µm	714	0	0	714
PARTICULATE MATTER 2.5µm	714	0	0	714
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.06	0	0	0.06
SULFUR DIOXIDE	49.1	0	0	49.1
TOLUENE	23.5	0	0	23.5
TOTAL SUSPENDED PARTICULATES (TSP)	714	0	0	714
TOTAL VOCS	517	0	0	517
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from cake and pastry manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.97.

Table 3.97: Estimated Emissions from Cake and Pastry Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0.192	0	0	0.192
BENZENE	8.54	0	0	8.54
CARBON MONOXIDE	1,340	0	0	1,340
FORMALDEHYDE	17	0	0	17
ISOMERS OF XYLENE	8.72	0	0	8.72
LEAD & COMPOUNDS	0.008	0	0	0.008
OXIDES OF NITROGEN	1,590	0	0	1,590
PARTICULATE MATTER 10µm	121	0	0	121
PARTICULATE MATTER 2.5µm	121	0	0	121
PERCHLOROETHYLENE	12.7	0	0	12.7
POLYCYCLIC AROMATIC HYDROCARBONS	0.01	0	0	0.01
SULFUR DIOXIDE	8.32	0	0	8.32
TOLUENE	11.2	0	0	11.2
TOTAL SUSPENDED PARTICULATES (TSP)	121	0	0	121
TOTAL VOCS	13,600	0	0	13,600
TRICHLOROETHYLENE (TCE)	1.55	0	0	1.55

Estimated emissions from ceramic product manufacturing n.e.c. businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.98.

Table 3.98: Estimated Emissions from Ceramic Product Manufacturing n.e.c.

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	0	4.8	0	4.8
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	0	34.8	0	34.8
PARTICULATE MATTER 10µm	0	1.08	0	1.08
PARTICULATE MATTER 2.5µm	0	1.07	0	1.07
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	0	0	0	0
TOTAL SUSPENDED PARTICULATES (TSP)	0	1.11	0	1.11
TOTAL VOCS	0	0.84	0	0.84
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from commercial chemical wholesaling businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.99.

Table 3.99: Estimated Emissions from Chemical Wholesaling

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	76.3	0	0	76.3
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0
PARTICULATE MATTER 10µm	0	0	0	0
PARTICULATE MATTER 2.5µm	0	0	0	0
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	125	0	0	125
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	0
TOTAL VOCS	782	0	0	782
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from confectionery manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.100.

Table 3.100: Estimated Emissions from Confectionery Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0.009	0	0	0.009
BENZENE	1.13	0	0	1.13
CARBON MONOXIDE	184	0	0	184
FORMALDEHYDE	2.25	0	0	2.25
ISOMERS OF XYLENE	0.428	0	0	0.428
LEAD & COMPOUNDS	0.001	0	0	0.001
OXIDES OF NITROGEN	220	0	0	220
PARTICULATE MATTER 10µm	16.7	0	0	16.7
PARTICULATE MATTER 2.5µm	16.7	0	0	16.7
PERCHLOROETHYLENE	0.623	0	0	0.623
POLYCYCLIC AROMATIC HYDROCARBONS	0.002	0	0	0.002
SULFUR DIOXIDE	1.15	0	0	1.15
TOLUENE	0.903	0	0	0.903
TOTAL SUSPENDED PARTICULATES (TSP)	16.7	0	0	16.7
TOTAL VOCS	15.7	0	0	15.7
TRICHLOROETHYLENE (TCE)	0.08	0	0	0.08

Estimated emissions from corrugated paperboard container manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.101.

Table 3.101: Estimated Emissions from Corrugated Paperboard Container Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	11.5	0	0	11.5
CARBON MONOXIDE	1,930	0	0	1,930
FORMALDEHYDE	23	0	0	23
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0.01	0	0	0.01
OXIDES OF NITROGEN	2,300	0	0	2,300
PARTICULATE MATTER 10µm	175	0	0	175
PARTICULATE MATTER 2.5µm	175	0	0	175
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.02	0	0	0.02
SULFUR DIOXIDE	12	0	0	12
TOLUENE	5.75	0	0	5.75
TOTAL SUSPENDED PARTICULATES (TSP)	175	0	0	175
TOTAL VOCS	127	0	0	127
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from electric cable and wire manufacturing businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.102.

Table 3.102: Estimated Emissions from Electric Cable and Wire Manufacturing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0	0	0	0
CARBON MONOXIDE	0	0	0	0	0
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	0	0	0	20,500	20,500
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0	0
PARTICULATE MATTER 10µm	0	0	0	840	840
PARTICULATE MATTER 2.5µm	0	0	0	629	629
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	0	0	0	14,100	14,100
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	1,330	1,330
TOTAL VOCS	0	0	0	84,000	84,000
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

Estimated emissions from electrical and equipment manufacturing n.e.c. businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.103.

Table 3.103: Estimated Emissions from Electrical and Equipment Manufacturing n.e.c.

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0.219	0	0	0.219
CARBON MONOXIDE	36.8	0	0	36.8
FORMALDEHYDE	0.438	0	0	0.438
ISOMERS OF XYLENE	206	0	0	206
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	422	0	0	422
PARTICULATE MATTER 10µm	429	0	0	429
PARTICULATE MATTER 2.5µm	429	0	0	429
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0.229	0	0	0.229
TOLUENE	556	0	0	556
TOTAL SUSPENDED PARTICULATES (TSP)	429	0	0	429
TOTAL VOCS	4,180	0	0	4,180
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from fabricated metal product manufacturing n.e.c. businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.104.

Table 3.104: Estimated Emissions from Fabricated Metal Product Manufacturing n.e.c.

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0.01	0	0	0	0.01
BENZENE	0.48	0	0	4.56	5.04
CARBON MONOXIDE	95.3	0	0	766.08	861
FORMALDEHYDE	1.16	0	0	9.12	10.3
ISOMERS OF XYLENE	3,640	0.828	11.1	0	3,650
LEAD & COMPOUNDS	0	0	0	0.005	0.005
OXIDES OF NITROGEN	1,160fu	413	0	450	2020
PARTICULATE MATTER 10µm	1,040	192	0	69.3	1,300
PARTICULATE MATTER 2.5µm	1,040	192	0	69.3	1,300
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.002	0	0	0.007	0.009
SULFUR DIOXIDE	0.502	0	0	4.77	5.27
TOLUENE	14,200	8.39	51.6	2.28	14,300
TOTAL SUSPENDED PARTICULATES (TSP)	1040	192	0	69.3	1300
TOTAL VOCS	42,000	24.7	134	58.6	42,200
TRICHLOROETHYLENE (TCE)	0	0	0	8.4	8.4

Estimated emissions from fruit and vegetable processing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.105.

Table 3.105: Estimated Emissions from Fruit and Vegetable Processing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	3.36	0	0	3.36
CARBON MONOXIDE	564	0	0	564
FORMALDEHYDE	6.72	0	0	6.72
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0.003	0	0	0.003
OXIDES OF NITROGEN	672	0	0	672
PARTICULATE MATTER 10µm	51.1	0	0	51.1
PARTICULATE MATTER 2.5µm	51.1	0	0	51.1
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.005	0	0	0.005
SULFUR DIOXIDE	3.51	0	0	3.51
TOLUENE	1.68	0	0	1.68
TOTAL SUSPENDED PARTICULATES (TSP)	51.1	0	0	51.1
TOTAL VOCS	37	0	0	37
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from furniture manufacturing businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.106.

Table 3.106: Estimated Emissions from Furniture Manufacturing n.e.c.

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0	0	9.49	9.49
CARBON MONOXIDE	0	0	0	1,590	1,590
FORMALDEHYDE	0	0	0	19	19
ISOMERS OF XYLENE	279	326	0	0.05	606
LEAD & COMPOUNDS	0	0	0	0.009	0.009
OXIDES OF NITROGEN	0	0	0	1,900	1,900
PARTICULATE MATTER 10µm	0	0	0	144	144
PARTICULATE MATTER 2.5µm	0	0	0	144	144
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0.01	0.01
SULFUR DIOXIDE	0	0	0	9.91	9.91
TOLUENE	621	1,530	0	4.76	2,150
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	144	144
TOTAL VOCS	2,840	4,290	0	105	7,240
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

Estimated emissions from gas supply businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.107.

Table 3.107: Estimated Emissions from Gas Supply

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR [a]
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	7.2	0	0	7.2
CARBON MONOXIDE	1210	0	0	1,210
FORMALDEHYDE	14.4	0	0	14.4
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0.007	0	0	0.007
OXIDES OF NITROGEN	1,440	0	0	1,440
PARTICULATE MATTER 10µm	109	0	0	109
PARTICULATE MATTER 2.5µm	109	0	0	109
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.01	0	0	0.01
SULFUR DIOXIDE	7.52	0	0	7.52
TOLUENE	3.6	0	0	3.6
TOTAL SUSPENDED PARTICULATES (TSP)	109	0	0	109
TOTAL VOCS	7,240	0	2,780	10,000
TRICHLOROETHYLENE (TCE)	0	0	0	0

[a] Totals may not appear additive due to rounding

Estimated emissions from ice cream manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.108.

Table 3.108: Estimated Emissions from Ice Cream Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0.966	0	0	0.966
BENZENE	9.02	0	0	9.02
CARBON MONOXIDE	1,030	0	0	1,030
FORMALDEHYDE	17.6	0	0	17.6
ISOMERS OF XYLENE	43.9	0	0	43.9
LEAD & COMPOUNDS	0.006	0	0	0.006
OXIDES OF NITROGEN	1,720	0	0	1,720
PARTICULATE MATTER 10µm	93	0	0	93
PARTICULATE MATTER 2.5µm	93	0	0	93
PERCHLOROETHYLENE	63.9	0	0	63.9
POLYCYCLIC AROMATIC HYDROCARBONS	0.008	0	0	0.008
SULFUR DIOXIDE	14.4	0	0	14.4
TOLUENE	39.3	0	0	39.3
TOTAL SUSPENDED PARTICULATES (TSP)	93	0	0	93
TOTAL VOCS	438	0	0	438
TRICHLOROETHYLENE (TCE)	7.81	0	0	7.81

Estimated emissions from industrial gas manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.109.

Table 3.109: Estimated Emissions from Industrial Gas Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	1.88	0	0	1.88
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	633	0	0	633
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	13.6	0	0	13.6
PARTICULATE MATTER 10µm	0.423	0	0	0.423
PARTICULATE MATTER 2.5µm	0.419	0	0	0.419
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	2,020	0	0	2020
TOTAL SUSPENDED PARTICULATES (TSP)	0.434	0	0	0.434
TOTAL VOCS	5,820	0	0	5,820
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from ink manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.110.

Table 3.110: Estimated Emissions from Ink Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	0.01	0	0	0.01
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0
PARTICULATE MATTER 10µm	615	0	0	615
PARTICULATE MATTER 2.5µm	610	0	0	610
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	1,260	0	0	1,260
TOTAL SUSPENDED PARTICULATES (TSP)	668	0	0	668
TOTAL VOCS	10,600	0	0	10,600
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from lifting and material handling equipment manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.111.

Table 3.111: Estimated Emissions from Lifting and Material Handling Equipment Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0.49	0	0	0.49
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	97	0	0	97
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	124	0	0	124
PARTICULATE MATTER 10µm	24.5	0	0	24.5
PARTICULATE MATTER 2.5µm	24.5	0	0	24.5
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	210	0	0	210
TOTAL SUSPENDED PARTICULATES (TSP)	24.5	0	0	24.5
TOTAL VOCS	745	0	0	745
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from medicinal and pharmaceutical product manufacturing businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.112.

Table 3.112: Estimated Emissions from Medicinal and Pharmaceutical Product Manufacturing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	14.4	0	0	3.09	17.5
CARBON MONOXIDE	2,440	0	0	520	2,960
FORMALDEHYDE	28.9	0	0	6.19	35
ISOMERS OF XYLENE	0.02	0	0	0	0.02
LEAD & COMPOUNDS	0.01	0	0	0.003	0.02
OXIDES OF NITROGEN	2,990	0	0	1,740	4,730
PARTICULATE MATTER 10µm	223	0	0	47	270
PARTICULATE MATTER 2.5µm	223	0	0	47	270
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.02	0	0	0.004	0.02
SULFUR DIOXIDE	15.1	0	0	3.23	18.3
TOLUENE	7.22	0	0	1.55	8.77
TOTAL SUSPENDED PARTICULATES (TSP)	223	0	0	47	270
TOTAL VOCS	1,350	0	0	693	2,040
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

Estimated emissions from milk and cream processing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.113.

Table 3.113: Estimated Emissions from Milk and Cream Processing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	6.12	0	0	6.12
CARBON MONOXIDE	1,030	0	0	1,030
FORMALDEHYDE	12.2	0	0	12.2
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0.006	0	0	0.006
OXIDES OF NITROGEN	1,220	0	0	1220
PARTICULATE MATTER 10µm	93	0	0	93
PARTICULATE MATTER 2.5µm	93	0	0	93
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.008	0	0	0.008
SULFUR DIOXIDE	6.4	0	0	6.4
TOLUENE	3.06	0	0	3.06
TOTAL SUSPENDED PARTICULATES (TSP)	93	0	0	93
TOTAL VOCS	67.3	0	0	67.3
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from mining and construction machinery manufacturing businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.114.

Table 3.114: Estimated Emissions from Mining and Construction Machinery Manufacturing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0.799	0	0	0.799
CARBON MONOXIDE	0	0	0	0	0
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	0	28.8	0	197	226
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0	0
PARTICULATE MATTER 10µm	0	0.201	0	0	0.201
PARTICULATE MATTER 2.5µm	0	0.201	0	0	0.201
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	0	134	0	136	270
TOTAL SUSPENDED PARTICULATES (TSP)	0	0.201	0	0	0.201
TOTAL VOCS	0	475	0	806	1,280
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

Estimated emissions from non-building construction n.e.c. businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.115.

Table 3.115: Estimated Emissions from Non-Building Construction n.e.c.

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0	0	0	0
CARBON MONOXIDE	16.5	0	0	5.65	22.1
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	0	0	0	0	0
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	119	0	0	40.9	160
PARTICULATE MATTER 10µm	3.71	0	0	1.27	4.98
PARTICULATE MATTER 2.5µm	3.67	0	0	1.26	4.93
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	0	0	0	0	0
TOTAL SUSPENDED PARTICULATES (TSP)	3.8	0	0	1.3	5.1
TOTAL VOCS	2.88	0	0	0.99	3.87
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

Estimated emissions from non-ferrous metal casting businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.116.

Table 3.116: Estimated Emissions from Non-Ferrous Metal Casting

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0	0	0	0
CARBON MONOXIDE	0	0	0	7.2	7.2
FORMALDEHYDE	0	0	0	0.234	0.234
ISOMERS OF XYLENE	0	0	0	0.01	0.01
LEAD & COMPOUNDS	0	0	0	0.002	0.002
OXIDES OF NITROGEN	0	0	0	28.8	28.8
PARTICULATE MATTER 10µm	0	0	0	244	244
PARTICULATE MATTER 2.5µm	0	0	0	183	183
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	21.7	21.7
TOLUENE	0	0	0	0.004	0.004
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	384	384
TOTAL VOCS	0	0	0	0.64	0.64
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

Estimated emissions from paper product manufacturing n.e.c. businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.117.

Table 3.117: Estimated Emissions from Paper Product Manufacturing n.e.c.

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	2.18	2.18
ACETALDEHYDE	0	0	0	0	0
BENZENE	10.4	0	0	2.46	12.8
CARBON MONOXIDE	1,740	0	0	81.1	1,820
FORMALDEHYDE	20.7	0	0	0	20.7
ISOMERS OF XYLENE	38.6	0	0	0	38.6
LEAD & COMPOUNDS	0.01	0	0	0	0.01
OXIDES OF NITROGEN	2,070	0	0	377	2,450
PARTICULATE MATTER 10µm	158	0	0	26.5	184
PARTICULATE MATTER 2.5µm	158	0	0	26.3	184
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.014	0	0	0.014	0.03
SULFUR DIOXIDE	10.8	0	0	24.8	35.6
TOLUENE	142	0	0	0	142
TOTAL SUSPENDED PARTICULATES (TSP)	158	0	0	27.2	185
TOTAL VOCS	510	0	0	27.6	538
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

Estimated emissions from commercial petroleum product wholesaling businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.118.

Table 3.118: Estimated Emissions from Petroleum Product Wholesaling

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	223	2.03	0	352	577
CARBON MONOXIDE	0	0	0	0	0
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	158	1.43	0	250	409
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0	0
PARTICULATE MATTER 10µm	0	0	0	0	0
PARTICULATE MATTER 2.5µm	0	0	0	0	0
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	544	4.94	0	858	1,410
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	0	0
TOTAL VOCS	35,100	251	0	43,900	79,300
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

Estimated emissions from plastic bag and film manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.119.

Table 3.119: Estimated Emissions from Plastic Bag and Film Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0.368	0	0	0.368
BENZENE	1.11	0	0	1.11
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	2.04	0	0	2.04
ISOMERS OF XYLENE	18.5	0	0	18.5
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0
PARTICULATE MATTER 10µm	899	0	0	899
PARTICULATE MATTER 2.5µm	832	0	0	832
PERCHLOROETHYLENE	24.3	0	0	24.3
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	1,150	0	0	1,150
TOTAL SUSPENDED PARTICULATES (TSP)	899	0	0	899
TOTAL VOCS	17,700	0	0	17,700
TRICHLOROETHYLENE (TCE)	2.98	0	0	2.98

Estimated emissions from plastic injection moulded product manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.120.

Table 3.120: Estimated Emissions from Plastic Injection Moulded Product Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	11.9	0	0	11.9
CARBON MONOXIDE	2,000	0	0	2,000
FORMALDEHYDE	24.1	0	0	24.1
ISOMERS OF XYLENE	0.532	0	0	0.532
LEAD & COMPOUNDS	0.01	0	0	0.01
OXIDES OF NITROGEN	2,410	0	0	2,410
PARTICULATE MATTER 10µm	182	0	0	182
PARTICULATE MATTER 2.5µm	182	0	0	182
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.02	0	0	0.02
SULFUR DIOXIDE	87.7	0	0	87.7
TOLUENE	14.3	0	0	14.3
TOTAL SUSPENDED PARTICULATES (TSP)	182	0	0	182
TOTAL VOCS	172	0	0	172
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from prepared animal and bird feed manufacturing businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.121.

Table 3.121: Estimated Emissions from Prepared Animal and Bird Feed Manufacturing

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0	0	7.74	7.74
CARBON MONOXIDE	1.44	0	0	1,300	1,300
FORMALDEHYDE	0.05	0	0	15.5	15.5
ISOMERS OF XYLENE	0	0	0	0	0
LEAD & COMPOUNDS	0	0	0	0.008	0.008
OXIDES OF NITROGEN	5.76	0	0	1,550	1,550
PARTICULATE MATTER 10µm	0.312	0	0	118	118
PARTICULATE MATTER 2.5µm	0.31	0	0	118	118
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0.01	0.01
SULFUR DIOXIDE	2.04	0	0	8.09	10.1
TOLUENE	0	0	0	3.87	3.87
TOTAL SUSPENDED PARTICULATES (TSP)	0.319	0	0	118	118
TOTAL VOCS	0.1	0	0	85.2	85.3
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

Estimated emissions from commercial rail transport businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.122.

Table 3.122: Estimated Emissions from Rail Transport

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0	0	0	0
CARBON MONOXIDE	0	0	0	0	0
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	0	0	0	2.49	2.49
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0	0
PARTICULATE MATTER 10µm	0	0	0	0	0
PARTICULATE MATTER 2.5µm	0	0	0	0	0
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0.02	0.02
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	0	0	0	1.94	1.94
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	0	0
TOTAL VOCS	0	0	0	13.9	13.9
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

Estimated emissions from road and bridge construction businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.123.

Table 3.123: Estimated Emissions from Road and Bridge Construction

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0	0.06	0	0.06	0.119
CARBON MONOXIDE	0	0	0	0	0
FORMALDEHYDE	0	0	0	0	0
ISOMERS OF XYLENE	0	0.04	0	0.05	0.09
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0	0
PARTICULATE MATTER 10µm	29.6	32.6	0	32.5	94.7
PARTICULATE MATTER 2.5µm	5.97	6.56	0	6.51	19
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0	0	0	0	0
TOLUENE	0	0.138	0	0.15	0.292
TOTAL SUSPENDED PARTICULATES (TSP)	59.2	65.2	0	65	189
TOTAL VOCS	0	7.02	0	7.84	14.9
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

Estimated emissions from rubber product manufacturing n.e.c. businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.124.

Table 3.124: Estimated Emissions from Rubber Product Manufacturing n.e.c.

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR [a]
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	0	0	7.2	7.2
FORMALDEHYDE	0	0	0.234	0.234
ISOMERS OF XYLENE	0.996	0	0.03	1.03
LEAD & COMPOUNDS	0	0	0.002	0.002
OXIDES OF NITROGEN	0	0	28.8	28.8
PARTICULATE MATTER 10µm	5.78	0	1.56	7.34
PARTICULATE MATTER 2.5µm	0	0	1.55	1.55
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	10.2	10.2
TOLUENE	0.926	0	0.01	0.937
TOTAL SUSPENDED PARTICULATES (TSP)	1.91	0	1.6	3.5
TOTAL VOCS	6	0	0.866	6.87
TRICHLOROETHYLENE (TCE)	0	0	0	0

[a] Totals may not appear additive due to rounding

Estimated emissions from soap and other detergent manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.125.

Table 3.125: Estimated Emissions from Soap and Other Detergent Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	0.003	0	0	0.003
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0
PARTICULATE MATTER 10µm	0	0	0	0
PARTICULATE MATTER 2.5µm	0	0	0	0
PERCHLOROETHYLENE	0.005	0	0	0.005
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	0.003	0	0	0.003
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	0
TOTAL VOCS	28.9	0	0	28.9
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from soft drink, cordial and syrup manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.126.

Table 3.126: Estimated Emissions from Soft Drink, Cordial and Syrup Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	16.2	0	0	16.2
CARBON MONOXIDE	2,660	0	0	2,660
FORMALDEHYDE	32.5	0	0	32.5
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0.02	0	0	0.02
OXIDES OF NITROGEN	3,250	0	0	3,250
PARTICULATE MATTER 10µm	247	0	0	247
PARTICULATE MATTER 2.5µm	247	0	0	247
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0.02	0	0	0.02
SULFUR DIOXIDE	17	0	0	17
TOLUENE	8.12	0	0	8.12
TOTAL SUSPENDED PARTICULATES (TSP)	247	0	0	247
TOTAL VOCS	179	0	0	179
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from solid paperboard container manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.127.

Table 3.127: Estimated Emissions from Solid Paperboard Container Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0
PARTICULATE MATTER 10µm	0	0	0	0
PARTICULATE MATTER 2.5µm	0	0	0	0
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	524	0	0	524
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	0
TOTAL VOCS	15,300	0	0	15,300
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from spirit manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.128.

Table 3.128: Estimated Emissions from Spirit Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0
PARTICULATE MATTER 10µm	0	0	0	0
PARTICULATE MATTER 2.5µm	0	0	0	0
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	0	0	0	0
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	0
TOTAL VOCS	66,700	0	0	66,700
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from spring and wire product manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.129.

Table 3.129: Estimated Emissions from Spring and Wire Product Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR [a]
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0.03	0	0	0.03
CARBON MONOXIDE	4.52	0	0.6	5.12
FORMALDEHYDE	0.06	0	0	0.06
ISOMERS OF XYLENE	0.02	0	0	14
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	5.38	0	4.35	781
PARTICULATE MATTER 10µm	0.409	0	0.135	130
PARTICULATE MATTER 2.5µm	0.409	0	0.134	130
PERCHLOROETHYLENE	0.04	0	0	0.04
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0.03	0	0	0.03
TOLUENE	0.03	0	0	169
TOTAL SUSPENDED PARTICULATES (TSP)	0.409	0	0.138	130
TOTAL VOCS	0.506	0	0.105	381
TRICHLOROETHYLENE (TCE)	0.004	0	0	0.004

[a] Totals may not appear additive due to rounding

Estimated emissions from structural metal product manufacturing n.e.c. businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.130.

Table 3.130: Estimated Emissions from Structural Metal Product Manufacturing n.e.c.

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	118	0	0	118
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0
PARTICULATE MATTER 10µm	0	0	0	0
PARTICULATE MATTER 2.5µm	0	0	0	0
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	544	0	0	544
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	0
TOTAL VOCS	1,990	0	0	1,990
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from structural steel fabricating businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.131.

Table 3.131: Estimated Emissions from Structural Steel Fabricating

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0
PARTICULATE MATTER 10µm	9.79	0	0	9.79
PARTICULATE MATTER 2.5µm	9.79	0	0	9.79
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	0	0	0	0
TOTAL SUSPENDED PARTICULATES (TSP)	9.79	0	0	9.79
TOTAL VOCS	0	0	0	0
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from synthetic resin manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.132.

Table 3.132: Estimated Emissions from Synthetic Resin Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0.009	0.009
CARBON MONOXIDE	0	0	1.48	1.48
FORMALDEHYDE	0	0	0.02	0.02
ISOMERS OF XYLENE	0	0	0	0
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	0	0	1.76	1.76
PARTICULATE MATTER 10µm	0	0	0.134	0.134
PARTICULATE MATTER 2.5µm	0	0	0.134	0.134
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0.009	0.009
TOLUENE	0	0	0.004	0.004
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0.134	0.134
TOTAL VOCS	0	0	0.1	0.1
TRICHLOROETHYLENE (TCE)	0	0	0	0

Estimated emissions from wood product manufacturing n.e.c. businesses within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.133.

Table 3.133: Estimated Emissions from Wood Product Manufacturing n.e.c.

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	0.003	0	0	0	0.003
CARBON MONOXIDE	0.5	0	0	0	0.5
FORMALDEHYDE	0.006	0	0	0	0.006
ISOMERS OF XYLENE	0	0	0	298	298
LEAD & COMPOUNDS	0	0	0	0	0
OXIDES OF NITROGEN	0.595	0	0	0	0.595
PARTICULATE MATTER 10µm	0.05	0	0	0	0.05
PARTICULATE MATTER 2.5µm	0.05	0	0	0	0.05
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0	0
SULFUR DIOXIDE	0.003	0	0	0	0.003
TOLUENE	0.001	0	0	1,140	1,140
TOTAL SUSPENDED PARTICULATES (TSP)	0.05	0	0	0	0.05
TOTAL VOCS	0.03	0	0	5,420	5,420
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

Estimated emissions from wooden furniture and upholstered seat manufacturing businesses within the GMR, Sydney, Newcastle and Wollongong regions are provided in Table 3.134.

Table 3.134: Estimated Emissions from Wooden Furniture and Upholstered Seat Manufacturing

Substance	Estimated Emissions (kg/year)			
	Sydney	Newcastle	Wollongong	GMR
1,3 BUTADIENE	0	0	0	0
ACETALDEHYDE	0	0	0	0
BENZENE	0	0	0	0
CARBON MONOXIDE	0	0	0	0
FORMALDEHYDE	0	0	0	0
ISOMERS OF XYLENE	86.4	0	0	86.4
LEAD & COMPOUNDS	0	0	0	0
OXIDES OF NITROGEN	0	0	0	0
PARTICULATE MATTER 10µm	0	0	0	0
PARTICULATE MATTER 2.5µm	0	0	0	0
PERCHLOROETHYLENE	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	0	0	0	0
SULFUR DIOXIDE	0	0	0	0
TOLUENE	647	0	0	647
TOTAL SUSPENDED PARTICULATES (TSP)	0	0	0	0
TOTAL VOCS	1,770	0	0	1,770
TRICHLOROETHYLENE (TCE)	0	0	0	0

3.23.6 Projection Factors

Table 3.135 outlines the projection factor methodology for each ANZSIC class considered in this section.

Table 3.135: Projection Factor Methodology for each Commercial Sector

Group/ Description	Class/ Description	Projection Methodology[1]
212/Dairy product manufacturing	2121/Milk and cream processing	Population growth rates. See Table 3.12.
	2122/Ice cream manufacturing	
213/Fruit and vegetable processing	2130/Fruit and vegetable processing	Population growth rates. See Table 3.12.
216/Bakery product manufacturing	2162/Cake and pastry manufacturing	Population growth rates. See Table 3.12.
	2163/Biscuit manufacturing	
217/Other food manufacturing	2172/Confectionary manufacturing	Population growth rates. See Table 3.12.
	2174/Prepared animal and bird feed manufacturing	
218/Beverage and malt manufacturing	2181/Soft drink, cordial and syrup manufacturing	Population growth rates. See Table 3.12.
	2184/Spirit manufacturing	
232/Other wood product manufacturing	2323/Wooden structural component manufacturing	Population growth rates. See Table 3.12.
	2329/Wood product manufacturing n.e.c.	
	2332/Solid paperboard container manufacturing	
	2333/Corrugated paperboard container manufacturing n.e.c.	

Group / Description	Class / Description	Projection Methodology[1]
	2339/Paper product manufacturing n.e.c.	
252/Petroleum and coal product manufacturing n.e.c.	2520/Petroleum and coal product manufacturing n.e.c.	Projected primary energy consumption by the petroleum refining sector (*Total Primary Energy Consumption – Petroleum Refining, Total Primary Energy Consumption by Industry and Fuel, New South Wales,* Australian Energy Statistics (ABARE, 2006)). See Table 3.136.
253/Basic chemical manufacturing	2532/Industrial gas manufacturing	Population growth rates. See Table 3.12.
	2533/Synthetic resin manufacturing	
254/Other chemical product manufacturing	2543/Medicinal and pharmaceutical product manufacturing	Population growth rates. See Table 3.12.
	2545/Soap and other detergent manufacturing	
	2547/Ink manufacturing	
255/Rubber product manufacturing	2559/Rubber product manufacturing	Population growth rates. See Table 3.12.
256/Plastic product manufacturing	2563/Plastic bag and film manufacturing	Population growth rates. See Table 3.12.
	2566/Plastic injection moulded product manufacturing	
261/Glass and glass product manufacturing	2629/Ceramic product manufacturing n.e.c.	Population growth rates. See Table 3.12.
	2632/Plaster product manufacturing	
271/Iron and steel manufacturing	2729/Basic non ferrous metal manufacturing	Projected final energy consumption by the basic “other” non-ferrous metal industry in NSW (i.e. excluding aluminium) (*Total Final Energy Consumption by Industry and Fuel, New South* Wales, Australian Energy Statistics, ABARE, 2006).See Table 3.137.
273/Non ferrous basic metal product manufacturing	2733/Nonferrous metal casting	
274/Structural metal product manufacturing	2741/Structural steel fabricating	Projected final energy consumption for the manufacturing and construction sector in NSW (*Total Final Energy Consumption by Industry and Fuel, New South* Wales, Australian Energy Statistics, ABARE, 2006). See Table 3.87.
	2749/Structural metal product manufacturing n.e.c.	
276/Fabricated metal product manufacturing	2762/Spring and wire product manufacturing	
	2769/Fabricated metal product manufacturing n.e.c.	
281/Motor vehicle and part manufacturing	2819/Automotive component manufacturing n.e.c.	Population growth rates. See Table 3.12.
282/Other transport equipment manufacturing	2824/Aircraft manufacturing	Population growth rates. See Table 3.12.
284/Electronic equipment manufacturing	2849/Electronic equipment manufacturing n.e.c.	Population growth rates. See Table 3.12.
285/Electrical equipment manufacturing	2852/Electric cable and wire manufacturing	Population growth rates. See Table 3.12.
	2853/Battery manufacturing	
286/Industrial machinery and equipment manufacturing	2862/Mining and construction machinery manufacturing	Projected final energy consumption by the mining sector in NSW (*Total*

Group / Description	Class / Description	Projection Methodology[1]
	2865/Lifting and material handling equipment manufacturing	*Final Energy Consumption by Industry and Fuel, New South* Wales, Australian Energy Statistics, ABARE, 2006). See Table 3.138.
292/Furniture manufacturing	2921/Wooden furniture and upholstered seat manufacturing	Population growth rates. See Table 3.12.
	2929/Furniture manufacturing n.e.c.	
412/Non building construction	4121/Road and bridge construction	Population growth rates. See Table 3.12.
	4122/Non building construction n.e.c.	
452/Mineral, metal and chemical wholesaling	4521/Petroleum product wholesaling	Population growth rates. See Table 3.12.
	4523/Chemical wholesaling	

Table 3.136: Projection Factors for Petroleum and Coal Product Manufacturing Sector

Year	Primary Energy Consumption (PJ/year) [a]	Projection Factor
2003	27.016	1.0000
2004	26.62	0.9853
2005	26.482	0.9802
2006	26.726	0.9893
2007	27.054	1.0014
2008	27.43	1.0153
2009	27.875	1.0318
2010	28.306	1.0477
2011	28.659	1.0608
2012	28.985	1.0729
2013	29.315	1.0851
2014	29.67	1.0982
2015	29.983	1.1098
2016	30.288	1.1211
2017	30.591	1.1323
2018	30.891	1.1434
2019	31.193	1.1546
2020	31.484	1.1654
2021	31.777	1.1762
2022	32.074	1.1872
2023	32.373	1.1983
2024	32.675	1.2095
2025	32.98	1.2208
2026	33.288	1.2322
2027	33.599	1.2437
2028	33.913	1.2553
2029	34.229	1.2670
2030		1.2769
2031		1.2871

[a] Source: *Total Primary Energy Consumption – Petroleum Refining, Total Primary Energy Consumption by Industry and Fuel, New South Wales,* Australian Energy Statistics (ABARE, 2006)

Table 3.137: Projection Factors for Basic Non-Ferrous Metals Sector

Year	Final Energy Consumption[a] (PJ/year)	Projection Factor
2003	11.6	1.0000
2004	11.8	1.0149
2005	12.1	1.0404
2006	12.5	1.0716
2007	12.8	1.1026
2008	13.2	1.1329
2009	13.6	1.1640
2010	13.9	1.1964
2011	14.3	1.2290
2012	14.7	1.2616
2013	15.1	1.2987
2014	15.5	1.3349
2015	16.0	1.3714
2016	16.4	1.4083
2017	16.8	1.4458
2018	17.3	1.4841
2019	17.7	1.5233
2020	18.2	1.5630
2021	18.7	1.6030
2022	19.1	1.6438
2023	19.6	1.6853
2024	20.1	1.7275
2025	20.6	1.7703
2026	21.1	1.8135
2027	21.6	1.8573
2028	22.1	1.9016
2029	22.7	1.9467
2030		1.9918
2031		2.0369

[a] Source: *Total Final Energy Consumption – Basic "Other" Non-Ferrous Metals Products, Total Final Energy Consumption by Industry and Fuel, New South Wales,* Australian Energy Statistics (ABARE, 2006)

Table 3.138: Projection Factors for Mining and Construction Machinery Manufacturing Sector

Year	Final Energy Consumption (PJ/year) [a]	Projection factor
2003	30.138	1.0000
2004	30.848	1.0236
2005	31.945	1.0600
2006	33.398	1.1082
2007	34.934	1.1591
2008	36.453	1.2095
2009	38.056	1.2627
2010	39.74	1.3186
2011	41.438	1.3749
2012	43.183	1.4328
2013	45.063	1.4952
2014	47.015	1.5600
2015	49.013	1.6263
2016	51.054	1.6940
2017	53.154	1.7637
2018	55.328	1.8358
2019	57.582	1.9106
2020	59.899	1.9875
2021	62.276	2.0664
2022	64.717	2.1474
2023	67.231	2.2308
2024	69.821	2.3167
2025	72.485	2.4051
2026	75.216	2.4957
2027	78.013	2.5885
2028	80.881	2.6837
2029	83.825	2.7814
2030		2.8473
2031		2.9158

[a] Source: *Total Final Energy Consumption – Mining, Total Final Energy Consumption by Industry and Fuel, New South Wales,* Australian Energy Statistics (ABARE, 2006)

3.24 Unaccounted Fuel Combustion

3.24.1 Unaccounted Coal Combustion

The total annual consumption of coal in NSW has been sourced from the Australian Bureau of Agricultural and Resource Economics (ABARE) for the period 2003-2004 and is shown in Table 3.139.

Table 3.139: Total Coal Consumption in NSW for the 2003/2004 Period [a]

Sector		Black Coal Consumption (PJ/year)	Black Coal Consumption (t/year) [b]	Black Coal Consumption (t/year) [c]
Mining		0.03	1,362	1,067
Manufacturing and construction	Wood, paper and printing	1.299	55,277	43,300
	Chemical rubber and plastic products	2.33	99,106	77,633
	Iron and steel	129.09	5,493,064	4,302,900
	Basic non-ferrous metal products	0.00	0	0
	Non-metallic minerals products	7.98	339,532	265,967
	Other manufacturing and construction	4.76	202,340	158,500
Electricity generation		648.52	27,596,426	21,617,200
Commercial and services		0.499	21,234	16,633
Total		**794.50**	**33,808,340**	**26,483,200**

[a] Source: *Total Primary Energy Consumption by Industry and Fuel, New South Wales,* Australian Energy Statistics (ABARE, 2006)).
[b] Assuming a heat value of 23.5 GJ/tonne for black coal
[c] Assuming a heat value of 30 GJ/tonne for black coal

The total coal consumed in returned industrial and commercial survey questionnaires is 31,150,000 tonnes/year. All coal consumption is by industrial businesses. Therefore, it is assumed that all coal consumed in the GMR has been accounted for in the industrial emissions inventory as all industrial businesses have been included in the emissions inventory. It is noted that no coal is assumed to be combusted by commercial businesses within the GMR. However, ABARE data indicates that 0.499 PJ/year of coal is combusted by the commercial and services sector. The assumption that no coal is consumed by commercial businesses is valid, considering that the ABARE estimate for the commercial and services sector accounts for less than 0.1% of the total coal consumed in NSW.

3.24.2 Unaccounted Gas Combustion

The total annual consumption of natural gas in NSW has been sourced from the Australian Bureau of Agricultural and Resource Economics (ABARE) for the period 2003-2004 (E2, Energy Consumption in NSW by Fuel Type, ABARE, 2005) to be 3,759 Mm^3 per year (assuming an average heat value of 38.8 MJ/m^3, ABARE, 2005).

Natural gas consumption in the GMR has been estimated assuming that the consumption of natural gas is proportional to population (and the GMR accounts for approximately 75% of the total population in NSW). Therefore, the estimated natural gas consumption in the GMR is 2,819 Mm^3 per year.

Natural gas consumption data provided in returned industrial and commercial survey questionnaires and estimated natural gas consumption for businesses in the commercial emissions inventory have been totalled, and the estimated natural gas consumption by the domestic sector have been compared to the estimated total gas consumption in the GMR. The estimated total gas consumption in NSW and total gas consumed by industrial, commercial and domestic sectors are shown in Table 3.140.

Table 3.140: Total Annual Natural Gas Consumption by Region and Sector

Consumption of Natural Gas by Region / Sector	Total Consumption of Natural Gas (Mm^3/year)
NSW	3,759
GMR	2,819
Businesses in industrial inventory	761
Businesses in commercial inventory	882
Domestic natural gas consumption	505.6
Unaccounted businesses in the GMR	**670**

From the data presented in Table 3.140, 670 Mm^3 per year is estimated to be combusted and unaccounted for in the industrial and commercial emissions inventory. Therefore, unaccounted natural gas combustion by industrial and commercial businesses in the emissions inventory account for approximately 29% of the total consumption of natural gas in the GMR.

3.24.3 Emissions Estimation Methodology

Emissions from unaccounted fuel combustion have been estimated using techniques outlined in the *NPI EET Manual for Aggregated Emissions from Fuel Combustion (Sub-Threshold)* (Environment Australia, 1999p).

More detailed information on the methodology employed is described in the methodology report (Bawden et. al., 2004).

3.24.4 Temporal Variation of Emissions

Emissions from unaccounted fuel combustion are assumed constant over 24 hours, seven days per week.

3.24.5 Emissions Estimation

Estimated emissions from unaccounted commercial natural gas burning within the GMR, Sydney, Newcastle, Wollongong and Non-Urban regions are provided in Table 3.141.

Table 3.141: Estimated Emissions from Unaccounted Fuel Combustion

Substance	Estimated Emissions (kg/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR [a]
1,3 BUTADIENE	0	0	0	0	0
ACETALDEHYDE	0	0	0	0	0
BENZENE	4,230	278	202	663	5,370
CARBON MONOXIDE	338,000	22,200	16,200	52,900	429,000
FORMALDEHYDE	8,450	557	405	1,330	10,700
ISOMERS OF XYLENE	0	0	0	0	0
LEAD & COMPOUNDS	4.23	0.28	0.20	0.66	5.37
OXIDES OF NITROGEN	791,400	52,140	37,910	124,090	1,006,000
PARTICULATE MATTER 10µm	63,300	4,170	3,030	9,930	80,500
PARTICULATE MATTER 2.5µm	63,300	4,170	3,030	9,930	80,500
PERCHLOROETHYLENE	0	0	0	0	0
POLYCYCLIC AROMATIC HYDROCARBONS	5.55	0.37	0.27	0.87	7.05
SULFUR DIOXIDE	5,080	334	243	796	6,450
TOLUENE	2,110	139	101	331	2,690
TOTAL SUSPENDED PARTICULATES (TSP)	63,300	4,170	3,030	9,930	80,500
TOTAL VOCS	46,500	3,060	2,230	7,290	59,100
TRICHLOROETHYLENE (TCE)	0	0	0	0	0

[a] Totals may not appear additive due to rounding

3.24.6 Projection Factors

Projection factors for unaccounted fuel consumption have been derived based on ABARE projected total primary energy consumption of natural gas in NSW (*Total Primary Energy Consumption by Industry and Fuel, New South Wales,* Australian Energy Statistics, ABARE, 2006) as all unaccounted fuel combustion is assumed to be natural gas.

The projection factors are provided in Table 3.142.

Table 3.142: Projection Factors for Unaccounted Fuel Combustion

Year	Annual Natural Gas Consumption[a] (PJ/year)	Projection Factor
2003	145.9	1.0000
2004	148.5	1.0184
2005	152.8	1.0473
2006	157.2	1.0777
2007	160.8	1.1026
2008	164.2	1.1258
2009	167.6	1.1489
2010	171.2	1.1739
2011	175.1	1.2003
2012	179.2	1.2286
2013	183.4	1.2576
2014	187.6	1.2860
2015	191.8	1.3150
2016	196.1	1.3442
2017	200.3	1.3735
2018	204.6	1.4030
2019	208.9	1.4326
2020	213.4	1.4634
2021	218.2	1.4957
2022	222.9	1.5280
2023	227.6	1.5606
2024	232.4	1.5936
2025	237.3	1.6269
2026	242.2	1.6606
2027	247.1	1.6944
2028	252.1	1.7284
2029	257.1	1.7630
2030		1.7975
2031		1.8321

[a] Source: *Total Gas Consumption, Total Primary Energy Consumption by Industry and Fuel, New South Wales,* Australian Energy Statistics (ABARE, 2006)

4 EMISSIONS SUMMARY

The commercial emissions inventory includes emissions from 5,056 businesses. A total of 22,951 emission sources have been included in the commercial emissions inventory, consisting of 314 point sources and 22,637 fugitive sources. Table 4.1 presents the number and type of emission sources included in the commercial emissions inventory for each area considered.

Table 4.1: Emission Source Summary

Area	Point Sources	Fugitive Sources	Total Sources
Sydney	202	15,876	16,078
Newcastle	29	1,421	1,450
Wollongong	16	871	887
Non-Urban	67	4,469	4,536
GMR	314	22,637	22,951

The pollutants inventoried include criteria pollutants specified in the Air NEPM, air toxics associated with the National Pollutant Inventory and the Air Toxics NEPMs and any other pollutants associated with state specific programs, i.e. Load Based Licensing (Protection of the Environment Operations (General) Regulation 1998 (DEC, 2002 & PCO, 1998)) and Protection of the Environment Operations (Clean Air) Regulation 2002 (PCO, 2005).

Figure 4.1 shows the location of all commercial emission sources that are included in the emissions inventory.

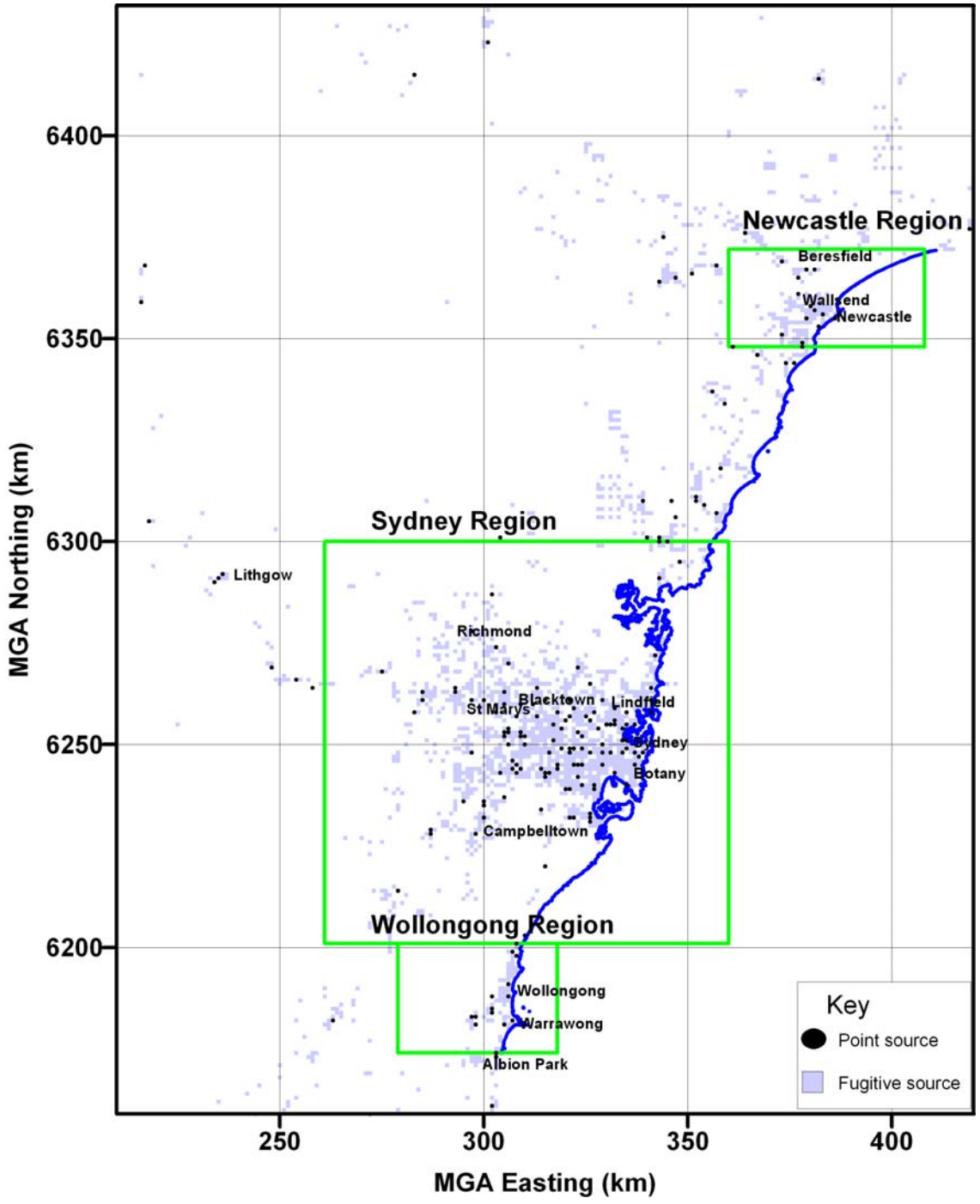

Figure 4.1: Location of all Commercial Emission Sources

Figure 4.2 shows the total emissions of each criteria pollutant (NO_x, Total VOCs, PM_{10}, CO, SO_2) and the proportion of total emissions in the GMR emitted in each region.

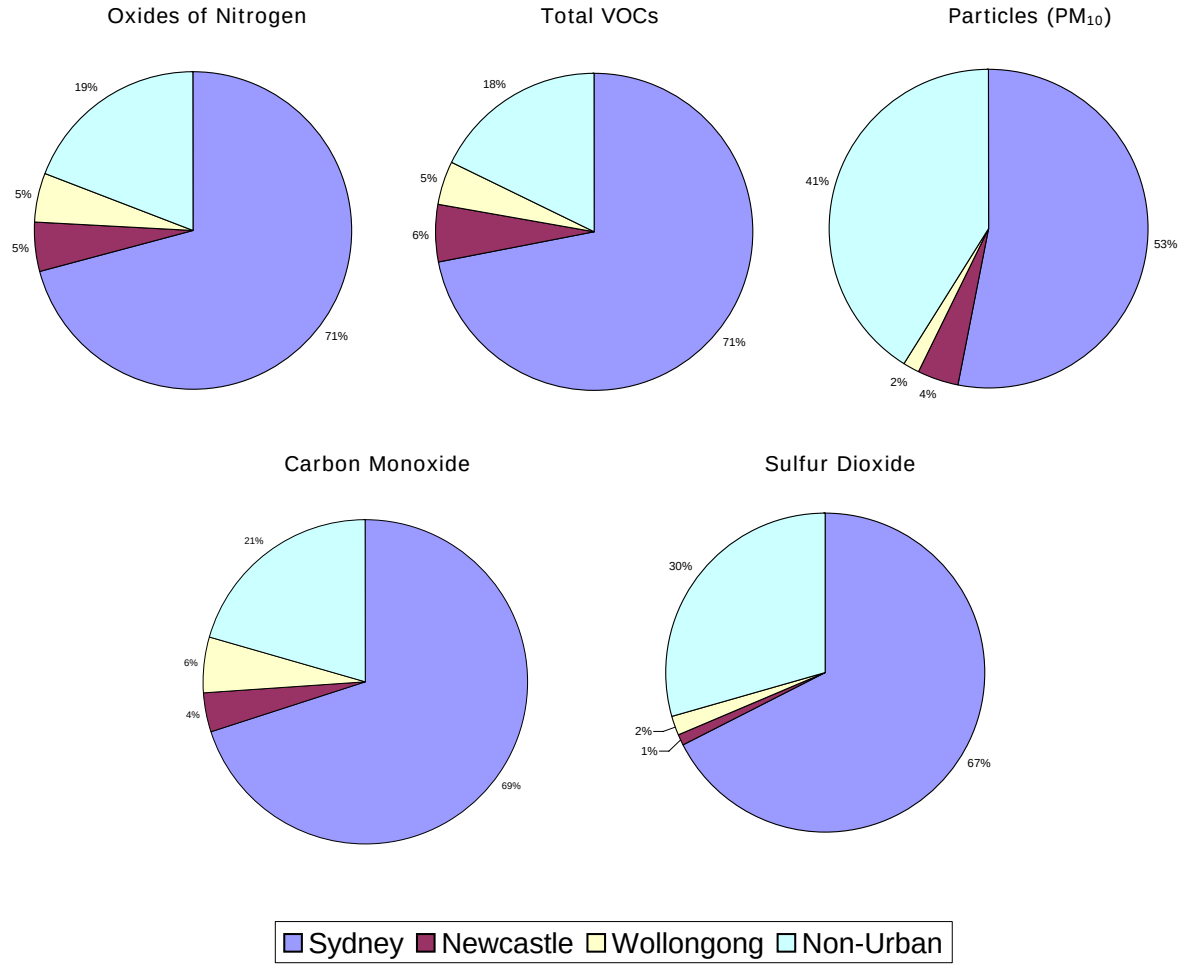

Figure 4.2: Proportion of Total Commercial Emissions in Each Region

Total commercial emissions for each ANZSIC Class for each criteria pollutant in each region (i.e. the GMR, Sydney, Newcastle and Wollongong) are presented graphically as follows:

- Figure 4.3 to Figure 4.7 present commercial emissions by ANZSIC Class for the entire GMR.
- Figure 4.8 to Figure 4.12 present commercial emissions by ANZSIC Class for the Sydney region.
- Figure 4.13 to Figure 4.17 present commercial emissions by ANZSIC Class for the Newcastle region
- Figure 4.18 to Figure 4.22 present commercial emissions by ANZSIC Class for the Wollongong region.

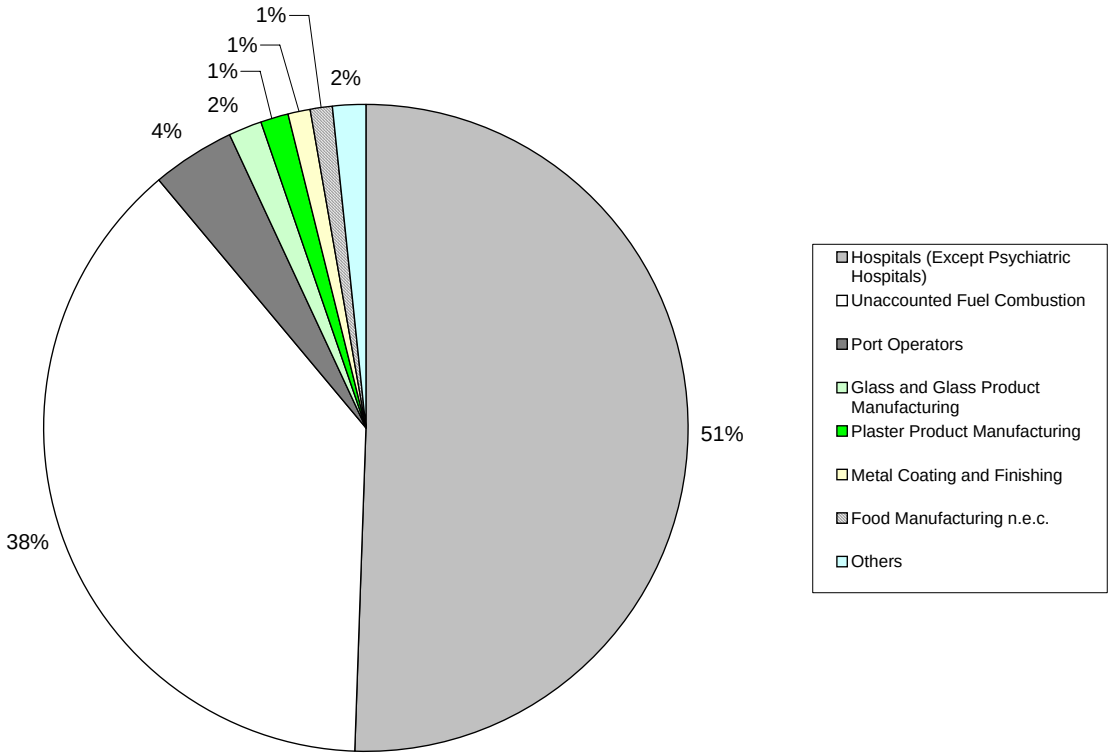

Figure 4.3: Commercial Emissions of Oxides of Nitrogen (NO_x) by ANZSIC Class in the GMR (Total Emissions = 2,620 tonnes/year)

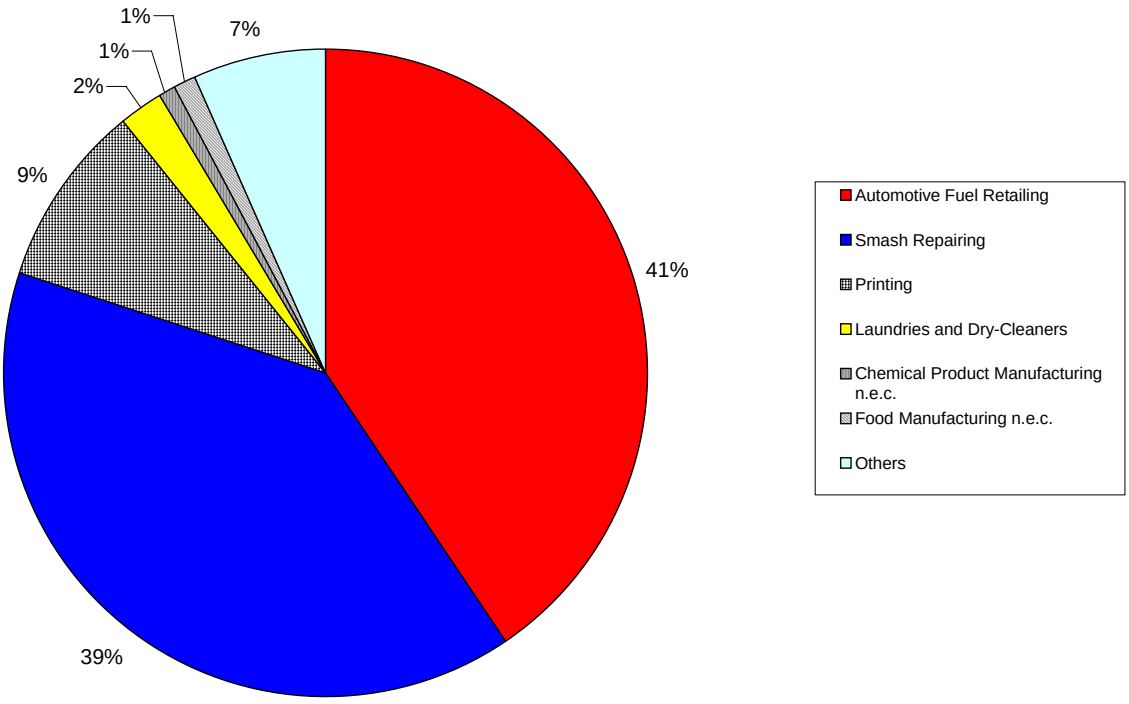

Figure 4.4: Commercial Emissions of Total VOCs by ANZSIC Class in the GMR (Total Emissions = 13,800 tonnes/year)

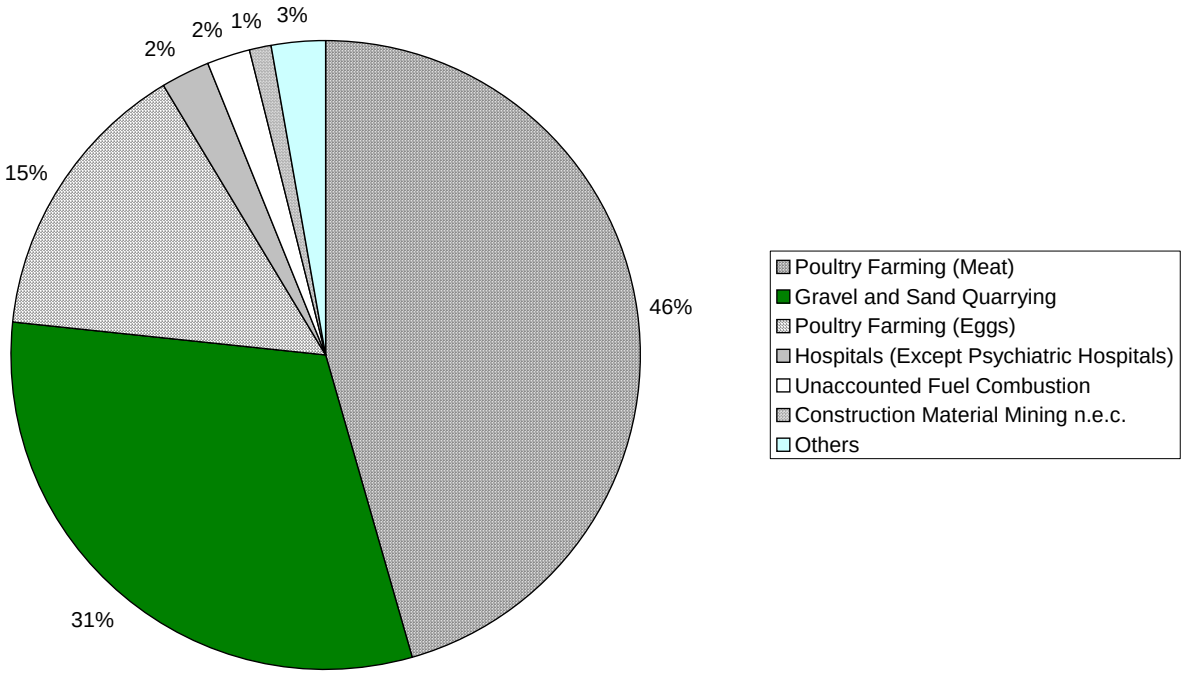

Figure 4.5: Commercial Emissions of Particles (PM_{10}) by ANZSIC Class in the GMR (Total Emissions = 4,030 tonnes/year)

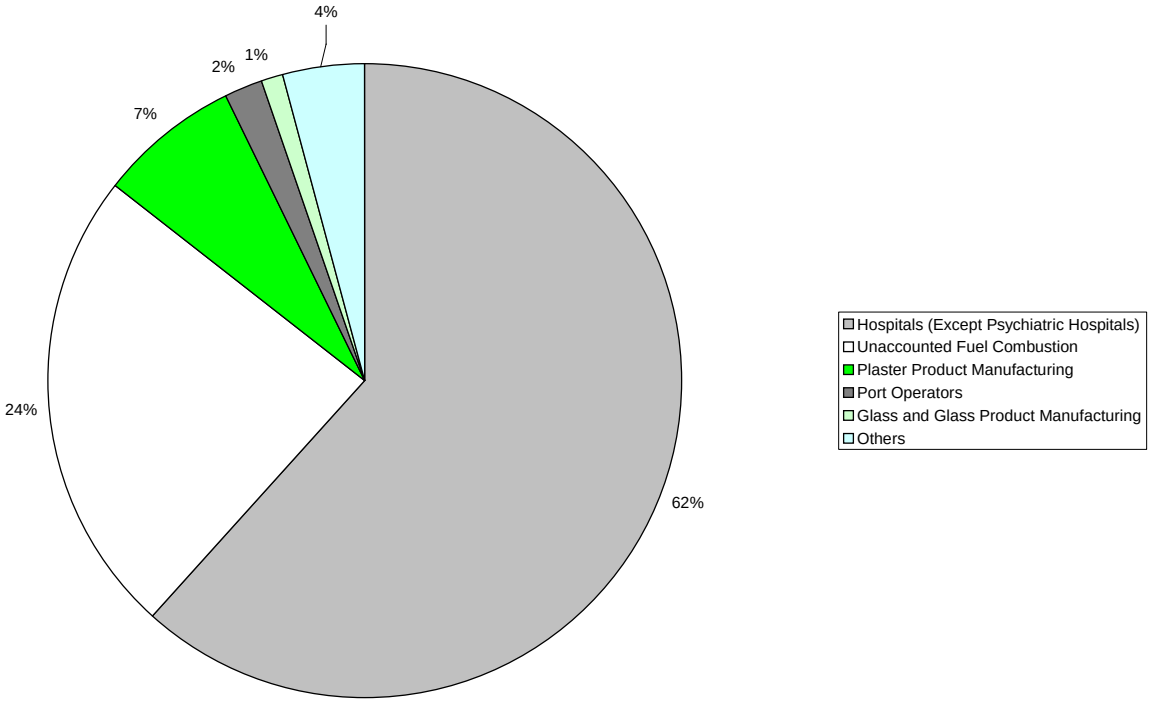

Figure 4.6: Commercial Emissions of Carbon Monoxide (CO) by ANZSIC Class in the GMR (Total Emissions = 1,800 tonnes/year)

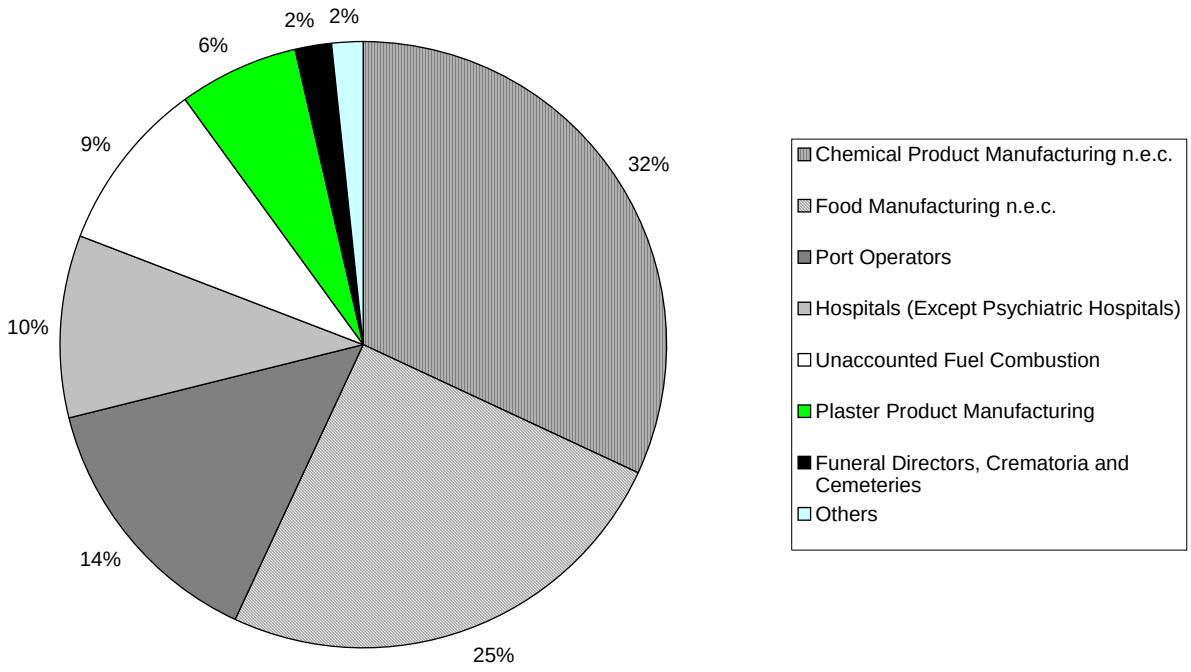

Figure 4.7: Commercial Emissions of Sulfur Dioxide (SO_2) by ANZSIC Class in the GMR (Total Emissions = 71 tonnes/year)

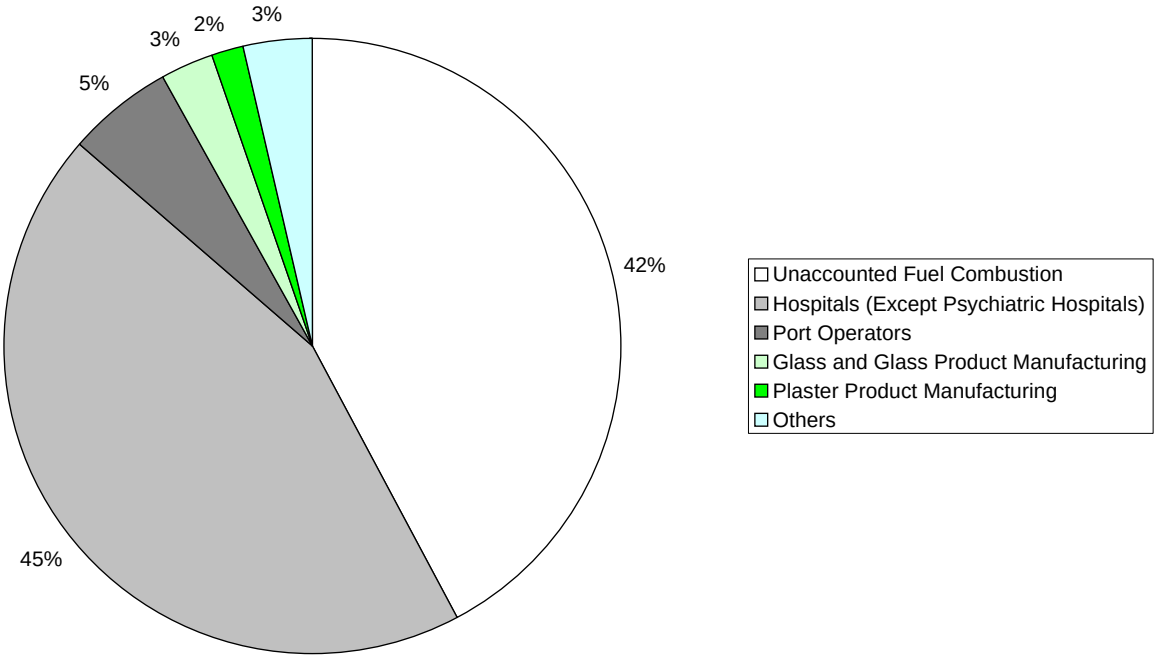

Figure 4.8: Commercial Emissions of Oxides of Nitrogen (NO_x) by ANZSIC Class in Sydney (Total Emissions = 1,870 tonnes/year)

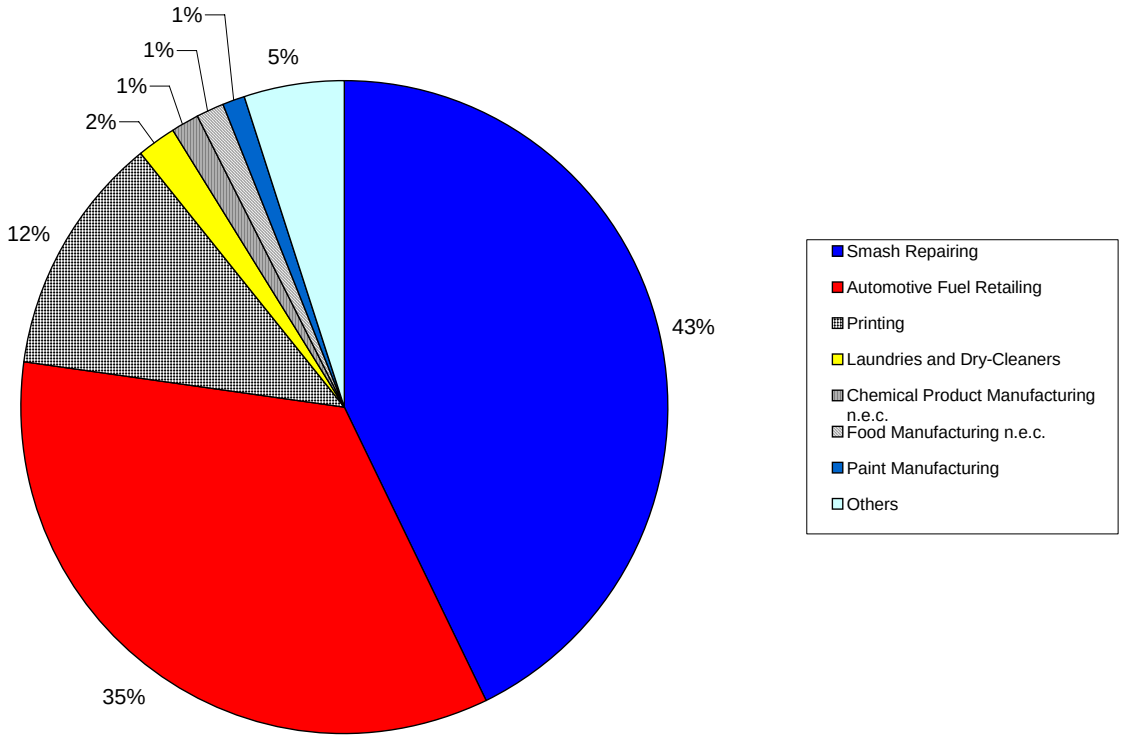

Figure 4.9: Commercial Emissions of Total VOCs by ANZSIC Class in Sydney (Total Emissions = 9,970 tonnes/year)

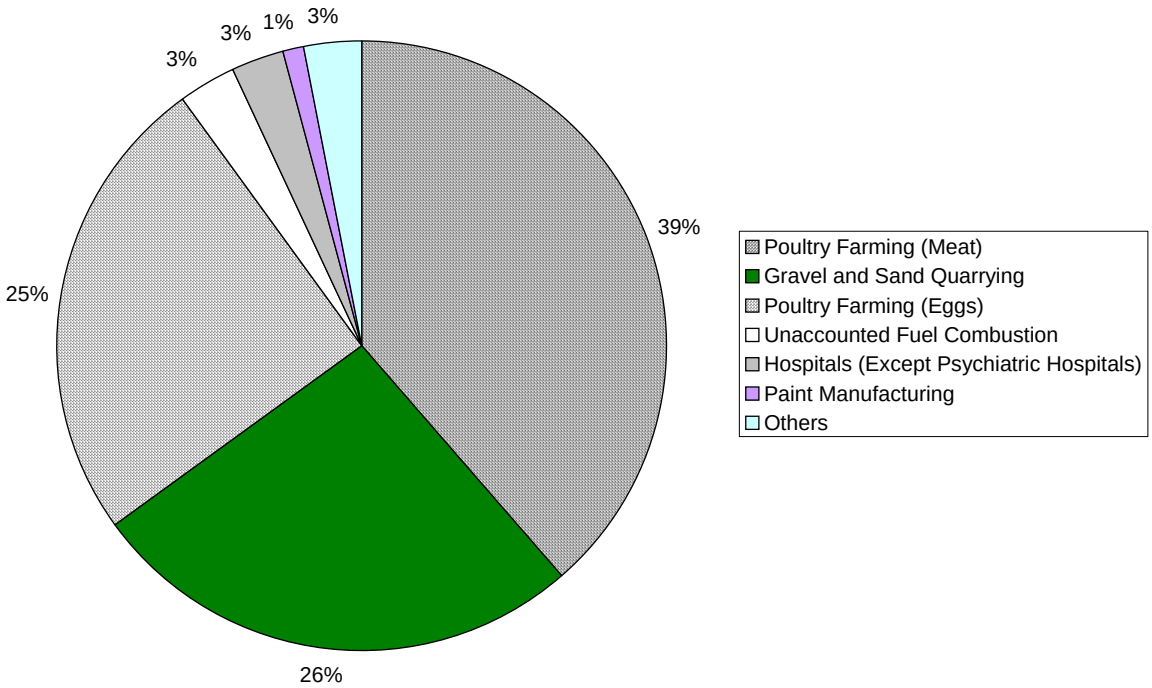

Figure 4.10: Commercial Emissions of Particles (PM_{10}) by ANZSIC Class in Sydney (Total Emissions =2,130 tonnes/year)

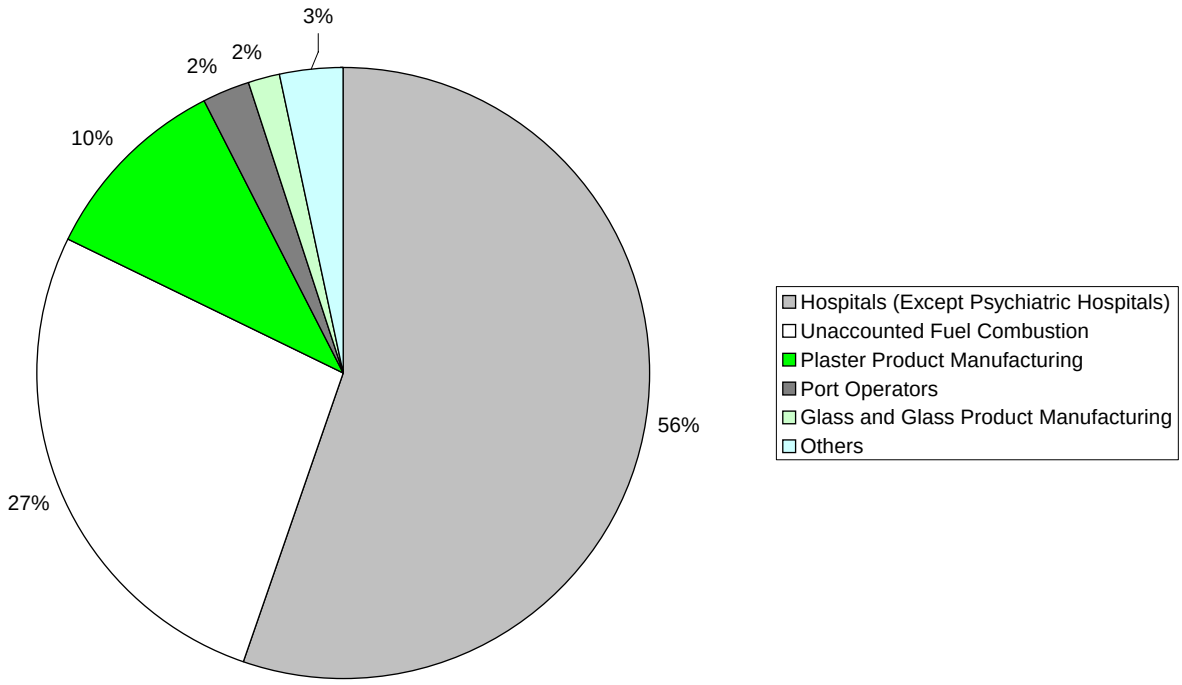

Figure 4.11: Commercial Emissions of Carbon Monoxide (CO) by ANZSIC Class in Sydney (Total Emissions = 1,260 tonnes/year)

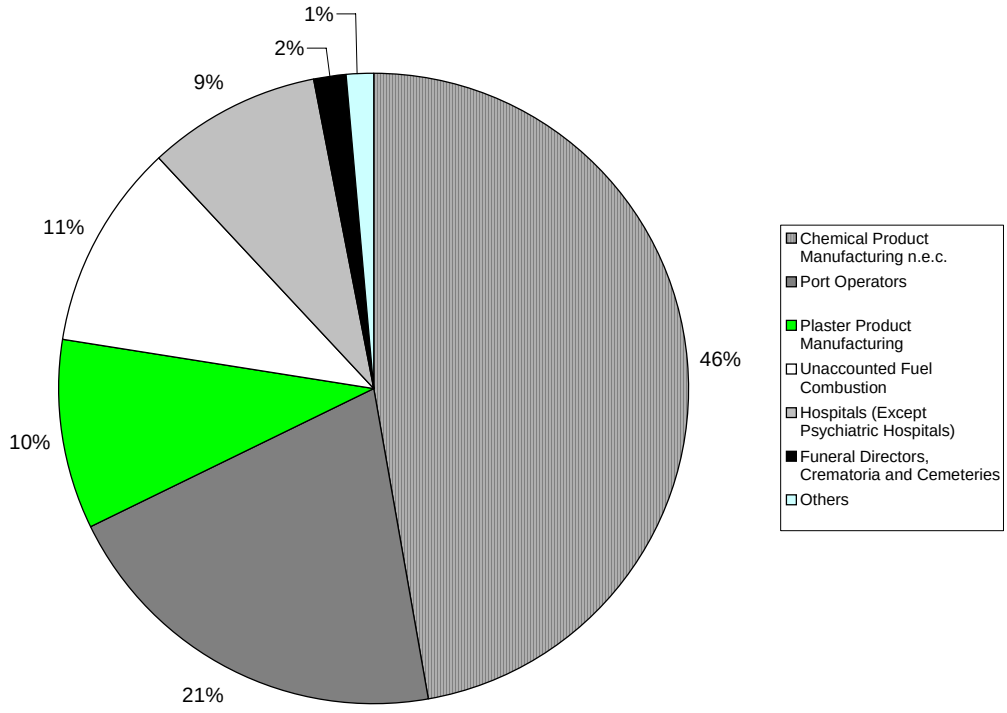

Figure 4.12: Commercial Emissions of Sulfur Dioxide (SO_2) by ANZSIC Class in Sydney (Total Emissions = 48 tonnes/year)

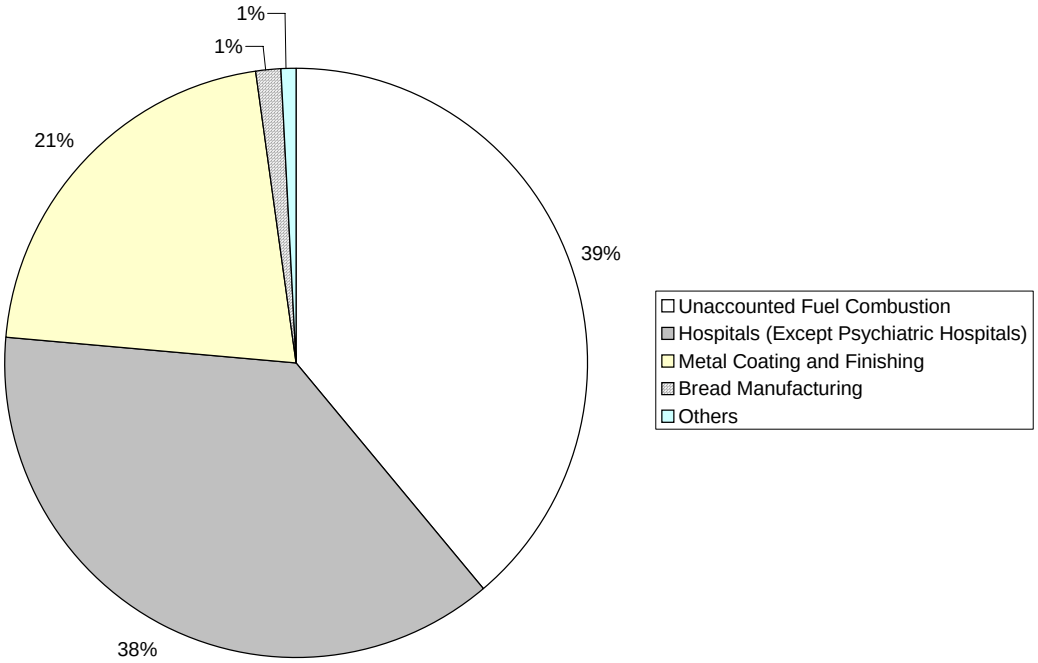

Figure 4.13: Commercial Emissions of Oxides of Nitrogen (NO_x) by ANZSIC Class in Newcastle (Total Emissions = 134 tonnes/year)

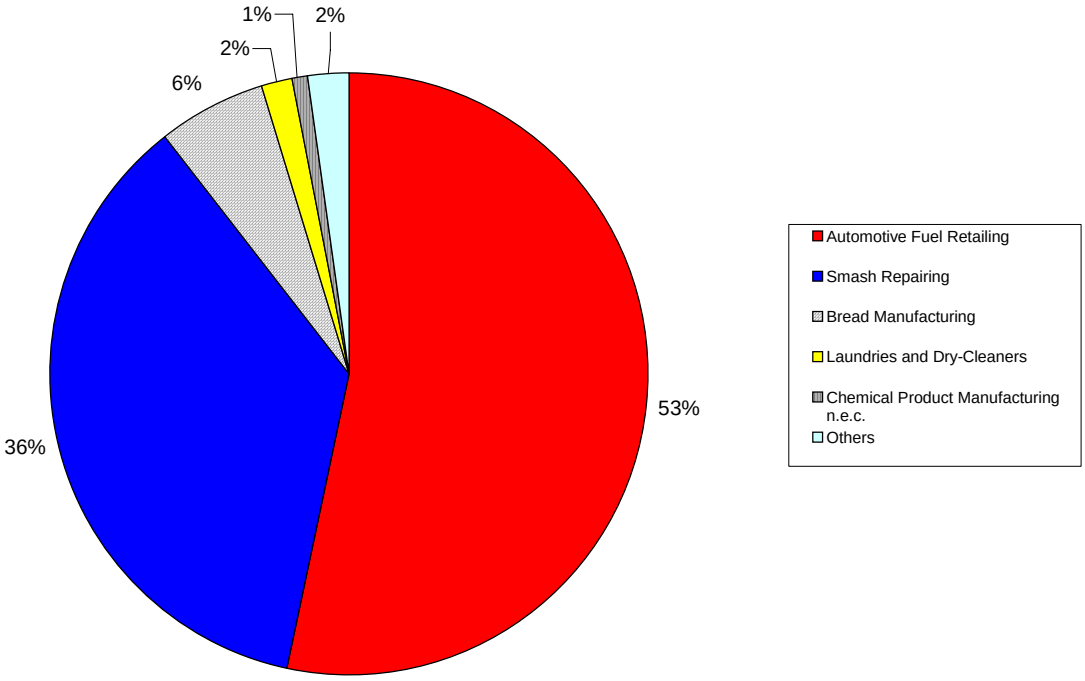

Figure 4.14: Commercial Emissions of Total VOCs by ANZSIC Class in Newcastle (Total Emissions = 799 tonnes/year)

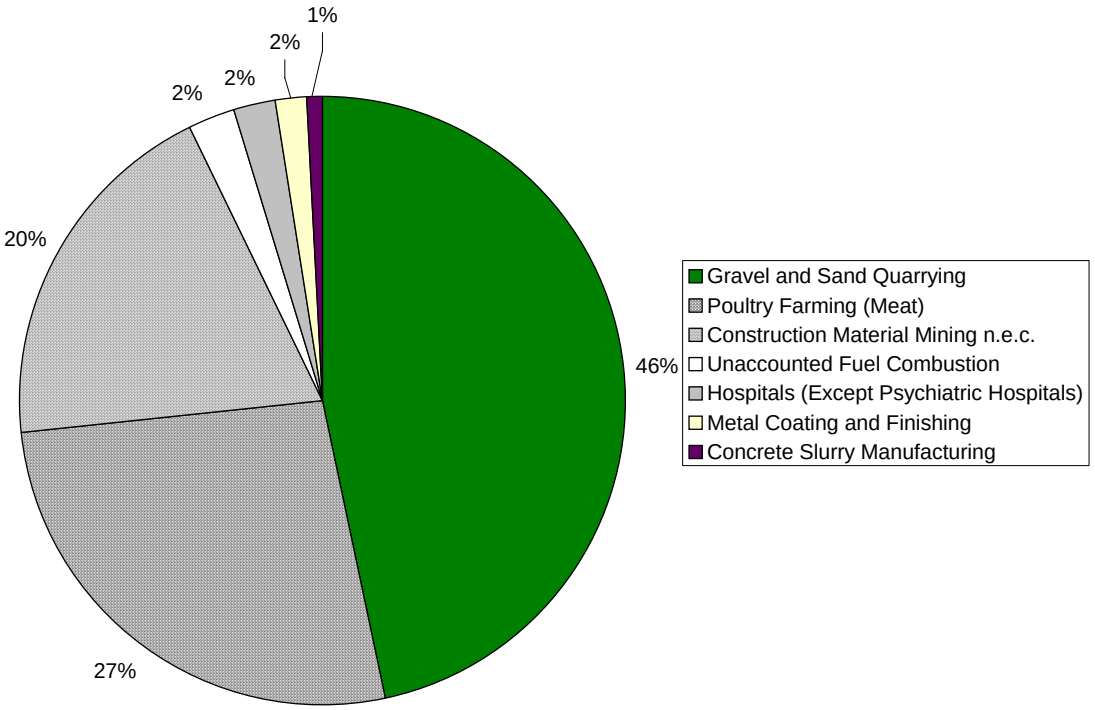

Figure 4.15: Commercial Emissions of Particles (PM_{10}) by ANZSIC Class in Newcastle (Total Emissions = 173 tonnes/year)

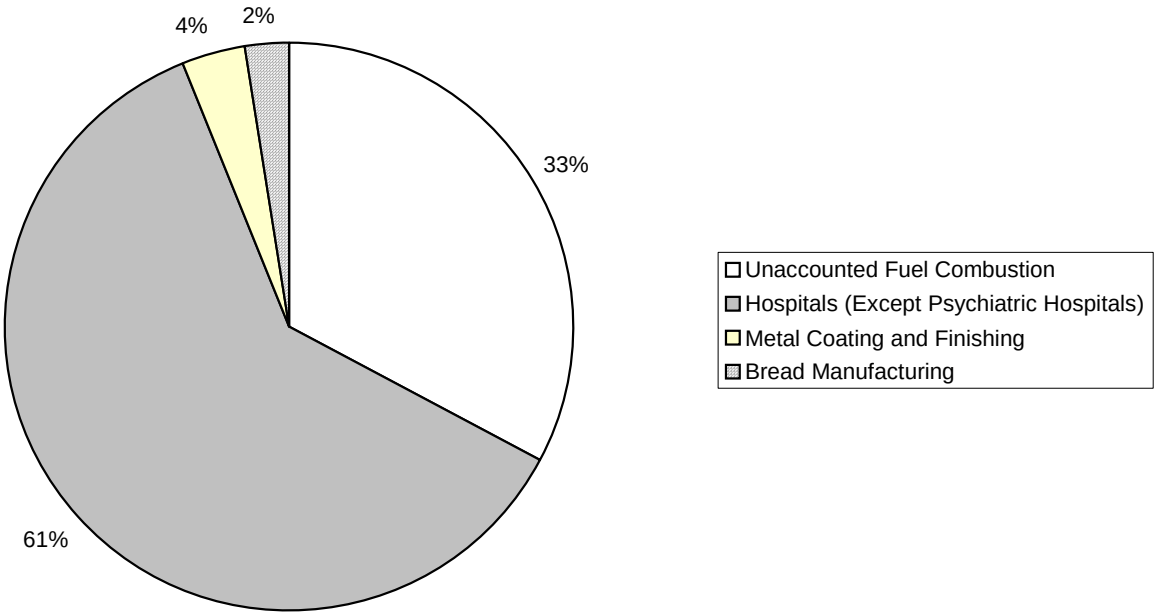

Figure 4.16: Commercial Emissions of Carbon Monoxide (CO) by ANZSIC Class in Newcastle (Total Emissions = 68 tonnes/year)

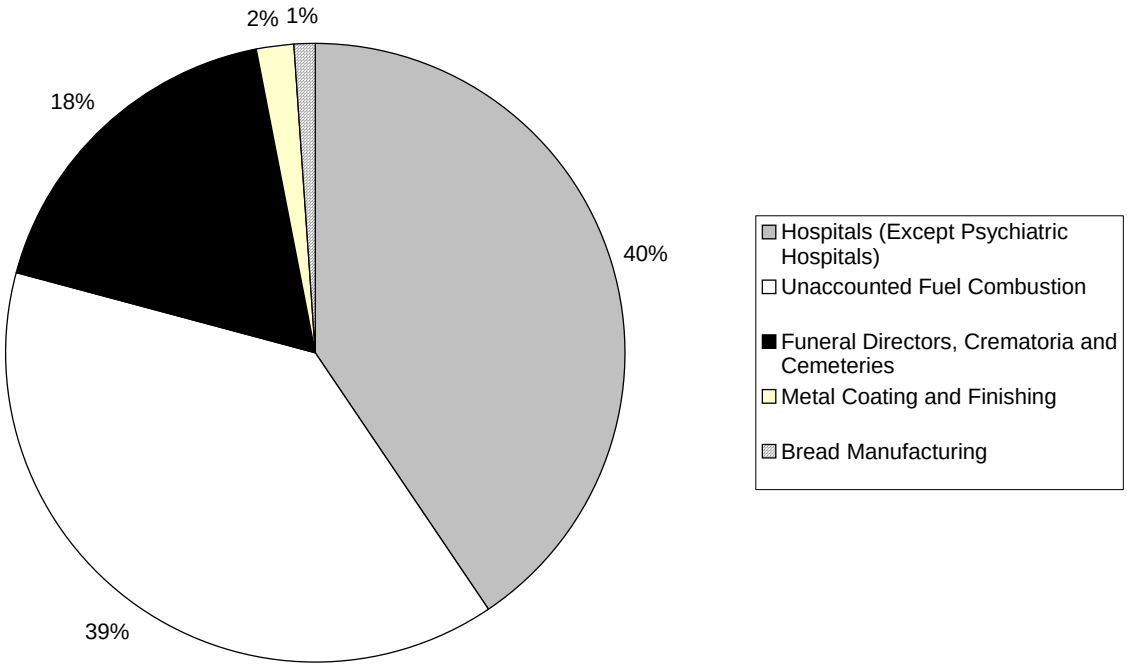

Figure 4.17: Commercial Emissions of Sulfur Dioxide (SO_2) by ANZSIC Class in Newcastle (Total Emissions = 0.9 tonnes/year)

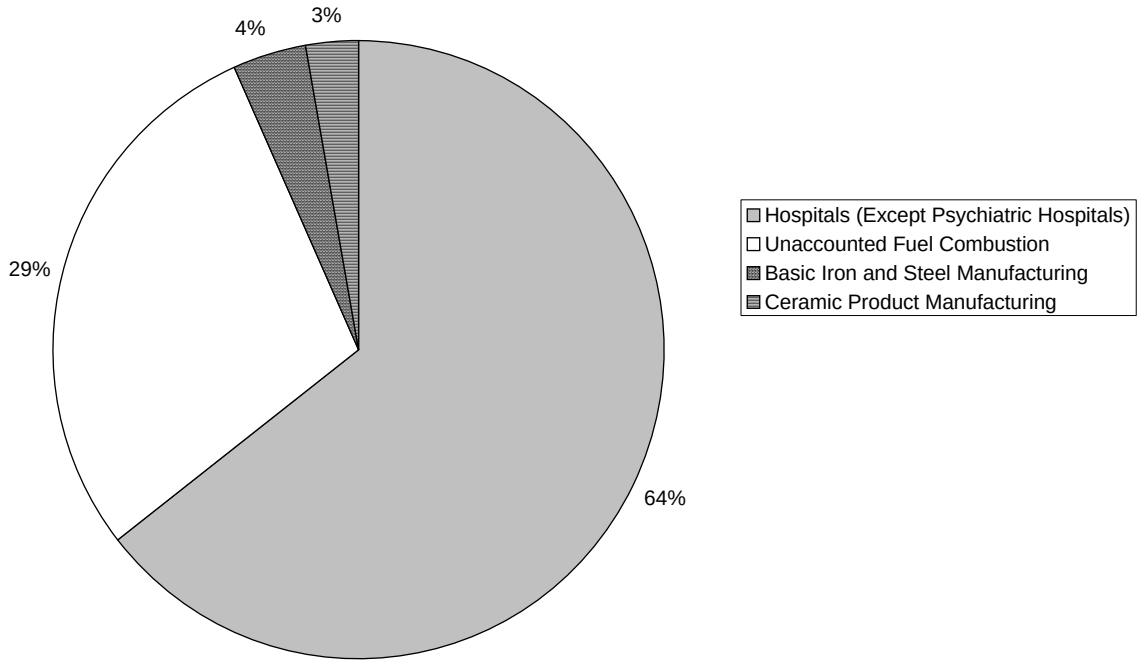

Figure 4.18: Commercial Emissions of Oxides of Nitrogen (NO_x) by ANZSIC Class in Wollongong (Total Emissions = 132 tonnes/year)

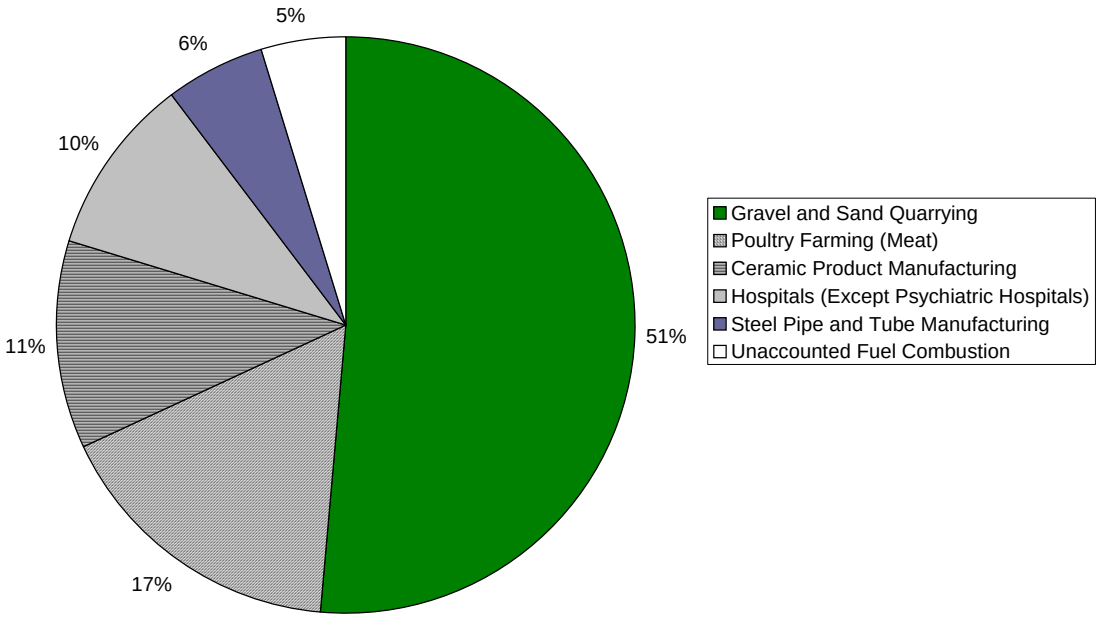

Figure 4.19: Commercial Emissions of Particles (PM_{10}) by ANZSIC Class in Wollongong (Total Emissions = 64 tonnes/year)

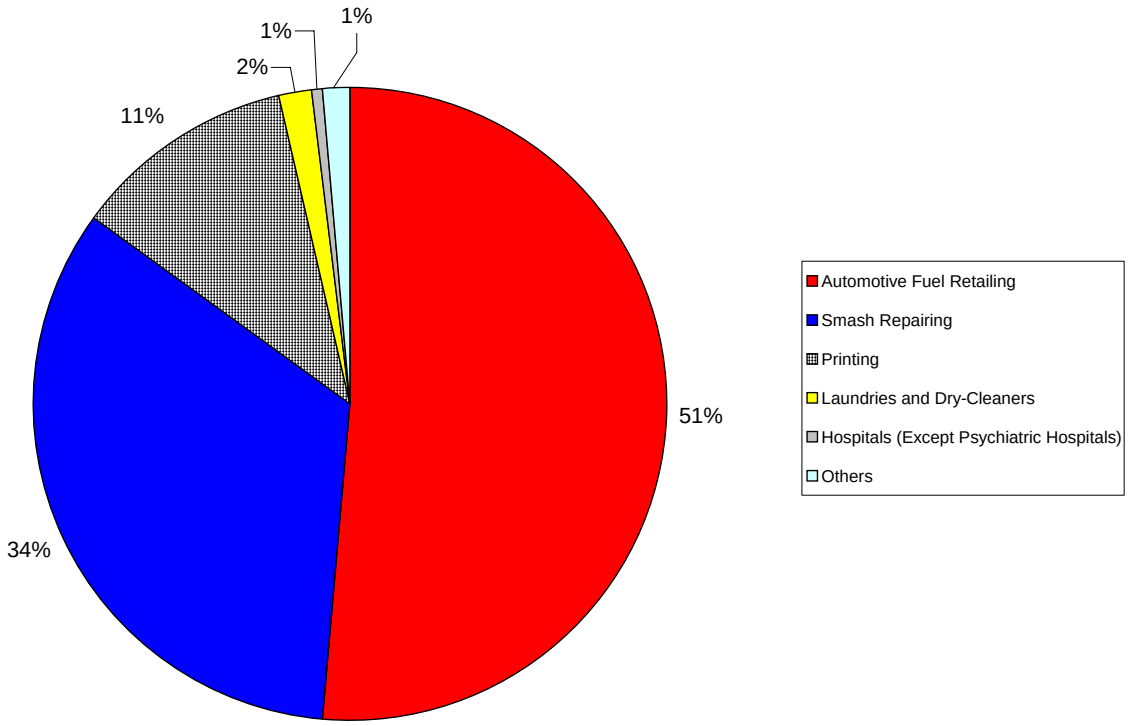

Figure 4.20: Commercial Emissions of Total VOCs by ANZSIC Class in Wollongong (Total Emissions = 624 tonnes/year)

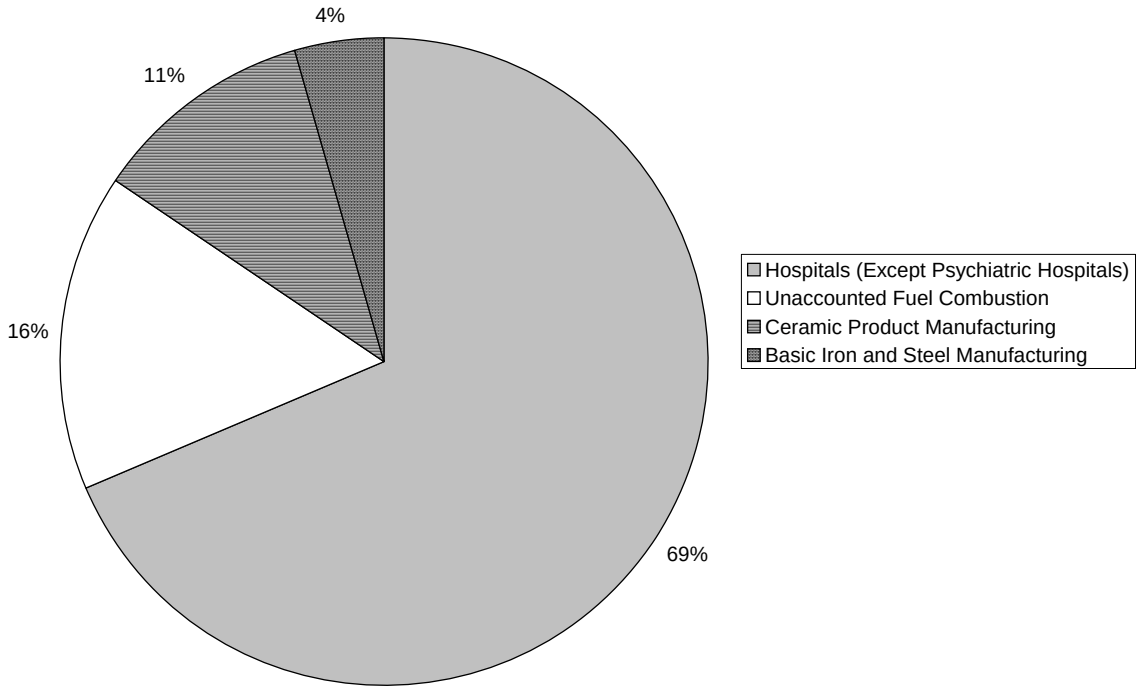

Figure 4.21: Commercial Emissions of Carbon Monoxide (CO) by ANZSIC Class in Wollongong (Total Emissions = 103 tonnes/year)

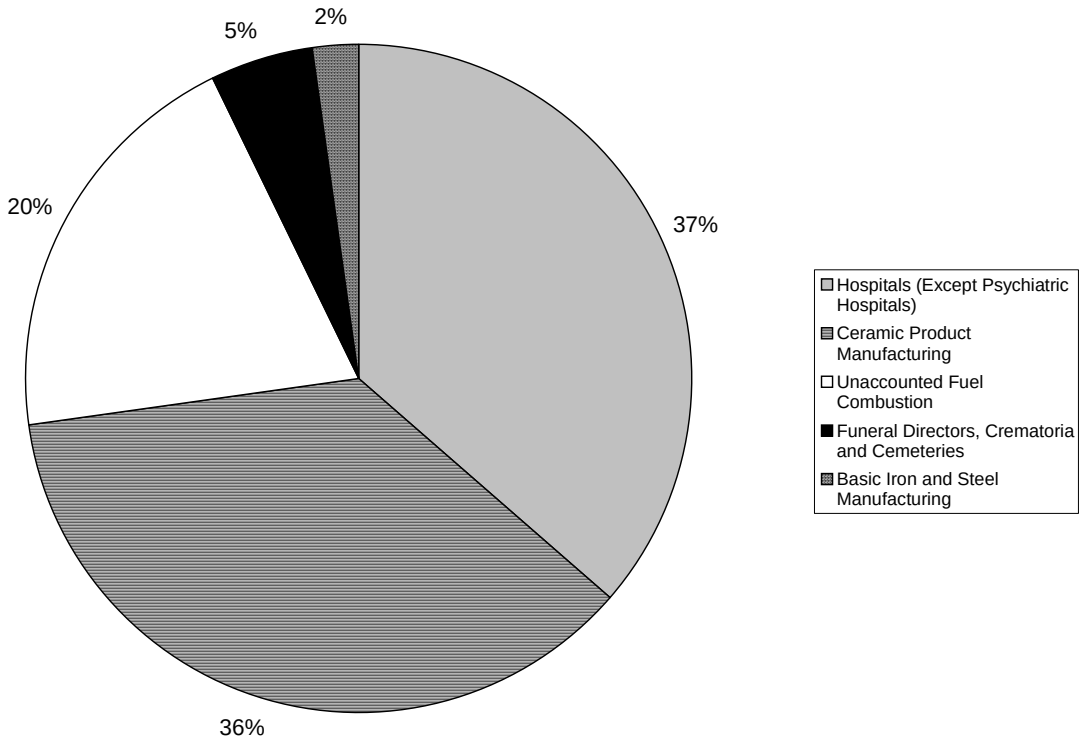

Figure 4.22: Commercial Emissions of Sulfur Dioxide (SO_2) by ANZSIC Class in Wollongong (Total Emissions = 1.2 tonnes/year)

4.1 Commercial Emissions by ANZSIC Class

Total commercial emissions by each ANZSIC Class are presented in this section.

- Table 4.2 and Table 4.3 present commercial emissions by ANZSIC Class for the entire GMR.
- Table 4.4 and Table 4.5 present commercial emissions by ANZSIC Class for the Sydney region.
- Table 4.6 and Table 4.7 present commercial emissions by ANZSIC Class for the Newcastle region
- Table 4.8 and Table 4.9 present commercial emissions by ANZSIC Class for the Wollongong region.

In this section emissions are presented for the following pollutants only:

- 1,3 butadiene (1,3-BUT)
- Acetaldehyde (ACET)
- Benzene (BENZ)
- Carbon monoxide (CO)
- Formaldehyde (HCHO)
- Isomers of xylene (XYLE)
- Lead & compounds (Pb)
- Oxides of nitrogen (NO_x)
- Particulate matter < 10 µm (PM_{10})
- Particulate matter < 2.5 µm ($PM_{2.5}$)
- Perchloroethylene (PERC)
- Polycyclic aromatic hydrocarbons (PAHs)
- Sulfur dioxide (SO_2)
- Toluene (TOLU)
- Total suspended particulates (TSP)
- Total VOCS (VOCs)
- Trichloroethylene (TCE)

Table 4.2: Total Commercial Emissions in the GMR by ANZSIC Class (tonnes/year)

ANZSIC Class	CO	Pb	NO_x	TSP	PM_{10}	$PM_{2.5}$	SO_2	VOCs
Aircraft Manufacturing	$2.4\times10^{+00}$	1.4×10^{-05}	$2.8\times10^{+00}$	2.1×10^{-01}	2.1×10^{-01}	2.1×10^{-01}	1.5×10^{-02}	1.5×10^{-01}
Automotive Component Manufacturing n.e.c.	2.1×10^{-01}	1.3×10^{-06}	2.5×10^{-01}	2.2×10^{-02}	2.2×10^{-02}	2.2×10^{-02}	1.3×10^{-03}	$1.4\times10^{+01}$
Automotive Fuel Retailing	0	0	0	0	0	0	0	$5.6\times10^{+03}$
Basic Iron and Steel Manufacturing	$5.2\times10^{+00}$	4.8×10^{-03}	$8.4\times10^{+00}$	$1.1\times10^{+01}$	$7.5\times10^{+00}$	$6.7\times10^{+00}$	3.2×10^{-02}	$4.7\times10^{+01}$
Basic Non-Ferrous Metal Manufacturing n.e.c.	8.8×10^{-02}	3.7×10^{-03}	1.1×10^{-01}	$1.6\times10^{+01}$	$1.0\times10^{+01}$	$7.5\times10^{+00}$	1.3×10^{-01}	5.8×10^{-03}
Biscuit Manufacturing	$7.9\times10^{+00}$	4.7×10^{-05}	$9.4\times10^{+00}$	7.1×10^{-01}	7.1×10^{-01}	7.1×10^{-01}	4.9×10^{-02}	5.2×10^{-01}
Bread Manufacturing	$6.1\times10^{+00}$	4.4×10^{-05}	$4.6\times10^{+00}$	8.1×10^{-01}	8.1×10^{-01}	8.1×10^{-01}	4.5×10^{-02}	$9.8\times10^{+01}$
Cake and Pastry Manufacturing	$1.3\times10^{+00}$	8.0×10^{-06}	$1.6\times10^{+00}$	1.2×10^{-01}	1.2×10^{-01}	1.2×10^{-01}	8.3×10^{-03}	$1.4\times10^{+01}$
Ceramic Product Manufacturing	$1.2\times10^{+01}$	2.9×10^{-05}	$3.5\times10^{+00}$	$1.3\times10^{+01}$	$7.3\times10^{+00}$	$6.7\times10^{+00}$	4.4×10^{-01}	5.9×10^{-01}
Ceramic Product Manufacturing n.e.c.	4.8×10^{-03}	0	3.5×10^{-02}	1.1×10^{-03}	1.1×10^{-03}	1.1×10^{-03}	1.8×10^{-07}	8.4×10^{-04}
Chemical Product Manufacturing n.e.c.	$1.5\times10^{+00}$	8.7×10^{-06}	$1.7\times10^{+00}$	1.4×10^{-01}	1.4×10^{-01}	1.4×10^{-01}	$2.3\times10^{+01}$	$1.4\times10^{+02}$
Chemical Wholesaling	0	0	0	0	0	0	0	7.8×10^{-01}
Concrete Slurry Manufacturing	0	3.1×10^{-05}	0	$3.8\times10^{+01}$	$1.5\times10^{+01}$	$2.3\times10^{+00}$	0	0
Confectionery Manufacturing	1.8×10^{-01}	1.1×10^{-06}	2.2×10^{-01}	1.7×10^{-02}	1.7×10^{-02}	1.7×10^{-02}	1.1×10^{-03}	1.6×10^{-02}
Construction Material Mining n.e.c.	0	1.3×10^{-04}	0	$1.1\times10^{+02}$	$5.0\times10^{+01}$	$1.0\times10^{+01}$	0	6.0×10^{-03}
Corrugated Paperboard Container Manufacturing	$1.9\times10^{+00}$	1.2×10^{-05}	$2.3\times10^{+00}$	1.7×10^{-01}	1.7×10^{-01}	1.7×10^{-01}	1.2×10^{-02}	1.3×10^{-01}
Electric Cable and Wire Manufacturing	0	0	0	$1.3\times10^{+00}$	8.4×10^{-01}	6.3×10^{-01}	0	$8.4\times10^{+01}$
Electrical and Equipment Manufacturing n.e.c.	3.7×10^{-02}	2.2×10^{-07}	4.2×10^{-01}	4.3×10^{-01}	4.3×10^{-01}	4.3×10^{-01}	2.3×10^{-04}	$4.2\times10^{+00}$
Fabricated Metal Product Manufacturing n.e.c.	8.6×10^{-01}	5.0×10^{-06}	$2.0\times10^{+00}$	$1.3\times10^{+00}$	$1.3\times10^{+00}$	$1.3\times10^{+00}$	5.3×10^{-03}	$4.2\times10^{+01}$
Food Manufacturing n.e.c.	$1.1\times10^{+01}$	4.6×10^{-04}	$2.7\times10^{+01}$	$2.0\times10^{+00}$	$1.4\times10^{+00}$	$1.1\times10^{+00}$	$1.8\times10^{+01}$	$1.3\times10^{+02}$
Fruit and Vegetable Processing	5.6×10^{-01}	3.4×10^{-06}	6.7×10^{-01}	5.1×10^{-02}	5.1×10^{-02}	5.1×10^{-02}	3.5×10^{-03}	3.7×10^{-02}
Funeral Directors, Crematoria and Cemeteries	$3.4\times10^{+00}$	4.5×10^{-07}	$7.4\times10^{+00}$	2.0×10^{-03}	6.1×10^{-04}	4.1×10^{-04}	$1.3\times10^{+00}$	1.1×10^{-08}
Furniture Manufacturing n.e.c.	$1.6\times10^{+00}$	9.5×10^{-06}	$1.9\times10^{+00}$	1.4×10^{-01}	1.4×10^{-01}	1.4×10^{-01}	9.9×10^{-03}	$7.2\times10^{+00}$
Gas Supply	$1.2\times10^{+00}$	7.2×10^{-06}	$1.4\times10^{+00}$	1.1×10^{-01}	1.1×10^{-01}	1.1×10^{-01}	7.5×10^{-03}	$1.0\times10^{+01}$
Glass and Glass Product Manufacturing	$2.1\times10^{+01}$	1.9×10^{-02}	$4.9\times10^{+01}$	$7.9\times10^{+00}$	$7.7\times10^{+00}$	$7.6\times10^{+00}$	1.5×10^{-01}	$1.5\times10^{+01}$
Gravel and Sand Quarrying	0	3.0×10^{-03}	0	$4.6\times10^{+03}$	$1.3\times10^{+03}$	$3.0\times10^{+02}$	0	1.1×10^{-01}
Hospitals (Except Psychiatric Hospitals)	$1.1\times10^{+03}$	6.6×10^{-03}	$1.3\times10^{+03}$	$1.0\times10^{+02}$	$1.0\times10^{+02}$	$1.0\times10^{+02}$	$7.0\times10^{+00}$	$7.3\times10^{+01}$
Ice Cream Manufacturing	$1.0\times10^{+00}$	6.1×10^{-06}	$1.7\times10^{+00}$	9.3×10^{-02}	9.3×10^{-02}	9.3×10^{-02}	1.4×10^{-02}	4.4×10^{-01}

ANZSIC Class	CO	Pb	NO_x	TSP	PM_{10}	$PM_{2.5}$	SO_2	VOCs
Industrial Gas Manufacturing	1.9×10^{-03}	0.0	1.4×10^{-02}	4.3×10^{-04}	4.2×10^{-04}	4.2×10^{-04}	7.1×10^{-08}	$5.8\times10^{+00}$
Ink Manufacturing	0	0	0	6.7×10^{-01}	6.2×10^{-01}	6.1×10^{-01}	0	$1.1\times10^{+01}$
Laundries and Dry-Cleaners	4.5×10^{-01}	2.7×10^{-06}	5.4×10^{-01}	4.1×10^{-02}	4.1×10^{-02}	4.1×10^{-02}	2.8×10^{-03}	$2.8\times10^{+02}$
Lifting and Material Handling Equipment Manufacturing	0	0	1.2×10^{-01}	2.4×10^{-02}	2.4×10^{-02}	2.4×10^{-02}	0	7.5×10^{-01}
Medicinal and Pharmaceutical Product Manufacturing	$3.0\times10^{+00}$	1.8×10^{-05}	$4.7\times10^{+00}$	2.7×10^{-01}	2.7×10^{-01}	2.7×10^{-01}	1.8×10^{-02}	$2.0\times10^{+00}$
Metal Coating and Finishing	$3.7\times10^{+00}$	2.2×10^{-05}	$3.0\times10^{+01}$	$3.3\times10^{+00}$	$3.3\times10^{+00}$	$3.3\times10^{+00}$	2.3×10^{-02}	$7.7\times10^{+00}$
Milk and Cream Processing	$1.0\times10^{+00}$	6.1×10^{-06}	$1.2\times10^{+00}$	9.3×10^{-02}	9.3×10^{-02}	9.3×10^{-02}	6.4×10^{-03}	6.7×10^{-02}
Mining and Construction Machinery Manufacturing	0	0	0	2.0×10^{-04}	2.0×10^{-04}	2.0×10^{-04}	0	$1.3\times10^{+00}$
Non-Building Construction n.e.c.	2.2×10^{-02}	0	1.6×10^{-01}	5.1×10^{-03}	5.0×10^{-03}	4.9×10^{-03}	8.3×10^{-07}	3.9×10^{-03}
Non-Ferrous Metal Casting	7.2×10^{-03}	1.8×10^{-06}	2.9×10^{-02}	3.8×10^{-01}	2.4×10^{-01}	1.8×10^{-01}	2.2×10^{-02}	6.4×10^{-04}
Paint Manufacturing	0	1.4×10^{-01}	0	$2.4\times10^{+01}$	$2.2\times10^{+01}$	$2.1\times10^{+01}$	0	$1.1\times10^{+02}$
Paper Product Manufacturing n.e.c.	$1.8\times10^{+00}$	1.0×10^{-05}	$2.4\times10^{+00}$	1.8×10^{-01}	1.8×10^{-01}	1.8×10^{-01}	3.6×10^{-02}	5.4×10^{-01}
Petroleum Product Wholesaling	0	0	0	0	0	0	0	$7.9\times10^{+01}$
Plaster Product Manufacturing	$1.3\times10^{+02}$	1.3×10^{-02}	$3.6\times10^{+01}$	$1.7\times10^{+01}$	$1.4\times10^{+01}$	$8.6\times10^{+00}$	$4.6\times10^{+00}$	$3.4\times10^{+00}$
Plastic Bag and Film Manufacturing	0	0	0	9.0×10^{-01}	9.0×10^{-01}	8.3×10^{-01}	0	$1.8\times10^{+01}$
Plastic Injection Moulded Product Manufacturing	$2.0\times10^{+00}$	1.3×10^{-05}	$2.4\times10^{+00}$	1.8×10^{-01}	1.8×10^{-01}	1.8×10^{-01}	8.8×10^{-02}	1.7×10^{-01}
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$1.4\times10^{+00}$	8.3×10^{-06}	$1.7\times10^{+00}$	1.3×10^{-01}	1.3×10^{-01}	1.3×10^{-01}	8.7×10^{-03}	$3.1\times10^{+01}$
Port Operators	$3.1\times10^{+01}$	4.0×10^{-04}	$1.0\times10^{+02}$	$9.0\times10^{+00}$	$9.0\times10^{+00}$	$9.0\times10^{+00}$	$9.9\times10^{+00}$	$1.4\times10^{+01}$
Poultry Farming (Eggs)	0	0	0	$1.2\times10^{+03}$	$5.9\times10^{+02}$	$1.7\times10^{+02}$	0	0
Poultry Farming (Meat)	0	0	0	$3.8\times10^{+03}$	$1.8\times10^{+03}$	$5.3\times10^{+02}$	0	0
Prepared Animal and Bird Feed Manufacturing	$1.3\times10^{+00}$	8.1×10^{-06}	$1.6\times10^{+00}$	1.2×10^{-01}	1.2×10^{-01}	1.2×10^{-01}	1.0×10^{-02}	8.5×10^{-02}
Printing	$3.0\times10^{+00}$	2.2×10^{-05}	$4.7\times10^{+00}$	3.3×10^{-01}	3.3×10^{-01}	3.3×10^{-01}	2.2×10^{-02}	$1.3\times10^{+03}$
Rail Transport	0	0	0	0	0	0	0	1.4×10^{-02}
Road and Bridge Construction	0	1.7×10^{-08}	0	1.9×10^{-01}	9.5×10^{-02}	1.9×10^{-02}	0	1.5×10^{-02}
Rubber Product Manufacturing n.e.c.	7.2×10^{-03}	1.9×10^{-06}	2.9×10^{-02}	3.5×10^{-03}	7.3×10^{-03}	1.5×10^{-03}	1.0×10^{-02}	6.9×10^{-03}
Smash Repairing	0	0	0	0	0	0	0	$5.4\times10^{+03}$
Soap and Other Detergent Manufacturing	0	0	0	0	0	0	0	2.9×10^{-02}
Soft Drink, Cordial and Syrup Manufacturing	$2.7\times10^{+00}$	1.6×10^{-05}	$3.2\times10^{+00}$	2.5×10^{-01}	2.5×10^{-01}	2.5×10^{-01}	1.7×10^{-02}	1.8×10^{-01}
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	$1.5\times10^{+01}$

ANZSIC Class	CO	Pb	NO_x	TSP	PM_{10}	$PM_{2.5}$	SO_2	VOCs
Spirit Manufacturing	0	0	0	0	0	0	0	$6.7\times10^{+01}$
Spring and Wire Product Manufacturing	5.1×10^{-03}	2.7×10^{-08}	7.8×10^{-01}	1.3×10^{-01}	1.3×10^{-01}	1.3×10^{-01}	2.8×10^{-05}	3.8×10^{-01}
Steel Pipe and Tube Manufacturing	0	0	7.4×10^{-01}	$4.9\times10^{+00}$	$4.5\times10^{+00}$	$4.5\times10^{+00}$	0	1.2×10^{-03}
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	0	0	0	$2.0\times10^{+00}$
Structural Steel Fabricating	0	0	0	9.8×10^{-03}	9.8×10^{-03}	9.8×10^{-03}	0	0
Synthetic Resin Manufacturing	1.5×10^{-03}	8.8×10^{-09}	1.8×10^{-03}	1.3×10^{-04}	1.3×10^{-04}	1.3×10^{-04}	9.2×10^{-06}	9.7×10^{-05}
Unaccounted Fuel Combustion	$4.3\times10^{+02}$	5.4×10^{-03}	$1.0\times10^{+03}$	$8.0\times10^{+01}$	$8.0\times10^{+01}$	$8.0\times10^{+01}$	$6.5\times10^{+00}$	$5.9\times10^{+01}$
Wine Manufacturing	2.4×10^{-04}	0	1.7×10^{-03}	5.5×10^{-05}	5.4×10^{-05}	5.4×10^{-05}	9.0×10^{-09}	$8.4\times10^{+01}$
Wood Product Manufacturing n.e.c.	5.0×10^{-04}	3.0×10^{-09}	6.0×10^{-04}	4.5×10^{-05}	4.5×10^{-05}	4.5×10^{-05}	3.1×10^{-06}	$5.4\times10^{+00}$
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	0	0	0	$1.8\times10^{+00}$
Total	**1,800**	**0.19**	**2,620**	**10,000**	**4,030**	**1,270**	**71.1**	**13,800**

Table 4.3: Total Commercial Emissions in the GMR by ANZSIC Class (tonnes/year)

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Aircraft Manufacturing	0	0	1.4×10^{-02}	2.8×10^{-02}	0	0	1.9×10^{-05}	7.0×10^{-03}	0
Automotive Component Manufacturing n.e.c.	0	7.1×10^{-06}	1.3×10^{-03}	2.5×10^{-03}	8.6×10^{-01}	4.7×10^{-04}	1.7×10^{-06}	$3.5\times10^{+00}$	5.8×10^{-05}
Automotive Fuel Retailing	0	0	$4.4\times10^{+01}$	0	$4.3\times10^{+01}$	0	0	$1.1\times10^{+02}$	0
Basic Iron and Steel Manufacturing	0	0	3.1×10^{-02}	6.2×10^{-02}	$6.3\times10^{+00}$	0	4.3×10^{-05}	$7.3\times10^{+00}$	0
Basic Non-Ferrous Metal Manufacturing n.e.c.	0	0	5.2×10^{-04}	1.0×10^{-03}	0	0	7.2×10^{-07}	2.6×10^{-04}	0
Biscuit Manufacturing	0	0	4.7×10^{-02}	7.1×10^{-03}	0	0	6.5×10^{-05}	2.3×10^{-02}	0
Bread Manufacturing	0	3.2×10^{-07}	4.4×10^{-02}	8.7×10^{-02}	4.7×10^{-04}	2.1×10^{-05}	6.0×10^{-05}	2.3×10^{-02}	2.6×10^{-06}
Cake and Pastry Manufacturing	0	1.9×10^{-04}	8.5×10^{-03}	1.7×10^{-02}	8.7×10^{-03}	1.3×10^{-02}	1.1×10^{-05}	1.1×10^{-02}	1.6×10^{-03}
Ceramic Product Manufacturing	0	0	5.2×10^{-02}	1.0×10^{-01}	0	0	0	2.6×10^{-02}	0
Ceramic Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0	0
Chemical Product Manufacturing n.e.c.	0	9.3×10^{-04}	$1.2\times10^{+01}$	$2.4\times10^{+01}$	1.6×10^{-01}	0	1.2×10^{-05}	$6.1\times10^{+00}$	0
Chemical Wholesaling	0	0	0	0	7.6×10^{-02}	0	0	1.2×10^{-01}	0
Concrete Slurry Manufacturing	0	0	0	0	0	0	0	0	0
Confectionery Manufacturing	0	9.4×10^{-06}	1.1×10^{-03}	2.2×10^{-03}	4.3×10^{-04}	6.2×10^{-04}	1.5×10^{-06}	9.0×10^{-04}	7.6×10^{-05}
Construction Material Mining n.e.c.	0	0	0	0	5.4×10^{-04}	0	0	1.7×10^{-04}	0
Corrugated Paperboard Container Manufacturing	0	0	1.2×10^{-02}	2.3×10^{-02}	0	0	1.6×10^{-05}	5.8×10^{-03}	0
Electric Cable and Wire Manufacturing	0	0	0	0	$2.1\times10^{+01}$	0	0	$1.4\times10^{+01}$	0
Electrical and Equipment Manufacturing n.e.c.	0	0	2.2×10^{-04}	4.4×10^{-04}	2.1×10^{-01}	0	3.0×10^{-07}	5.6×10^{-01}	0
Fabricated Metal Product Manufacturing n.e.c.	0	9.9×10^{-06}	5.0×10^{-03}	1.0×10^{-02}	$3.6\times10^{+00}$	0	8.6×10^{-06}	$1.4\times10^{+01}$	8.4×10^{-03}
Food Manufacturing n.e.c.	0	3.3×10^{-01}	$1.0\times10^{+00}$	$1.9\times10^{+00}$	$1.5\times10^{+01}$	$2.2\times10^{+01}$	1.0×10^{-04}	$1.2\times10^{+01}$	$2.7\times10^{+00}$
Fruit and Vegetable Processing	0	0	3.4×10^{-03}	6.7×10^{-03}	0	0	4.6×10^{-06}	1.7×10^{-03}	0
Funeral Directors, Crematoria and Cemeteries	0	0	0	0	0	0	0	0	0
Furniture Manufacturing n.e.c.	0	0	9.5×10^{-03}	1.9×10^{-02}	6.1×10^{-01}	0	1.3×10^{-05}	$2.2\times10^{+00}$	0
Gas Supply	0	0	7.2×10^{-03}	1.4×10^{-02}	0	0	9.9×10^{-06}	3.6×10^{-03}	0
Glass and Glass Product Manufacturing	0	0	5.3×10^{-01}	3.2×10^{-01}	0	0	0	1.5×10^{-01}	0
Gravel and Sand Quarrying	0	0	0	0	9.6×10^{-03}	0	0	3.0×10^{-03}	0
Hospitals (Except Psychiatric Hospitals)	1.0×10^{-02}	0	$6.6\times10^{+00}$	$1.3\times10^{+01}$	0	0	9.1×10^{-03}	$3.3\times10^{+00}$	0
Ice Cream Manufacturing	0	9.7×10^{-04}	9.0×10^{-03}	1.8×10^{-02}	4.4×10^{-02}	6.4×10^{-02}	8.4×10^{-06}	3.9×10^{-02}	7.8×10^{-03}
Industrial Gas Manufacturing	0	0	0	0	6.3×10^{-01}	0	0	$2.0\times10^{+00}$	0
Ink Manufacturing	0	0	0	0	1.4×10^{-05}	0	0	$1.3\times10^{+00}$	0
Laundries and Dry-Cleaners	0	0	2.7×10^{-03}	5.4×10^{-03}	5.8×10^{-01}	$2.6\times10^{+02}$	3.7×10^{-06}	7.8×10^{-02}	0

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Lifting and Material Handling Equipment Manufacturing	0	0	4.9×10^{-04}	0	9.7×10^{-02}	0	0	2.1×10^{-01}	0
Medicinal and Pharmaceutical Product Manufacturing	0	0	1.8×10^{-02}	3.5×10^{-02}	1.5×10^{-05}	0	2.4×10^{-05}	8.8×10^{-03}	0
Metal Coating and Finishing	0	1.8×10^{-02}	7.6×10^{-02}	1.4×10^{-01}	9.0×10^{-01}	$1.2\times10^{+00}$	3.0×10^{-05}	8.2×10^{-01}	1.4×10^{-01}
Milk and Cream Processing	0	0	6.1×10^{-03}	1.2×10^{-02}	0	0	8.4×10^{-06}	3.1×10^{-03}	0
Mining and Construction Machinery Manufacturing	0	0	8.0×10^{-04}	0	2.3×10^{-01}	0	0	2.7×10^{-01}	0
Non-Building Construction n.e.c.	0	0	0	0	0	0	0	0	0
Non-Ferrous Metal Casting	0	0	0	2.3×10^{-04}	1.4×10^{-05}	0	0	4.4×10^{-06}	0
Paint Manufacturing	0	0	0	0	$4.4\times10^{+00}$	0	0	$3.2\times10^{+01}$	0
Paper Product Manufacturing n.e.c.	2.2×10^{-03}	0	1.3×10^{-02}	2.1×10^{-02}	3.9×10^{-02}	0	2.9×10^{-05}	1.4×10^{-01}	0
Petroleum Product Wholesaling	0	0	5.8×10^{-01}	0	4.1×10^{-01}	0	0	$1.4\times10^{+00}$	0
Plaster Product Manufacturing	0	0	2.3×10^{-01}	$1.1\times10^{+00}$	0	0	1.0×10^{-02}	1.1×10^{-01}	0
Plastic Bag and Film Manufacturing	0	3.7×10^{-04}	1.1×10^{-03}	2.0×10^{-03}	1.8×10^{-02}	2.4×10^{-02}	0	$1.2\times10^{+00}$	3.0×10^{-03}
Plastic Injection Moulded Product Manufacturing	0	0	1.2×10^{-02}	2.4×10^{-02}	5.3×10^{-04}	0	1.7×10^{-05}	1.4×10^{-02}	0
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$1.9\times10^{+00}$	0	3.4×10^{-01}	1.7×10^{-02}	8.1×10^{-02}	0	1.1×10^{-05}	5.2×10^{-01}	0
Port Operators	0	0	$1.2\times10^{+00}$	$2.5\times10^{+00}$	0	0	3.8×10^{-04}	6.2×10^{-01}	0
Poultry Farming (Eggs)	0	0	0	0	0	0	0	0	0
Poultry Farming (Meat)	0	0	0	0	0	0	0	0	0
Prepared Animal and Bird Feed Manufacturing	0	0	7.7×10^{-03}	1.6×10^{-02}	0	0	1.1×10^{-05}	3.9×10^{-03}	0
Printing	0	0	2.2×10^{-02}	$4.3\times10^{+01}$	0	0	3.0×10^{-05}	1.1×10^{-02}	0
Rail Transport	0	0	0	0	2.5×10^{-03}	0	2.0×10^{-05}	1.9×10^{-03}	0
Road and Bridge Construction	0	0	1.2×10^{-04}	0	9.0×10^{-05}	0	0	2.9×10^{-04}	0
Rubber Product Manufacturing n.e.c.	6.0×10^{-09}	0	0	2.3×10^{-04}	1.0×10^{-03}	0	0	9.4×10^{-04}	0
Smash Repairing	0	0	0	0	$3.4\times10^{+02}$	0	0	$1.4\times10^{+03}$	0
Soap and Other Detergent Manufacturing	0	7.2×10^{-08}	2.2×10^{-07}	4.0×10^{-07}	3.3×10^{-06}	4.8×10^{-06}	0	2.7×10^{-06}	5.9×10^{-07}
Soft Drink, Cordial and Syrup Manufacturing	0	0	1.6×10^{-02}	3.2×10^{-02}	0	0	2.2×10^{-05}	8.1×10^{-03}	0
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	5.2×10^{-01}	0
Spirit Manufacturing	0	0	0	0	0	0	0	0	0
Spring and Wire Product Manufacturing	0	5.5×10^{-07}	2.9×10^{-05}	5.7×10^{-05}	1.4×10^{-02}	3.6×10^{-05}	3.7×10^{-08}	1.7×10^{-01}	4.4×10^{-06}
Steel Pipe and Tube Manufacturing	0	3.2×10^{-06}	9.6×10^{-06}	1.8×10^{-05}	1.5×10^{-04}	2.1×10^{-04}	0	1.2×10^{-04}	2.6×10^{-05}
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	1.2×10^{-01}	0	0	5.4×10^{-01}	0
Structural Steel Fabricating	0	0	0	0	0	0	0	0	0
Synthetic Resin Manufacturing	0	0	8.8×10^{-06}	1.8×10^{-05}	0	0	1.2×10^{-08}	4.4×10^{-06}	0

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Unaccounted Fuel Combustion	0	0	$5.4\times10^{+00}$	$1.1\times10^{+01}$	0	0	7.1×10^{-03}	$2.7\times10^{+00}$	0
Wine Manufacturing	0	9.2×10^{-04}	3.0×10^{-03}	5.1×10^{-03}	4.2×10^{-02}	6.1×10^{-02}	0	3.5×10^{-02}	7.4×10^{-03}
Wood Product Manufacturing n.e.c.	0	0	3.0×10^{-06}	6.0×10^{-06}	3.0×10^{-01}	0	4.1×10^{-09}	$1.1\times10^{+00}$	0
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	8.6×10^{-02}	0	0	6.5×10^{-01}	0
Total	**1.93**	**0.35**	**72.7**	**96.9**	**436**	**285**	**0.03**	**1,620**	**2.83**

Table 4.4: Total Commercial Emissions in Sydney Region by ANZSIC Class (tonnes/year)

ANZSIC Class	CO	Pb	NOx	TSP	PM_{10}	$PM_{2.5}$	SO_2	VOCs
Aircraft Manufacturing	$2.4\times10^{+00}$	1.4×10^{-05}	$2.8\times10^{+00}$	2.1×10^{-01}	2.1×10^{-01}	2.1×10^{-01}	1.5×10^{-02}	1.5×10^{-01}
Automotive Component Manufacturing n.e.c.	2.1×10^{-01}	1.2×10^{-06}	2.5×10^{-01}	2.2×10^{-02}	2.2×10^{-02}	2.2×10^{-02}	1.3×10^{-03}	$1.3\times10^{+01}$
Automotive Fuel Retailing	0	0	0	0	0	0	0	$3.4\times10^{+03}$
Basic Iron and Steel Manufacturing	6.4×10^{-01}	4.8×10^{-03}	$2.9\times10^{+00}$	$1.0\times10^{+01}$	$7.1\times10^{+00}$	$6.2\times10^{+00}$	4.0×10^{-03}	$4.7\times10^{+01}$
Basic Non-Ferrous Metal Manufacturing n.e.c.	8.8×10^{-02}	3.7×10^{-03}	1.1×10^{-01}	$1.6\times10^{+01}$	$1.0\times10^{+01}$	$7.5\times10^{+00}$	1.3×10^{-01}	5.8×10^{-03}
Biscuit Manufacturing	$7.9\times10^{+00}$	4.7×10^{-05}	$9.4\times10^{+00}$	7.1×10^{-01}	7.1×10^{-01}	7.1×10^{-01}	4.9×10^{-02}	5.2×10^{-01}
Bread Manufacturing	$4.4\times10^{+00}$	3.4×10^{-05}	$2.6\times10^{+00}$	5.1×10^{-01}	5.1×10^{-01}	5.1×10^{-01}	3.5×10^{-02}	$5.2\times10^{+01}$
Cake and Pastry Manufacturing	$1.3\times10^{+00}$	8.0×10^{-06}	$1.6\times10^{+00}$	1.2×10^{-01}	1.2×10^{-01}	1.2×10^{-01}	8.3×10^{-03}	$1.4\times10^{+01}$
Chemical Product Manufacturing n.e.c.	$1.5\times10^{+00}$	8.7×10^{-06}	$1.7\times10^{+00}$	1.3×10^{-01}	1.3×10^{-01}	1.3×10^{-01}	$2.3\times10^{+01}$	$1.3\times10^{+02}$
Chemical Wholesaling	0	0	0	0	0	0	0	7.8×10^{-01}
Concrete Slurry Manufacturing	0	1.9×10^{-05}	0	$2.3\times10^{+01}$	$9.1\times10^{+00}$	$1.4\times10^{+00}$	0	0
Confectionery Manufacturing	1.8×10^{-01}	1.1×10^{-06}	2.2×10^{-01}	1.7×10^{-02}	1.7×10^{-02}	1.7×10^{-02}	1.1×10^{-03}	1.6×10^{-02}
Corrugated Paperboard Container Manufacturing	$1.9\times10^{+00}$	1.2×10^{-05}	$2.3\times10^{+00}$	1.7×10^{-01}	1.7×10^{-01}	1.7×10^{-01}	1.2×10^{-02}	1.3×10^{-01}
Electrical and Equipment Manufacturing n.e.c.	3.7×10^{-02}	2.2×10^{-07}	4.2×10^{-01}	4.3×10^{-01}	4.3×10^{-01}	4.3×10^{-01}	2.3×10^{-04}	$4.2\times10^{+00}$
Fabricated Metal Product Manufacturing n.e.c.	9.5×10^{-02}	4.4×10^{-07}	$1.2\times10^{+00}$	$1.0\times10^{+00}$	$1.0\times10^{+00}$	$1.0\times10^{+00}$	5.0×10^{-04}	$4.2\times10^{+01}$
Food Manufacturing n.e.c.	$6.9\times10^{+00}$	4.1×10^{-05}	$8.2\times10^{+00}$	6.2×10^{-01}	6.2×10^{-01}	6.2×10^{-01}	4.3×10^{-02}	$1.3\times10^{+02}$
Fruit and Vegetable Processing	5.6×10^{-01}	3.4×10^{-06}	6.7×10^{-01}	5.1×10^{-02}	5.1×10^{-02}	5.1×10^{-02}	3.5×10^{-03}	3.7×10^{-02}
Funeral Directors, Crematoria and Cemeteries	$2.0\times10^{+00}$	2.7×10^{-07}	$4.5\times10^{+00}$	1.2×10^{-03}	3.7×10^{-04}	2.5×10^{-04}	7.9×10^{-01}	6.6×10^{-09}
Furniture Manufacturing n.e.c.	0	0	0	0	0	0	0	$2.8\times10^{+00}$
Gas Supply	$1.2\times10^{+00}$	7.2×10^{-06}	$1.4\times10^{+00}$	1.1×10^{-01}	1.1×10^{-01}	1.1×10^{-01}	7.5×10^{-03}	$7.2\times10^{+00}$
Glass and Glass Product Manufacturing	$2.1\times10^{+01}$	1.9×10^{-02}	$4.9\times10^{+01}$	$7.9\times10^{+00}$	$7.7\times10^{+00}$	$7.6\times10^{+00}$	1.5×10^{-01}	$1.5\times10^{+01}$
Gravel and Sand Quarrying	0	1.5×10^{-03}	0	$2.3\times10^{+03}$	$5.6\times10^{+02}$	$1.4\times10^{+02}$	0	4.8×10^{-02}
Hospitals (Except Psychiatric Hospitals)	$7.0\times10^{+02}$	4.1×10^{-03}	$8.3\times10^{+02}$	$6.3\times10^{+01}$	$6.3\times10^{+01}$	$6.3\times10^{+01}$	$4.3\times10^{+00}$	$4.6\times10^{+01}$
Ice Cream Manufacturing	$1.0\times10^{+00}$	6.1×10^{-06}	$1.7\times10^{+00}$	9.3×10^{-02}	9.3×10^{-02}	9.3×10^{-02}	1.4×10^{-02}	4.4×10^{-01}
Industrial Gas Manufacturing	1.9×10^{-03}	0	1.4×10^{-02}	4.3×10^{-04}	4.2×10^{-04}	4.2×10^{-04}	7.1×10^{-08}	$5.8\times10^{+00}$
Ink Manufacturing	0	0	0	6.7×10^{-01}	6.2×10^{-01}	6.1×10^{-01}	0	$1.1\times10^{+01}$
Laundries and Dry-Cleaners	4.5×10^{-01}	2.7×10^{-06}	5.4×10^{-01}	4.1×10^{-02}	4.1×10^{-02}	4.1×10^{-02}	2.8×10^{-03}	$2.2\times10^{+02}$
Lifting and Material Handling Equipment Manufacturing	0	0	1.2×10^{-01}	2.4×10^{-02}	2.4×10^{-02}	2.4×10^{-02}	0	7.5×10^{-01}

ANZSIC Class	CO	Pb	NOx	TSP	PM_{10}	$PM_{2.5}$	SO_2	VOCs
Medicinal and Pharmaceutical Product Manufacturing	$2.4\times10^{+00}$	1.4×10^{-05}	$3.0\times10^{+00}$	2.2×10^{-01}	2.2×10^{-01}	2.2×10^{-01}	1.5×10^{-02}	$1.3\times10^{+00}$
Metal Coating and Finishing	$1.3\times10^{+00}$	7.5×10^{-06}	$1.7\times10^{+00}$	6.2×10^{-01}	6.2×10^{-01}	6.2×10^{-01}	7.8×10^{-03}	$7.1\times10^{+00}$
Milk and Cream Processing	$1.0\times10^{+00}$	6.1×10^{-06}	$1.2\times10^{+00}$	9.3×10^{-02}	9.3×10^{-02}	9.3×10^{-02}	6.4×10^{-03}	6.7×10^{-02}
Non-Building Construction n.e.c.	1.6×10^{-02}	0	1.2×10^{-01}	3.8×10^{-03}	3.7×10^{-03}	3.7×10^{-03}	6.2×10^{-07}	2.9×10^{-03}
Paint Manufacturing	0	1.4×10^{-01}	0	$2.4\times10^{+01}$	$2.2\times10^{+01}$	$2.1\times10^{+01}$	0	$1.1\times10^{+02}$
Paper Product Manufacturing n.e.c.	$1.7\times10^{+00}$	1.0×10^{-05}	$2.1\times10^{+00}$	1.6×10^{-01}	1.6×10^{-01}	1.6×10^{-01}	1.1×10^{-02}	5.1×10^{-01}
Petroleum Product Wholesaling	0	0	0	0	0	0	0	$3.5\times10^{+01}$
Plaster Product Manufacturing	$1.3\times10^{+02}$	1.3×10^{-02}	$3.6\times10^{+01}$	$1.7\times10^{+01}$	$1.4\times10^{+01}$	$8.6\times10^{+00}$	$4.6\times10^{+00}$	$3.4\times10^{+00}$
Plastic Bag and Film Manufacturing	0	0	0	9.0×10^{-01}	9.0×10^{-01}	8.3×10^{-01}	0	$1.8\times10^{+01}$
Plastic Injection Moulded Product Manufacturing	$2.0\times10^{+00}$	1.3×10^{-05}	$2.4\times10^{+00}$	1.8×10^{-01}	1.8×10^{-01}	1.8×10^{-01}	8.8×10^{-02}	1.7×10^{-01}
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$1.4\times10^{+00}$	8.3×10^{-06}	$1.7\times10^{+00}$	1.3×10^{-01}	1.3×10^{-01}	1.3×10^{-01}	8.7×10^{-03}	$2.0\times10^{+01}$
Port Operators	$3.1\times10^{+01}$	4.0×10^{-04}	$1.0\times10^{+02}$	$9.0\times10^{+00}$	$9.0\times10^{+00}$	$9.0\times10^{+00}$	$9.9\times10^{+00}$	$1.4\times10^{+01}$
Poultry Farming (Eggs)	0	0	0	$1.1\times10^{+03}$	$5.3\times10^{+02}$	$1.5\times10^{+02}$	0	0
Poultry Farming (Meat)	0	0	0	$1.7\times10^{+03}$	$8.3\times10^{+02}$	$2.4\times10^{+02}$	0	0
Prepared Animal and Bird Feed Manufacturing	1.4×10^{-03}	3.6×10^{-07}	5.8×10^{-03}	3.2×10^{-04}	3.1×10^{-04}	3.1×10^{-04}	2.0×10^{-03}	9.6×10^{-05}
Printing	$3.0\times10^{+00}$	2.2×10^{-05}	$4.7\times10^{+00}$	3.3×10^{-01}	3.3×10^{-01}	3.3×10^{-01}	2.2×10^{-02}	$1.2\times10^{+03}$
Road and Bridge Construction	0	0	0	5.9×10^{-02}	3.0×10^{-02}	6.0×10^{-03}	0	0
Rubber Product Manufacturing n.e.c.	0	1.1×10^{-07}	0	1.9×10^{-03}	5.8×10^{-03}	0	0	6.0×10^{-03}
Smash Repairing	0	0	0	0	0	0	0	$4.3\times10^{+03}$
Soap and Other Detergent Manufacturing	0	0	0	0	0	0	0	2.9×10^{-02}
Soft Drink, Cordial and Syrup Manufacturing	$2.7\times10^{+00}$	1.6×10^{-05}	$3.2\times10^{+00}$	2.5×10^{-01}	2.5×10^{-01}	2.5×10^{-01}	1.7×10^{-02}	1.8×10^{-01}
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	$1.5\times10^{+01}$
Spirit Manufacturing	0	0	0	0	0	0	0	$6.7\times10^{+01}$
Spring and Wire Product Manufacturing	4.5×10^{-03}	2.7×10^{-08}	5.4×10^{-03}	4.1×10^{-04}	4.1×10^{-04}	4.1×10^{-04}	2.8×10^{-05}	5.1×10^{-04}
Steel Pipe and Tube Manufacturing	0	0	7.4×10^{-01}	$1.0\times10^{+00}$	$1.0\times10^{+00}$	$1.0\times10^{+00}$	0	1.2×10^{-03}
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	0	0	0	$2.0\times10^{+00}$
Structural Steel Fabricating	0	0	0	9.8×10^{-03}	9.8×10^{-03}	9.8×10^{-03}	0	0
Unaccounted Fuel Combustion	$3.4\times10^{+02}$	4.2×10^{-03}	$7.9\times10^{+02}$	$6.3\times10^{+01}$	$6.3\times10^{+01}$	$6.3\times10^{+01}$	$5.1\times10^{+00}$	$4.6\times10^{+01}$
Wine Manufacturing	2.4×10^{-04}	0	1.7×10^{-03}	5.5×10^{-05}	5.4×10^{-05}	5.4×10^{-05}	9.0×10^{-09}	$7.7\times10^{+00}$

ANZSIC Class	CO	Pb	NOx	TSP	PM_{10}	$PM_{2.5}$	SO_2	VOCs
Wood Product Manufacturing n.e.c.	5.0×10^{-04}	3.0×10^{-09}	6.0×10^{-04}	4.5×10^{-05}	4.5×10^{-05}	4.5×10^{-05}	3.1×10^{-06}	3.3×10^{-05}
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	0	0	0	$1.8\times10^{+00}$
Total	**1,260**	**0.19**	**1,870**	**5,300**	**2,130**	**721**	**48.1**	**9,970**

Table 4.5: Total Commercial Emissions in Sydney Region by ANZSIC Class (tonnes/year)

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Aircraft Manufacturing	0	0	1.4×10^{-02}	2.8×10^{-02}	0	0	1.9×10^{-05}	7.0×10^{-03}	0
Automotive Component Manufacturing n.e.c.	0	7.1×10^{-06}	1.3×10^{-03}	2.5×10^{-03}	7.7×10^{-01}	4.7×10^{-04}	1.7×10^{-06}	$3.0\times10^{+00}$	5.8×10^{-05}
Automotive Fuel Retailing	0	0	$2.7\times10^{+01}$	0	$2.7\times10^{+01}$	0	0	$6.8\times10^{+01}$	0
Basic Iron and Steel Manufacturing	0	0	3.8×10^{-03}	7.7×10^{-03}	$6.3\times10^{+00}$	0	5.3×10^{-06}	$7.3\times10^{+00}$	0
Basic Non-Ferrous Metal Manufacturing n.e.c.	0	0	5.2×10^{-04}	1.0×10^{-03}	0	0	7.2×10^{-07}	2.6×10^{-04}	0
Biscuit Manufacturing	0	0	4.7×10^{-02}	7.1×10^{-03}	0	0	6.5×10^{-05}	2.3×10^{-02}	0
Bread Manufacturing	0	0	3.4×10^{-02}	6.7×10^{-02}	0	0	4.6×10^{-05}	1.7×10^{-02}	0
Cake and Pastry Manufacturing	0	1.9×10^{-04}	8.5×10^{-03}	1.7×10^{-02}	8.7×10^{-03}	1.3×10^{-02}	1.1×10^{-05}	1.1×10^{-02}	1.6×10^{-03}
Chemical Product Manufacturing n.e.c.	0	9.3×10^{-04}	$1.2\times10^{+01}$	$2.4\times10^{+01}$	1.2×10^{-01}	0	1.2×10^{-05}	$6.1\times10^{+00}$	0
Chemical Wholesaling	0	0	0	0	7.6×10^{-02}	0	0	1.2×10^{-01}	0
Concrete Slurry Manufacturing	0	0	0	0	0	0	0	0	0
Confectionery Manufacturing	0	9.4×10^{-06}	1.1×10^{-03}	2.2×10^{-03}	4.3×10^{-04}	6.2×10^{-04}	1.5×10^{-06}	9.0×10^{-04}	7.6×10^{-05}
Corrugated Paperboard Container Manufacturing	0	0	1.2×10^{-02}	2.3×10^{-02}	0	0	1.6×10^{-05}	5.8×10^{-03}	0
Electrical and Equipment Manufacturing n.e.c.	0	0	2.2×10^{-04}	4.4×10^{-04}	2.1×10^{-01}	0	3.0×10^{-07}	5.6×10^{-01}	0
Fabricated Metal Product Manufacturing n.e.c.	0	9.9×10^{-06}	4.8×10^{-04}	1.2×10^{-03}	$3.6\times10^{+00}$	0	2.4×10^{-06}	$1.4\times10^{+01}$	0
Food Manufacturing n.e.c.	0	3.3×10^{-01}	$1.0\times10^{+00}$	$1.9\times10^{+00}$	$1.5\times10^{+01}$	$2.2\times10^{+01}$	5.6×10^{-05}	$1.2\times10^{+01}$	$2.7\times10^{+00}$
Fruit and Vegetable Processing	0	0	3.4×10^{-03}	6.7×10^{-03}	0	0	4.6×10^{-06}	1.7×10^{-03}	0
Funeral Directors, Crematoria and Cemeteries	0	0	0	0	0	0	0	0	0
Furniture Manufacturing n.e.c.	0	0	0	0	2.8×10^{-01}	0	0	6.2×10^{-01}	0
Gas Supply	0	0	7.2×10^{-03}	1.4×10^{-02}	0	0	9.9×10^{-06}	3.6×10^{-03}	0
Glass and Glass Product Manufacturing	0	0	5.3×10^{-01}	3.2×10^{-01}	0	0	0	1.5×10^{-01}	0
Gravel and Sand Quarrying	0	0	0	0	4.3×10^{-03}	0	0	1.3×10^{-03}	0
Hospitals (Except Psychiatric Hospitals)	4.2×10^{-05}	0	$4.1\times10^{+00}$	$8.3\times10^{+00}$	0	0	5.7×10^{-03}	$2.1\times10^{+00}$	0
Ice Cream Manufacturing	0	9.7×10^{-04}	9.0×10^{-03}	1.8×10^{-02}	4.4×10^{-02}	6.4×10^{-02}	8.4×10^{-06}	3.9×10^{-02}	7.8×10^{-03}
Industrial Gas Manufacturing	0	0	0	0	6.3×10^{-01}	0	0	$2.0\times10^{+00}$	0
Ink Manufacturing	0	0	0	0	1.4×10^{-05}	0	0	$1.3\times10^{+00}$	0
Laundries and Dry-Cleaners	0	0	2.7×10^{-03}	5.4×10^{-03}	4.7×10^{-01}	$2.0\times10^{+02}$	3.7×10^{-06}	6.3×10^{-02}	0
Lifting and Material Handling Equipment Manufacturing	0	0	4.9×10^{-04}	0	9.7×10^{-02}	0	0	2.1×10^{-01}	0

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Medicinal and Pharmaceutical Product Manufacturing	0	0	1.4×10^{-02}	2.9×10^{-02}	1.5×10^{-05}	0	2.0×10^{-05}	7.2×10^{-03}	0
Metal Coating and Finishing	0	1.8×10^{-02}	6.1×10^{-02}	1.1×10^{-01}	8.2×10^{-01}	$1.2\times10^{+00}$	1.0×10^{-05}	7.2×10^{-01}	1.4×10^{-01}
Milk and Cream Processing	0	0	6.1×10^{-03}	1.2×10^{-02}	0	0	8.4×10^{-06}	3.1×10^{-03}	0
Non-Building Construction n.e.c.	0	0	0	0	0	0	0	0	0
Paint Manufacturing	0	0	0	0	$4.4\times10^{+00}$	0	0	$3.2\times10^{+01}$	0
Paper Product Manufacturing n.e.c.	0	0	1.0×10^{-02}	2.1×10^{-02}	3.9×10^{-02}	0	1.4×10^{-05}	1.4×10^{-01}	0
Petroleum Product Wholesaling	0	0	2.2×10^{-01}	0	1.6×10^{-01}	0	0	5.4×10^{-01}	0
Plaster Product Manufacturing	0	0	2.3×10^{-01}	$1.1\times10^{+00}$	0	0	1.0×10^{-02}	1.1×10^{-01}	0
Plastic Bag and Film Manufacturing	0	3.7×10^{-04}	1.1×10^{-03}	2.0×10^{-03}	1.8×10^{-02}	2.4×10^{-02}	0	$1.2\times10^{+00}$	3.0×10^{-03}
Plastic Injection Moulded Product Manufacturing	0	0	1.2×10^{-02}	2.4×10^{-02}	5.3×10^{-04}	0	1.7×10^{-05}	1.4×10^{-02}	0
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$1.3\times10^{+00}$	0	2.4×10^{-01}	1.7×10^{-02}	8.1×10^{-02}	0	1.1×10^{-05}	5.1×10^{-01}	0
Port Operators	0	0	$1.2\times10^{+00}$	$2.5\times10^{+00}$	0	0	3.8×10^{-04}	6.2×10^{-01}	0
Poultry Farming (Eggs)	0	0	0	0	0	0	0	0	0
Poultry Farming (Meat)	0	0	0	0	0	0	0	0	0
Prepared Animal and Bird Feed Manufacturing	0	0	0	4.7×10^{-05}	0	0	0	0	0
Printing	0	0	2.2×10^{-02}	$4.2\times10^{+01}$	0	0	3.0×10^{-05}	1.1×10^{-02}	0
Road and Bridge Construction	0	0	0	0	0	0	0	0	0
Rubber Product Manufacturing n.e.c.	6.0×10^{-09}	0	0	0	1.0×10^{-03}	0	0	9.3×10^{-04}	0
Smash Repairing	0	0	0	0	$2.6\times10^{+02}$	0	0	$1.1\times10^{+03}$	0
Soap and Other Detergent Manufacturing	0	7.2×10^{-08}	2.2×10^{-07}	4.0×10^{-07}	3.3×10^{-06}	4.8×10^{-06}	0	2.7×10^{-06}	5.9×10^{-07}
Soft Drink, Cordial and Syrup Manufacturing	0	0	1.6×10^{-02}	3.2×10^{-02}	0	0	2.2×10^{-05}	8.1×10^{-03}	0
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	5.2×10^{-01}	0
Spirit Manufacturing	0	0	0	0	0	0	0	0	0
Spring and Wire Product Manufacturing	0	5.5×10^{-07}	2.9×10^{-05}	5.7×10^{-05}	2.5×10^{-05}	3.6×10^{-05}	3.7×10^{-08}	3.4×10^{-05}	4.4×10^{-06}
Steel Pipe and Tube Manufacturing	0	3.2×10^{-06}	9.6×10^{-06}	1.8×10^{-05}	1.5×10^{-04}	2.1×10^{-04}	0	1.2×10^{-04}	2.6×10^{-05}
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	1.2×10^{-01}	0	0	5.4×10^{-01}	0
Structural Steel Fabricating	0	0	0	0	0	0	0	0	0
Unaccounted Fuel Combustion	0	0	$4.2\times10^{+00}$	$8.4\times10^{+00}$	0	0	5.6×10^{-03}	$2.1\times10^{+00}$	0
Wine Manufacturing	0	8.1×10^{-05}	2.9×10^{-04}	4.5×10^{-04}	3.7×10^{-03}	5.3×10^{-03}	0	3.1×10^{-03}	6.5×10^{-04}

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Wood Product Manufacturing n.e.c.	0	0	3.0×10^{-06}	6.0×10^{-06}	0	0	4.1×10^{-09}	1.5×10^{-06}	0
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	8.6×10^{-02}	0	0	6.5×10^{-01}	0
Total	**1.33**	**0.35**	**51.1**	**89.2**	**325**	**228**	**0.02**	**1,250**	**2.82**

Table 4.6: Total Commercial Emissions in Newcastle Region by ANZSIC Class (tonnes/year)

ANZSIC Class	CO	Pb	NOx	TSP	PM10	PM2.5	SO2	VOCs
Automotive Fuel Retailing	0	0	0	0	0	0	0	$4.3\times10^{+02}$
Bread Manufacturing	$1.7\times10^{+00}$	1.0×10^{-05}	$2.0\times10^{+00}$	3.0×10^{-01}	3.0×10^{-01}	3.0×10^{-01}	1.0×10^{-02}	$4.6\times10^{+01}$
Ceramic Product Manufacturing n.e.c.	4.8×10^{-03}	0	3.5×10^{-02}	1.1×10^{-03}	1.1×10^{-03}	1.1×10^{-03}	1.8×10^{-07}	8.4×10^{-04}
Chemical Product Manufacturing n.e.c.	0	0	0	0	0	0	0	$6.3\times10^{+00}$
Concrete Slurry Manufacturing	0	3.0×10^{-06}	0	$3.8\times10^{+00}$	$1.6\times10^{+00}$	2.4×10^{-01}	0	0
Construction Material Mining n.e.c.	0	9.5×10^{-05}	0	$5.7\times10^{+01}$	$3.4\times10^{+01}$	$6.6\times10^{+00}$	0	4.2×10^{-03}
Fabricated Metal Product Manufacturing n.e.c.	0	0	4.1×10^{-01}	1.9×10^{-01}	1.9×10^{-01}	1.9×10^{-01}	0	2.5×10^{-02}
Funeral Directors, Crematoria and Cemeteries	4.0×10^{-01}	5.3×10^{-08}	8.8×10^{-01}	2.4×10^{-04}	7.2×10^{-05}	4.8×10^{-05}	1.6×10^{-01}	1.3×10^{-09}
Furniture Manufacturing n.e.c.	0	0	0	0	0	0	0	$4.3\times10^{+00}$
Gravel and Sand Quarrying	0	1.7×10^{-04}	0	$2.3\times10^{+02}$	$8.1\times10^{+01}$	$1.8\times10^{+01}$	0	9.0×10^{-03}
Hospitals (Except Psychiatric Hospitals)	$4.1\times10^{+01}$	2.4×10^{-04}	$5.0\times10^{+01}$	$3.8\times10^{+00}$	$3.8\times10^{+00}$	$3.8\times10^{+00}$	3.5×10^{-01}	$2.8\times10^{+00}$
Laundries and Dry-Cleaners	0	0	0	0	0	0	0	$1.3\times10^{+01}$
Metal Coating and Finishing	$2.5\times10^{+00}$	1.5×10^{-05}	$2.9\times10^{+01}$	$2.7\times10^{+00}$	$2.7\times10^{+00}$	$2.7\times10^{+00}$	1.5×10^{-02}	5.9×10^{-01}
Mining and Construction Machinery Manufacturing	0	0	0	2.0×10^{-04}	2.0×10^{-04}	2.0×10^{-04}	0	4.7×10^{-01}
Petroleum Product Wholesaling	0	0	0	0	0	0	0	2.5×10^{-01}
Plastic Product, Rigid Fibre Reinforced, Manufacturing	0	0	0	0	0	0	0	$5.3\times10^{+00}$
Poultry Farming (Meat)	0	0	0	$9.4\times10^{+01}$	$4.6\times10^{+01}$	$1.3\times10^{+01}$	0	0
Road and Bridge Construction	0	1.5×10^{-09}	0	6.5×10^{-02}	3.3×10^{-02}	6.6×10^{-03}	0	7.0×10^{-03}
Smash Repairing	0	0	0	0	0	0	0	$2.9\times10^{+02}$
Unaccounted Fuel Combustion	$2.2\times10^{+01}$	2.8×10^{-04}	$5.6\times10^{+01}$	$4.2\times10^{+00}$	$4.2\times10^{+00}$	$4.2\times10^{+00}$	2.9×10^{-01}	$3.1\times10^{+00}$
Wine Manufacturing	0	0	0	0	0	0	0	$1.4\times10^{+00}$
Total	**68.4**	**0.0008**	**134**	**394**	**173**	**49.1**	**0.86**	**799**

Table 4.7: Total Commercial Emissions in Newcastle Region by ANZSIC Class (tonnes/year)

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Automotive Fuel Retailing	0	0	$3.4\times10^{+00}$	0	$3.1\times10^{+00}$	0	0	$8.5\times10^{+00}$	0
Bread Manufacturing	0	3.2×10^{-07}	1.0×10^{-02}	2.0×10^{-02}	4.7×10^{-04}	2.1×10^{-05}	1.4×10^{-05}	6.1×10^{-03}	2.6×10^{-06}
Ceramic Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0	0
Chemical Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0	0
Concrete Slurry Manufacturing	0	0	0	0	0	0	0	0	0
Construction Material Mining n.e.c.	0	0	0	0	3.8×10^{-04}	0	0	1.2×10^{-04}	0
Fabricated Metal Product Manufacturing n.e.c.	0	0	0	0	8.3×10^{-04}	0	0	8.4×10^{-03}	0
Funeral Directors, Crematoria and Cemeteries	0	0	0	0	0	0	0	0	0
Furniture Manufacturing n.e.c.	0	0	0	0	3.3×10^{-01}	0	0	$1.5\times10^{+00}$	0
Gravel and Sand Quarrying	0	0	0	0	8.1×10^{-04}	0	0	2.5×10^{-04}	0
Hospitals (Except Psychiatric Hospitals)	8.4×10^{-03}	0	2.5×10^{-01}	4.9×10^{-01}	0	0	3.9×10^{-04}	1.2×10^{-01}	0
Laundries and Dry-Cleaners	0	0	0	0	2.4×10^{-02}	$1.3\times10^{+01}$	0	3.1×10^{-03}	0
Metal Coating and Finishing	0	7.8×10^{-08}	1.5×10^{-02}	2.9×10^{-02}	7.8×10^{-02}	5.2×10^{-06}	2.0×10^{-05}	9.4×10^{-02}	6.3×10^{-07}
Mining and Construction Machinery Manufacturing	0	0	8.0×10^{-04}	0	2.9×10^{-02}	0	0	1.3×10^{-01}	0
Petroleum Product Wholesaling	0	0	2.0×10^{-03}	0	1.4×10^{-03}	0	0	4.9×10^{-03}	0
Plastic Product, Rigid Fibre Reinforced, Manufacturing	2.0×10^{-01}	0	3.5×10^{-02}	0	0	0	0	3.1×10^{-03}	0
Poultry Farming (Meat)	0	0	0	0	0	0	0	0	0
Road and Bridge Construction	0	0	5.7×10^{-05}	0	4.0×10^{-05}	0	0	1.4×10^{-04}	0
Smash Repairing	0	0	0	0	$1.8\times10^{+01}$	0	0	$7.4\times10^{+01}$	0
Unaccounted Fuel Combustion	0	0	2.8×10^{-01}	5.6×10^{-01}	0	0	3.7×10^{-04}	1.4×10^{-01}	0
Wine Manufacturing	0	1.5×10^{-05}	4.4×10^{-05}	8.1×10^{-05}	6.6×10^{-04}	9.7×10^{-04}	0	5.5×10^{-04}	1.2×10^{-04}
Total	**0.21**	**0.00002**	**3.98**	**1.1**	**21.5**	**12.5**	**0.001**	**84.4**	**0.0001**

Table 4.8: Total Commercial Emissions in Wollongong Region by ANZSIC Class (tonnes/year)

ANZSIC Class	CO	Pb	NOx	TSP	PM10	PM2.5	SO2	VOCs
Automotive Component Manufacturing n.e.c.	2.7×10^{-03}	1.6×10^{-08}	3.2×10^{-03}	2.4×10^{-04}	2.4×10^{-04}	2.4×10^{-04}	1.7×10^{-05}	8.1×10^{-01}
Automotive Fuel Retailing	0	0	0	0	0	0	0	$3.2\times10^{+02}$
Basic Iron and Steel Manufacturing	$4.6\times10^{+00}$	2.7×10^{-05}	$5.4\times10^{+00}$	4.1×10^{-01}	4.1×10^{-01}	4.1×10^{-01}	2.8×10^{-02}	3.3×10^{-01}
Ceramic Product Manufacturing	$1.2\times10^{+01}$	2.9×10^{-05}	$3.5\times10^{+00}$	$1.3\times10^{+01}$	$7.3\times10^{+00}$	$6.7\times10^{+00}$	4.4×10^{-01}	5.9×10^{-01}
Concrete Slurry Manufacturing	0	5.0×10^{-07}	0	6.4×10^{-01}	2.6×10^{-01}	4.0×10^{-02}	0	0
Fabricated Metal Product Manufacturing n.e.c.	0	0	0	0	0	0	0	1.3×10^{-01}
Funeral Directors, Crematoria and Cemeteries	1.5×10^{-01}	2.0×10^{-08}	3.3×10^{-01}	9.1×10^{-05}	2.7×10^{-05}	1.8×10^{-05}	5.9×10^{-02}	4.9×10^{-10}
Gas Supply	0	0	0	0	0	0	0	$2.8\times10^{+00}$
Gravel and Sand Quarrying	0	7.3×10^{-05}	0	$9.8\times10^{+01}$	$3.3\times10^{+01}$	$7.4\times10^{+00}$	0	3.6×10^{-03}
Hospitals (Except Psychiatric Hospitals)	$7.1\times10^{+01}$	4.2×10^{-04}	$8.5\times10^{+01}$	$6.4\times10^{+00}$	$6.4\times10^{+00}$	$6.4\times10^{+00}$	4.4×10^{-01}	$4.7\times10^{+00}$
Laundries and Dry-Cleaners	0	0	0	0	0	0	0	$1.0\times10^{+01}$
Plastic Product, Rigid Fibre Reinforced, Manufacturing	0	0	0	0	0	0	0	$1.4\times10^{+00}$
Poultry Farming (Meat)	0	0	0	$2.2\times10^{+01}$	$1.1\times10^{+01}$	$3.0\times10^{+00}$	0	0
Printing	0	0	0	0	0	0	0	$7.1\times10^{+01}$
Rubber Product Manufacturing n.e.c.	7.2×10^{-03}	1.8×10^{-06}	2.9×10^{-02}	1.6×10^{-03}	1.6×10^{-03}	1.5×10^{-03}	1.0×10^{-02}	8.7×10^{-04}
Smash Repairing	0	0	0	0	0	0	0	$2.1\times10^{+02}$
Spring and Wire Product Manufacturing	6.0×10^{-04}	0	4.4×10^{-03}	1.4×10^{-04}	1.4×10^{-04}	1.3×10^{-04}	2.3×10^{-08}	1.1×10^{-04}
Steel Pipe and Tube Manufacturing	0	0	0	$3.9\times10^{+00}$	$3.5\times10^{+00}$	$3.5\times10^{+00}$	0	0
Synthetic Resin Manufacturing	1.5×10^{-03}	8.8×10^{-09}	1.8×10^{-03}	1.3×10^{-04}	1.3×10^{-04}	1.3×10^{-04}	9.2×10^{-06}	9.7×10^{-05}
Unaccounted Fuel Combustion	$1.6\times10^{+01}$	2.0×10^{-04}	$3.8\times10^{+01}$	$3.0\times10^{+00}$	$3.0\times10^{+00}$	$3.0\times10^{+00}$	2.4×10^{-01}	$2.2\times10^{+00}$
Total	**103**	**0.0008**	**132**	**146**	**64.3**	**30.6**	**1.22**	**624**

Table 4.9: Total Commercial Emissions in Wollongong Region by ANZSIC Class (tonnes/year)

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Automotive Component Manufacturing n.e.c.	0	0	1.6×10^{-05}	3.2×10^{-05}	6.7×10^{-02}	0	2.2×10^{-08}	3.1×10^{-01}	0
Automotive Fuel Retailing	0	0	$2.5\times10^{+00}$	0	$2.2\times10^{+00}$	0	0	$6.3\times10^{+00}$	0
Basic Iron and Steel Manufacturing	0	0	2.7×10^{-02}	5.4×10^{-02}	2.9×10^{-03}	0	3.7×10^{-05}	2.7×10^{-02}	0
Ceramic Product Manufacturing	0	0	5.2×10^{-02}	1.0×10^{-01}	0	0	0	2.6×10^{-02}	0
Concrete Slurry Manufacturing	0	0	0	0	0	0	0	0	0
Fabricated Metal Product Manufacturing n.e.c.	0	0	0	0	1.1×10^{-02}	0	0	5.2×10^{-02}	0
Funeral Directors, Crematoria and Cemeteries	0	0	0	0	0	0	0	0	0
Gas Supply	0	0	0	0	0	0	0	0	0
Gravel and Sand Quarrying	0	0	0	0	3.2×10^{-04}	0	0	1.0×10^{-04}	0
Hospitals (Except Psychiatric Hospitals)	0	0	4.2×10^{-01}	8.5×10^{-01}	0	0	5.8×10^{-04}	2.1×10^{-01}	0
Laundries and Dry-Cleaners	0	0	0	0	1.9×10^{-02}	$9.9\times10^{+00}$	0	2.5×10^{-03}	0
Plastic Product, Rigid Fibre Reinforced, Manufacturing	6.4×10^{-02}	0	1.1×10^{-02}	0	0	0	0	1.5×10^{-03}	0
Poultry Farming (Meat)	0	0	0	0	0	0	0	0	0
Printing	0	0	0	0	0	0	0	0	0
Rubber Product Manufacturing n.e.c.	0	0	0	2.3×10^{-04}	3.5×10^{-05}	0	0	1.1×10^{-05}	0
Smash Repairing	0	0	0	0	$1.3\times10^{+01}$	0	0	$5.4\times10^{+01}$	0
Spring and Wire Product Manufacturing	0	0	0	0	0	0	0	0	0
Steel Pipe and Tube Manufacturing	0	0	0	0	0	0	0	0	0
Synthetic Resin Manufacturing	0	0	8.8×10^{-06}	1.8×10^{-05}	0	0	1.2×10^{-08}	4.4×10^{-06}	0
Unaccounted Fuel Combustion	0	0	2.0×10^{-01}	4.0×10^{-01}	0	0	2.7×10^{-04}	1.0×10^{-01}	0
Total	**0.06**	**0**	**3.26**	**1.41**	**15.3**	**9.92**	**0.0009**	**60.8**	**0**

4.2 Commercial Emissions by ANZSIC Class by Day Type

Average daily emissions for each ANZSIC Class within the GMR are presented in this section.

- Table 4.10 and Table 4.11 present emissions for a January week day (representing a typical summer week day)
- Table 4.12 and Table 4.13 present emissions for a January weekend day (representing a typical summer weekend day)
- Table 4.14 and Table 4.15 present emissions for a July week day (representing a typical winter week day)
- Table 4.16 and Table 4.17 present emissions for a July weekend day (representing a typical winter weekend day)

In this section emissions are presented for the following pollutants only:

- 1,3 butadiene (1,3-BUT)
- Acetaldehyde (ACET)
- Benzene (BENZ)
- Carbon monoxide (CO)
- Formaldehyde (HCHO)
- Isomers of xylene (XYLE)
- Lead & compounds (Pb)
- Oxides of nitrogen (NO_x)
- Particulate matter < 10 µm (PM_{10})
- Particulate matter < 2.5 µm ($PM_{2.5}$)
- Perchloroethylene (PERC)
- Polycyclic aromatic hydrocarbons (PAHs)
- Sulfur dioxide (SO_2)
- Toluene (TOLU)
- Total suspended particulates (TSP)
- Total VOCS (VOCs)
- Trichloroethylene (TCE)

Table 4.10: Average Daily Commercial Emissions (January Week Day/Summer Week Day) (kg/day)

ANZSIC Class	CO	Pb	NOx	TSP	PM10	PM2.5	SO2	VOCs
Aircraft Manufacturing	$6.3x10^{+00}$	$3.8x10^{-05}$	$7.5x10^{+00}$	$5.7x10^{-01}$	$5.7x10^{-01}$	$5.7x10^{-01}$	$3.9x10^{-02}$	$4.1x10^{-01}$
Automotive Component Manufacturing n.e.c.	$2.9x10^{-01}$	$1.8x10^{-06}$	$3.5x10^{-01}$	$3.1x10^{-02}$	$3.1x10^{-02}$	$3.1x10^{-02}$	$1.8x10^{-03}$	$2.2x10^{+01}$
Automotive Fuel Retailing	0	0	0	0	0	0	0	$1.9x10^{+04}$
Basic Iron and Steel Manufacturing	$1.4x10^{+01}$	$9.1x10^{-03}$	$2.2x10^{+01}$	$2.1x10^{+01}$	$1.4x10^{+01}$	$1.3x10^{+01}$	$8.7x10^{-02}$	$1.3x10^{+02}$
Basic Non-Ferrous Metal Manufacturing n.e.c.	$2.4x10^{-01}$	$9.9x10^{-03}$	$2.8x10^{-01}$	$4.2x10^{+01}$	$2.7x10^{+01}$	$2.0x10^{+01}$	$3.5x10^{-01}$	$1.5x10^{-02}$
Biscuit Manufacturing	$2.1x10^{+01}$	$1.3x10^{-04}$	$2.5x10^{+01}$	$1.9x10^{+00}$	$1.9x10^{+00}$	$1.9x10^{+00}$	$1.3x10^{-01}$	$1.4x10^{+00}$
Bread Manufacturing	$1.6x10^{+01}$	$1.2x10^{-04}$	$1.2x10^{+01}$	$2.2x10^{+00}$	$2.2x10^{+00}$	$2.2x10^{+00}$	$1.2x10^{-01}$	$2.6x10^{+02}$
Cake and Pastry Manufacturing	$3.6x10^{+00}$	$2.1x10^{-05}$	$4.3x10^{+00}$	$3.3x10^{-01}$	$3.3x10^{-01}$	$3.3x10^{-01}$	$2.2x10^{-02}$	$3.7x10^{+01}$
Ceramic Product Manufacturing	$3.1x10^{+01}$	$7.8x10^{-05}$	$9.4x10^{+00}$	$3.4x10^{+01}$	$2.0x10^{+01}$	$1.8x10^{+01}$	$1.2x10^{+00}$	$1.6x10^{+00}$
Ceramic Product Manufacturing n.e.c.	$1.5x10^{-02}$	0	$1.1x10^{-01}$	$3.6x10^{-03}$	$3.5x10^{-03}$	$3.5x10^{-03}$	$5.8x10^{-07}$	$2.7x10^{-03}$
Chemical Product Manufacturing n.e.c.	$3.9x10^{+00}$	$2.3x10^{-05}$	$4.7x10^{+00}$	$3.7x10^{-01}$	$3.7x10^{-01}$	$3.7x10^{-01}$	$6.1x10^{+01}$	$3.9x10^{+02}$
Chemical Wholesaling	0	0	0	0	0	0	0	$2.5x10^{+00}$
Concrete Slurry Manufacturing	0	$6.8x10^{-05}$	0	$8.5x10^{+01}$	$3.5x10^{+01}$	$5.3x10^{+00}$	0	0
Confectionery Manufacturing	$5.0x10^{-01}$	$2.9x10^{-06}$	$5.9x10^{-01}$	$4.5x10^{-02}$	$4.5x10^{-02}$	$4.5x10^{-02}$	$3.1x10^{-03}$	$4.2x10^{-02}$
Construction Material Mining n.e.c.	0	$2.9x10^{-04}$	0	$2.8x10^{+02}$	$1.2x10^{+02}$	$2.5x10^{+01}$	0	$1.9x10^{-02}$
Corrugated Paperboard Container Manufacturing	$5.2x10^{+00}$	$3.1x10^{-05}$	$6.2x10^{+00}$	$4.7x10^{-01}$	$4.7x10^{-01}$	$4.7x10^{-01}$	$3.2x10^{-02}$	$3.4x10^{-01}$
Electric Cable and Wire Manufacturing	0	0	0	$2.1x10^{+00}$	$1.4x10^{+00}$	$1.0x10^{+00}$	0	$1.4x10^{+02}$
Electrical and Equipment Manufacturing n.e.c.	$2.2x10^{-02}$	$1.3x10^{-07}$	$2.6x10^{-02}$	$7.7x10^{-01}$	$7.7x10^{-01}$	$7.7x10^{-01}$	$1.4x10^{-04}$	$6.4x10^{+00}$
Fabricated Metal Product Manufacturing n.e.c.	$2.2x10^{+00}$	$1.3x10^{-05}$	$5.7x10^{+00}$	$3.9x10^{+00}$	$3.9x10^{+00}$	$3.9x10^{+00}$	$1.4x10^{-02}$	$8.3x10^{+01}$
Food Manufacturing n.e.c.	$2.8x10^{+01}$	$1.2x10^{-03}$	$6.9x10^{+01}$	$5.3x10^{+00}$	$3.6x10^{+00}$	$2.9x10^{+00}$	$4.6x10^{+01}$	$3.4x10^{+02}$
Fruit and Vegetable Processing	$1.5x10^{+00}$	$9.0x10^{-06}$	$1.8x10^{+00}$	$1.4x10^{-01}$	$1.4x10^{-01}$	$1.4x10^{-01}$	$9.4x10^{-03}$	$9.9x10^{-02}$
Funeral Directors, Crematoria and Cemeteries	$1.1x10^{+01}$	$1.4x10^{-06}$	$2.3x10^{+01}$	$6.4x10^{-03}$	$1.9x10^{-03}$	$1.3x10^{-03}$	$4.1x10^{+00}$	$3.4x10^{-08}$
Furniture Manufacturing n.e.c.	$5.0x10^{+00}$	$3.0x10^{-05}$	$6.0x10^{+00}$	$4.5x10^{-01}$	$4.5x10^{-01}$	$4.5x10^{-01}$	$3.1x10^{-02}$	$6.2x10^{+00}$
Gas Supply	$3.3x10^{+00}$	$1.9x10^{-05}$	$3.9x10^{+00}$	$2.9x10^{-01}$	$2.9x10^{-01}$	$2.9x10^{-01}$	$2.0x10^{-02}$	$2.7x10^{+01}$
Glass and Glass Product Manufacturing	$5.6x10^{+01}$	$5.1x10^{-02}$	$1.3x10^{+02}$	$2.1x10^{+01}$	$2.1x10^{+01}$	$2.0x10^{+01}$	$4.1x10^{-01}$	$4.1x10^{+01}$
Gravel and Sand Quarrying	0	$1.1x10^{-02}$	0	$1.5x10^{+04}$	$3.6x10^{+03}$	$8.9x10^{+02}$	0	$3.4x10^{-01}$
Hospitals (Except Psychiatric Hospitals)	$3.0x10^{+03}$	$1.8x10^{-02}$	$3.6x10^{+03}$	$2.7x10^{+02}$	$2.7x10^{+02}$	$2.7x10^{+02}$	$1.9x10^{+01}$	$2.0x10^{+02}$
Ice Cream Manufacturing	$2.8x10^{+00}$	$1.6x10^{-05}$	$4.6x10^{+00}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$3.9x10^{-02}$	$1.2x10^{+00}$
Industrial Gas Manufacturing	$7.1x10^{-03}$	0	$5.1x10^{-02}$	$1.6x10^{-03}$	$1.6x10^{-03}$	$1.6x10^{-03}$	$2.7x10^{-07}$	$2.2x10^{+01}$
Ink Manufacturing	0	0	0	$2.5x10^{+00}$	$2.3x10^{+00}$	$2.3x10^{+00}$	0	$4.0x10^{+01}$
Laundries and Dry-Cleaners	$1.4x10^{+00}$	$8.5x10^{-06}$	$1.7x10^{+00}$	$1.3x10^{-01}$	$1.3x10^{-01}$	$1.3x10^{-01}$	$8.8x10^{-03}$	$8.7x10^{+02}$

ANZSIC Class	CO	Pb	NOx	TSP	PM10	PM2.5	SO2	VOCs
Lifting and Material Handling Equipment Manufacturing	0	0	0.388725806	$7.7x10^{-02}$	$7.7x10^{-02}$	$7.7x10^{-02}$	0	$2.3x10^{+00}$
Medicinal and Pharmaceutical Product Manufacturing	$1.1x10^{+01}$	$6.7x10^{-05}$	$1.8x10^{+01}$	$1.0x10^{+00}$	$1.0x10^{+00}$	$1.0x10^{+00}$	$7.0x10^{-02}$	$7.0x10^{+00}$
Metal Coating and Finishing	$1.2x10^{+01}$	$7.4x10^{-05}$	$9.3x10^{+01}$	$1.2x10^{+01}$	$1.1x10^{+01}$	$1.1x10^{+01}$	$7.7x10^{-02}$	$2.1x10^{+01}$
Milk and Cream Processing	$2.8x10^{+00}$	$1.6x10^{-05}$	$3.3x10^{+00}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$1.7x10^{-02}$	$1.8x10^{-01}$
Mining and Construction Machinery Manufacturing	0	0	0	$5.4x10^{-04}$	$5.4x10^{-04}$	$5.4x10^{-04}$	0	$3.8x10^{+00}$
Non-Building Construction n.e.c.	$4.6x10^{-02}$	0	$3.3x10^{-01}$	$1.1x10^{-02}$	$1.0x10^{-02}$	$1.0x10^{-02}$	$1.7x10^{-06}$	$8.1x10^{-03}$
Non-Ferrous Metal Casting	$2.7x10^{-02}$	$6.8x10^{-06}$	$1.1x10^{-01}$	$1.4x10^{+00}$	$9.2x10^{-01}$	$6.9x10^{-01}$	$8.2x10^{-02}$	$2.3x10^{-03}$
Paint Manufacturing	0	$5.2x10^{-01}$	0	$8.5x10^{+01}$	$7.7x10^{+01}$	$7.6x10^{+01}$	0	$2.2x10^{+02}$
Paper Product Manufacturing n.e.c.	$4.9x10^{+00}$	$2.8x10^{-05}$	$6.6x10^{+00}$	$5.0x10^{-01}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$9.6x10^{-02}$	$1.4x10^{+00}$
Petroleum Product Wholesaling	0	0	0	0	0	0	0	$2.2x10^{+02}$
Plaster Product Manufacturing	$3.5x10^{+02}$	$3.4x10^{-02}$	$9.7x10^{+01}$	$4.6x10^{+01}$	$3.9x10^{+01}$	$2.3x10^{+01}$	$1.2x10^{+01}$	$9.2x10^{+00}$
Plastic Bag and Film Manufacturing	0	0	0	$2.2x10^{+00}$	$2.2x10^{+00}$	$2.1x10^{+00}$	0	$3.6x10^{+01}$
Plastic Injection Moulded Product Manufacturing	$5.4x10^{+00}$	$3.4x10^{-05}$	$6.5x10^{+00}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$2.3x10^{-01}$	$4.6x10^{-01}$
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$3.8x10^{+00}$	$2.2x10^{-05}$	$4.6x10^{+00}$	$3.4x10^{-01}$	$3.4x10^{-01}$	$3.4x10^{-01}$	$2.3x10^{-02}$	$1.1x10^{+02}$
Port Operators	$8.4x10^{+01}$	$1.1x10^{-03}$	$2.7x10^{+02}$	$2.4x10^{+01}$	$2.4x10^{+01}$	$2.4x10^{+01}$	$2.7x10^{+01}$	$3.7x10^{+01}$
Poultry Farming (Eggs)	0	0	0	$3.3x10^{+03}$	$1.6x10^{+03}$	$4.6x10^{+02}$	0	0
Poultry Farming (Meat)	0	0	0	$1.0x10^{+04}$	$4.9x10^{+03}$	$1.4x10^{+03}$	0	0
Prepared Animal and Bird Feed Manufacturing	$3.5x10^{+00}$	$2.2x10^{-05}$	$4.2x10^{+00}$	$3.2x10^{-01}$	$3.2x10^{-01}$	$3.2x10^{-01}$	$2.7x10^{-02}$	$2.3x10^{-01}$
Printing	$8.1x10^{+00}$	$5.8x10^{-05}$	$1.3x10^{+01}$	$8.8x10^{-01}$	$8.8x10^{-01}$	$8.8x10^{-01}$	$6.0x10^{-02}$	$4.1x10^{+03}$
Rail Transport	0	0	0	0	0	0	0	$3.7x10^{-02}$
Road and Bridge Construction	0	$4.7x10^{-08}$	0	$5.1x10^{-01}$	$2.5x10^{-01}$	$5.1x10^{-02}$	0	$4.1x10^{-02}$
Rubber Product Manufacturing n.e.c.	$2.7x10^{-02}$	$7.1x10^{-06}$	$1.1x10^{-01}$	$1.2x10^{-02}$	$2.4x10^{-02}$	$5.8x10^{-03}$	$3.8x10^{-02}$	$2.2x10^{-02}$
Smash Repairing	0	0	0	0	0	0	0	$1.7x10^{+04}$
Soap and Other Detergent Manufacturing	0	0	0	0	0	0	0	$6.5x10^{-02}$
Soft Drink, Cordial and Syrup Manufacturing	$7.2x10^{+00}$	$4.4x10^{-05}$	$8.7x10^{+00}$	$6.6x10^{-01}$	$6.6x10^{-01}$	$6.6x10^{-01}$	$4.6x10^{-02}$	$4.8x10^{-01}$
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	$4.1x10^{+01}$
Spirit Manufacturing	0	0	0	0	0	0	0	$1.8x10^{+02}$
Spring and Wire Product Manufacturing	$1.4x10^{-02}$	$7.2x10^{-08}$	$2.9x10^{+00}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$7.6x10^{-05}$	$1.4x10^{+00}$
Steel Pipe and Tube Manufacturing	0	0	$2.3x10^{+00}$	$1.4x10^{+01}$	$1.3x10^{+01}$	$1.3x10^{+01}$	0	$3.3x10^{-03}$
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	0	0	0	$5.3x10^{+00}$
Structural Steel Fabricating	0	0	0	$2.5x10^{-02}$	$2.5x10^{-02}$	$2.5x10^{-02}$	0	0
Synthetic Resin Manufacturing	$4.0x10^{-03}$	$2.4x10^{-08}$	$4.7x10^{-03}$	$3.6x10^{-04}$	$3.6x10^{-04}$	$3.6x10^{-04}$	$2.5x10^{-05}$	$2.6x10^{-04}$

ANZSIC Class	CO	Pb	NOx	TSP	PM10	PM2.5	SO2	VOCs
Unaccounted Fuel Combustion	$1.2x10^{+03}$	$1.4x10^{-02}$	$2.7x10^{+03}$	$2.2x10^{+02}$	$2.2x10^{+02}$	$2.2x10^{+02}$	$1.7x10^{+01}$	$1.6x10^{+02}$
Wine Manufacturing	$6.5x10^{-04}$	0	$4.7x10^{-03}$	$1.5x10^{-04}$	$1.5x10^{-04}$	$1.4x10^{-04}$	$2.4x10^{-08}$	$1.4x10^{+02}$
Wood Product Manufacturing n.e.c.	$9.0x10^{-04}$	$5.4x10^{-09}$	$1.1x10^{-03}$	$8.2x10^{-05}$	$8.2x10^{-05}$	$8.2x10^{-05}$	$5.6x10^{-06}$	$1.2x10^{+01}$
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	0	0	0	0
Grand Total	**4,850**	**0.67**	**7,140**	**29,500**	**11,100**	**3,520**	**190**	**44,200**

Table 4.11: Average Daily Commercial Emissions (January Week Day/Summer Week Day) (kg/day)

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Aircraft Manufacturing	0	0	$3.8x10^{-02}$	$7.5x10^{-02}$	0	0	$5.2x10^{-05}$	$1.9x10^{-02}$	0
Automotive Component Manufacturing n.e.c.	0	$1.9x10^{-05}$	$1.8x10^{-03}$	$3.6x10^{-03}$	$1.4x10^{+00}$	$1.3x10^{-03}$	$2.4x10^{-06}$	$5.7x10^{+00}$	$1.5x10^{-04}$
Automotive Fuel Retailing	0	0	$1.5x10^{+02}$	0	$1.4x10^{+02}$	0	0	$3.8x10^{+02}$	0
Basic Iron and Steel Manufacturing	0	0	$8.3x10^{-02}$	$1.7x10^{-01}$	$1.7x10^{+01}$	0	$1.1x10^{-04}$	$2.0x10^{+01}$	0
Basic Non-Ferrous Metal Manufacturing n.e.c.	0	0	$1.4x10^{-03}$	$2.8x10^{-03}$	0	0	$1.9x10^{-06}$	$7.0x10^{-04}$	0
Biscuit Manufacturing	0	0	$1.3x10^{-01}$	$1.9x10^{-02}$	0	0	$1.7x10^{-04}$	$6.3x10^{-02}$	0
Bread Manufacturing	0	$8.5x10^{-07}$	$1.2x10^{-01}$	$2.3x10^{-01}$	$1.3x10^{-03}$	$5.6x10^{-05}$	$1.6x10^{-04}$	$6.2x10^{-02}$	$6.9x10^{-06}$
Cake and Pastry Manufacturing	0	$5.2x10^{-04}$	$2.3x10^{-02}$	$4.6x10^{-02}$	$2.3x10^{-02}$	$3.4x10^{-02}$	$2.9x10^{-05}$	$3.0x10^{-02}$	$4.2x10^{-03}$
Ceramic Product Manufacturing	0	0	$1.4x10^{-01}$	$2.8x10^{-01}$	0	0	0	$7.1x10^{-02}$	0
Ceramic Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0	0
Chemical Product Manufacturing n.e.c.	0	$2.5x10^{-03}$	$3.2x10^{+01}$	$6.4x10^{+01}$	$5.8x10^{-01}$	0	$3.2x10^{-05}$	$1.7x10^{+01}$	0
Chemical Wholesaling	0	0	0	0	$2.4x10^{-01}$	0	0	$3.9x10^{-01}$	0
Concrete Slurry Manufacturing	0	0	0	0	0	0	0	0	0
Confectionery Manufacturing	0	$2.5x10^{-05}$	$3.0x10^{-03}$	$6.0x10^{-03}$	$1.2x10^{-03}$	$1.7x10^{-03}$	$4.1x10^{-06}$	$2.4x10^{-03}$	$2.0x10^{-04}$
Construction Material Mining n.e.c.	0	0	0	0	$1.7x10^{-03}$	0	0	$5.4x10^{-04}$	0
Corrugated Paperboard Container Manufacturing	0	0	$3.1x10^{-02}$	$6.2x10^{-02}$	0	0	$4.3x10^{-05}$	$1.5x10^{-02}$	0
Electric Cable and Wire Manufacturing	0	0	0	0	$3.3x10^{+01}$	0	0	$2.3x10^{+01}$	0
Electrical and Equipment Manufacturing n.e.c.	0	0	$1.3x10^{-04}$	$2.6x10^{-04}$	$1.5x10^{-01}$	0	$1.8x10^{-07}$	$8.3x10^{-01}$	0
Fabricated Metal Product Manufacturing n.e.c.	0	$1.8x10^{-05}$	$1.3x10^{-02}$	$2.7x10^{-02}$	$6.9x10^{+00}$	0	$2.1x10^{-05}$	$2.8x10^{+01}$	$2.3x10^{-02}$
Food Manufacturing n.e.c.	0	$8.9x10^{-01}$	$2.8x10^{+00}$	$5.1x10^{+00}$	$4.0x10^{+01}$	$5.9x10^{+01}$	$2.6x10^{-04}$	$3.3x10^{+01}$	$7.2x10^{+00}$
Fruit and Vegetable Processing	0	0	$9.0x10^{-03}$	$1.8x10^{-02}$	0	0	$1.2x10^{-05}$	$4.5x10^{-03}$	0
Funeral Directors, Crematoria and Cemeteries	0	0	0	0	0	0	0	0	0
Furniture Manufacturing n.e.c.	0	0	$3.0x10^{-02}$	$6.0x10^{-02}$	$5.7x10^{-01}$	0	$4.1x10^{-05}$	$1.3x10^{+00}$	0
Gas Supply	0	0	$1.9x10^{-02}$	$3.9x10^{-02}$	$0.0x10^{+00}$	0	$2.7x10^{-05}$	$9.7x10^{-03}$	0
Glass and Glass Product Manufacturing	0	0	$1.4x10^{+00}$	$8.6x10^{-01}$	$0.0x10^{+00}$	0	0	$3.9x10^{-01}$	0
Gravel and Sand Quarrying	0	0	0	0	$3.1x10^{-02}$	0	0	$9.5x10^{-03}$	0
Hospitals (Except Psychiatric Hospitals)	$2.7x10^{-02}$	0	$1.8x10^{+01}$	$3.6x10^{+01}$	0	0	$2.5x10^{-02}$	$8.9x10^{+00}$	0
Ice Cream Manufacturing	0	$2.6x10^{-03}$	$2.4x10^{-02}$	$4.7x10^{-02}$	$1.2x10^{-01}$	$1.7x10^{-01}$	$2.3x10^{-05}$	$1.1x10^{-01}$	$2.1x10^{-02}$
Industrial Gas Manufacturing	0	0	0	0	$2.4x10^{+00}$	0	0	$7.6x10^{+00}$	0
Ink Manufacturing	0	0	0	0	$4.4x10^{-05}$	0	0	$4.7x10^{+00}$	0
Laundries and Dry-Cleaners	0	0	$8.5x10^{-03}$	$1.7x10^{-02}$	$1.8x10^{+00}$	$8.2x10^{+02}$	$1.2x10^{-05}$	$2.4x10^{-01}$	0

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Lifting and Material Handling Equipment Manufacturing	0	0	$1.4x10^{-03}$	0	$3.0x10^{-01}$	0	0	$6.6x10^{-01}$	0
Medicinal and Pharmaceutical Product Manufacturing	0	0	$6.7x10^{-02}$	$1.3x10^{-01}$	$4.8x10^{-05}$	0	$9.2x10^{-05}$	$3.4x10^{-02}$	0
Metal Coating and Finishing	0	$4.8x10^{-02}$	$2.2x10^{-01}$	$4.1x10^{-01}$	$2.5x10^{+00}$	$3.2x10^{+00}$	$1.0x10^{-04}$	$2.3x10^{+00}$	$3.9x10^{-01}$
Milk and Cream Processing	0	0	$1.6x10^{-02}$	$3.3x10^{-02}$	0	0	$2.3x10^{-05}$	$8.2x10^{-03}$	0
Mining and Construction Machinery Manufacturing	0	0	$2.2x10^{-03}$	0	$7.0x10^{-01}$	0	0	$7.9x10^{-01}$	0
Non-Building Construction n.e.c.	0	0	0	0	0	0	0	0	0
Non-Ferrous Metal Casting	0	0	0	$8.8x10^{-04}$	$4.6x10^{-05}$	0	0	$1.4x10^{-05}$	0
Paint Manufacturing	0	0	0	0	$1.7x10^{+01}$	0	0	$9.2x10^{+01}$	0
Paper Product Manufacturing n.e.c.	$5.9x10^{-03}$	0	$3.4x10^{-02}$	$5.6x10^{-02}$	$1.0x10^{-01}$	0	$7.7x10^{-05}$	$3.8x10^{-01}$	0
Petroleum Product Wholesaling	0	0	$1.6x10^{+00}$	0	$1.1x10^{+00}$	0	0	$3.9x10^{+00}$	0
Plaster Product Manufacturing	0	0	$6.1x10^{-01}$	$3.1x10^{+00}$	0	0	$2.7x10^{-02}$	$3.1x10^{-01}$	0
Plastic Bag and Film Manufacturing	0	$6.9x10^{-04}$	$2.1x10^{-03}$	$3.8x10^{-03}$	$3.6x10^{-02}$	$4.6x10^{-02}$	0	$2.3x10^{+00}$	$5.6x10^{-03}$
Plastic Injection Moulded Product Manufacturing	0	0	$3.2x10^{-02}$	$6.5x10^{-02}$	$1.4x10^{-03}$	0	$4.6x10^{-05}$	$3.8x10^{-02}$	0
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$7.2x10^{+00}$	0	$1.3x10^{+00}$	$4.5x10^{-02}$	$2.5x10^{-01}$	0	$3.1x10^{-05}$	$1.6x10^{+00}$	0
Port Operators	0	0	$3.4x10^{+00}$	$6.7x10^{+00}$	0	0	$1.0x10^{-03}$	$1.7x10^{+00}$	0
Poultry Farming (Eggs)	0	0	0	0	0	0	0	0	0
Poultry Farming (Meat)	0	0	0	0	0	0	0	0	0
Prepared Animal and Bird Feed Manufacturing	0	0	$2.1x10^{-02}$	$4.2x10^{-02}$	0	0	$2.9x10^{-05}$	$1.0x10^{-02}$	0
Printing	0	0	$5.8x10^{-02}$	$1.5x10^{+02}$	0	0	$8.0x10^{-05}$	$2.9x10^{-02}$	0
Rail Transport	0	0	0	0	$6.7x10^{-03}$	0	$5.4x10^{-05}$	$5.2x10^{-03}$	0
Road and Bridge Construction	0	0	$3.3x10^{-04}$	0	$2.5x10^{-04}$	0	0	$8.1x10^{-04}$	0
Rubber Product Manufacturing n.e.c.	$1.9x10^{-08}$	0	0	$8.8x10^{-04}$	$3.2x10^{-03}$	0	0	$2.9x10^{-03}$	0
Smash Repairing	0	0	0	0	$1.1x10^{+03}$	0	0	$4.4x10^{+03}$	0
Soap and Other Detergent Manufacturing	0	$1.9x10^{-07}$	$5.9x10^{-07}$	$1.1x10^{-06}$	$8.9x10^{-06}$	$1.3x10^{-05}$	0	$7.3x10^{-06}$	$1.6x10^{-06}$
Soft Drink, Cordial and Syrup Manufacturing	0	0	$4.4x10^{-02}$	$8.7x10^{-02}$	0	0	$6.0x10^{-05}$	$2.2x10^{-02}$	0
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	$1.4x10^{+00}$	0
Spirit Manufacturing	0	0	0	0	0	0	0	0	0
Spring and Wire Product Manufacturing	0	$1.5x10^{-06}$	$7.7x10^{-05}$	$1.5x10^{-04}$	$5.3x10^{-02}$	$9.7x10^{-05}$	$9.9x10^{-08}$	$6.3x10^{-01}$	$1.2x10^{-05}$
Steel Pipe and Tube Manufacturing	0	$8.6x10^{-06}$	$2.6x10^{-05}$	$4.8x10^{-05}$	$3.9x10^{-04}$	$5.7x10^{-04}$	0	$3.2x10^{-04}$	$7.0x10^{-05}$
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	$3.2x10^{-01}$	0	0	$1.5x10^{+00}$	0
Structural Steel Fabricating	0	0	0	0	0	0	0	0	0
Synthetic Resin Manufacturing	0	0	$2.4x10^{-05}$	$4.7x10^{-05}$	0	0	$3.3x10^{-08}$	$1.2x10^{-05}$	0

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Unaccounted Fuel Combustion	0	0	$1.4x10^{+01}$	$2.9x10^{+01}$	0	0	$1.9x10^{-02}$	$7.2x10^{+00}$	0
Wine Manufacturing	0	$1.5x10^{-03}$	$5.0x10^{-03}$	$8.2x10^{-03}$	$6.8x10^{-02}$	$9.7x10^{-02}$	0	$5.7x10^{-02}$	$1.2x10^{-02}$
Wood Product Manufacturing n.e.c.	0	0	$5.4x10^{-06}$	$1.1x10^{-05}$	$6.7x10^{-01}$	0	$7.4x10^{-09}$	$2.6x10^{+00}$	0
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	0	0	0	0	0
Grand Total	**7.26**	**0.94**	**229**	**296**	**1,320**	**884**	**0.074**	**5,020**	**7.61**

Table 4.12: Average Daily Commercial Emissions (January Weekend Day/Summer Weekend day) (kg/day)

ANZSIC Class	CO	Pb	NOx	TSP	PM10	PM2.5	SO2	VOCs
Aircraft Manufacturing	$6.3x10^{+00}$	$3.8x10^{-05}$	$7.5x10^{+00}$	$5.7x10^{-01}$	$5.7x10^{-01}$	$5.7x10^{-01}$	$3.9x10^{-02}$	$4.1x10^{-01}$
Automotive Component Manufacturing n.e.c.	$1.5x10^{-01}$	$9.0x10^{-07}$	$1.8x10^{-01}$	$1.6x10^{-02}$	$1.6x10^{-02}$	$1.6x10^{-02}$	$9.4x10^{-04}$	$1.3x10^{+01}$
Automotive Fuel Retailing	0	0	0	0	0	0	0	$9.5x10^{+03}$
Basic Iron and Steel Manufacturing	$1.4x10^{+01}$	$4.6x10^{-03}$	$1.9x10^{+01}$	$1.1x10^{+01}$	$7.9x10^{+00}$	$7.1x10^{+00}$	$8.7x10^{-02}$	$1.3x10^{+02}$
Basic Non-Ferrous Metal Manufacturing n.e.c.	$2.4x10^{-01}$	$9.9x10^{-03}$	$2.8x10^{-01}$	$4.2x10^{+01}$	$2.7x10^{+01}$	$2.0x10^{+01}$	$3.5x10^{-01}$	$1.5x10^{-02}$
Biscuit Manufacturing	$2.1x10^{+01}$	$1.3x10^{-04}$	$2.5x10^{+01}$	$1.9x10^{+00}$	$1.9x10^{+00}$	$1.9x10^{+00}$	$1.3x10^{-01}$	$1.4x10^{+00}$
Bread Manufacturing	$1.6x10^{+01}$	$1.2x10^{-04}$	$1.2x10^{+01}$	$2.2x10^{+00}$	$2.2x10^{+00}$	$2.2x10^{+00}$	$1.2x10^{-01}$	$2.6x10^{+02}$
Cake and Pastry Manufacturing	$3.6x10^{+00}$	$2.1x10^{-05}$	$4.3x10^{+00}$	$3.3x10^{-01}$	$3.3x10^{-01}$	$3.3x10^{-01}$	$2.2x10^{-02}$	$3.7x10^{+01}$
Ceramic Product Manufacturing	$3.1x10^{+01}$	$7.8x10^{-05}$	$9.4x10^{+00}$	$3.4x10^{+01}$	$2.0x10^{+01}$	$1.8x10^{+01}$	$1.2x10^{+00}$	$1.6x10^{+00}$
Ceramic Product Manufacturing n.e.c.	$1.5x10^{-02}$	0	$1.1x10^{-01}$	$3.6x10^{-03}$	$3.5x10^{-03}$	$3.5x10^{-03}$	$5.8x10^{-07}$	$2.7x10^{-03}$
Chemical Product Manufacturing n.e.c.	$3.9x10^{+00}$	$2.3x10^{-05}$	$4.7x10^{+00}$	$3.6x10^{-01}$	$3.6x10^{-01}$	$3.6x10^{-01}$	$6.1x10^{+01}$	$3.5x10^{+02}$
Chemical Wholesaling	0	0	0	0	0	0	0	$1.2x10^{+00}$
Concrete Slurry Manufacturing	0	$3.1x10^{-06}$	0	$5.2x10^{+00}$	$2.4x10^{+00}$	$4.3x10^{-01}$	0	0
Confectionery Manufacturing	$4.9x10^{-01}$	$2.9x10^{-06}$	$5.8x10^{-01}$	$4.4x10^{-02}$	$4.4x10^{-02}$	$4.4x10^{-02}$	$3.0x10^{-03}$	$4.2x10^{-02}$
Construction Material Mining n.e.c.	0	$7.8x10^{-05}$	0	$1.8x10^{+02}$	$9.6x10^{+01}$	$1.9x10^{+01}$	0	$1.9x10^{-02}$
Corrugated Paperboard Container Manufacturing	$5.2x10^{+00}$	$3.1x10^{-05}$	$6.2x10^{+00}$	$4.7x10^{-01}$	$4.7x10^{-01}$	$4.7x10^{-01}$	$3.2x10^{-02}$	$3.4x10^{-01}$
Electric Cable and Wire Manufacturing	0	0	0	$2.1x10^{+00}$	$1.4x10^{+00}$	$1.0x10^{+00}$	0	$1.4x10^{+02}$
Electrical and Equipment Manufacturing n.e.c.	$1.1x10^{-02}$	$6.5x10^{-08}$	$1.3x10^{-02}$	$3.8x10^{-01}$	$3.8x10^{-01}$	$3.8x10^{-01}$	$6.8x10^{-05}$	$3.2x10^{+00}$
Fabricated Metal Product Manufacturing n.e.c.	$2.1x10^{+00}$	$1.2x10^{-05}$	$2.4x10^{+00}$	$1.6x10^{+00}$	$1.6x10^{+00}$	$1.6x10^{+00}$	$1.3x10^{-02}$	$1.4x10^{+01}$
Food Manufacturing n.e.c.	$2.7x10^{+01}$	$1.2x10^{-03}$	$6.8x10^{+01}$	$5.2x10^{+00}$	$3.5x10^{+00}$	$2.8x10^{+00}$	$4.6x10^{+01}$	$3.4x10^{+02}$
Fruit and Vegetable Processing	$1.5x10^{+00}$	$9.0x10^{-06}$	$1.8x10^{+00}$	$1.4x10^{-01}$	$1.4x10^{-01}$	$1.4x10^{-01}$	$9.4x10^{-03}$	$9.9x10^{-02}$
Funeral Directors, Crematoria and Cemeteries	$5.3x10^{+00}$	$7.1x10^{-07}$	$1.2x10^{+01}$	$3.2x10^{-03}$	$9.6x10^{-04}$	$6.4x10^{-04}$	$2.1x10^{+00}$	$1.7x10^{-08}$
Furniture Manufacturing n.e.c.	$2.5x10^{+00}$	$1.5x10^{-05}$	$3.0x10^{+00}$	$2.3x10^{-01}$	$2.3x10^{-01}$	$2.3x10^{-01}$	$1.6x10^{-02}$	$1.7x10^{-01}$
Gas Supply	$3.3x10^{+00}$	$1.9x10^{-05}$	$3.9x10^{+00}$	$2.9x10^{-01}$	$2.9x10^{-01}$	$2.9x10^{-01}$	$2.0x10^{-02}$	$2.7x10^{+01}$
Glass and Glass Product Manufacturing	$5.6x10^{+01}$	$5.1x10^{-02}$	$1.3x10^{+02}$	$2.1x10^{+01}$	$2.1x10^{+01}$	$2.0x10^{+01}$	$4.1x10^{-01}$	$4.1x10^{+01}$
Gravel and Sand Quarrying	0	$1.9x10^{-04}$	0	$5.6x10^{+03}$	$2.6x10^{+03}$	$5.3x10^{+02}$	0	$3.4x10^{-01}$
Hospitals (Except Psychiatric Hospitals)	$3.0x10^{+03}$	$1.8x10^{-02}$	$3.6x10^{+03}$	$2.7x10^{+02}$	$2.7x10^{+02}$	$2.7x10^{+02}$	$1.9x10^{+01}$	$2.0x10^{+02}$
Ice Cream Manufacturing	$2.8x10^{+00}$	$1.6x10^{-05}$	$4.6x10^{+00}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$3.9x10^{-02}$	$1.2x10^{+00}$
Industrial Gas Manufacturing	$3.5x10^{-03}$	0	$2.6x10^{-02}$	$8.2x10^{-04}$	$8.0x10^{-04}$	$7.9x10^{-04}$	$1.3x10^{-07}$	$1.1x10^{+01}$
Ink Manufacturing	0	0	0	0	0	0	0	$4.9x10^{-04}$
Laundries and Dry-Cleaners	$7.1x10^{-01}$	$4.2x10^{-06}$	$8.5x10^{-01}$	$6.4x10^{-02}$	$6.4x10^{-02}$	$6.4x10^{-02}$	$4.4x10^{-03}$	$4.3x10^{+02}$

ANZSIC Class	CO	Pb	NOx	TSP	PM10	PM2.5	SO2	VOCs
Lifting and Material Handling Equipment Manufacturing	0	0	$1.9x10^{-01}$	$3.8x10^{-02}$	$3.8x10^{-02}$	$3.8x10^{-02}$	0	$1.2x10^{+00}$
Medicinal and Pharmaceutical Product Manufacturing	0	0	0	0	0	0	0	$1.8x10^{+00}$
Metal Coating and Finishing	$2.6x10^{+00}$	$1.5x10^{-05}$	$3.1x10^{+00}$	$2.3x10^{-01}$	$2.3x10^{-01}$	$2.3x10^{-01}$	$1.6x10^{-02}$	$1.9x10^{+01}$
Milk and Cream Processing	$2.8x10^{+00}$	$1.6x10^{-05}$	$3.3x10^{+00}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$1.7x10^{-02}$	$1.8x10^{-01}$
Mining and Construction Machinery Manufacturing	0	0	0	$5.4x10^{-04}$	$5.4x10^{-04}$	$5.4x10^{-04}$	0	$2.5x10^{+00}$
Non-Building Construction n.e.c.	$3.1x10^{-02}$	0	$2.2x10^{-01}$	$7.1x10^{-03}$	$6.9x10^{-03}$	$6.8x10^{-03}$	$1.2x10^{-06}$	$5.4x10^{-03}$
Non-Ferrous Metal Casting	0	0	0	0	0	0	0	$5.1x10^{-04}$
Paint Manufacturing	0	0	0	$1.3x10^{+01}$	$1.1x10^{+01}$	$1.1x10^{+01}$	0	$1.8x10^{+01}$
Paper Product Manufacturing n.e.c.	$4.9x10^{+00}$	$2.8x10^{-05}$	$6.6x10^{+00}$	$5.0x10^{-01}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$9.6x10^{-02}$	$1.4x10^{+00}$
Petroleum Product Wholesaling	0	0	0	0	0	0	0	$2.2x10^{+02}$
Plaster Product Manufacturing	$3.5x10^{+02}$	$3.4x10^{-02}$	$9.7x10^{+01}$	$4.6x10^{+01}$	$3.9x10^{+01}$	$2.3x10^{+01}$	$1.2x10^{+01}$	$9.2x10^{+00}$
Plastic Bag and Film Manufacturing	0	0	0	$5.7x10^{-01}$	$5.7x10^{-01}$	$5.1x10^{-01}$	0	$1.5x10^{+01}$
Plastic Injection Moulded Product Manufacturing	$5.4x10^{+00}$	$3.2x10^{-05}$	$6.4x10^{+00}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$3.3x10^{-02}$	$4.6x10^{-01}$
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$3.8x10^{+00}$	$2.2x10^{-05}$	$4.6x10^{+00}$	$3.4x10^{-01}$	$3.4x10^{-01}$	$3.4x10^{-01}$	$2.3x10^{-02}$	$1.4x10^{+01}$
Port Operators	$8.4x10^{+01}$	$1.1x10^{-03}$	$2.7x10^{+02}$	$2.4x10^{+01}$	$2.4x10^{+01}$	$2.4x10^{+01}$	$2.7x10^{+01}$	$3.7x10^{+01}$
Poultry Farming (Eggs)	0	0	0	$3.3x10^{+03}$	$1.6x10^{+03}$	$4.6x10^{+02}$	0	0
Poultry Farming (Meat)	0	0	0	$1.0x10^{+04}$	$4.9x10^{+03}$	$1.4x10^{+03}$	0	0
Prepared Animal and Bird Feed Manufacturing	$3.5x10^{+00}$	$2.2x10^{-05}$	$4.2x10^{+00}$	$3.2x10^{-01}$	$3.2x10^{-01}$	$3.2x10^{-01}$	$2.7x10^{-02}$	$2.3x10^{-01}$
Printing	$8.1x10^{+00}$	$5.8x10^{-05}$	$1.3x10^{+01}$	$8.8x10^{-01}$	$8.8x10^{-01}$	$8.8x10^{-01}$	$6.0x10^{-02}$	$1.8x10^{+03}$
Rail Transport	0	0	0	0	0	0	0	$3.7x10^{-02}$
Road and Bridge Construction	0	$4.4x10^{-08}$	0	$5.1x10^{-01}$	$2.5x10^{-01}$	$5.1x10^{-02}$	0	$4.1x10^{-02}$
Rubber Product Manufacturing n.e.c.	0	$1.6x10^{-07}$	0	$3.0x10^{-03}$	$9.1x10^{-03}$	0	0	$1.1x10^{-02}$
Smash Repairing	0	0	0	0	0	0	0	$8.5x10^{+03}$
Soap and Other Detergent Manufacturing	0	0	0	0	0	0	0	$7.5x10^{-05}$
Soft Drink, Cordial and Syrup Manufacturing	$7.2x10^{+00}$	$4.4x10^{-05}$	$8.7x10^{+00}$	$6.6x10^{-01}$	$6.6x10^{-01}$	$6.6x10^{-01}$	$4.6x10^{-02}$	$4.8x10^{-01}$
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	$4.1x10^{+01}$
Spirit Manufacturing	0	0	0	0	0	0	0	$1.8x10^{+02}$
Spring and Wire Product Manufacturing	$1.4x10^{-02}$	$7.2x10^{-08}$	$2.6x10^{-02}$	$1.5x10^{-03}$	$1.5x10^{-03}$	$1.5x10^{-03}$	$7.6x10^{-05}$	$1.6x10^{-03}$
Steel Pipe and Tube Manufacturing	0	0	$1.2x10^{+00}$	$1.2x10^{+01}$	$1.1x10^{+01}$	$1.1x10^{+01}$	0	$3.3x10^{-03}$
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	0	0	0	$5.3x10^{+00}$
Structural Steel Fabricating	0	0	0	$1.2x10^{-02}$	$1.2x10^{-02}$	$1.2x10^{-02}$	0	0
Synthetic Resin Manufacturing	$4.0x10^{-03}$	$2.4x10^{-08}$	$4.7x10^{-03}$	$3.6x10^{-04}$	$3.6x10^{-04}$	$3.6x10^{-04}$	$2.5x10^{-05}$	$2.6x10^{-04}$

ANZSIC Class	CO	Pb	NOx	TSP	PM10	PM2.5	SO2	VOCs
Unaccounted Fuel Combustion	$1.2x10^{+03}$	$1.4x10^{-02}$	$2.7x10^{+03}$	$2.2x10^{+02}$	$2.2x10^{+02}$	$2.2x10^{+02}$	$1.7x10^{+01}$	$1.6x10^{+02}$
Wine Manufacturing	$6.5x10^{-04}$	0	$4.7x10^{-03}$	$1.5x10^{-04}$	$1.5x10^{-04}$	$1.4x10^{-04}$	$2.4x10^{-08}$	$1.4x10^{+02}$
Wood Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	0	0	0	0
Grand Total	**4,820**	**0.13**	**7,000**	**19,800**	**9,940**	**3,060**	**187**	**22,700**

Table 4.13: Average Daily Commercial Emissions (January Weekend Day/Summer Weekend day) (kg/day)

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Aircraft Manufacturing	0	0	$3.8x10^{-02}$	$7.5x10^{-02}$	0	0	$5.2x10^{-05}$	$1.9x10^{-02}$	0
Automotive Component Manufacturing n.e.c.	0	$1.9x10^{-05}$	$9.5x10^{-04}$	$1.9x10^{-03}$	$9.0x10^{-01}$	$1.3x10^{-03}$	$1.2x10^{-06}$	$3.8x10^{+00}$	$1.5x10^{-04}$
Automotive Fuel Retailing	0	0	$7.4x10^{+01}$	0	$8.3x10^{+01}$	0	0	$1.9x10^{+02}$	0
Basic Iron and Steel Manufacturing	0	0	$8.3x10^{-02}$	$1.7x10^{-01}$	$1.7x10^{+01}$	0	$1.1x10^{-04}$	$2.0x10^{+01}$	0
Basic Non-Ferrous Metal Manufacturing n.e.c.	0	0	$1.4x10^{-03}$	$2.8x10^{-03}$	0	0	$1.9x10^{-06}$	$7.0x10^{-04}$	0
Biscuit Manufacturing	0	0	$1.3x10^{-01}$	$1.9x10^{-02}$	0	0	$1.7x10^{-04}$	$6.3x10^{-02}$	0
Bread Manufacturing	0	$8.5x10^{-07}$	$1.2x10^{-01}$	$2.3x10^{-01}$	$1.3x10^{-03}$	$5.6x10^{-05}$	$1.6x10^{-04}$	$6.2x10^{-02}$	$6.9x10^{-06}$
Cake and Pastry Manufacturing	0	$5.2x10^{-04}$	$2.3x10^{-02}$	$4.6x10^{-02}$	$2.3x10^{-02}$	$3.4x10^{-02}$	$2.9x10^{-05}$	$3.0x10^{-02}$	$4.2x10^{-03}$
Ceramic Product Manufacturing	0	0	$1.4x10^{-01}$	$2.8x10^{-01}$	0	0	0	$7.1x10^{-02}$	0
Ceramic Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0	0
Chemical Product Manufacturing n.e.c.	0	$2.5x10^{-03}$	$3.2x10^{+01}$	$6.4x10^{+01}$	$1.1x10^{-03}$	0	$3.2x10^{-05}$	$1.6x10^{+01}$	0
Chemical Wholesaling	0	0	0	0	$1.2x10^{-01}$	0	0	$2.0x10^{-01}$	0
Concrete Slurry Manufacturing	0	0	0	0	0	0	0	0	0
Confectionery Manufacturing	0	$2.5x10^{-05}$	$3.0x10^{-03}$	$5.9x10^{-03}$	$1.2x10^{-03}$	$1.7x10^{-03}$	$4.0x10^{-06}$	$2.4x10^{-03}$	$2.0x10^{-04}$
Construction Material Mining n.e.c.	0	0	0	0	$1.7x10^{-03}$	0	0	$5.4x10^{-04}$	0
Corrugated Paperboard Container Manufacturing	0	0	$3.1x10^{-02}$	$6.2x10^{-02}$	0	0	$4.3x10^{-05}$	$1.5x10^{-02}$	0
Electric Cable and Wire Manufacturing	0	0	0	0	$3.3x10^{+01}$	0	0	$2.3x10^{+01}$	0
Electrical and Equipment Manufacturing n.e.c.	0	0	$6.5x10^{-05}$	$1.3x10^{-04}$	$7.5x10^{-02}$	0	$8.9x10^{-08}$	$4.1x10^{-01}$	0
Fabricated Metal Product Manufacturing n.e.c.	0	0	$1.2x10^{-02}$	$2.5x10^{-02}$	$6.5x10^{-01}$	0	$1.7x10^{-05}$	$3.8x10^{+00}$	$2.3x10^{-02}$
Food Manufacturing n.e.c.	0	$8.9x10^{-01}$	$2.8x10^{+00}$	$5.1x10^{+00}$	$4.0x10^{+01}$	$5.9x10^{+01}$	$2.5x10^{-04}$	$3.3x10^{+01}$	$7.2x10^{+00}$
Fruit and Vegetable Processing	0	0	$9.0x10^{-03}$	$1.8x10^{-02}$	0	0	$1.2x10^{-05}$	$4.5x10^{-03}$	0
Funeral Directors, Crematoria and Cemeteries	0	0	0	0	0	0	0	0	0
Furniture Manufacturing n.e.c.	0	0	$1.5x10^{-02}$	$3.0x10^{-02}$	$1.7x10^{-04}$	0	$2.0x10^{-05}$	$7.5x10^{-03}$	0
Gas Supply	0	0	$1.9x10^{-02}$	$3.9x10^{-02}$	0	0	$2.7x10^{-05}$	$9.7x10^{-03}$	0
Glass and Glass Product Manufacturing	0	0	$1.4x10^{+00}$	$8.6x10^{-01}$	0	0	0	$3.9x10^{-01}$	0
Gravel and Sand Quarrying	0	0	0	0	$3.1x10^{-02}$	0	0	$9.5x10^{-03}$	0
Hospitals (Except Psychiatric Hospitals)	$2.7x10^{-02}$	0	$1.8x10^{+01}$	$3.6x10^{+01}$	0	0	$2.5x10^{-02}$	$8.9x10^{+00}$	0
Ice Cream Manufacturing	0	$2.6x10^{-03}$	$2.4x10^{-02}$	$4.7x10^{-02}$	$1.2x10^{-01}$	$1.7x10^{-01}$	$2.3x10^{-05}$	$1.1x10^{-01}$	$2.1x10^{-02}$
Industrial Gas Manufacturing	0	0	0	0	$1.2x10^{+00}$	0	0	$3.8x10^{+00}$	0
Ink Manufacturing	0	0	0	0	$4.4x10^{-05}$	0	0	$1.4x10^{-05}$	0
Laundries and Dry-Cleaners	0	0	$4.2x10^{-03}$	$8.5x10^{-03}$	$9.1x10^{-01}$	$4.1x10^{+02}$	$5.8x10^{-06}$	$1.2x10^{-01}$	0

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Lifting and Material Handling Equipment Manufacturing	0	0	$1.4x10^{-03}$	0	$1.5x10^{-01}$	0	0	$3.3x10^{-01}$	0
Medicinal and Pharmaceutical Product Manufacturing	0	0	0	0	$4.8x10^{-05}$	0	0	$1.5x10^{-05}$	0
Metal Coating and Finishing	0	$4.8x10^{-02}$	$1.6x10^{-01}$	$3.0x10^{-01}$	$2.2x10^{+00}$	$3.2x10^{+00}$	$2.1x10^{-05}$	$1.9x10^{+00}$	$3.9x10^{-01}$
Milk and Cream Processing	0	0	$1.6x10^{-02}$	$3.3x10^{-02}$	0	0	$2.3x10^{-05}$	$8.2x10^{-03}$	0
Mining and Construction Machinery Manufacturing	0	0	$2.2x10^{-03}$	0	$3.9x10^{-01}$	0	0	$5.7x10^{-01}$	0
Non-Building Construction n.e.c.	0	0	0	0	0	0	0	0	0
Non-Ferrous Metal Casting	0	0	0	0	$4.6x10^{-05}$	0	0	$1.4x10^{-05}$	0
Paint Manufacturing	0	0	0	0	0	0	0	0	0
Paper Product Manufacturing n.e.c.	$5.9x10^{-03}$	0	$3.4x10^{-02}$	$5.6x10^{-02}$	$1.0x10^{-01}$	0	$7.7x10^{-05}$	$3.8x10^{-01}$	0
Petroleum Product Wholesaling	0	0	$1.6x10^{+00}$	0	$1.1x10^{+00}$	0	0	$3.9x10^{+00}$	0
Plaster Product Manufacturing	0	0	$6.1x10^{-01}$	$3.1x10^{+00}$	0	0	$2.7x10^{-02}$	$3.1x10^{-01}$	0
Plastic Bag and Film Manufacturing	0	$3.5x10^{-04}$	$1.0x10^{-03}$	$1.9x10^{-03}$	$2.0x10^{-02}$	$2.3x10^{-02}$	0	$1.0x10^{+00}$	$2.8x10^{-03}$
Plastic Injection Moulded Product Manufacturing	0	0	$3.2x10^{-02}$	$6.4x10^{-02}$	$1.4x10^{-03}$	0	$4.4x10^{-05}$	$3.8x10^{-02}$	0
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$9.9x10^{-01}$	0	$2.0x10^{-01}$	$4.5x10^{-02}$	$1.3x10^{-01}$	0	$3.1x10^{-05}$	$7.8x10^{-01}$	0
Port Operators	0	0	$3.4x10^{+00}$	$6.7x10^{+00}$	0	0	$1.0x10^{-03}$	$1.7x10^{+00}$	0
Poultry Farming (Eggs)	0	0	0	0	0	0	0	0	0
Poultry Farming (Meat)	0	0	0	0	0	0	0	0	0
Prepared Animal and Bird Feed Manufacturing	0	0	$2.1x10^{-02}$	$4.2x10^{-02}$	0	0	$2.9x10^{-05}$	$1.0x10^{-02}$	0
Printing	0	0	$5.8x10^{-02}$	$8.5x10^{+00}$	0	0	$8.0x10^{-05}$	$2.9x10^{-02}$	0
Rail Transport	0	0	0	0	$6.7x10^{-03}$	0	$5.4x10^{-05}$	$5.2x10^{-03}$	0
Road and Bridge Construction	0	0	$3.3x10^{-04}$	0	$2.5x10^{-04}$	0	0	$8.1x10^{-04}$	0
Rubber Product Manufacturing n.e.c.	$9.4x10^{-09}$	0	0	0	$1.7x10^{-03}$	0	0	$1.5x10^{-03}$	0
Smash Repairing	0	0	0	0	$5.3x10^{+02}$	0	0	$2.2x10^{+03}$	0
Soap and Other Detergent Manufacturing	0	$1.9x10^{-07}$	$5.9x10^{-07}$	$1.1x10^{-06}$	$8.9x10^{-06}$	$1.3x10^{-05}$	0	$7.3x10^{-06}$	$1.6x10^{-06}$
Soft Drink, Cordial and Syrup Manufacturing	0	0	$4.4x10^{-02}$	$8.7x10^{-02}$	0	0	$6.0x10^{-05}$	$2.2x10^{-02}$	0
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	$1.4x10^{+00}$	0
Spirit Manufacturing	0	0	0	0	0	0	0	0	0
Spring and Wire Product Manufacturing	0	$1.5x10^{-06}$	$7.7x10^{-05}$	$1.5x10^{-04}$	$6.7x10^{-05}$	$9.7x10^{-05}$	$9.9x10^{-08}$	$9.1x10^{-05}$	$1.2x10^{-05}$
Steel Pipe and Tube Manufacturing	0	$8.6x10^{-06}$	$2.6x10^{-05}$	$4.8x10^{-05}$	$3.9x10^{-04}$	$5.7x10^{-04}$	0	$3.2x10^{-04}$	$7.0x10^{-05}$
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	$3.2x10^{-01}$	0	0	$1.5x10^{+00}$	0
Structural Steel Fabricating	0	0	0	0	0	0	0	0	0
Synthetic Resin Manufacturing	0	0	$2.4x10^{-05}$	$4.7x10^{-05}$	0	0	$3.3x10^{-08}$	$1.2x10^{-05}$	0

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Unaccounted Fuel Combustion	0	0	$1.4x10^{+01}$	$2.9x10^{+01}$	0	0	$1.9x10^{-02}$	$7.2x10^{+00}$	0
Wine Manufacturing	0	$1.5x10^{-03}$	$5.0x10^{-03}$	$8.2x10^{-03}$	$6.8x10^{-02}$	$9.7x10^{-02}$	0	$5.7x10^{-02}$	$1.2x10^{-02}$
Wood Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0	0
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	0	0	0	0	0
Grand Total	**1.03**	**0.94**	**149**	**154**	**711**	**473**	**0.073**	**2,510**	**7.61**

Table 4.14: Average Daily Commercial Emissions (July Week Day / Winter Week day) (kg / day)

ANZSIC Class	CO	Pb	NOx	PM10	PM2.5	SO2	TSP	VOCs
Aircraft Manufacturing	$6.3x10^{+00}$	$3.8x10^{-05}$	$7.5x10^{+00}$	$5.7x10^{-01}$	$5.7x10^{-01}$	$3.9x10^{-02}$	$5.7x10^{-01}$	$4.1x10^{-01}$
Automotive Component Manufacturing n.e.c.	$7.2x10^{-01}$	$4.3x10^{-06}$	$8.6x10^{-01}$	$7.5x10^{-02}$	$7.5x10^{-02}$	$4.5x10^{-03}$	$7.5x10^{-02}$	$4.7x10^{+01}$
Automotive Fuel Retailing	0	0	0	0	0	0	0	$1.7x10^{+04}$
Basic Iron and Steel Manufacturing	$1.4x10^{+01}$	$1.6x10^{-02}$	$2.4x10^{+01}$	$2.5x10^{+01}$	$2.2x10^{+01}$	$8.7x10^{-02}$	$3.6x10^{+01}$	$1.3x10^{+02}$
Basic Non-Ferrous Metal Manufacturing n.e.c.	$2.4x10^{-01}$	$9.9x10^{-03}$	$2.8x10^{-01}$	$2.7x10^{+01}$	$2.0x10^{+01}$	$3.5x10^{-01}$	$4.2x10^{+01}$	$1.5x10^{-02}$
Biscuit Manufacturing	$2.1x10^{+01}$	$1.3x10^{-04}$	$2.5x10^{+01}$	$1.9x10^{+00}$	$1.9x10^{+00}$	$1.3x10^{-01}$	$1.9x10^{+00}$	$1.4x10^{+00}$
Bread Manufacturing	$1.6x10^{+01}$	$1.2x10^{-04}$	$1.2x10^{+01}$	$2.2x10^{+00}$	$2.2x10^{+00}$	$1.2x10^{-01}$	$2.2x10^{+00}$	$2.6x10^{+02}$
Cake and Pastry Manufacturing	$3.6x10^{+00}$	$2.1x10^{-05}$	$4.3x10^{+00}$	$3.3x10^{-01}$	$3.3x10^{-01}$	$2.2x10^{-02}$	$3.3x10^{-01}$	$3.7x10^{+01}$
Ceramic Product Manufacturing	$3.1x10^{+01}$	$7.8x10^{-05}$	$9.4x10^{+00}$	$2.0x10^{+01}$	$1.8x10^{+01}$	$1.2x10^{+00}$	$3.4x10^{+01}$	$1.6x10^{+00}$
Ceramic Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0
Chemical Product Manufacturing n.e.c.	$3.9x10^{+00}$	$2.3x10^{-05}$	$4.7x10^{+00}$	$3.8x10^{-01}$	$3.8x10^{-01}$	$6.1x10^{+01}$	$3.8x10^{-01}$	$4.0x10^{+02}$
Chemical Wholesaling	0	0	0	0	0	0	0	$2.5x10^{+00}$
Concrete Slurry Manufacturing	0	$1.2x10^{-04}$	0	$6.0x10^{+01}$	$9.1x10^{+00}$	0	$1.5x10^{+02}$	0
Confectionery Manufacturing	$5.0x10^{-01}$	$3.0x10^{-06}$	$6.0x10^{-01}$	$4.5x10^{-02}$	$4.5x10^{-02}$	$3.1x10^{-03}$	$4.5x10^{-02}$	$4.2x10^{-02}$
Construction Material Mining n.e.c.	0	$4.5x10^{-04}$	0	$1.5x10^{+02}$	$3.1x10^{+01}$	0	$3.2x10^{+02}$	$1.4x10^{-02}$
Corrugated Paperboard Container Manufacturing	$5.2x10^{+00}$	$3.1x10^{-05}$	$6.2x10^{+00}$	$4.7x10^{-01}$	$4.7x10^{-01}$	$3.2x10^{-02}$	$4.7x10^{-01}$	$3.4x10^{-01}$
Electric Cable and Wire Manufacturing	0	0	0	$2.7x10^{+00}$	$2.0x10^{+00}$	0	$4.3x10^{+00}$	$2.7x10^{+02}$
Electrical and Equipment Manufacturing n.e.c.	$1.3x10^{-01}$	$7.7x10^{-07}$	$1.7x10^{+00}$	$1.0x10^{+00}$	$1.0x10^{+00}$	$8.1x10^{-04}$	$1.0x10^{+00}$	$1.1x10^{+01}$
Fabricated Metal Product Manufacturing n.e.c.	$2.5x10^{+00}$	$1.4x10^{-05}$	$7.2x10^{+00}$	$4.7x10^{+00}$	$4.7x10^{+00}$	$1.5x10^{-02}$	$4.7x10^{+00}$	$1.7x10^{+02}$
Food Manufacturing n.e.c.	$2.9x10^{+01}$	$9.8x10^{-04}$	$6.3x10^{+01}$	$3.5x10^{+00}$	$2.9x10^{+00}$	$3.6x10^{+01}$	$4.8x10^{+00}$	$3.4x10^{+02}$
Fruit and Vegetable Processing	$1.5x10^{+00}$	$9.0x10^{-06}$	$1.8x10^{+00}$	$1.4x10^{-01}$	$1.4x10^{-01}$	$9.4x10^{-03}$	$1.4x10^{-01}$	$9.9x10^{-02}$
Funeral Directors, Crematoria and Cemeteries	$1.1x10^{+01}$	$1.4x10^{-06}$	$2.3x10^{+01}$	$1.9x10^{-03}$	$1.3x10^{-03}$	$4.1x10^{+00}$	$6.4x10^{-03}$	$3.4x10^{-08}$
Furniture Manufacturing n.e.c.	$5.0x10^{+00}$	$3.0x10^{-05}$	$6.0x10^{+00}$	$4.5x10^{-01}$	$4.5x10^{-01}$	$3.1x10^{-02}$	$4.5x10^{-01}$	$5.1x10^{+01}$
Gas Supply	$3.3x10^{+00}$	$1.9x10^{-05}$	$3.9x10^{+00}$	$2.9x10^{-01}$	$2.9x10^{-01}$	$2.0x10^{-02}$	$2.9x10^{-01}$	$2.7x10^{+01}$
Glass and Glass Product Manufacturing	$5.6x10^{+01}$	$5.1x10^{-02}$	$1.3x10^{+02}$	$2.1x10^{+01}$	$2.0x10^{+01}$	$4.1x10^{-01}$	$2.1x10^{+01}$	$4.1x10^{+01}$
Gravel and Sand Quarrying	0	$1.1x10^{-02}$	0	$3.7x10^{+03}$	$9.0x10^{+02}$	0	$1.5x10^{+04}$	$2.6x10^{-01}$
Hospitals (Except Psychiatric Hospitals)	$3.0x10^{+03}$	$1.8x10^{-02}$	$3.6x10^{+03}$	$2.7x10^{+02}$	$2.7x10^{+02}$	$1.9x10^{+01}$	$2.7x10^{+02}$	$2.0x10^{+02}$
Ice Cream Manufacturing	$2.8x10^{+00}$	$1.6x10^{-05}$	$4.6x10^{+00}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$3.9x10^{-02}$	$2.5x10^{-01}$	$1.2x10^{+00}$
Industrial Gas Manufacturing	$3.5x10^{-03}$	0	$2.6x10^{-02}$	$8.0x10^{-04}$	$7.9x10^{-04}$	$1.3x10^{-07}$	$8.2x10^{-04}$	$1.1x10^{+01}$
Ink Manufacturing	0	0	0	$2.3x10^{+00}$	$2.3x10^{+00}$	0	$2.5x10^{+00}$	$4.0x10^{+01}$
Laundries and Dry-Cleaners	$1.4x10^{+00}$	$8.5x10^{-06}$	$1.7x10^{+00}$	$1.3x10^{-01}$	$1.3x10^{-01}$	$8.8x10^{-03}$	$1.3x10^{-01}$	$8.7x10^{+02}$

ANZSIC Class	CO	Pb	NOx	PM10	PM2.5	SO2	TSP	VOCs
Lifting and Material Handling Equipment Manufacturing	0	0	$3.9x10^{-01}$	$7.7x10^{-02}$	$7.7x10^{-02}$	0	$7.7x10^{-02}$	$2.3x10^{+00}$
Medicinal and Pharmaceutical Product Manufacturing	$1.1x10^{+01}$	$6.7x10^{-05}$	$1.8x10^{+01}$	$1.0x10^{+00}$	$1.0x10^{+00}$	$7.0x10^{-02}$	$1.0x10^{+00}$	$7.0x10^{+00}$
Metal Coating and Finishing	$1.3x10^{+01}$	$7.8x10^{-05}$	$1.3x10^{+02}$	$1.3x10^{+01}$	$1.2x10^{+01}$	$8.1x10^{-02}$	$1.3x10^{+01}$	$2.1x10^{+01}$
Milk and Cream Processing	$2.8x10^{+00}$	$1.6x10^{-05}$	$3.3x10^{+00}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$1.7x10^{-02}$	$2.5x10^{-01}$	$1.8x10^{-01}$
Mining and Construction Machinery Manufacturing	0	0	0	$5.4x10^{-04}$	$5.4x10^{-04}$	0	$5.4x10^{-04}$	$3.8x10^{+00}$
Non-Building Construction n.e.c.	$5.2x10^{-02}$	0	$3.8x10^{-01}$	$1.2x10^{-02}$	$1.2x10^{-02}$	$2.0x10^{-06}$	$1.2x10^{-02}$	$9.2x10^{-03}$
Non-Ferrous Metal Casting	$2.7x10^{-02}$	$6.8x10^{-06}$	$1.1x10^{-01}$	$9.2x10^{-01}$	$6.9x10^{-01}$	$8.2x10^{-02}$	$1.4x10^{+00}$	$2.2x10^{-03}$
Paint Manufacturing	0	$5.2x10^{-01}$	0	$7.7x10^{+01}$	$7.6x10^{+01}$	0	$8.6x10^{+01}$	$4.6x10^{+02}$
Paper Product Manufacturing n.e.c.	$4.9x10^{+00}$	$2.8x10^{-05}$	$6.6x10^{+00}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$9.6x10^{-02}$	$5.0x10^{-01}$	$1.4x10^{+00}$
Petroleum Product Wholesaling	0	0	0	0	0	0	0	$2.1x10^{+02}$
Plaster Product Manufacturing	$3.5x10^{+02}$	$3.4x10^{-02}$	$9.7x10^{+01}$	$3.9x10^{+01}$	$2.3x10^{+01}$	$1.2x10^{+01}$	$4.6x10^{+01}$	$9.2x10^{+00}$
Plastic Bag and Film Manufacturing	0	0	0	$3.2x10^{+00}$	$2.9x10^{+00}$	0	$3.2x10^{+00}$	$6.1x10^{+01}$
Plastic Injection Moulded Product Manufacturing	$5.4x10^{+00}$	$3.3x10^{-05}$	$6.4x10^{+00}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$1.5x10^{-01}$	$4.9x10^{-01}$	$4.6x10^{-01}$
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$3.8x10^{+00}$	$2.2x10^{-05}$	$4.6x10^{+00}$	$3.4x10^{-01}$	$3.4x10^{-01}$	$2.3x10^{-02}$	$3.4x10^{-01}$	$1.0x10^{+02}$
Port Operators	$8.4x10^{+01}$	$1.1x10^{-03}$	$2.7x10^{+02}$	$2.4x10^{+01}$	$2.4x10^{+01}$	$2.7x10^{+01}$	$2.4x10^{+01}$	$3.7x10^{+01}$
Poultry Farming (Eggs)	0	0	0	$1.6x10^{+03}$	$4.6x10^{+02}$	0	$3.3x10^{+03}$	0
Poultry Farming (Meat)	0	0	0	$4.9x10^{+03}$	$1.4x10^{+03}$	0	$1.0x10^{+04}$	0
Prepared Animal and Bird Feed Manufacturing	$3.5x10^{+00}$	$2.2x10^{-05}$	$4.2x10^{+00}$	$3.2x10^{-01}$	$3.2x10^{-01}$	$2.7x10^{-02}$	$3.2x10^{-01}$	$2.3x10^{-01}$
Printing	$8.1x10^{+00}$	$5.8x10^{-05}$	$1.3x10^{+01}$	$8.8x10^{-01}$	$8.8x10^{-01}$	$6.0x10^{-02}$	$8.8x10^{-01}$	$4.1x10^{+03}$
Rail Transport	0	0	0	0	0	0	0	$3.7x10^{-02}$
Road and Bridge Construction	0	$4.7x10^{-08}$	0	$2.5x10^{-01}$	$5.1x10^{-02}$	0	$5.1x10^{-01}$	$3.9x10^{-02}$
Rubber Product Manufacturing n.e.c.	$2.7x10^{-02}$	$7.1x10^{-06}$	$1.1x10^{-01}$	$2.4x10^{-02}$	$5.8x10^{-03}$	$3.8x10^{-02}$	$1.2x10^{-02}$	$2.2x10^{-02}$
Smash Repairing	0	0	0	0	0	0	0	$1.7x10^{+04}$
Soap and Other Detergent Manufacturing	0	0	0	0	0	0	0	$1.2x10^{-01}$
Soft Drink, Cordial and Syrup Manufacturing	$7.2x10^{+00}$	$4.4x10^{-05}$	$8.7x10^{+00}$	$6.6x10^{-01}$	$6.6x10^{-01}$	$4.6x10^{-02}$	$6.6x10^{-01}$	$4.8x10^{-01}$
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	$4.1x10^{+01}$
Spirit Manufacturing	0	0	0	0	0	0	0	$1.8x10^{+02}$
Spring and Wire Product Manufacturing	$1.4x10^{-02}$	$7.2x10^{-08}$	$2.9x10^{+00}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$7.6x10^{-05}$	$4.9x10^{-01}$	$1.4x10^{+00}$
Steel Pipe and Tube Manufacturing	0	0	$2.3x10^{+00}$	$1.3x10^{+01}$	$1.3x10^{+01}$	0	$1.4x10^{+01}$	$3.3x10^{-03}$
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	0	0	0	$5.3x10^{+00}$
Structural Steel Fabricating	0	0	0	$3.7x10^{-02}$	$3.7x10^{-02}$	0	$3.7x10^{-02}$	0
Synthetic Resin Manufacturing	$4.0x10^{-03}$	$2.4x10^{-08}$	$4.7x10^{-03}$	$3.6x10^{-04}$	$3.6x10^{-04}$	$2.5x10^{-05}$	$3.6x10^{-04}$	$2.6x10^{-04}$

ANZSIC Class	CO	Pb	NOx	PM10	PM2.5	SO2	TSP	VOCs
Unaccounted Fuel Combustion	$1.2x10^{+03}$	$1.4x10^{-02}$	$2.7x10^{+03}$	$2.2x10^{+02}$	$2.2x10^{+02}$	$1.7x10^{+01}$	$2.2x10^{+02}$	$1.6x10^{+02}$
Wine Manufacturing	$6.5x10^{-04}$	0	$4.7x10^{-03}$	$1.5x10^{-04}$	$1.4x10^{-04}$	$2.4x10^{-08}$	$1.5x10^{-04}$	$1.4x10^{+02}$
Wood Product Manufacturing n.e.c.	$2.0x10^{-03}$	$1.2x10^{-08}$	$2.4x10^{-03}$	$1.8x10^{-04}$	$1.8x10^{-04}$	$1.3x10^{-05}$	$1.8x10^{-04}$	$2.4x10^{+01}$
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	0	0	0	$7.3x10^{+00}$
Grand Total	**4,850**	**0.68**	**7,180**	**11,200**	**3,550**	**180**	**29,800**	**42,400**

Table 4.15: Average Daily Commercial Emissions (July Week Day/Winter Week day) (kg/day)

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Aircraft Manufacturing	0	0	$3.8x10^{-02}$	$7.5x10^{-02}$	0	0	$5.2x10^{-05}$	$1.9x10^{-02}$	0
Automotive Component Manufacturing n.e.c.	0	$1.9x10^{-05}$	$4.4x10^{-03}$	$8.7x10^{-03}$	$2.9x10^{+00}$	$1.3x10^{-03}$	$5.9x10^{-06}$	$1.1x10^{+01}$	$1.5x10^{-04}$
Automotive Fuel Retailing	0	0	$1.3x10^{+02}$	0	$1.2x10^{+02}$	0	0	$3.3x10^{+02}$	0
Basic Iron and Steel Manufacturing	0	0	$8.3x10^{-02}$	$1.7x10^{-01}$	$1.7x10^{+01}$	0	$1.1x10^{-04}$	$2.0x10^{+01}$	0
Basic Non-Ferrous Metal Manufacturing n.e.c.	0	0	$1.4x10^{-03}$	$2.8x10^{-03}$	0	0	$1.9x10^{-06}$	$7.0x10^{-04}$	0
Biscuit Manufacturing	0	0	$1.3x10^{-01}$	$1.9x10^{-02}$	0	0	$1.7x10^{-04}$	$6.3x10^{-02}$	0
Bread Manufacturing	0	$8.5x10^{-07}$	$1.2x10^{-01}$	$2.3x10^{-01}$	$1.3x10^{-03}$	$5.6x10^{-05}$	$1.6x10^{-04}$	$6.2x10^{-02}$	$6.9x10^{-06}$
Cake and Pastry Manufacturing	0	$5.2x10^{-04}$	$2.3x10^{-02}$	$4.6x10^{-02}$	$2.3x10^{-02}$	$3.4x10^{-02}$	$2.9x10^{-05}$	$3.0x10^{-02}$	$4.2x10^{-03}$
Ceramic Product Manufacturing	0	0	$1.4x10^{-01}$	$2.8x10^{-01}$	0	0	0	$7.1x10^{-02}$	0
Ceramic Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0	0
Chemical Product Manufacturing n.e.c.	0	$2.5x10^{-03}$	$3.2x10^{+01}$	$6.4x10^{+01}$	$5.9x10^{-01}$	0	$3.2x10^{-05}$	$1.7x10^{+01}$	0
Chemical Wholesaling	0	0	0	0	$2.4x10^{-01}$	0	0	$3.9x10^{-01}$	0
Concrete Slurry Manufacturing	0	0	0	0	0	0	0	0	0
Confectionery Manufacturing	0	$2.5x10^{-05}$	$3.1x10^{-03}$	$6.1x10^{-03}$	$1.2x10^{-03}$	$1.7x10^{-03}$	$4.1x10^{-06}$	$2.4x10^{-03}$	$2.0x10^{-04}$
Construction Material Mining n.e.c.	0	0	0	0	$1.3x10^{-03}$	0	0	$4.0x10^{-04}$	0
Corrugated Paperboard Container Manufacturing	0	0	$3.1x10^{-02}$	$6.2x10^{-02}$	0	0	$4.3x10^{-05}$	$1.5x10^{-02}$	0
Electric Cable and Wire Manufacturing	0	0	0	0	$6.6x10^{+01}$	0	0	$4.6x10^{+01}$	0
Electrical and Equipment Manufacturing n.e.c.	0	0	$7.7x10^{-04}$	$1.5x10^{-03}$	$7.0x10^{-01}$	0	$1.1x10^{-06}$	$1.5x10^{+00}$	0
Fabricated Metal Product Manufacturing n.e.c.	0	$4.2x10^{-05}$	$1.4x10^{-02}$	$2.9x10^{-02}$	$1.5x10^{+01}$	0	$2.7x10^{-05}$	$5.8x10^{+01}$	$2.3x10^{-02}$
Food Manufacturing n.e.c.	0	$8.9x10^{-01}$	$2.8x10^{+00}$	$5.1x10^{+00}$	$4.0x10^{+01}$	$5.9x10^{+01}$	$2.6x10^{-04}$	$3.3x10^{+01}$	$7.2x10^{+00}$
Fruit and Vegetable Processing	0	0	$9.0x10^{-03}$	$1.8x10^{-02}$	0	0	$1.2x10^{-05}$	$4.5x10^{-03}$	0
Funeral Directors, Crematoria and Cemeteries	0	0	0	0	0	0	0	0	0
Furniture Manufacturing n.e.c.	0	0	$3.0x10^{-02}$	$6.0x10^{-02}$	$4.1x10^{+00}$	0	$4.1x10^{-05}$	$1.6x10^{+01}$	0
Gas Supply	0	0	$1.9x10^{-02}$	$3.9x10^{-02}$	0	0	$2.7x10^{-05}$	$9.7x10^{-03}$	0
Glass and Glass Product Manufacturing	0	0	$1.4x10^{+00}$	$8.6x10^{-01}$	0	0	0	$3.9x10^{-01}$	0
Gravel and Sand Quarrying	0	0	0	0	$2.3x10^{-02}$	0	0	$7.1x10^{-03}$	0
Hospitals (Except Psychiatric Hospitals)	$2.7x10^{-02}$	0	$1.8x10^{+01}$	$3.6x10^{+01}$	0	0	$2.5x10^{-02}$	$8.9x10^{+00}$	0
Ice Cream Manufacturing	0	$2.6x10^{-03}$	$2.4x10^{-02}$	$4.7x10^{-02}$	$1.2x10^{-01}$	$1.7x10^{-01}$	$2.3x10^{-05}$	$1.1x10^{-01}$	$2.1x10^{-02}$
Industrial Gas Manufacturing	0	0	0	0	$1.2x10^{+00}$	0	0	$3.8x10^{+00}$	0
Ink Manufacturing	0	0	0	0	$3.3x10^{-05}$	0	0	$4.7x10^{+00}$	0
Laundries and Dry-Cleaners	0	0	$8.5x10^{-03}$	$1.7x10^{-02}$	$1.8x10^{+00}$	$8.2x10^{+02}$	$1.2x10^{-05}$	$2.4x10^{-01}$	0

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Lifting and Material Handling Equipment Manufacturing	0	0	$1.3x10^{-03}$	0	$3.0x10^{-01}$	0	0	$6.6x10^{-01}$	0
Medicinal and Pharmaceutical Product Manufacturing	0	0	$6.7x10^{-02}$	$1.3x10^{-01}$	$3.6x10^{-05}$	0	$9.2x10^{-05}$	$3.4x10^{-02}$	0
Metal Coating and Finishing	0	$4.8x10^{-02}$	$2.2x10^{-01}$	$4.2x10^{-01}$	$2.5x10^{+00}$	$3.2x10^{+00}$	$1.1x10^{-04}$	$2.3x10^{+00}$	$3.9x10^{-01}$
Milk and Cream Processing	0	0	$1.6x10^{-02}$	$3.3x10^{-02}$	0	0	$2.3x10^{-05}$	$8.2x10^{-03}$	0
Mining and Construction Machinery Manufacturing	0	0	$2.1x10^{-03}$	0	$7.0x10^{-01}$	0	0	$7.9x10^{-01}$	0
Non-Building Construction n.e.c.	0	0	0	0	0	0	0	0	0
Non-Ferrous Metal Casting	0	0	0	$8.8x10^{-04}$	$3.5x10^{-05}$	0	0	$1.1x10^{-05}$	0
Paint Manufacturing	0	0	0	0	$1.7x10^{+01}$	0	0	$1.3x10^{+02}$	0
Paper Product Manufacturing n.e.c.	$5.9x10^{-03}$	0	$3.4x10^{-02}$	$5.6x10^{-02}$	$1.0x10^{-01}$	0	$7.7x10^{-05}$	$3.8x10^{-01}$	0
Petroleum Product Wholesaling	0	0	$1.5x10^{+00}$	0	$1.1x10^{+00}$	0	0	$3.7x10^{+00}$	0
Plaster Product Manufacturing	0	0	$6.1x10^{-01}$	$3.1x10^{+00}$	0	0	$2.7x10^{-02}$	$3.1x10^{-01}$	0
Plastic Bag and Film Manufacturing	0	$1.2x10^{-03}$	$3.7x10^{-03}$	$6.9x10^{-03}$	$6.1x10^{-02}$	$8.2x10^{-02}$	0	$3.9x10^{+00}$	$1.0x10^{-02}$
Plastic Injection Moulded Product Manufacturing	0	0	$3.2x10^{-02}$	$6.4x10^{-02}$	$1.4x10^{-03}$	0	$4.5x10^{-05}$	$3.8x10^{-02}$	0
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$5.7x10^{+00}$	0	$1.0x10^{+00}$	$4.5x10^{-02}$	$2.5x10^{-01}$	0	$3.1x10^{-05}$	$1.7x10^{+00}$	0
Port Operators	0	0	$3.4x10^{+00}$	$6.7x10^{+00}$	0	0	$1.0x10^{-03}$	$1.7x10^{+00}$	0
Poultry Farming (Eggs)	0	0	0	0	0	0	0	0	0
Poultry Farming (Meat)	0	0	0	0	0	0	0	0	0
Prepared Animal and Bird Feed Manufacturing	0	0	$2.1x10^{-02}$	$4.2x10^{-02}$	0	0	$2.9x10^{-05}$	$1.0x10^{-02}$	0
Printing	0	0	$5.8x10^{-02}$	$1.5x10^{+02}$	0	0	$8.0x10^{-05}$	$2.9x10^{-02}$	0
Rail Transport	0	0	0	0	$6.7x10^{-03}$	0	$5.4x10^{-05}$	$5.2x10^{-03}$	0
Road and Bridge Construction	0	0	$3.1x10^{-04}$	0	$2.3x10^{-04}$	0	0	$7.6x10^{-04}$	0
Rubber Product Manufacturing n.e.c.	$1.9x10^{-08}$	0	0	$8.8x10^{-04}$	$3.2x10^{-03}$	0	0	$2.9x10^{-03}$	0
Smash Repairing	0	0	0	0	$1.1x10^{+03}$	0	0	$4.4x10^{+03}$	0
Soap and Other Detergent Manufacturing	0	$1.9x10^{-07}$	$5.9x10^{-07}$	$1.1x10^{-06}$	$8.9x10^{-06}$	$1.3x10^{-05}$	0	$7.3x10^{-06}$	$1.6x10^{-06}$
Soft Drink, Cordial and Syrup Manufacturing	0	0	$4.4x10^{-02}$	$8.7x10^{-02}$	0	0	$6.0x10^{-05}$	$2.2x10^{-02}$	0
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	$1.4x10^{+00}$	0
Spirit Manufacturing	0	0	0	0	0	0	0	0	0
Spring and Wire Product Manufacturing	0	$1.5x10^{-06}$	$7.7x10^{-05}$	$1.5x10^{-04}$	$5.3x10^{-02}$	$9.7x10^{-05}$	$9.9x10^{-08}$	$6.3x10^{-01}$	$1.2x10^{-05}$
Steel Pipe and Tube Manufacturing	0	$8.6x10^{-06}$	$2.6x10^{-05}$	$4.8x10^{-05}$	$3.9x10^{-04}$	$5.7x10^{-04}$	0	$3.2x10^{-04}$	$7.0x10^{-05}$
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	$3.2x10^{-01}$	0	0	$1.5x10^{+00}$	0
Structural Steel Fabricating	0	0	0	0	0	0	0	0	0
Synthetic Resin Manufacturing	0	0	$2.4x10^{-05}$	$4.7x10^{-05}$	0	0	$3.3x10^{-08}$	$1.2x10^{-05}$	0

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Unaccounted Fuel Combustion	0	0	$1.4x10^{+01}$	$2.9x10^{+01}$	0	0	$1.9x10^{-02}$	$7.2x10^{+00}$	0
Wine Manufacturing	0	$1.5x10^{-03}$	$5.0x10^{-03}$	$8.2x10^{-03}$	$6.8x10^{-02}$	$9.8x10^{-02}$	0	$5.7x10^{-02}$	$1.2x10^{-02}$
Wood Product Manufacturing n.e.c.	0	0	$1.2x10^{-05}$	$2.4x10^{-05}$	$1.3x10^{+00}$	0	$1.7x10^{-08}$	$5.1x10^{+00}$	0
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	$3.5x10^{-01}$	0	0	$2.7x10^{+00}$	0
Grand Total	**5.75**	**0.94**	**210**	**297**	**1,360**	**884**	**0.074**	**5,090**	**7.61**

Table 4.16: Average Daily Commercial Emissions (July Weekend Day / Winter Weekend day) (kg / day)

ANZSIC Class	CO	Pb	NOx	PM10	PM2.5	SO2	TSP	VOCs
Aircraft Manufacturing	$6.3x10^{+00}$	$3.8x10^{-05}$	$7.5x10^{+00}$	$5.7x10^{-01}$	$5.7x10^{-01}$	$3.9x10^{-02}$	$5.7x10^{-01}$	$4.1x10^{-01}$
Automotive Component Manufacturing n.e.c.	$3.7x10^{-01}$	$2.2x10^{-06}$	$4.4x10^{-01}$	$3.8x10^{-02}$	$3.8x10^{-02}$	$2.3x10^{-03}$	$3.8x10^{-02}$	$2.6x10^{+01}$
Automotive Fuel Retailing	0	0	0	0	0	0	0	$8.4x10^{+03}$
Basic Iron and Steel Manufacturing	$1.4x10^{+01}$	$8.2x10^{-03}$	$2.0x10^{+01}$	$1.3x10^{+01}$	$1.2x10^{+01}$	$8.7x10^{-02}$	$1.9x10^{+01}$	$1.3x10^{+02}$
Basic Non-Ferrous Metal Manufacturing n.e.c.	$2.4x10^{-01}$	$9.9x10^{-03}$	$2.8x10^{-01}$	$2.7x10^{+01}$	$2.0x10^{+01}$	$3.5x10^{-01}$	$4.2x10^{+01}$	$1.5x10^{-02}$
Biscuit Manufacturing	$2.1x10^{+01}$	$1.3x10^{-04}$	$2.5x10^{+01}$	$1.9x10^{+00}$	$1.9x10^{+00}$	$1.3x10^{-01}$	$1.9x10^{+00}$	$1.4x10^{+00}$
Bread Manufacturing	$1.6x10^{+01}$	$1.2x10^{-04}$	$1.2x10^{+01}$	$2.2x10^{+00}$	$2.2x10^{+00}$	$1.2x10^{-01}$	$2.2x10^{+00}$	$2.6x10^{+02}$
Cake and Pastry Manufacturing	$3.6x10^{+00}$	$2.1x10^{-05}$	$4.3x10^{+00}$	$3.3x10^{-01}$	$3.3x10^{-01}$	$2.2x10^{-02}$	$3.3x10^{-01}$	$3.7x10^{+01}$
Ceramic Product Manufacturing	$3.1x10^{+01}$	$7.8x10^{-05}$	$9.4x10^{+00}$	$2.0x10^{+01}$	$1.8x10^{+01}$	$1.2x10^{+00}$	$3.4x10^{+01}$	$1.6x10^{+00}$
Ceramic Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0
Chemical Product Manufacturing n.e.c.	$3.9x10^{+00}$	$2.3x10^{-05}$	$4.7x10^{+00}$	$3.6x10^{-01}$	$3.6x10^{-01}$	$6.1x10^{+01}$	$3.6x10^{-01}$	$3.5x10^{+02}$
Chemical Wholesaling	0	0	0	0	0	0	0	$1.2x10^{+00}$
Concrete Slurry Manufacturing	0	$5.6x10^{-06}$	0	$3.2x10^{+00}$	$5.6x10^{-01}$	0	$7.3x10^{+00}$	0
Confectionery Manufacturing	$4.9x10^{-01}$	$2.9x10^{-06}$	$5.8x10^{-01}$	$4.4x10^{-02}$	$4.4x10^{-02}$	$3.1x10^{-03}$	$4.4x10^{-02}$	$4.2x10^{-02}$
Construction Material Mining n.e.c.	0	$1.6x10^{-04}$	0	$1.1x10^{+02}$	$2.2x10^{+01}$	0	$2.0x10^{+02}$	$1.4x10^{-02}$
Corrugated Paperboard Container Manufacturing	$5.2x10^{+00}$	$3.1x10^{-05}$	$6.2x10^{+00}$	$4.7x10^{-01}$	$4.7x10^{-01}$	$3.2x10^{-02}$	$4.7x10^{-01}$	$3.4x10^{-01}$
Electric Cable and Wire Manufacturing	0	0	0	$2.7x10^{+00}$	$2.0x10^{+00}$	0	$4.3x10^{+00}$	$2.7x10^{+02}$
Electrical and Equipment Manufacturing n.e.c.	$1.3x10^{-02}$	$7.8x10^{-08}$	$1.6x10^{-02}$	$4.6x10^{-01}$	$4.6x10^{-01}$	$8.1x10^{-05}$	$4.6x10^{-01}$	$3.9x10^{+00}$
Fabricated Metal Product Manufacturing n.e.c.	$2.1x10^{+00}$	$1.2x10^{-05}$	$2.7x10^{+00}$	$2.0x10^{+00}$	$2.0x10^{+00}$	$1.3x10^{-02}$	$2.0x10^{+00}$	$1.5x10^{+01}$
Food Manufacturing n.e.c.	$2.7x10^{+01}$	$9.7x10^{-04}$	$6.1x10^{+01}$	$3.3x10^{+00}$	$2.8x10^{+00}$	$3.6x10^{+01}$	$4.7x10^{+00}$	$3.4x10^{+02}$
Fruit and Vegetable Processing	$1.5x10^{+00}$	$9.0x10^{-06}$	$1.8x10^{+00}$	$1.4x10^{-01}$	$1.4x10^{-01}$	$9.4x10^{-03}$	$1.4x10^{-01}$	$9.9x10^{-02}$
Funeral Directors, Crematoria and Cemeteries	$5.3x10^{+00}$	$7.1x10^{-07}$	$1.2x10^{+01}$	$9.6x10^{-04}$	$6.4x10^{-04}$	$2.1x10^{+00}$	$3.2x10^{-03}$	$1.7x10^{-08}$
Furniture Manufacturing n.e.c.	$2.5x10^{+00}$	$1.5x10^{-05}$	$3.0x10^{+00}$	$2.3x10^{-01}$	$2.3x10^{-01}$	$1.6x10^{-02}$	$2.3x10^{-01}$	$1.7x10^{-01}$
Gas Supply	$3.3x10^{+00}$	$1.9x10^{-05}$	$3.9x10^{+00}$	$2.9x10^{-01}$	$2.9x10^{-01}$	$2.0x10^{-02}$	$2.9x10^{-01}$	$2.7x10^{+01}$
Glass and Glass Product Manufacturing	$5.6x10^{+01}$	$5.1x10^{-02}$	$1.3x10^{+02}$	$2.1x10^{+01}$	$2.0x10^{+01}$	$4.1x10^{-01}$	$2.1x10^{+01}$	$4.1x10^{+01}$
Gravel and Sand Quarrying	0	$2.4x10^{-04}$	0	$2.6x10^{+03}$	$5.4x10^{+02}$	0	$5.6x10^{+03}$	$2.6x10^{-01}$
Hospitals (Except Psychiatric Hospitals)	$3.0x10^{+03}$	$1.8x10^{-02}$	$3.6x10^{+03}$	$2.7x10^{+02}$	$2.7x10^{+02}$	$1.9x10^{+01}$	$2.7x10^{+02}$	$2.0x10^{+02}$
Ice Cream Manufacturing	$2.8x10^{+00}$	$1.6x10^{-05}$	$4.6x10^{+00}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$3.9x10^{-02}$	$2.5x10^{-01}$	$1.2x10^{+00}$
Industrial Gas Manufacturing	$1.8x10^{-03}$	0	$1.3x10^{-02}$	$4.0x10^{-04}$	$3.9x10^{-04}$	$6.6x10^{-08}$	$4.1x10^{-04}$	$5.5x10^{+00}$
Ink Manufacturing	0	0	0	0	0	0	0	$3.7x10^{-04}$
Laundries and Dry-Cleaners	$7.1x10^{-01}$	$4.2x10^{-06}$	$8.5x10^{-01}$	$6.4x10^{-02}$	$6.4x10^{-02}$	$4.4x10^{-03}$	$6.4x10^{-02}$	$4.3x10^{+02}$

ANZSIC Class	CO	Pb	NOx	PM10	PM2.5	SO2	TSP	VOCs
Lifting and Material Handling Equipment Manufacturing	0	0	$1.9x10^{-01}$	$3.8x10^{-02}$	$3.8x10^{-02}$	0	$3.8x10^{-02}$	$1.2x10^{+00}$
Medicinal and Pharmaceutical Product Manufacturing	0	0	0	0	0	0	0	$1.8x10^{+00}$
Metal Coating and Finishing	$2.6x10^{+00}$	$1.5x10^{-05}$	$3.1x10^{+00}$	$2.3x10^{-01}$	$2.3x10^{-01}$	$1.6x10^{-02}$	$2.3x10^{-01}$	$1.9x10^{+01}$
Milk and Cream Processing	$2.8x10^{+00}$	$1.6x10^{-05}$	$3.3x10^{+00}$	$2.5x10^{-01}$	$2.5x10^{-01}$	$1.7x10^{-02}$	$2.5x10^{-01}$	$1.8x10^{-01}$
Mining and Construction Machinery Manufacturing	0	0	0	$5.4x10^{-04}$	$5.4x10^{-04}$	0	$5.4x10^{-04}$	$2.5x10^{+00}$
Non-Building Construction n.e.c.	$3.4x10^{-02}$	0	$2.4x10^{-01}$	$7.6x10^{-03}$	$7.5x10^{-03}$	$1.3x10^{-06}$	$7.8x10^{-03}$	$5.9x10^{-03}$
Non-Ferrous Metal Casting	0	0	0	0	0	0	0	$3.8x10^{-04}$
Paint Manufacturing	0	0	0	$1.1x10^{+01}$	$1.1x10^{+01}$	0	$1.3x10^{+01}$	$1.8x10^{+01}$
Paper Product Manufacturing n.e.c.	$4.9x10^{+00}$	$2.8x10^{-05}$	$6.6x10^{+00}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$9.6x10^{-02}$	$5.0x10^{-01}$	$1.4x10^{+00}$
Petroleum Product Wholesaling	0	0	0	0	0	0	0	$2.1x10^{+02}$
Plaster Product Manufacturing	$3.5x10^{+02}$	$3.4x10^{-02}$	$9.7x10^{+01}$	$3.9x10^{+01}$	$2.3x10^{+01}$	$1.2x10^{+01}$	$4.6x10^{+01}$	$9.2x10^{+00}$
Plastic Bag and Film Manufacturing	0	0	0	$1.0x10^{+00}$	$9.1x10^{-01}$	0	$1.0x10^{+00}$	$2.8x10^{+01}$
Plastic Injection Moulded Product Manufacturing	$5.4x10^{+00}$	$3.2x10^{-05}$	$6.4x10^{+00}$	$4.9x10^{-01}$	$4.9x10^{-01}$	$3.3x10^{-02}$	$4.9x10^{-01}$	$4.6x10^{-01}$
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$3.8x10^{+00}$	$2.2x10^{-05}$	$4.6x10^{+00}$	$3.4x10^{-01}$	$3.4x10^{-01}$	$2.3x10^{-02}$	$3.4x10^{-01}$	$6.9x10^{+00}$
Port Operators	$8.4x10^{+01}$	$1.1x10^{-03}$	$2.7x10^{+02}$	$2.4x10^{+01}$	$2.4x10^{+01}$	$2.7x10^{+01}$	$2.4x10^{+01}$	$3.7x10^{+01}$
Poultry Farming (Eggs)	0	0	0	$1.6x10^{+03}$	$4.6x10^{+02}$	0	$3.3x10^{+03}$	0
Poultry Farming (Meat)	0	0	0	$4.9x10^{+03}$	$1.4x10^{+03}$	0	$1.0x10^{+04}$	0
Prepared Animal and Bird Feed Manufacturing	$3.5x10^{+00}$	$2.2x10^{-05}$	$4.2x10^{+00}$	$3.2x10^{-01}$	$3.2x10^{-01}$	$2.7x10^{-02}$	$3.2x10^{-01}$	$2.3x10^{-01}$
Printing	$8.1x10^{+00}$	$5.8x10^{-05}$	$1.3x10^{+01}$	$8.8x10^{-01}$	$8.8x10^{-01}$	$6.0x10^{-02}$	$8.8x10^{-01}$	$1.8x10^{+03}$
Rail Transport	0	0	0	0	0	0	0	$3.7x10^{-02}$
Road and Bridge Construction	0	$4.4x10^{-08}$	0	$2.5x10^{-01}$	$5.1x10^{-02}$	0	$5.1x10^{-01}$	$3.9x10^{-02}$
Rubber Product Manufacturing n.e.c.	0	$1.6x10^{-07}$	0	$9.1x10^{-03}$	0	0	$3.0x10^{-03}$	$1.0x10^{-02}$
Smash Repairing	0	0	0	0	0	0	0	$8.5x10^{+03}$
Soap and Other Detergent Manufacturing	0	0	0	0	0	0	0	$7.5x10^{-05}$
Soft Drink, Cordial and Syrup Manufacturing	$7.2x10^{+00}$	$4.4x10^{-05}$	$8.7x10^{+00}$	$6.6x10^{-01}$	$6.6x10^{-01}$	$4.6x10^{-02}$	$6.6x10^{-01}$	$4.8x10^{-01}$
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	$4.1x10^{+01}$
Spirit Manufacturing	0	0	0	0	0	0	0	$1.8x10^{+02}$
Spring and Wire Product Manufacturing	$1.4x10^{-02}$	$7.2x10^{-08}$	$2.6x10^{-02}$	$1.5x10^{-03}$	$1.5x10^{-03}$	$7.6x10^{-05}$	$1.5x10^{-03}$	$1.6x10^{-03}$
Steel Pipe and Tube Manufacturing	0	0	$1.2x10^{+00}$	$1.1x10^{+01}$	$1.1x10^{+01}$	0	$1.2x10^{+01}$	$3.3x10^{-03}$
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	0	0	0	$5.3x10^{+00}$
Structural Steel Fabricating	0	0	0	$1.8x10^{-02}$	$1.8x10^{-02}$	0	$1.8x10^{-02}$	0
Synthetic Resin Manufacturing	$4.0x10^{-03}$	$2.4x10^{-08}$	$4.7x10^{-03}$	$3.6x10^{-04}$	$3.6x10^{-04}$	$2.5x10^{-05}$	$3.6x10^{-04}$	$2.6x10^{-04}$

ANZSIC Class	CO	Pb	NOx	PM10	PM2.5	SO2	TSP	VOCs
Unaccounted Fuel Combustion	$1.2x10^{+03}$	$1.4x10^{-02}$	$2.7x10^{+03}$	$2.2x10^{+02}$	$2.2x10^{+02}$	$1.7x10^{+01}$	$2.2x10^{+02}$	$1.6x10^{+02}$
Wine Manufacturing	$6.5x10^{-04}$	0	$4.7x10^{-03}$	$1.5x10^{-04}$	$1.4x10^{-04}$	$2.4x10^{-08}$	$1.5x10^{-04}$	$1.4x10^{+02}$
Wood Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	0	0	0	0
Grand Total	4,820	0.14	7,000	9,970	3,080	177	19,900	21,800

Table 4.17: Average Daily Commercial Emissions (July Weekend Day / Winter Weekend day) (kg / day)

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Aircraft Manufacturing	0	0	$3.8x10^{-02}$	$7.5x10^{-02}$	0	0	$5.2x10^{-05}$	$1.9x10^{-02}$	0
Automotive Component Manufacturing n.e.c.	0	$1.9x10^{-05}$	$2.2x10^{-03}$	$4.5x10^{-03}$	$1.6x10^{+00}$	$1.3x10^{-03}$	$3.0x10^{-06}$	$6.6x10^{+00}$	$1.5x10^{-04}$
Automotive Fuel Retailing	0	0	$6.5x10^{+01}$	0	$7.7x10^{+01}$	0	0	$1.7x10^{+02}$	0
Basic Iron and Steel Manufacturing	0	0	$8.3x10^{-02}$	$1.7x10^{-01}$	$1.7x10^{+01}$	0	$1.1x10^{-04}$	$2.0x10^{+01}$	0
Basic Non-Ferrous Metal Manufacturing n.e.c.	0	0	$1.4x10^{-03}$	$2.8x10^{-03}$	0	0	$1.9x10^{-06}$	$7.0x10^{-04}$	0
Biscuit Manufacturing	0	0	$1.3x10^{-01}$	$1.9x10^{-02}$	0	0	$1.7x10^{-04}$	$6.3x10^{-02}$	0
Bread Manufacturing	0	$8.5x10^{-07}$	$1.2x10^{-01}$	$2.3x10^{-01}$	$1.3x10^{-03}$	$5.6x10^{-05}$	$1.6x10^{-04}$	$6.2x10^{-02}$	$6.9x10^{-06}$
Cake and Pastry Manufacturing	0	$5.2x10^{-04}$	$2.3x10^{-02}$	$4.6x10^{-02}$	$2.3x10^{-02}$	$3.4x10^{-02}$	$2.9x10^{-05}$	$3.0x10^{-02}$	$4.2x10^{-03}$
Ceramic Product Manufacturing	0	0	$1.4x10^{-01}$	$2.8x10^{-01}$	0	0	0	$7.1x10^{-02}$	0
Ceramic Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0	0
Chemical Product Manufacturing n.e.c.	0	$2.5x10^{-03}$	$3.2x10^{+01}$	$6.4x10^{+01}$	$1.1x10^{-03}$	0	$3.2x10^{-05}$	$1.6x10^{+01}$	0
Chemical Wholesaling	0	0	0	0	$1.2x10^{-01}$	0	0	$2.0x10^{-01}$	0
Concrete Slurry Manufacturing	0	0	0	0	0	0	0	0	0
Confectionery Manufacturing	0	$2.5x10^{-05}$	$3.0x10^{-03}$	$6.0x10^{-03}$	$1.2x10^{-03}$	$1.7x10^{-03}$	$4.0x10^{-06}$	$2.4x10^{-03}$	$2.0x10^{-04}$
Construction Material Mining n.e.c.	0	0	0	0	$1.3x10^{-03}$	0	0	$4.0x10^{-04}$	0
Corrugated Paperboard Container Manufacturing	0	0	$3.1x10^{-02}$	$6.2x10^{-02}$	0	0	$4.3x10^{-05}$	$1.5x10^{-02}$	0
Electric Cable and Wire Manufacturing	0	0	0	0	$6.6x10^{+01}$	0	0	$4.6x10^{+01}$	0
Electrical and Equipment Manufacturing n.e.c.	0	0	$7.8x10^{-05}$	$1.6x10^{-04}$	$9.1x10^{-02}$	0	$1.1x10^{-07}$	$5.0x10^{-01}$	0
Fabricated Metal Product Manufacturing n.e.c.	0	0	$1.2x10^{-02}$	$2.5x10^{-02}$	$6.9x10^{-01}$	0	$1.7x10^{-05}$	$4.2x10^{+00}$	$2.3x10^{-02}$
Food Manufacturing n.e.c.	0	$8.9x10^{-01}$	$2.8x10^{+00}$	$5.1x10^{+00}$	$4.0x10^{+01}$	$5.9x10^{+01}$	$2.5x10^{-04}$	$3.3x10^{+01}$	$7.2x10^{+00}$
Fruit and Vegetable Processing	0	0	$9.0x10^{-03}$	$1.8x10^{-02}$	0	0	$1.2x10^{-05}$	$4.5x10^{-03}$	0
Funeral Directors, Crematoria and Cemeteries	0	0	0	0	0	0	0	0	0
Furniture Manufacturing n.e.c.	0	0	$1.5x10^{-02}$	$3.0x10^{-02}$	$1.3x10^{-04}$	0	$2.0x10^{-05}$	$7.5x10^{-03}$	0
Gas Supply	0	0	$1.9x10^{-02}$	$3.9x10^{-02}$	0	0	$2.7x10^{-05}$	$9.7x10^{-03}$	0
Glass and Glass Product Manufacturing	0	0	$1.4x10^{+00}$	$8.6x10^{-01}$	0	0	0	$3.9x10^{-01}$	0
Gravel and Sand Quarrying	0	0	0	0	$2.3x10^{-02}$	0	0	$7.1x10^{-03}$	0
Hospitals (Except Psychiatric Hospitals)	$2.7x10^{-02}$	0	$1.8x10^{+01}$	$3.6x10^{+01}$	0	0	$2.5x10^{-02}$	$8.9x10^{+00}$	0
Ice Cream Manufacturing	0	$2.6x10^{-03}$	$2.4x10^{-02}$	$4.7x10^{-02}$	$1.2x10^{-01}$	$1.7x10^{-01}$	$2.3x10^{-05}$	$1.1x10^{-01}$	$2.1x10^{-02}$
Industrial Gas Manufacturing	0	0	0	0	$6.0x10^{-01}$	0	0	$1.9x10^{+00}$	0
Ink Manufacturing	0	0	0	0	$3.3x10^{-05}$	0	0	$1.0x10^{-05}$	0
Laundries and Dry-Cleaners	0	0	$4.2x10^{-03}$	$8.5x10^{-03}$	$9.1x10^{-01}$	$4.1x10^{+02}$	$5.8x10^{-06}$	$1.2x10^{-01}$	0

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Lifting and Material Handling Equipment Manufacturing	0	0	$1.3x10^{-03}$	0	$1.5x10^{-01}$	0	0	$3.3x10^{-01}$	0
Medicinal and Pharmaceutical Product Manufacturing	0	0	0	0	$3.6x10^{-05}$	0	0	$1.1x10^{-05}$	0
Metal Coating and Finishing	0	$4.8x10^{-02}$	$1.6x10^{-01}$	$3.0x10^{-01}$	$2.2x10^{+00}$	$3.2x10^{+00}$	$2.1x10^{-05}$	$1.9x10^{+00}$	$3.9x10^{-01}$
Milk and Cream Processing	0	0	$1.6x10^{-02}$	$3.3x10^{-02}$	0	0	$2.3x10^{-05}$	$8.2x10^{-03}$	0
Mining and Construction Machinery Manufacturing	0	0	$2.1x10^{-03}$	0	$3.9x10^{-01}$	0	0	$5.7x10^{-01}$	0
Non-Building Construction n.e.c.	0	0	0	0	0	0	0	0	0
Non-Ferrous Metal Casting	0	0	0	0	$3.5x10^{-05}$	0	0	$1.1x10^{-05}$	0
Paint Manufacturing	0	0	0	0	0	0	0	0	0
Paper Product Manufacturing n.e.c.	$5.9x10^{-03}$	0	$3.4x10^{-02}$	$5.6x10^{-02}$	$1.0x10^{-01}$	0	$7.7x10^{-05}$	$3.8x10^{-01}$	0
Petroleum Product Wholesaling	0	0	$1.5x10^{+00}$	0	$1.1x10^{+00}$	0	0	$3.7x10^{+00}$	0
Plaster Product Manufacturing	0	0	$6.1x10^{-01}$	$3.1x10^{+00}$	0	0	$2.7x10^{-02}$	$3.1x10^{-01}$	0
Plastic Bag and Film Manufacturing	0	$6.2x10^{-04}$	$1.9x10^{-03}$	$3.5x10^{-03}$	$3.3x10^{-02}$	$4.1x10^{-02}$	0	$1.8x10^{+00}$	$5.0x10^{-03}$
Plastic Injection Moulded Product Manufacturing	0	0	$3.2x10^{-02}$	$6.4x10^{-02}$	$1.4x10^{-03}$	0	$4.4x10^{-05}$	$3.8x10^{-02}$	0
Plastic Product, Rigid Fibre Reinforced, Manufacturing	$2.0x10^{-01}$	0	$5.7x10^{-02}$	$4.5x10^{-02}$	$1.3x10^{-01}$	0	$3.1x10^{-05}$	$7.8x10^{-01}$	0
Port Operators	0	0	$3.4x10^{+00}$	$6.7x10^{+00}$	0	0	$1.0x10^{-03}$	$1.7x10^{+00}$	0
Poultry Farming (Eggs)	0	0	0	0	0	0	0	0	0
Poultry Farming (Meat)	0	0	0	0	0	0	0	0	0
Prepared Animal and Bird Feed Manufacturing	0	0	$2.1x10^{-02}$	$4.2x10^{-02}$	0	0	$2.9x10^{-05}$	$1.0x10^{-02}$	0
Printing	0	0	$5.8x10^{-02}$	$9.0x10^{+00}$	0	0	$8.0x10^{-05}$	$2.9x10^{-02}$	0
Rail Transport	0	0	0	0	$6.7x10^{-03}$	0	$5.4x10^{-05}$	$5.2x10^{-03}$	0
Road and Bridge Construction	0	0	$3.1x10^{-04}$	0	$2.3x10^{-04}$	0	0	$7.6x10^{-04}$	0
Rubber Product Manufacturing n.e.c.	$9.4x10^{-09}$	0	0	0	$1.6x10^{-03}$	0	0	$1.5x10^{-03}$	0
Smash Repairing	0	0	0	0	$5.3x10^{+02}$	0	0	$2.2x10^{+03}$	0
Soap and Other Detergent Manufacturing	0	$1.9x10^{-07}$	$5.9x10^{-07}$	$1.1x10^{-06}$	$8.9x10^{-06}$	$1.3x10^{-05}$	0	$7.3x10^{-06}$	$1.6x10^{-06}$
Soft Drink, Cordial and Syrup Manufacturing	0	0	$4.4x10^{-02}$	$8.7x10^{-02}$	0	0	$6.0x10^{-05}$	$2.2x10^{-02}$	0
Solid Paperboard Container Manufacturing	0	0	0	0	0	0	0	$1.4x10^{+00}$	0
Spirit Manufacturing	0	0	0	0	0	0	0	0	0
Spring and Wire Product Manufacturing	0	$1.5x10^{-06}$	$7.7x10^{-05}$	$1.5x10^{-04}$	$6.7x10^{-05}$	$9.7x10^{-05}$	$9.9x10^{-08}$	$9.1x10^{-05}$	$1.2x10^{-05}$
Steel Pipe and Tube Manufacturing	0	$8.6x10^{-06}$	$2.6x10^{-05}$	$4.8x10^{-05}$	$3.9x10^{-04}$	$5.7x10^{-04}$	0	$3.2x10^{-04}$	$7.0x10^{-05}$
Structural Metal Product Manufacturing n.e.c.	0	0	0	0	$3.2x10^{-01}$	0	0	$1.5x10^{+00}$	0
Structural Steel Fabricating	0	0	0	0	0	0	0	0	0
Synthetic Resin Manufacturing	0	0	$2.4x10^{-05}$	$4.7x10^{-05}$	0	0	$3.3x10^{-08}$	$1.2x10^{-05}$	0

ANZSIC Class	1,3-BUT	ACET	BENZ	HCHO	XLYE	PERC	PAHs	TOLU	TCE
Unaccounted Fuel Combustion	0	0	$1.4x10^{+01}$	$2.9x10^{+01}$	0	0	$1.9x10^{-02}$	$7.2x10^{+00}$	0
Wine Manufacturing	0	$1.5x10^{-03}$	$5.0x10^{-03}$	$8.2x10^{-03}$	$6.8x10^{-02}$	$9.8x10^{-02}$	0	$5.7x10^{-02}$	$1.2x10^{-02}$
Wood Product Manufacturing n.e.c.	0	0	0	0	0	0	0	0	0
Wooden Furniture and Upholstered Seat Manufacturing	0	0	0	0	0	0	0	0	0
Grand Total	**0.23**	**0.94**	**140**	**155**	**738**	**473**	**0.073**	**2,510**	**7.61**

5 COMMERCIAL INVENTORY SOFTWARE

The commercial emissions inventory has been compiled using a database specifically designed for the project. The database is compatible with Microsoft SQL server using Microsoft Access.

The database includes the following functionalities:

- Generate mail-merge letters for commercial survey questionnaires;
- Track progress of the survey and store survey responses;
- Store activity data, emission factors and organic speciation profiles;
- Store and calculate emissions data for each source and pollutant;
- Store emission source locations (MGA coordinates) and LGA identity;
- Store temporal variation of each emission source (hourly, daily, monthly and yearly); and
- Store source type (ANZSIC code, emission source name/type).

The database calculates source category specific emissions. The database is structured so that it holds all information required to estimate emissions from every identified emission source, using all possible emission estimation techniques. Each emission estimation technique is stored in the database as an “emission module”. Within each module, relevant emission factors are stored and the required data to estimate emissions for each substance is stored by the database. When compiling the emissions inventory, users enter emission type details (name of emission source e.g. Natural Gas Boiler) and select the appropriate emission source from the library of emission source types within the database (e.g. boiler, industrial, natural gas). Based on the available information, the user must select the most appropriate emission module to estimate emissions for each identified emission source. Once this has been completed, the user enters the required information necessary to estimate emissions from the selected emission source.

The database design concept for the commercial emissions inventory is shown in Figure 5.1.

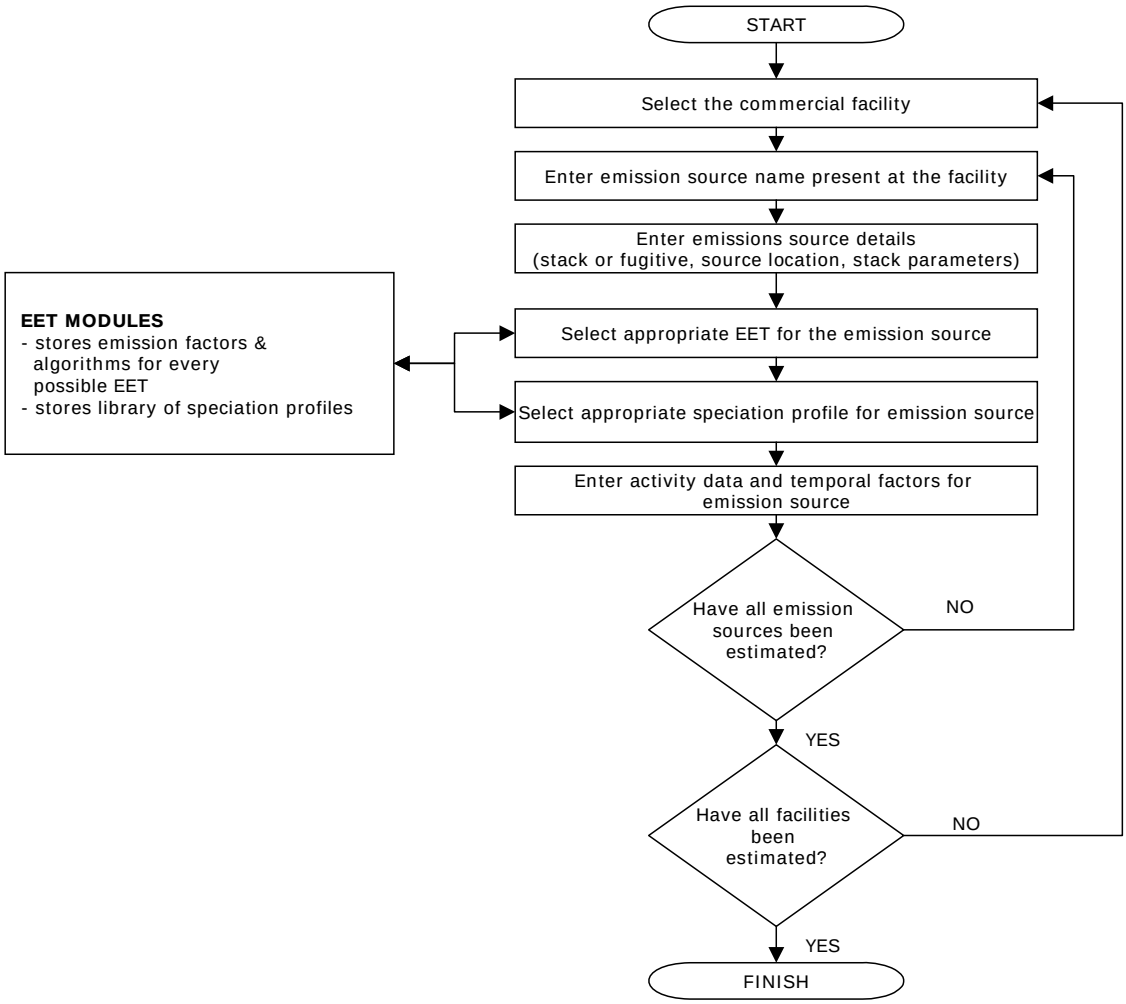

Figure 5.1: Commercial Database Design

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Appendix A:

Sample Commercial Survey Questionnaires

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

CONCRETE PRODUCT MANUFACTURING QUESTIONNAIRE

Please indicate as much of the following information as possible. If information is unavailable or is difficult to obtain, please provide a best estimate. Please indicate where a question is not applicable (e.g. "NA") or where no data are available (e.g. "ND"). If any assistance is required in filling out this questionnaire please contact Chris Boyce (or in his absence, Phuong Tran) at Pacific Air & Environment on (07) 3004 6400.

Pacific Air & Environment (PAE) acknowledges that the information may be commercially sensitive. All information presented in this survey will be kept strictly confidential.

Q1. Facility name: <<Facility>>

Q2. Facility street address <<Premises Street>>
<<Premises Suburb>>
<<Premises State>>
<<Premises Postcode>>

Q3. Facility primary ANZSIC code <<ANZSIC>>
(*Please indicate if incorrect)*

Q4. Does the facility perform any other activity other than described in Question 3 (provide ANZSIC Code if known)? _____

Q5. Approximate number of full-time employees: _____

Q6. Person completing questionnaire: _____

Q7. Contact Details Phone number: _____
Fax number: _____
Email: _____

Operating Schedule *(cross out when not operating)*

Q8. Months of the Year: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Q9. Days of the Week: MON TUES WED THUR FRI SAT SUN

Q10. Weekday Hours of the Day:
1 2 3 4 5 6 7 8 9 10 11 12 (noon) 1 2 3 4 5 6 7 8 9 10 11 12 (midnight)

Weekend Hours of the Day:
1 2 3 4 5 6 7 8 9 10 11 12 (noon) 1 2 3 4 5 6 7 8 9 10 11 12 (midnight)

Q11. Seasonal Variation
If production varies for any reason please indicate the **approximate** production as a percentage of a full year.
e.g.: JAN – MAR 30%, APR – JUNE 20%, JULY – SEP 10%, OCT – DEC 40%

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Q12. Are there any additional variations in production not addressed by Q8-Q11 above.
_____
_____

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

Emission Sources

Q13. Please identify all air emission sources at the facility, indicating whether any emission control technologies (e.g. baghouse, scrubber) are utilised. Note that both controlled and uncontrolled sources should be included. Attach a separate sheet if there is insufficient space in the table below.

Emission Source Name	Stack/Vent Number	Control Technology	Reduction Efficiency (%)

Stockpiling

Q14. Regarding the storage of materials in piles, please specify the following information as best as possible. Please read the footnotes.

Storage Pile Material[a]	Pile Height (m)[b]	Pile Base Area (m²)	Number of Piles [c]	Material Moisture Content (%) [b]	Silt Content (%) [b, d]	Dust Control Method [e]

a Please indicate the material type (e.g. soil, mineral (please name), coal etc)
b Only approximate values are required.
c Please indicate the number of piles that are the same or very similar in size and shape, that are used for the storage of the same material.
d Silt is defined as particles equal to or less than 75 μm (micrometres) in diameter.
e Categorise dust control methods into one of the following categories:
(1) Watering by periodic spraying;
(2) Watering by wind activated spraying system;
(3) Chemical wetting agents;
(4) Continuous chemical spray onto input material;
(5) Surface crusting agents;
(6) Covered (eg using a shed); and/or
(7) Other (please specify) .
If dust generation reduction efficiencies are available please specify (%).

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

Material Handling

Q15. Please estimate the annual quantity of material and product. Attach a separate sheet if there is insufficient space in the table below.

Material transferred	Quantity (tonnes/year)	Typical Number of Transfers [a]
1. Sand		
2. Cement		
3. Aggregate		
4. Fly ash		
4. Other (please specify)		

a A transfer is defined as whenever the material is dropped to a receiving surface (e.g. conveyor to conveyor, truck to storage pile).

Fuel Combustion

Q16. If combustion devices (e.g. furnace, kiln) are utilised by the plant, please specify their characteristics in the table below). Please read the footnotes. Attach a separate sheet if there is insufficient space in the table below.

Type of Combustion Device [a]	Stack/Vent Number	Fuel Type	Estimated Annual Fuel Consumption (either tonnes, litres, cubic metres or MJ)	Control Technology	Reduction Efficiency (%)

a For example: boiler, internal combustion engine, kiln, furnace

Liquid Storage

Q17. Please indicate the following information for any fuel or organic liquid storage tanks at the facility. All volumes should be expressed in kilolitres (kL). Attach a separate sheet if there is insufficient space in the table below.

Tank ID	Number	Capacity (kL)	Material Stored (e.g. diesel, LPG, acetone)	Estimated Loss (if known) (kL)	Annual Throughput (kL/y)

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

On-Site Vehicles

Q18. Please specify the following information pertaining to vehicles used for ON-SITE operations as best as possible (please read the footnotes beneath the table).

Type of vehicle [a]	Vehicle model year	Number of vehicles of this type operating	Fuel type (Petrol, diesel, LPG)	Engine Size (or power rating – kW or HP)	ON-SITE operating regime (e.g. 6am – 6pm, Monday to Friday)[b]	Typical operating hours per day	Number of operating days per year	Annual ON-SITE VKT per vehicle (km) [c, d]	% of VKT on PAVED roads (%) [c, d]	% of VKT on UNPAVED roads (%) [c,d]

a Covers Off-Road vehicles only. Off-Road vehicles typically are not registered with the Road and Traffic Authority (RTA) because they do not access the road network. Some may have Conditional Registrations with the RTA, when it requires limited access to the road network. Example: front end loader, grader, bulldozer, fork lifts.

b Please characterise the ON-SITE operating regime if it differs to that described in Q8 – Q12.

c It is important to ensure that only ON-SITE operations are considered when providing these data.

d VKT = Vehicle Kilometres Travelled (km). Provide these data on a 'per vehicle' basis (ie so the TOTAL VKT's for a particular vehicle type will be the 'number of vehicles' by the 'VKT's' for each vehicle). This data only needs to be approximate.

Q19. Please specify the total fuel consumed by on-site vehicles:

Petrol:_____ kL/year
Diesel:_____ kL/year
LPG: _____ m^3 /year

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

Q20. Please estimate the annual electricity consumption at the facility (MWh): _____

Q21. Any additional comments relating to this questionnaire.
_____
_____
_____
_____
_____
_____

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

SERVICE STATION QUESTIONNAIRE

Please answer as many of the following questions as possible. If information is unavailable or is difficult to obtain, please provide a best estimate. Please indicate where a question is not applicable (e.g. "NA") or where no data are available (e.g. "ND"). If any assistance is required in filling out this questionnaire please contact Chris Boyce (or in his absence, Phuong Tran) at Pacific Air & Environment on (07) 3004 6400.

Pacific Air & Environment (PAE) acknowledges that the information may be commercially sensitive. All information presented in this survey will be kept strictly confidential.

Q1. Facility name: <<Facility>>

Q2. Facility street address <<Premises Street>>
<<Premises Suburb>>
<<Premises State>>
<<Premises Postcode>>

Q3. Facility primary ANZSIC code <<ANZSIC>>
(*Please indicate if incorrect*)

Q4. Does the facility perform any other activity other than described in Question 3 (please provide ANZSIC Code if known): _____

Q5. Person completing questionnaire: _____

Q6. Contact Details
Phone number: _____
Fax number: _____
Email: _____

Q7. Approximate number of full-time employees: _____

Operating Schedule *(cross out when not operating)*

Q8. Months of the Year: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Q9. Days of the Week: MON TUE WED THU FRI SAT SUN

Q10. Weekday Hours of the Day:
1 2 3 4 5 6 7 8 9 10 11 12 (noon) 1 2 3 4 5 6 7 8 9 10 11 12 (midnight)

Weekend Hours of the Day:
1 2 3 4 5 6 7 8 9 10 11 12 (noon) 1 2 3 4 5 6 7 8 9 10 11 12 (midnight)

Q11. Seasonal Variation
If petroleum sales vary for any reason please indicate the **approximate** variation as a percentage of a full year:
e.g.: JAN – MAR 30%, APR – JUNE – 20%, JULY – SEP 10%, OCT – DEC 40%

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

Q12. Are there any additional variations in operations not addressed by Q8-11 above:

Delivery Schedule

Q13. What are the typical times that delivery tankers transfer fuel to storage tanks at the facility:

e.g.: Every Monday morning, or during operating hours Thursday to Friday, or fortnightly on Saturday nights, or no typical delivery time

---

Q14. How often do deliveries occur on weekends:

e.g.: Weekdays 80%, Weekends 20%

Q15. What is the typical quantity of fuel delivered:

e.g.: 50 kL, or between 35 kL – 60 kL

Q16. Which company is the facility's petrol supplier:

e.g.: solely BP, or 60% Shell 40% Caltex

Q17. When a tanker truck delivers petrol, is a vapour return hose connected to the tanker, or is the displaced vapour vented to the atmosphere:

Q18. How many bowsers/pumps and nozzles are present that are used to supply fuel to motorists (*note – in this instance, a bowser/pump is the larger main unit and nozzles are the hoses connected to the bowser/pump that are used by motorists to deliver fuel to a car)*

e.g.: 6 bowsers/pumps, 4 that have two nozzles and 2 that have four nozzles

---

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

Fuel Storage

Q19. Please indicate the following information for any fuel and/or organic liquid storage tanks at the facility. All volumes should be expressed in kilolitres (kL). Attach a separate sheet if there is insufficient space in the table below.

Tank Type (please tick)		Capacity	Annual Throughput	Estimated Loss (if known)	Filling Method (i.e. splash loading, submerged loading or bottom loading) [b]	During filling tanks, are the vapours displaced from the tank **vented** directly to the atmosphere or are they **returned** to the filling tanker?	Material Stored (e.g. leaded, unleaded, premium unleaded, diesel, LPG)	Please specify any emission control measures utilised on the tanks [c]
Above Ground [a]	Below Ground	(kL)	(kL/y)	(kL)				

a If any above ground tanks are present, please indicate whether the tank design is fixed roof, floating roof (internal or external), or a pressure tank.
b *Splash Filling*: The liquid enters the tank from the top of the tank, freefalling and splashing to the bottom of the tank;
Submerge Filling: The liquid enters the tank via a pipe which reaches down to the bottom of the tank, allowing the end of the pipe to become submerged shortly after filling commences; and *Bottom Loading*: The liquid is filled via a pipe that enters through the bottom of the tank. For gas filled tanks please indicate "NA".
c Emission controls may include devices such as secondary seals (for above ground tanks), vapour recovery units (VRUs) and/or activated carbon filters used on the storage tank vents to minimise breathing and filling releases. Indicate the control efficiency where possible.

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

Fugitive Emissions – Valves, Seals and Flanges

Q20. Please provide the annual losses from valves, seals and flanges if they have been estimated at the facility (specify compounds and mass emissions):

_____
_____
_____
_____
_____
_____

Q21. Please estimate the annual electricity consumption at the facility (MWh): _____

Q22. Please specify any other activities leading to airborne emissions that have not been considered already in this questionnaire. If any estimates of emissions have been performed by the facility please present them in the following table:

Activity	Pollutant Emitted	Emission Estimation Technique [a]	Emission Estimate [b]

a please specify the method used to estimate the emission (e.g., source testing, mass balance)
b Please specify the units of measurement

Q23. Any additional comments relating to this questionnaire:

_____
_____
_____
_____
_____
_____
_____

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

MOTOR VEHICLE SMASH REPAIRING QUESTIONNAIRE

Please indicate as much of the following information as possible. If information is unavailable or is difficult to obtain, please provide a best estimate. Please indicate where a question is not applicable (e.g. "NA") or where no data are available (e.g. "ND"). If any assistance is required in filling out this questionnaire please contact Chris Boyce (or in his absence, Phuong Tran) at Pacific Air & Environment on (07) 3004 6400.

Pacific Air & Environment (PAE) acknowledges that the information may be commercially sensitive. All information presented in this survey will be kept strictly confidential.

Q1. Facility name: <<Facility>>

Q2. Facility street address <<Premises Street>>
<<Premises Suburb>>
<<Premises State>>
<<Premises Postcode>>

Q3. Facility primary ANZSIC code <<ANZSIC>>
(*Please indicate if incorrect)*

Q4. Does the facility perform any other activity other than described in Question 3 (provide ANZSIC Code if known)? _____

Q5. Approximate number of full-time employees: _____

Q6. Person completing questionnaire: _____

Q7. Contact Details Phone number: _____
Fax number: _____
Email: _____

Operating Schedule *(cross out when not operating)*

Q8. Months of the Year: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Q9. Days of the Week: MON TUES WED THUR FRI SAT SUN

Q10. Weekday Hours of the Day:
1 2 3 4 5 6 7 8 9 10 11 12 (noon) 1 2 3 4 5 6 7 8 9 10 11 12 (midnight)

Weekend Hours of the Day:
1 2 3 4 5 6 7 8 9 10 11 12 (noon) 1 2 3 4 5 6 7 8 9 10 11 12 (midnight)

Q11. Seasonal Variation
If activity varies for any reason please indicate the **approximate** variation in activity as a percentage of a full year.
e.g.: JAN – MAR 30%, APR – JUNE 20%, JULY – SEP 10%, OCT – DEC 40%

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Q12. Are there any additional variations in production not addressed by Q8-Q11 above.
_____
_____

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

Surface Coating Usage

Q13. Please estimate the (typical) annual **or** monthly quantity of motor vehicle refinishing coating types consumed. Attach a separate sheet if there is insufficient space in the table below.

Surface Coating Type	Quantity Used	
	Litres/month	Litres/year
1. Primer Lacquer		
2. Primer Two Pack		
3. Basecoats		
4. Topcoat Lacquers & Clears		
5. Topcoat Synthetic Enamels		
6. Topcoat Two Pack		
7. Hardener Two Pack		
8. Thinner Lacquers & Others		
9. Thinner Two Pack		
10. Other (specify)		

Facility Air Emission Sources

Q14. Please indicate the following information.

1. Number of spraying/drying booths	
2. Number of vents	
3. Estimate typical vent height above the ground (m)	
4. Estimated exit velocity of vent (m/s)	
5. Estimate vent diameter (m)	

Liquid Storage

Q15. Please indicate the following information for any fuel or organic liquid storage tanks at the facility. All volumes should be expressed in kilolitres (kL).

Tank ID	Number	Capacity (kL)	Material Stored (e.g. petrol, LPG, acetone)	Estimated Loss (if known) (kL)	Annual Throughput (kL/y)

Commercial Emissions Inventory
Facility ID: <<Facility ID>>

Q16. Please estimate the annual electricity consumption at the facility (MWh):

_____

Emission Controls

Q17. Please list what air emission control techniques (e.g. high efficiency spray guns, scrubber, after burner etc) that you use at your facility and their estimated reduction in air emissions (if known).

_____
_____
_____
_____
_____
_____
_____
_____
_____

Q18. Any additional comments relating to this questionnaire.

_____
_____
_____
_____
_____
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_____

Appendix B:
Total Commercial Emissions

Table B1: Total Estimated Commercial Emissions (tonnes/year)

Substance	Emissions (tonnes/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
(1-METHYLPROPYL)BENZENE (SEC-BUTYL BENZENE)	$4.3x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.3x10^{-06}$	$4.3x10^{-04}$
(2-METHYLBUTYL)CYCLOHEXANE	$5.7x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.7x10^{-06}$	$5.8x10^{-04}$
1,1,1-TRICHLOROETHANE	$2.4x10^{+01}$	$1.0x10^{-03}$	$0.0x10^{+00}$	$1.3x10^{-01}$	$2.4x10^{+01}$
1,1,2,3-TETRAMETHYLCYCLOHEXANE	$1.4x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-06}$	$1.4x10^{-04}$
1,1,2-TRIMETHYLCYCLOHEXANE	$2.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-06}$	$2.9x10^{-04}$
1,1,2-TRIMETHYLCYCLOPENTANE	$8.6x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$8.6x10^{-06}$	$8.7x10^{-04}$
1,1,3,4-TETRAMETHYLCYCLOHEXANE	$7.1x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.1x10^{-06}$	$7.2x10^{-04}$
1,1,3,5-TETRAMETHYLCYCLOHEXANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
1,1,3-TRIMETHYLCYCLOHEXANE	$2.9x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-05}$	$2.9x10^{-03}$
1,1,3-TRIMETHYLCYCLOPENTANE	$2.9x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-05}$	$2.9x10^{-03}$
1,1,4-TRIMETHYLCYCLOHEXANE	$5.7x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.7x10^{-06}$	$5.8x10^{-04}$
1,1-DICHLOROETHENE {VINYLIDENE CHLORIDE}	$1.1x10^{-01}$	$4.6x10^{-06}$	$0.0x10^{+00}$	$2.6x10^{-04}$	$1.1x10^{-01}$
1,1-DIMETHYL-2-PROPYLCYCLOHEXANE	$2.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-06}$	$2.9x10^{-04}$
1,1-DIMETHYLCYCLOHEXANE	$1.1x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.1x10^{-05}$	$1.2x10^{-03}$
1,1-DIMETHYLCYCLOPENTANE	$4.3x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.3x10^{-06}$	$4.3x10^{-04}$
1,1-METHYLETHYLCYCLOPENTANE	$2.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-06}$	$2.9x10^{-04}$
1,2,3,5-TETRAMETHYLBENZENE	$1.3x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.3x10^{-05}$	$1.3x10^{-03}$
1,2,3-TRIMETHYL-4-ETHYLBENZENE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
1,2,3-TRIMETHYLBENZENE	$1.3x10^{+01}$	$1.2x10^{+00}$	$5.8x10^{-01}$	$3.2x10^{+00}$	$1.8x10^{+01}$
1,2,3-TRIMETHYLCYCLOHEXANE	$1.7x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.7x10^{-05}$	$1.7x10^{-03}$
1,2,4,5-TETRAMETHYLBENZENE	$8.6x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$8.6x10^{-06}$	$8.7x10^{-04}$
1,2,4-TRIMETHYLBENZENE	$8.0x10^{+00}$	$7.6x10^{-01}$	$4.1x10^{-01}$	$2.2x10^{+00}$	$1.1x10^{+01}$
1,2,4-TRIMETHYLCYCLOPENTENE	$5.9x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.9x10^{-05}$	$5.9x10^{-03}$
1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE {CFC-114}	$3.5x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$3.5x10^{-05}$
1,2-DICHLOROETHANE	$8.2x10^{-02}$	$3.5x10^{-06}$	$0.0x10^{+00}$	$2.0x10^{-04}$	$8.2x10^{-02}$
1,2-DICHLOROPROPANE	$4.0x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.0x10^{-05}$
1,2-DIETHYL-1-METHYLCYCLOHEXANE	$5.7x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.7x10^{-06}$	$5.8x10^{-04}$
1,2-DIMETHYL-3-ETHYLCYCLOHEXANE	$7.1x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.1x10^{-06}$	$7.2x10^{-04}$
1,2-DIMETHYL-4-ETHYLBENZENE	$1.4x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-05}$	$1.4x10^{-03}$
1,2-DIMETHYLCYCLOPENTANE	$5.0x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.0x10^{-05}$	$5.0x10^{-03}$
1,3,5-TRIETHYL CYCLOHEXANE	$2.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-06}$	$2.9x10^{-04}$
1,3,5-TRIMETHYLBENZENE	$9.7x10^{+00}$	$8.8x10^{-01}$	$4.3x10^{-01}$	$2.4x10^{+00}$	$1.3x10^{+01}$
1,3-BUTADIENE	$1.3x10^{+00}$	$2.1x10^{-01}$	$6.4x10^{-02}$	$3.2x10^{-01}$	$1.9x10^{+00}$
1,3-DICHLOROBENZENE {M-DICHLOROBENZENE}	$2.7x10^{-02}$	$1.2x10^{-06}$	$0.0x10^{+00}$	$6.6x10^{-05}$	$2.7x10^{-02}$
1,3-DIETHYL-5-METHYL CYCLOHEXANE	$1.6x10^{+01}$	$1.1x10^{+00}$	$8.0x10^{-01}$	$2.6x10^{+00}$	$2.1x10^{+01}$
1,3-DIETHYL-CYCLOHEXANE	$4.3x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.3x10^{-06}$	$4.3x10^{-04}$
1,3-DIMETHYL-2-ETHYLBENZENE	$1.1x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.1x10^{-05}$	$1.2x10^{-03}$
1,3-DIMETHYL-4-ETHYLBENZENE	$5.7x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.7x10^{-06}$	$5.8x10^{-04}$
1,3-DIMETHYL-4-ISOPROPYLBENZENE	$1.4x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-06}$	$1.4x10^{-04}$
1,3-DIMETHYL-5-ETHYLBENZENE	$1.1x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.1x10^{-05}$	$1.2x10^{-03}$
1,3-DIPROPYL-5-ETHYL CYCLOHEXANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
1,4-BUTANEDIOL	$3.5x10^{+01}$	$2.2x10^{+00}$	$1.6x10^{+00}$	$5.2x10^{+00}$	$4.4x10^{+01}$
1,4-DIETHYL-CYCLOHEXANE	$5.5x10^{+01}$	$3.5x10^{+00}$	$2.6x10^{+00}$	$8.9x10^{+00}$	$7.0x10^{+01}$
1,4-DIMETHYL-2-ETHYLBENZENE	$8.6x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$8.6x10^{-06}$	$8.7x10^{-04}$
1,4-DIOXANE	$5.4x10^{-02}$	$2.3x10^{-06}$	$0.0x10^{+00}$	$1.3x10^{-04}$	$5.4x10^{-02}$
1,4-PENTADIENE	$3.5x10^{+00}$	$4.3x10^{-01}$	$3.3x10^{-01}$	$1.5x10^{+00}$	$5.8x10^{+00}$
1-BUTENE	$4.3x10^{+01}$	$2.0x10^{+00}$	$1.5x10^{+00}$	$7.0x10^{+00}$	$5.4x10^{+01}$
1-DECENE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.5x10^{-03}$	$1.5x10^{-03}$
1-ETHYL-1,2-DIMETHYLCYCLOHEXANE	$1.2x10^{-01}$	$6.0x10^{-03}$	$4.7x10^{-03}$	$1.7x10^{-02}$	$1.5x10^{-01}$

Substance	Emissions (tonnes/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
1-ETHYL-2,2,6-TRIMETHYLCYCLOHEXANE	$2.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-06}$	$2.9x10^{-04}$
1-ETHYL-2,4-DIMETHYLCYCLOHEXANE	$1.4x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-06}$	$1.4x10^{-04}$
1-ETHYL-2-PROPYL CYCLOHEXANE	$4.9x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.9x10^{-05}$	$4.9x10^{-03}$
1-ETHYL-4-ISOPROPYLBENZENE	$5.7x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.7x10^{-06}$	$5.8x10^{-04}$
1-HEXENE	$4.0x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.0x10^{-03}$	$2.1x10^{-03}$
1-METHYL INDAN	$1.7x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.7x10^{-05}$	$1.7x10^{-03}$
1-METHYL-2-HEXYL-CYCLOHEXANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
1-METHYL-2-ISOPROPYLCYCLOHEXANE	$1.3x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.3x10^{-05}$	$1.3x10^{-03}$
1-METHYL-3-BUTYLBENZENE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
1-METHYL-3-ISOPROPYL CYCLOHEXANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
1-METHYL-3-ISOPROPYLBENZENE	$1.7x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.7x10^{-05}$	$1.7x10^{-03}$
1-METHYL-3-ISOPROPYLCYCLOHEXANE	$1.4x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-05}$	$1.4x10^{-03}$
1-METHYL-4-ISOBUTYLBENZENE	$1.4x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-06}$	$1.4x10^{-04}$
1-METHYL-4-ISOPROPYLBENZENE	$1.4x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-06}$	$1.4x10^{-04}$
1-METHYL-4-ISOPROPYLCYCLOHEXANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
1-METHYL-4N-PROPYLBENZENE	$2.1x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.1x10^{-05}$	$2.2x10^{-03}$
1-METHYL-4-PENTYL CYCLOHEXANE	$2.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-06}$	$2.9x10^{-04}$
1-NONENE	$3.3x10^{-06}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$3.3x10^{-06}$
1-OCTENE	$3.3x10^{-06}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$3.3x10^{-06}$
1-PENTENE	$4.2x10^{+01}$	$2.4x10^{+00}$	$1.8x10^{+00}$	$8.4x10^{+00}$	$5.5x10^{+01}$
2-(2-BUTOXYETHOXY)ETHANOL {BUTYL CARBITOL}	$7.7x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.7x10^{-05}$	$7.8x10^{-03}$
2,2,3,3-TETRAMETHYLPENTANE	$1.4x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-06}$	$1.4x10^{-04}$
2,2,3,TRIMETHYLHEXANE	$3.5x10^{-01}$	$4.3x10^{-02}$	$3.3x10^{-02}$	$1.5x10^{-01}$	$5.8x10^{-01}$
2,2,3-TRIMETHYLBUTANE	$7.0x10^{-01}$	$8.7x10^{-02}$	$6.5x10^{-02}$	$3.0x10^{-01}$	$1.2x10^{+00}$
2,2,4,4-TETRAMETHYL-3-PENTANONE	$7.9x10^{-02}$	$4.0x10^{-03}$	$3.2x10^{-03}$	$1.1x10^{-02}$	$9.8x10^{-02}$
2,2,4-TRIMETHYLPENTANE	$1.7x10^{+01}$	$2.1x10^{+00}$	$1.6x10^{+00}$	$7.4x10^{+00}$	$2.8x10^{+01}$
2,2,5-TRIETHYLHEPTANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
2,2,5-TRIMETHYLHEXANE	$4.3x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.3x10^{-06}$	$4.3x10^{-04}$
2,2-DICHLORONITROANILINE	$1.5x10^{-01}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.9x10^{-06}$	$1.5x10^{-01}$
2,2-DIMETHYLBUTANE	$5.2x10^{+00}$	$6.5x10^{-01}$	$4.9x10^{-01}$	$2.3x10^{+00}$	$8.6x10^{+00}$
2,2-DIMETHYLHEPTANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
2,2-DIMETHYLHEXANE	$7.0x10^{-01}$	$8.7x10^{-02}$	$6.5x10^{-02}$	$3.0x10^{-01}$	$1.2x10^{+00}$
2,2-DIMETHYLPENTANE	$1.7x10^{+00}$	$2.2x10^{-01}$	$1.6x10^{-01}$	$7.5x10^{-01}$	$2.9x10^{+00}$
2,3,3-TRIMETHYLPENTANE	$1.7x10^{+00}$	$2.2x10^{-01}$	$1.6x10^{-01}$	$7.5x10^{-01}$	$2.9x10^{+00}$
2,3,4-TRIMETHYLPENTANE	$1.7x10^{+00}$	$2.2x10^{-01}$	$1.6x10^{-01}$	$7.5x10^{-01}$	$2.9x10^{+00}$
2,3,5-TRIMETHYLHEPTANE	$1.4x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-06}$	$1.4x10^{-04}$
2,3-DIMETHYLBUTANE	$2.8x10^{+01}$	$3.5x10^{+00}$	$2.6x10^{+00}$	$1.2x10^{+01}$	$4.7x10^{+01}$
2,3-DIMETHYLHEPTANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
2,3-DIMETHYLHEXANE	$2.8x10^{+00}$	$3.5x10^{-01}$	$2.6x10^{-01}$	$1.2x10^{+00}$	$4.6x10^{+00}$
2,3-DIMETHYLOCTANE	$2.1x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.1x10^{-05}$	$2.2x10^{-03}$
2,3-DIMETHYLPENTANE	$6.3x10^{+00}$	$7.8x10^{-01}$	$5.9x10^{-01}$	$2.7x10^{+00}$	$1.0x10^{+01}$
2,4,5-TRICHLOROPHENOL	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
2,4-DIMETHYLHEPTANE	$1.3x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.3x10^{-05}$	$1.3x10^{-03}$
2,4-DIMETHYLHEXANE	$1.1x10^{+02}$	$8.1x10^{+00}$	$5.7x10^{+00}$	$1.9x10^{+01}$	$1.5x10^{+02}$
2,4-DIMETHYLNONANE	$1.4x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-06}$	$1.4x10^{-04}$
2,4-DIMETHYLOCTANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
2,4-DIMETHYLPENTANE	$3.1x10^{+01}$	$2.4x10^{+00}$	$1.7x10^{+00}$	$6.3x10^{+00}$	$4.1x10^{+01}$
2,4-TOLUENE DIISOCYANATE {TDI}	$3.1x10^{-01}$	$0.0x10^{+00}$	$2.1x10^{-02}$	$1.7x10^{-02}$	$3.5x10^{-01}$
2,5-DIMETHYLHEPTANE	$1.9x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.9x10^{-05}$	$1.9x10^{-03}$
2,5-DIMETHYLHEXANE	$2.4x10^{+00}$	$3.0x10^{-01}$	$2.3x10^{-01}$	$1.1x10^{+00}$	$4.0x10^{+00}$
2,5-DIMETHYLNONANE	$1.6x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.6x10^{-05}$	$1.6x10^{-03}$
2,5-DIMETHYLOCTANE	$1.4x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-06}$	$1.4x10^{-04}$
2,6-DIMETHYLDECANE	$1.1x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.1x10^{-05}$	$1.2x10^{-03}$

Substance	Emissions (tonnes/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
2,6-DIMETHYLHEPTANE	3.3x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	3.3x10^{-05}	3.3x10^{-03}
2,6-DIMETHYLNONANE	6.3x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	6.3x10^{-05}	6.3x10^{-03}
2,6-DIMETHYLOCTANE	2.4x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	2.4x10^{-05}	2.5x10^{-03}
2,6-DIMETHYLUNDECANE	2.9x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	2.9x10^{-06}	2.9x10^{-04}
2,7-DIMETHYLDECANE	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}
2,7-DIMETHYLOCTANE	2.9x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	2.9x10^{-06}	2.9x10^{-04}
2-ETHOXYETHANOL {CELLOSOLVE} {EGEE}	3.4x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	3.4x10^{-05}	3.5x10^{-03}
2-ETHOXYETHYL ACETATE {CELLOSOLVE ACETATE}	5.1x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	5.1x10^{-05}	5.2x10^{-03}
2-ETHYL-1,3-DIMETHYLCYCLOHEXANE	4.3x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	4.3x10^{-06}	4.3x10^{-04}
2-METHYL-1-BUTENE	4.0x10^{+01}	4.9x10^{+00}	3.7x10^{+00}	1.7x10^{+01}	6.5x10^{+01}
2-METHYL-1-PENTENE	6.6x10^{-06}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	6.6x10^{-06}
2-METHYL-2-BUTENE	1.5x10^{+02}	1.9x10^{+01}	1.4x10^{+01}	6.7x10^{+01}	2.6x10^{+02}
2-METHYL-3-ETHYLPENTANE	2.9x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	2.9x10^{-06}	2.9x10^{-04}
2-METHYL-3-HEXANONE	1.1x10^{+02}	7.6x10^{+00}	5.4x10^{+00}	3.2x10^{+01}	1.6x10^{+02}
2-METHYL-BUTANE	2.5x10^{-05}	0.0x10^{+00}	0.0x10^{+00}	6.8x10^{-04}	7.1x10^{-04}
2-METHYLDECALIN	5.7x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	5.7x10^{-06}	5.8x10^{-04}
2-METHYLDECANE	3.6x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	3.6x10^{-05}	3.6x10^{-03}
2-METHYLHEPTANE	5.3x10^{+00}	6.5x10^{-01}	4.9x10^{-01}	2.3x10^{+00}	8.6x10^{+00}
2-METHYLHEXANE	1.8x10^{+01}	2.2x10^{+00}	1.7x10^{+00}	7.7x10^{+00}	2.9x10^{+01}
2-METHYLNAPHTHALENE	1.4x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	1.4x10^{-06}	1.4x10^{-04}
2-METHYLNONANE	3.5x10^{-01}	4.3x10^{-02}	3.3x10^{-02}	1.5x10^{-01}	5.8x10^{-01}
2-METHYLOCTANE	3.5x10^{-01}	4.3x10^{-02}	3.3x10^{-02}	1.5x10^{-01}	5.8x10^{-01}
2-METHYLPENTANE	1.7x10^{+02}	2.1x10^{+01}	1.6x10^{+01}	7.2x10^{+01}	2.8x10^{+02}
2-METHYLPROPANE; ISOBUTANE	1.1x10^{+02}	1.3x10^{+01}	1.0x10^{+01}	4.6x10^{+01}	1.8x10^{+02}
2-METHYLPROPENE (ISOBUTENE)	6.6x10^{-06}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	6.6x10^{-06}
2-METHYLUNDECANE {ISODODECANE}	1.3x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	1.3x10^{-05}	1.3x10^{-03}
3,3,5-TRIMETHYLHEPTANE	1.4x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	1.4x10^{-06}	1.4x10^{-04}
3,3-DIMETHYLPENTANE	2.1x10^{+00}	2.6x10^{-01}	2.0x10^{-01}	9.0x10^{-01}	3.5x10^{+00}
3,4-DIMETHYLHEXANE	5.7x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	5.7x10^{-06}	5.8x10^{-04}
3,4-DIMETHYLOCTANE	4.3x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	4.3x10^{-06}	4.3x10^{-04}
3,5-DIMETHYLNONANE	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}
3,5-DIMETHYLOCTANE	4.3x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	4.3x10^{-06}	4.3x10^{-04}
3,6-DIMETHYL DECANE	4.3x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	4.3x10^{-06}	4.3x10^{-04}
3,6-DIMETHYL UNDECANE	2.6x10^{+00}	1.5x10^{-03}	1.8x10^{-01}	1.4x10^{-01}	2.9x10^{+00}
3,6-DIMETHYLOCTANE	5.7x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	5.7x10^{-06}	5.8x10^{-04}
3,7-DIMETHYL-1-OCTANOL	6.1x10^{-01}	0.0x10^{+00}	4.3x10^{-02}	3.3x10^{-02}	6.9x10^{-01}
3,7-DIMETHYLNONANE	1.9x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	1.9x10^{-05}	1.9x10^{-03}
3-ETHYL-2-METHYLHEPTANE	7.1x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	7.1x10^{-06}	7.2x10^{-04}
3-ETHYL-3-METHYLOCTANE	5.7x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	5.7x10^{-06}	5.8x10^{-04}
3-ETHYL-4-METHYLHEPTANE	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}
3-ETHYLDECANE	1.4x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	1.4x10^{-06}	1.4x10^{-04}
3-ETHYLHEPTANE	5.7x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	5.7x10^{-06}	5.8x10^{-04}
3-ETHYLHEXANE	1.3x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	1.3x10^{-05}	1.3x10^{-03}
3-ETHYLOCTANE	4.3x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	4.3x10^{-06}	4.3x10^{-04}
3-ETHYLPENTANE	3.5x10^{+00}	4.3x10^{-01}	3.3x10^{-01}	1.5x10^{+00}	5.8x10^{+00}
3-METHYL DODECANE	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}
3-METHYL-1-BUTENE	1.0x10^{+00}	1.3x10^{-01}	9.8x10^{-02}	4.5x10^{-01}	1.7x10^{+00}
3-METHYL-5-ETHYLHEPTANE	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}
3-METHYLDECANE	3.3x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	3.3x10^{-05}	3.3x10^{-03}
3-METHYLHEPTANE	4.9x10^{+00}	6.1x10^{-01}	4.6x10^{-01}	2.1x10^{+00}	8.1x10^{+00}
3-METHYLHEXANE	2.2x10^{+01}	2.7x10^{+00}	2.1x10^{+00}	9.5x10^{+00}	3.6x10^{+01}
3-METHYLNONANE	1.4x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	1.4x10^{-05}	1.4x10^{-03}
3-METHYLOCTANE	7.0x10^{-01}	8.7x10^{-02}	6.5x10^{-02}	3.0x10^{-01}	1.2x10^{+00}

Substance	Emissions (tonnes/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
3-METHYLPENTANE	$8.2x10^{+01}$	$1.0x10^{+01}$	$7.6x10^{+00}$	$3.5x10^{+01}$	$1.3x10^{+02}$
3-METHYLUNDECANE	$7.1x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.1x10^{-06}$	$7.2x10^{-04}$
3-PHENYLPENTANE	$7.1x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.1x10^{-06}$	$7.2x10^{-04}$
4,5-DIMETHYLDECANE	$1.4x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.4x10^{-06}$	$1.4x10^{-04}$
4,5-DIMETHYLOCTANE	$7.1x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.1x10^{-06}$	$7.2x10^{-04}$
4-ETHYLDECANE	$5.7x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.7x10^{-06}$	$5.8x10^{-04}$
4-METHYLDECANE	$2.9x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-05}$	$2.9x10^{-03}$
4-METHYLHEPTANE	$2.8x10^{+00}$	$3.5x10^{-01}$	$2.6x10^{-01}$	$1.2x10^{+00}$	$4.6x10^{+00}$
4-METHYLINDAN	$2.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-06}$	$2.9x10^{-04}$
4-METHYLNONANE	$4.1x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.1x10^{-05}$	$4.2x10^{-03}$
4-METHYLOCTANE	$3.5x10^{-01}$	$4.3x10^{-02}$	$3.3x10^{-02}$	$1.5x10^{-01}$	$5.8x10^{-01}$
4-METHYLUNDECANE	$4.3x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.3x10^{-06}$	$4.3x10^{-04}$
5-ISOPROPYLNONANE	$4.3x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.3x10^{-06}$	$4.3x10^{-04}$
5-METHYL DODECANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
5-METHYLDECANE	$2.7x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.7x10^{-05}$	$2.7x10^{-03}$
5-METHYLINDAN	$2.3x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.3x10^{-05}$	$2.3x10^{-03}$
5-METHYLUNDECANE	$5.7x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.7x10^{-06}$	$5.8x10^{-04}$
6-ETHYL-2-METHYLOCTANE	$7.1x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.1x10^{-06}$	$7.2x10^{-04}$
6-METHYLUNDECANE	$7.1x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.1x10^{-06}$	$7.2x10^{-04}$
ACENAPHTHENE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
ACENAPHTHYLENE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
ACETALDEHYDE	$3.5x10^{-01}$	$1.5x10^{-05}$	$0.0x10^{+00}$	$8.6x10^{-04}$	$3.5x10^{-01}$
ACETIC ACID	$7.4x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.4x10^{-04}$
ACETIC ANHYDRIDE	$4.5x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.5x10^{-05}$
ACETONE	$9.8x10^{+01}$	$9.5x10^{+00}$	$4.8x10^{+00}$	$2.0x10^{+01}$	$1.3x10^{+02}$
ACETYLENE	$1.2x10^{-03}$	$1.4x10^{-02}$	$0.0x10^{+00}$	$6.2x10^{-03}$	$2.1x10^{-02}$
ACROLEIN (2-PROPENAL)	$9.0x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$9.0x10^{-04}$
ACRYLONITRILE	$4.8x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.8x10^{-04}$
AMMONIA (TOTAL)	$5.2x10^{+03}$	$8.8x10^{+01}$	$2.0x10^{+01}$	$3.1x10^{+03}$	$8.4x10^{+03}$
ANTHRACENE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
ANTIMONY & COMPOUNDS	$4.6x10^{-05}$	$7.7x10^{-06}$	$2.1x10^{-06}$	$5.4x10^{-05}$	$1.1x10^{-04}$
ARSENIC & COMPOUNDS	$4.0x10^{-03}$	$2.5x10^{-04}$	$2.1x10^{-04}$	$1.7x10^{-03}$	$6.1x10^{-03}$
BENZALDEHYDE	$1.4x10^{+01}$	$9.3x10^{-01}$	$6.7x10^{-01}$	$2.2x10^{+00}$	$1.8x10^{+01}$
BENZENE	$5.1x10^{+01}$	$4.0x10^{+00}$	$3.3x10^{+00}$	$1.4x10^{+01}$	$7.3x10^{+01}$
BENZO(A)ANTHRACENE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
BENZO(A)PYRENE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
BENZOIC ACID	$2.1x10^{-01}$	$0.0x10^{+00}$	$1.4x10^{-02}$	$1.1x10^{-02}$	$2.3x10^{-01}$
BENZOTHIAZOLE	$6.2x10^{-03}$	$3.1x10^{-04}$	$2.5x10^{-04}$	$8.8x10^{-04}$	$7.6x10^{-03}$
BERYLLIUM & COMPOUNDS	$3.5x10^{-04}$	$1.4x10^{-05}$	$1.3x10^{-05}$	$1.0x10^{-04}$	$4.8x10^{-04}$
BICYCLO[4.3.0]NONANE (OCTAHYDROINDENE)	$2.1x10^{-02}$	$1.1x10^{-03}$	$8.5x10^{-04}$	$3.0x10^{-03}$	$2.6x10^{-02}$
BIPHENYLOL {2-PHENYLPHENOL}	$7.2x10^{-01}$	$0.0x10^{+00}$	$5.0x10^{-02}$	$3.9x10^{-02}$	$8.1x10^{-01}$
BORON & COMPOUNDS	$2.3x10^{-01}$	$1.5x10^{-04}$	$1.8x10^{-01}$	$7.4x10^{-04}$	$4.1x10^{-01}$
BUTANOIC ACID	$5.0x10^{-02}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.0x10^{-02}$
BUTYL CELLOSOLVE {2-BUTOXYETHANOL} {EGBE}	$9.5x10^{+01}$	$6.5x10^{+00}$	$4.6x10^{+00}$	$1.5x10^{+01}$	$1.2x10^{+02}$
BUTYL ISOPROPYL PHTHALATE	$1.3x10^{+02}$	$0.0x10^{+00}$	$9.1x10^{+00}$	$7.1x10^{+00}$	$1.5x10^{+02}$
BUTYLBENZENE ISOMERS	$4.6x10^{-01}$	$2.3x10^{-02}$	$1.9x10^{-02}$	$6.6x10^{-02}$	$5.7x10^{-01}$
BUTYLCYCLOHEXANE	$2.1x10^{-01}$	$1.1x10^{-02}$	$8.4x10^{-03}$	$3.0x10^{-02}$	$2.6x10^{-01}$
BUTYRALDEHYDE	$5.0x10^{-06}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.0x10^{-06}$
C10 OLEFINS	$1.3x10^{+02}$	$8.8x10^{+00}$	$6.5x10^{+00}$	$2.1x10^{+01}$	$1.7x10^{+02}$
C10H12	$2.7x10^{+00}$	$4.6x10^{-03}$	$3.7x10^{-03}$	$7.2x10^{-01}$	$3.4x10^{+00}$
C11 OLEFINS	$1.2x10^{-01}$	$6.2x10^{-03}$	$4.9x10^{-03}$	$1.7x10^{-02}$	$1.5x10^{-01}$
C12 OLEFINS	$1.5x10^{-02}$	$7.5x10^{-04}$	$6.0x10^{-04}$	$2.1x10^{-03}$	$1.8x10^{-02}$
C2 ALKYL INDAN	$4.2x10^{-01}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.5x10^{-06}$	$4.2x10^{-01}$

Substance	Emissions (tonnes/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
C4 SUBSTITUTED CYCLOHEXANONE	8.9x10^{-02}	0.0x10^{+00}	0.0x10^{+00}	1.2x10^{-06}	8.9x10^{-02}
C5 KETONES	6.3x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	6.3x10^{-05}	6.3x10^{-03}
C5 SUBSTITUTED CYCLOHEXANE	1.5x10^{-01}	0.0x10^{+00}	0.0x10^{+00}	2.0x10^{-06}	1.5x10^{-01}
C6 SUBSTITUTED CYCLOHEXANE	1.2x10^{-01}	0.0x10^{+00}	0.0x10^{+00}	1.5x10^{-06}	1.2x10^{-01}
C7 CYCLOPARAFFINS	1.2x10^{+00}	1.5x10^{-01}	4.6x10^{-02}	2.3x10^{-01}	1.6x10^{+00}
C7 INTERNAL ALKENES	3.3x10^{-06}	0.0x10^{+00}	0.0x10^{+00}	2.1x10^{-03}	2.1x10^{-03}
C8 CYCLOPARAFFINS	1.5x10^{-01}	2.0x10^{-02}	6.4x10^{-03}	3.2x10^{-02}	2.1x10^{-01}
C8 INTERNAL ALKENES	7.8x10^{+00}	5.2x10^{-01}	3.8x10^{-01}	1.2x10^{+00}	9.9x10^{+00}
C8 OLEFINS	4.5x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	4.5x10^{-04}
C9 CYCLOPARAFFINS	1.1x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	3.1x10^{-01}	1.4x10^{+00}
C9 OLEFINS	2.5x10^{-03}	1.3x10^{-04}	9.9x10^{-05}	3.5x10^{-04}	3.1x10^{-03}
CADMIUM & COMPOUNDS	2.0x10^{-02}	1.1x10^{-03}	1.1x10^{-03}	6.3x10^{-03}	2.9x10^{-02}
CARBITOL {DEGEE} {2-(2-ETHOXYETHOXY)ETHANOL}	1.7x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	1.7x10^{-05}	1.7x10^{-03}
CARBON DISULFIDE	2.0x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	2.0x10^{-04}
CARBON MONOXIDE	1.3x10^{+03}	6.8x10^{+01}	1.0x10^{+02}	3.3x10^{+02}	1.8x10^{+03}
CARBON TETRACHLORIDE	1.6x10^{-01}	6.9x10^{-06}	0.0x10^{+00}	4.0x10^{-04}	1.6x10^{-01}
CARBONYL SULFIDE	6.5x10^{-05}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	6.5x10^{-05}
CARYOPHYLLENE	1.1x10^{+00}	0.0x10^{+00}	7.8x10^{-02}	6.1x10^{-02}	1.3x10^{+00}
CHLOROBENZENE	6.1x10^{-02}	1.6x10^{-03}	1.3x10^{-03}	4.6x10^{-03}	6.8x10^{-02}
CHLORODIFLUOROMETHANE (F-22)	3.6x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	3.6x10^{-04}
CHLOROETHANE (ETHYL CHLORIDE)	6.4x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	6.4x10^{-04}
CHLOROFLUOROMETHANE {HCFC-31}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}
CHLOROFORM (TRICHLOROMETHANE)	1.8x10^{+01}	7.9x10^{-04}	0.0x10^{+00}	4.5x10^{-02}	1.8x10^{+01}
CHLOROPENTAFLUOROETHANE (F115)	3.5x10^{-05}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	3.5x10^{-05}
CHLOROPRENE (2-CHLORO-1,3-BUTADIENE)	7.6x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	7.6x10^{-04}
CHLOROTRIFLUOROMETHANE (F-13)	1.2x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	1.2x10^{-04}
CHROMIUM (III) COMPOUNDS	8.0x10^{-02}	6.0x10^{-03}	3.0x10^{-01}	1.2x10^{-02}	4.0x10^{-01}
CHROMIUM (VI) COMPOUNDS	4.2x10^{-03}	4.2x10^{-04}	9.9x10^{-05}	1.1x10^{-03}	5.8x10^{-03}
CHRYSENE	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}
CIS,CIS-1,2,4-TRIMETHYLCYCLOHEXANE	5.7x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	5.7x10^{-06}	5.8x10^{-04}
CIS,TRANS-1,2,3-TRIMETHYLCYCLOHEXANE	4.3x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	4.3x10^{-06}	4.3x10^{-04}
CIS,TRANS-1,2,4-TRIMETHYLCYCLOHEXANE	1.1x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	1.1x10^{-05}	1.2x10^{-03}
CIS-1,2-DIMETHYLCYCLOHEXANE	4.3x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	4.3x10^{-06}	4.3x10^{-04}
CIS-1,3-DIMETHYLCYCLOHEXANE	1.1x10^{-02}	0.0x10^{+00}	0.0x10^{+00}	1.1x10^{-04}	1.1x10^{-02}
CIS-1,3-DIMETHYLCYCLOPENTANE	7.7x10^{+00}	9.5x10^{-01}	7.2x10^{-01}	3.3x10^{+00}	1.3x10^{+01}
CIS-1,4-DIMETHYLCYCLOHEXANE	5.7x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	5.7x10^{-06}	5.8x10^{-04}
CIS-1,CIS-2,3-TRIMETHYLCYCLOPENTANE	1.4x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	1.4x10^{-05}	1.4x10^{-03}
CIS-1,CIS-2,4-TRIMETHYLCYCLOPENTANE	4.9x10^{+00}	6.1x10^{-01}	4.6x10^{-01}	2.1x10^{+00}	8.1x10^{+00}
CIS-1,CIS-3,5-TRIMETHYLCYCLOHEXANE	3.0x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	3.0x10^{-05}	3.0x10^{-03}
CIS-1,TRANS-2,3-TRIMETHYLCYCLOPENTANE	1.4x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	1.4x10^{-05}	1.4x10^{-03}
CIS-1-2-DIMETHYLCYCLOPENTANE	4.9x10^{+00}	6.1x10^{-01}	4.6x10^{-01}	2.1x10^{+00}	8.1x10^{+00}
CIS-1-ETHYL-2-METHYLCYCLOHEXANE	1.4x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	1.4x10^{-06}	1.4x10^{-04}
CIS-1-ETHYL-2-METHYLCYCLOPENTANE	1.4x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	1.4x10^{-06}	1.4x10^{-04}
CIS-1-ETHYL-3-METHYLCYCLOHEXANE	1.9x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	1.9x10^{-05}	1.9x10^{-03}
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	4.3x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	4.3x10^{-06}	4.3x10^{-04}
CIS-2-BUTENE	1.0x10^{+01}	1.3x10^{+00}	9.8x10^{-01}	4.5x10^{+00}	1.7x10^{+01}
CIS-2-PENTENE	5.7x10^{+01}	7.0x10^{+00}	5.3x10^{+00}	2.4x10^{+01}	9.3x10^{+01}
CIS-BICYCLO[3.3.0]OCTANE	1.4x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	1.4x10^{-06}	1.4x10^{-04}
CIS-BICYCLO[4.3.0]NONANE	5.7x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	5.7x10^{-06}	5.8x10^{-04}
CIS-DECALIN	1.4x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	1.4x10^{-06}	1.4x10^{-04}
COBALT & COMPOUNDS	1.8x10^{-03}	1.4x10^{-04}	9.1x10^{-05}	8.4x10^{-04}	2.8x10^{-03}
COPPER & COMPOUNDS	1.0x10^{-01}	1.1x10^{-03}	2.0x10^{-03}	6.2x10^{-03}	1.1x10^{-01}
CUMENE (1-METHYLETHYLBENZENE)	4.7x10^{+00}	4.2x10^{-01}	2.1x10^{-01}	1.2x10^{+00}	6.5x10^{+00}

Substance	Emissions (tonnes/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
CYCLOHEXANE	$7.0x10^{+01}$	$1.5x10^{+00}$	$4.3x10^{+00}$	$8.5x10^{+00}$	$8.4x10^{+01}$
CYCLOHEXANOL	$8.0x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$8.0x10^{-05}$
CYCLOHEXANONE	$9.9x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$9.9x10^{-03}$
CYCLOHEXENE	$2.3x10^{+00}$	$0.0x10^{+00}$	$1.6x10^{-01}$	$1.2x10^{-01}$	$2.5x10^{+00}$
CYCLOPENTANE	$9.8x10^{-02}$	$7.1x10^{-04}$	$2.2x10^{-04}$	$1.1x10^{-03}$	$1.0x10^{-01}$
CYCLOPENTENE	$1.0x10^{+00}$	$1.3x10^{-01}$	$9.8x10^{-02}$	$4.5x10^{-01}$	$1.7x10^{+00}$
DECALINS (MIXED CIS,TRANS)	$7.4x10^{-02}$	$3.8x10^{-03}$	$3.0x10^{-03}$	$1.1x10^{-02}$	$9.2x10^{-02}$
DI(2-ETHYLHEXYL)PHTHALATE	$8.1x10^{-02}$	$3.5x10^{-06}$	$0.0x10^{+00}$	$2.0x10^{-04}$	$8.1x10^{-02}$
DI(PROPYLENE GLYCOL) METHYL ETHER	$4.3x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.3x10^{-05}$	$4.3x10^{-03}$
DIACETONE ALCOHOL (4-HYDROXY-4-METHYL-2-PENTANONE)	$4.2x10^{-02}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.2x10^{-04}$	$4.2x10^{-02}$
DIBROMOETHANE	$1.7x10^{+01}$	$1.1x10^{+00}$	$8.0x10^{-01}$	$2.6x10^{+00}$	$2.1x10^{+01}$
DIBUTYL PHTHALATE	$1.0x10^{+02}$	$0.0x10^{+00}$	$7.1x10^{+00}$	$5.5x10^{+00}$	$1.2x10^{+02}$
DICHLOROBENZENES	$4.5x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.5x10^{-05}$
DICHLORODIFLUOROMETHANE (F-12)	$8.0x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$8.0x10^{-04}$
DICHLOROMETHANE {METHYLENE CHLORIDE}	$5.0x10^{+01}$	$1.5x10^{+00}$	$1.1x10^{+00}$	$3.5x10^{+00}$	$5.7x10^{+01}$
DIETHYLBENZENES	$2.5x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.5x10^{-05}$
DIETHYLCYCLOHEXANE	$1.4x10^{+02}$	$9.7x10^{+00}$	$7.0x10^{+00}$	$2.3x10^{+01}$	$1.8x10^{+02}$
DIETHYLENE GLYCOL (2,2'-OXYBISETHANOL)	$3.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$3.0x10^{+00}$
DIETHYLMETHYLCYCLOHEXANES	$6.8x10^{-02}$	$3.5x10^{-03}$	$2.7x10^{-03}$	$9.7x10^{-03}$	$8.4x10^{-02}$
DIMETHOXYMETHANE (METHYLAL)	$1.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.9x10^{-04}$
DIMETHYL ETHER	$2.1x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.1x10^{-03}$
DIMETHYLBENZYLALCOHOL	$1.9x10^{-02}$	$9.4x10^{-04}$	$7.5x10^{-04}$	$2.6x10^{-03}$	$2.3x10^{-02}$
DIMETHYLBUTYLCYCLOHEXANE	$6.2x10^{-03}$	$3.1x10^{-04}$	$2.5x10^{-04}$	$8.8x10^{-04}$	$7.6x10^{-03}$
DIMETHYLCYCLOBUTANONE	$8.6x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$8.6x10^{-05}$
DIMETHYLCYCLOHEXANES	$9.5x10^{+01}$	$6.4x10^{+00}$	$4.6x10^{+00}$	$1.5x10^{+01}$	$1.2x10^{+02}$
DIMETHYLCYCLOPENTANE	$1.0x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.0x10^{-03}$
DIMETHYLDECANE	$3.6x10^{-02}$	$1.8x10^{-03}$	$1.4x10^{-03}$	$5.1x10^{-03}$	$4.4x10^{-02}$
DIMETHYLHEPTANES	$9.9x10^{+00}$	$6.7x10^{-01}$	$4.8x10^{-01}$	$1.5x10^{+00}$	$1.3x10^{+01}$
DIMETHYLHEPTANOL (2,6-DIMETHYL-2-HEPTANOL)	$4.1x10^{-01}$	$0.0x10^{+00}$	$2.9x10^{-02}$	$2.2x10^{-02}$	$4.6x10^{-01}$
DIMETHYLHEXANES	$4.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.9x10^{-04}$
DIMETHYLNONANES	$3.1x10^{-01}$	$1.6x10^{-02}$	$1.2x10^{-02}$	$4.4x10^{-02}$	$3.8x10^{-01}$
DIMETHYLOCTANES	$8.0x10^{-01}$	$4.1x10^{-02}$	$3.2x10^{-02}$	$1.1x10^{-01}$	$9.9x10^{-01}$
DIMETHYLOCTYNE	$1.2x10^{-02}$	$6.3x10^{-04}$	$5.0x10^{-04}$	$1.8x10^{-03}$	$1.5x10^{-02}$
EICOSANE	$4.9x10^{+00}$	$0.0x10^{+00}$	$3.4x10^{-01}$	$2.7x10^{-01}$	$5.5x10^{+00}$
ETHANE	$7.4x10^{+00}$	$3.4x10^{-03}$	$2.7x10^{+00}$	$2.7x10^{-03}$	$1.0x10^{+01}$
ETHYL ACETATE	$1.0x10^{+02}$	$4.2x10^{+00}$	$3.0x10^{+00}$	$1.8x10^{+01}$	$1.3x10^{+02}$
ETHYL ACRYLATE	$2.7x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.7x10^{-04}$
ETHYL ALCOHOL	$1.6x10^{+02}$	$5.4x10^{+01}$	$0.0x10^{+00}$	$7.5x10^{+01}$	$2.9x10^{+02}$
ETHYL ETHER	$2.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-04}$
ETHYL PROPYLCYCLOHEXANES	$6.2x10^{-02}$	$3.1x10^{-03}$	$2.5x10^{-03}$	$8.8x10^{-03}$	$7.6x10^{-02}$
ETHYLBENZENE	$3.7x10^{+01}$	$2.7x10^{+00}$	$2.0x10^{+00}$	$8.9x10^{+00}$	$5.1x10^{+01}$
ETHYLCYCLOHEXANE	$2.5x10^{+01}$	$1.7x10^{+00}$	$1.2x10^{+00}$	$3.9x10^{+00}$	$3.2x10^{+01}$
ETHYLCYCLOPENTANE	$1.2x10^{+01}$	$9.0x10^{-01}$	$6.6x10^{-01}$	$2.2x10^{+00}$	$1.6x10^{+01}$
ETHYLDIMETHYLPHENOL	$6.8x10^{-02}$	$3.5x10^{-03}$	$2.7x10^{-03}$	$9.7x10^{-03}$	$8.4x10^{-02}$
ETHYLENE	$4.0x10^{+00}$	$3.4x10^{-02}$	$0.0x10^{+00}$	$3.2x10^{-02}$	$4.1x10^{+00}$
ETHYLENE GLYCOL	$4.8x10^{-02}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.8x10^{-04}$	$4.8x10^{-02}$
ETHYLENE OXIDE	$3.5x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$3.5x10^{-05}$
ETHYLHEPTENE	$4.1x10^{+01}$	$2.8x10^{+00}$	$2.0x10^{+00}$	$6.4x10^{+00}$	$5.2x10^{+01}$
ETHYLHEXANE	$4.2x10^{-02}$	$2.1x10^{-03}$	$1.7x10^{-03}$	$6.0x10^{-03}$	$5.2x10^{-02}$
ETHYLMETHYLCYCLOHEXANES	$5.3x10^{-01}$	$2.7x10^{-02}$	$2.1x10^{-02}$	$7.5x10^{-02}$	$6.5x10^{-01}$
ETHYLMETHYLHEXANE	$1.2x10^{-02}$	$6.3x10^{-04}$	$5.0x10^{-04}$	$1.8x10^{-03}$	$1.5x10^{-02}$
ETHYLMETHYLOCTANE	$9.9x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$9.9x10^{-05}$

Substance	Emissions (tonnes/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
ETHYLOCTANE	$4.5x10^{+00}$	$1.3x10^{-03}$	$3.1x10^{-01}$	$2.5x10^{-01}$	$5.1x10^{+00}$
ETHYLOCTENES	$6.3x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$6.3x10^{-05}$
ETHYLTOLUENES {METHYLETHYLBENZENES}	$6.0x10^{+00}$	$4.1x10^{-01}$	$2.9x10^{-01}$	$1.7x10^{+00}$	$8.5x10^{+00}$
FLUORANTHENE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
FLUORENE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
FLUORIDE COMPOUNDS	$1.6x10^{-01}$	$1.5x10^{-03}$	$1.4x10^{+00}$	$1.5x10^{-01}$	$1.7x10^{+00}$
FORMALDEHYDE	$8.9x10^{+01}$	$1.1x10^{+00}$	$1.4x10^{+00}$	$5.2x10^{+00}$	$9.7x10^{+01}$
FORMIC ACID	$5.0x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.0x10^{-05}$
HENEICOSANE	$3.1x10^{+00}$	$0.0x10^{+00}$	$2.1x10^{-01}$	$1.7x10^{-01}$	$3.5x10^{+00}$
HEPTYL CYCLOHEXANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
HEXADECANE	$3.4x10^{+01}$	$2.5x10^{-03}$	$2.4x10^{+00}$	$1.8x10^{+00}$	$3.8x10^{+01}$
HEXAFLUOROETHANE {F-116}	$9.0x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$9.0x10^{-04}$
HEXAMETHYLENEDIAMINE	$7.6x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.6x10^{-04}$
HEXYLCYCLOHEXANE	$2.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-06}$	$2.9x10^{-04}$
HEXYLCYCLOPENTANE	$4.3x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.3x10^{-06}$	$4.3x10^{-04}$
HYDROCHLORIC ACID	$2.7x10^{-03}$	$4.5x10^{-03}$	$1.4x10^{+00}$	$1.1x10^{+00}$	$2.5x10^{+00}$
HYDROGEN SULFIDE	$3.8x10^{-03}$	$6.8x10^{-04}$	$0.0x10^{+00}$	$3.6x10^{-02}$	$4.1x10^{-02}$
INDAN	$8.6x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$8.6x10^{-06}$	$8.7x10^{-04}$
ISOAMYL ALCOHOL (3-METHYL-1-BUTANOL)	$6.9x10^{-03}$	$1.3x10^{-03}$	$0.0x10^{+00}$	$6.7x10^{-02}$	$7.6x10^{-02}$
ISOBUTYL ALCOHOL	$3.2x10^{-02}$	$4.2x10^{-04}$	$0.0x10^{+00}$	$2.3x10^{-02}$	$5.5x10^{-02}$
ISOBUTYLCYCLOHEXANE (2-METHYLPROPYL CYCLOHEXANE)	$1.3x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.3x10^{-05}$	$1.3x10^{-03}$
ISOBUTYRALDEHYDE	$6.6x10^{-06}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$6.6x10^{-06}$
ISOMERS OF BUTENE	$1.5x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.5x10^{-04}$
ISOMERS OF C10H18	$8.1x10^{+01}$	$5.4x10^{+00}$	$3.9x10^{+00}$	$1.3x10^{+01}$	$1.0x10^{+02}$
ISOMERS OF C11H20	$4.0x10^{-02}$	$2.0x10^{-03}$	$1.6x10^{-03}$	$5.6x10^{-03}$	$4.9x10^{-02}$
ISOMERS OF C9H16	$1.8x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.8x10^{-04}$
ISOMERS OF DECANE (C10 PARAFFINS)	$1.2x10^{+02}$	$8.0x10^{+00}$	$5.8x10^{+00}$	$1.9x10^{+01}$	$1.5x10^{+02}$
ISOMERS OF DODECANE (C12 PARAFFINS)	$5.0x10^{-01}$	$7.0x10^{-03}$	$5.6x10^{-03}$	$2.0x10^{-02}$	$5.3x10^{-01}$
ISOMERS OF HEPTADECANE (C17 PARAFFINS)	$3.8x10^{+01}$	$0.0x10^{+00}$	$2.6x10^{+00}$	$2.0x10^{+00}$	$4.2x10^{+01}$
ISOMERS OF HEPTANE	$5.2x10^{-01}$	$1.6x10^{-02}$	$5.2x10^{-03}$	$2.6x10^{-02}$	$5.7x10^{-01}$
ISOMERS OF HEXANE	$7.0x10^{+00}$	$2.0x10^{-01}$	$1.5x10^{-01}$	$8.2x10^{-01}$	$8.1x10^{+00}$
ISOMERS OF NONANE (C9 PARAFFIN)	$1.6x10^{+02}$	$1.1x10^{+01}$	$7.7x10^{+00}$	$2.5x10^{+01}$	$2.0x10^{+02}$
ISOMERS OF OCTADECANE (C18 PARAFFINS)	$1.7x10^{+01}$	$0.0x10^{+00}$	$1.2x10^{+00}$	$9.4x10^{-01}$	$1.9x10^{+01}$
ISOMERS OF OCTANE (C8 PARAFFIN)	$3.3x10^{-01}$	$2.7x10^{-03}$	$8.8x10^{-04}$	$4.5x10^{-03}$	$3.4x10^{-01}$
ISOMERS OF PENTADECANE (C15 PARAFFINS)	$1.5x10^{+00}$	$0.0x10^{+00}$	$1.1x10^{-01}$	$8.3x10^{-02}$	$1.7x10^{+00}$
ISOMERS OF PENTANE	$2.0x10^{+03}$	$2.3x10^{+02}$	$1.7x10^{+02}$	$7.8x10^{+02}$	$3.1x10^{+03}$
ISOMERS OF PENTENE	$1.9x10^{-02}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.5x10^{-07}$	$1.9x10^{-02}$
ISOMERS OF PROPYLBENZENE	$1.2x10^{-01}$	$6.2x10^{-03}$	$4.9x10^{-03}$	$1.7x10^{-02}$	$1.5x10^{-01}$
ISOMERS OF TETRADECANE (C14 PARAFFINS)	$1.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.8x10^{-01}$	$1.3x10^{+00}$
ISOMERS OF TRIDECANE (C13 PARAFFINS)	$6.2x10^{-03}$	$3.1x10^{-04}$	$2.5x10^{-04}$	$8.8x10^{-04}$	$7.6x10^{-03}$
ISOMERS OF UNDECANE (C11 PARAFFINS)	$3.2x10^{+01}$	$2.0x10^{+00}$	$1.5x10^{+00}$	$5.3x10^{+00}$	$4.1x10^{+01}$
ISOMERS OF XYLENE	$3.3x10^{+02}$	$2.2x10^{+01}$	$1.5x10^{+01}$	$7.4x10^{+01}$	$4.4x10^{+02}$
ISOPROPYL ACETATE	$3.1x10^{+02}$	$0.0x10^{+00}$	$2.1x10^{+01}$	$1.7x10^{+01}$	$3.5x10^{+02}$
ISOPROPYL ALCOHOL	$9.5x10^{+01}$	$6.0x10^{+00}$	$4.3x10^{+00}$	$1.4x10^{+01}$	$1.2x10^{+02}$
ISOPROPYLCYCLOHEXANE (2-METHYLETHYL CYCLOHEXANE)	$1.3x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.3x10^{-05}$	$1.3x10^{-03}$
ISOPROPYLMETHYLCYCLOHEXANE	$5.3x10^{-02}$	$2.7x10^{-03}$	$2.1x10^{-03}$	$7.6x10^{-03}$	$6.6x10^{-02}$
LEAD & COMPOUNDS	$1.9x10^{-01}$	$7.6x10^{-04}$	$8.0x10^{-04}$	$4.4x10^{-03}$	$1.9x10^{-01}$
MAGNESIUM OXIDE FUME	$8.8x10^{-01}$	$5.3x10^{+00}$	$0.0x10^{+00}$	$1.6x10^{-01}$	$6.3x10^{+00}$
MALEIC ANHYDRIDE	$1.5x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.5x10^{-04}$
MANGANESE & COMPOUNDS	$1.2x10^{+00}$	$8.5x10^{-02}$	$4.2x10^{-02}$	$7.8x10^{-02}$	$1.4x10^{+00}$
MERCURIC CHLORIDE	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.1x10^{-05}$	$0.0x10^{+00}$	$1.1x10^{-05}$
MERCURY & COMPOUNDS	$2.9x10^{-01}$	$2.6x10^{-04}$	$2.4x10^{-04}$	$1.5x10^{-03}$	$2.9x10^{-01}$

Substance	Emissions (tonnes/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
METHANE	$4.2x10^{+02}$	$6.9x10^{+00}$	$3.8x10^{+01}$	$3.9x10^{+01}$	$5.1x10^{+02}$
METHYL ACETATE	$6.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$6.9x10^{-04}$
METHYL ALCOHOL	$6.5x10^{-02}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$3.0x10^{+00}$	$3.1x10^{+00}$
METHYL AMYL KETONE	$2.5x10^{+01}$	$1.7x10^{+00}$	$1.2x10^{+00}$	$7.1x10^{+00}$	$3.5x10^{+01}$
METHYL CARBITOL {2-(2-METHOXYETHOXY)ETHANOL} {DEGM	$4.1x10^{-01}$	$0.0x10^{+00}$	$2.9x10^{-02}$	$2.2x10^{-02}$	$4.6x10^{-01}$
METHYL CHLORIDE	$5.0x10^{-06}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.0x10^{-06}$
METHYL ETHYL KETONE (MEK) (2-BUTANONE)	$1.5x10^{+02}$	$8.3x10^{+00}$	$6.0x10^{+00}$	$2.2x10^{+01}$	$1.8x10^{+02}$
METHYL FORMATE	$5.0x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.0x10^{-04}$
METHYL HEXANE	$1.9x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.9x10^{-03}$
METHYL ISOBUTYL KETONE	$2.0x10^{+01}$	$8.9x10^{-01}$	$6.4x10^{-01}$	$3.5x10^{+00}$	$2.5x10^{+01}$
METHYL METHACRYLATE	$2.2x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.2x10^{-04}$
METHYL PROPYLCYCLOHEXANES	$7.4x10^{-01}$	$3.8x10^{-02}$	$3.0x10^{-02}$	$1.1x10^{-01}$	$9.1x10^{-01}$
METHYLCYCLOHEXANE	$3.0x10^{+02}$	$2.0x10^{+01}$	$1.5x10^{+01}$	$4.7x10^{+01}$	$3.8x10^{+02}$
METHYLCYCLOOCTANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
METHYLCYCLOPENTANE	$2.1x10^{+01}$	$2.1x10^{+00}$	$1.5x10^{+00}$	$6.1x10^{+00}$	$3.1x10^{+01}$
METHYLDECALINS	$6.8x10^{-02}$	$3.5x10^{-03}$	$2.7x10^{-03}$	$9.7x10^{-03}$	$8.4x10^{-02}$
METHYLDECANES	$5.2x10^{-01}$	$2.6x10^{-02}$	$2.1x10^{-02}$	$7.4x10^{-02}$	$6.4x10^{-01}$
METHYLDECENES	$8.3x10^{-02}$	$4.2x10^{-03}$	$3.3x10^{-03}$	$1.2x10^{-02}$	$1.0x10^{-01}$
METHYLDODECANES	$2.7x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.7x10^{-05}$
METHYLENE BROMIDE	$7.5x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.5x10^{-05}$
METHYLETHYLPENTANOATE	$3.1x10^{-01}$	$0.0x10^{+00}$	$2.1x10^{-02}$	$1.7x10^{-02}$	$3.5x10^{-01}$
METHYLHEPTANE	$2.5x10^{-03}$	$1.3x10^{-04}$	$9.9x10^{-05}$	$3.5x10^{-04}$	$3.1x10^{-03}$
METHYLHEPTANOL	$7.2x10^{-01}$	$0.0x10^{+00}$	$5.0x10^{-02}$	$3.9x10^{-02}$	$8.1x10^{-01}$
METHYLHEXENES	$1.8x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.8x10^{-04}$
METHYLINDANS	$4.5x10^{-06}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.5x10^{-06}$
METHYLNAPHTHALENES	$3.8x10^{-01}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.0x10^{-06}$	$3.8x10^{-01}$
METHYLNONANE	$5.2x10^{-01}$	$2.6x10^{-02}$	$2.1x10^{-02}$	$7.3x10^{-02}$	$6.4x10^{-01}$
METHYLNONENES	$4.1x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.1x10^{-05}$
METHYLOCTANES	$1.9x10^{-01}$	$9.4x10^{-03}$	$7.4x10^{-03}$	$2.6x10^{-02}$	$2.3x10^{-01}$
METHYLPROPYLNONANE	$5.0x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.0x10^{-05}$
M-ETHYLTOLUENE	$1.3x10^{+01}$	$1.3x10^{+00}$	$6.9x10^{-01}$	$3.7x10^{+00}$	$1.9x10^{+01}$
METHYLUNDECANE	$1.8x10^{+01}$	$5.7x10^{-03}$	$1.2x10^{+00}$	$9.6x10^{-01}$	$2.0x10^{+01}$
NAPTHALENE	$2.9x10^{-01}$	$2.2x10^{-03}$	$1.7x10^{-03}$	$6.2x10^{-03}$	$3.0x10^{-01}$
N-BUTANE	$5.2x10^{+02}$	$5.9x10^{+01}$	$4.5x10^{+01}$	$2.1x10^{+02}$	$8.3x10^{+02}$
N-BUTYL ACETATE	$4.1x10^{+02}$	$2.8x10^{+01}$	$2.0x10^{+01}$	$7.3x10^{+01}$	$5.4x10^{+02}$
N-BUTYL ACRYLATE	$1.1x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.1x10^{-04}$
N-BUTYL ALCOHOL	$2.9x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$7.7x10^{-02}$	$3.0x10^{+00}$
N-BUTYLCYCHOHEPTANE	$1.3x10^{-06}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.3x10^{-06}$
N-BUTYLCYCLOPENTANE	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$
N-DECANE	$1.9x10^{+00}$	$4.3x10^{-02}$	$3.3x10^{-02}$	$1.5x10^{-01}$	$2.2x10^{+00}$
N-DODECANE	$2.8x10^{+00}$	$6.8x10^{-02}$	$3.4x10^{-02}$	$1.9x10^{-01}$	$3.1x10^{+00}$
N-HEPTADECANE	$9.2x10^{-03}$	$8.3x10^{-04}$	$4.1x10^{-04}$	$2.3x10^{-03}$	$1.3x10^{-02}$
N-HEPTANE	$1.7x10^{+02}$	$1.2x10^{+01}$	$8.8x10^{+00}$	$3.1x10^{+01}$	$2.2x10^{+02}$
N-HEXANE	$1.2x10^{+01}$	$1.3x10^{+00}$	$8.9x10^{-01}$	$3.9x10^{+00}$	$1.8x10^{+01}$
NICKEL & COMPOUNDS	$1.3x10^{-01}$	$7.8x10^{-03}$	$4.1x10^{-03}$	$1.7x10^{-02}$	$1.6x10^{-01}$
NITRIC OXIDE	$1.2x10^{+03}$	$7.8x10^{+01}$	$5.9x10^{+01}$	$3.5x10^{+02}$	$1.7x10^{+03}$
NITROGEN DIOXIDE	$9.6x10^{+01}$	$6.3x10^{+00}$	$4.8x10^{+00}$	$2.9x10^{+01}$	$1.4x10^{+02}$
NITROUS OXIDE	$2.0x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.0x10^{-05}$
N-NONANE	$1.6x10^{+00}$	$8.7x10^{-02}$	$6.7x10^{-02}$	$2.7x10^{-01}$	$2.0x10^{+00}$
N-OCTANE	$1.6x10^{-01}$	$1.3x10^{-03}$	$4.1x10^{-04}$	$2.2x10^{-03}$	$1.7x10^{-01}$
NONADECANE	$9.1x10^{+00}$	$0.0x10^{+00}$	$6.3x10^{-01}$	$4.9x10^{-01}$	$1.0x10^{+01}$
NONADIENE	$2.1x10^{-02}$	$1.1x10^{-03}$	$8.5x10^{-04}$	$3.0x10^{-03}$	$2.6x10^{-02}$
N-PENTADECANE	$6.6x10^{-01}$	$1.2x10^{-02}$	$5.8x10^{-03}$	$3.2x10^{-02}$	$7.1x10^{-01}$

Substance	Emissions (tonnes/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
N-PENTANE	3.4x10^{+01}	7.3x10^{-01}	7.7x10^{-01}	4.1x10^{+00}	4.0x10^{+01}
N-PENTYLCYCLOHEXANE	7.7x10^{-02}	0.0x10^{+00}	0.0x10^{+00}	9.6x10^{-06}	7.7x10^{-02}
N-PHENYLANILINE {DIPHENYLAMINE}	4.1x10^{-01}	0.0x10^{+00}	2.9x10^{-02}	2.2x10^{-02}	4.6x10^{-01}
N-PROPYL ALCOHOL	1.7x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	1.7x10^{+00}
N-PROPYLBENZENE	6.3x10^{+00}	6.0x10^{-01}	3.2x10^{-01}	1.7x10^{+00}	9.0x10^{+00}
N-TETRADECANE	1.2x10^{+00}	3.3x10^{-02}	1.6x10^{-02}	9.2x10^{-02}	1.4x10^{+00}
N-TRIDECANE	1.8x10^{+00}	4.6x10^{-02}	2.3x10^{-02}	1.3x10^{-01}	2.0x10^{+00}
N-UNDECANE	4.8x10^{+01}	3.1x10^{+00}	2.2x10^{+00}	7.2x10^{+00}	6.0x10^{+01}
OCTANOL ISOMERS	1.2x10^{-02}	6.3x10^{-04}	5.0x10^{-04}	1.8x10^{-03}	1.5x10^{-02}
O-DICHLOROBENZENE	8.1x10^{-02}	3.5x10^{-06}	0.0x10^{+00}	2.0x10^{-04}	8.1x10^{-02}
O-ETHYLTOLUENE	9.5x10^{+00}	8.6x10^{-01}	4.2x10^{-01}	2.4x10^{+00}	1.3x10^{+01}
OXIDES OF NITROGEN	1.9x10^{+03}	1.4x10^{+02}	1.3x10^{+02}	5.2x10^{+02}	2.6x10^{+03}
PARTICULATE MATTER 10µm	2.1x10^{+03}	1.7x10^{+02}	6.4x10^{+01}	1.7x10^{+03}	4.0x10^{+03}
PARTICULATE MATTER 2.5µm	7.2x10^{+02}	4.9x10^{+01}	3.1x10^{+01}	4.7x10^{+02}	1.3x10^{+03}
P-DICHLOROBENZENE	2.8x10^{+00}	1.2x10^{-04}	0.0x10^{+00}	6.8x10^{-03}	2.8x10^{+00}
PENTAMETHYLBENZENE	1.2x10^{-02}	6.3x10^{-04}	5.0x10^{-04}	1.8x10^{-03}	1.5x10^{-02}
PENTYL CYCLOHEXANE	5.3x10^{-02}	2.7x10^{-03}	2.1x10^{-03}	7.6x10^{-03}	6.6x10^{-02}
PENTYLCYCLOPENTANE	1.3x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	1.3x10^{-05}	1.3x10^{-03}
PENTYLIDENECYCLOHEXANE	2.1x10^{-02}	1.1x10^{-03}	8.5x10^{-04}	3.0x10^{-03}	2.6x10^{-02}
PERCHLOROETHYLENE	2.3x10^{+02}	1.3x10^{+01}	9.9x10^{+00}	3.5x10^{+01}	2.9x10^{+02}
P-ETHYLTOLUENE	1.9x10^{+01}	1.8x10^{+00}	9.1x10^{-01}	5.0x10^{+00}	2.7x10^{+01}
PHENANTHRENE	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}
PHENOL (CARBOLIC ACID)	3.5x10^{+00}	2.9x10^{-05}	9.9x10^{-03}	1.6x10^{-03}	3.5x10^{+00}
PHOSPHORIC ACID	0.0x10^{+00}	0.0x10^{+00}	2.4x10^{-02}	0.0x10^{+00}	2.4x10^{-02}
PHTHALIC ANHYDRIDE	1.4x10^{+01}	9.3x10^{-01}	6.7x10^{-01}	2.2x10^{+00}	1.8x10^{+01}
POLYCHLORINATED DIOXINS AND FURANS	1.9x10^{-07}	9.1x10^{-08}	1.8x10^{-04}	7.1x10^{-09}	1.8x10^{-04}
POLYCYCLIC AROMATIC HYDROCARBONS	2.2x10^{-02}	7.3x10^{-04}	9.0x10^{-04}	3.9x10^{-03}	2.8x10^{-02}
PROPANE	2.3x10^{+01}	4.9x10^{-01}	5.8x10^{-01}	2.8x10^{+00}	2.7x10^{+01}
PROPENYLCYCLOHEXANE	9.5x10^{-02}	4.8x10^{-03}	3.8x10^{-03}	1.4x10^{-02}	1.2x10^{-01}
PROPYL ACETATE	2.8x10^{+02}	0.0x10^{+00}	2.0x10^{+01}	1.5x10^{+01}	3.2x10^{+02}
PROPYLCYCLOHEXANE	2.6x10^{-01}	1.3x10^{-02}	1.0x10^{-02}	3.7x10^{-02}	3.2x10^{-01}
PROPYLCYCLOPENTANE	2.9x10^{-04}	0.0x10^{+00}	0.0x10^{+00}	2.9x10^{-06}	2.9x10^{-04}
PROPYLENE	6.5x10^{+01}	2.1x10^{-02}	0.0x10^{+00}	2.8x10^{-01}	6.6x10^{+01}
PROPYLENE GLYCOL	6.8x10^{-02}	0.0x10^{+00}	0.0x10^{+00}	1.8x10^{-04}	6.8x10^{-02}
PROPYLENE GLYCOL METHYL ETHER {1-METHOXY-2-PROPANO	4.3x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	4.3x10^{-05}	4.3x10^{-03}
PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE {2-(1-ME	8.6x10^{-03}	0.0x10^{+00}	0.0x10^{+00}	8.6x10^{-05}	8.7x10^{-03}
PROPYLENE OXIDE	1.0x10^{-05}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	1.0x10^{-05}
PROPYLHEPTENES	6.8x10^{-02}	3.5x10^{-03}	2.7x10^{-03}	9.7x10^{-03}	8.4x10^{-02}
P-TOLUALDEHYDE {4-METHYLBENZALDEHYDE}	1.9x10^{+01}	1.3x10^{+00}	9.3x10^{-01}	3.0x10^{+00}	2.4x10^{+01}
PYRENE	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}
SEC-BUTYL ALCOHOL	4.2x10^{-02}	0.0x10^{+00}	0.0x10^{+00}	4.2x10^{-04}	4.3x10^{-02}
SEC-BUTYLCYCLOHEXANE	5.3x10^{-07}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	5.3x10^{-07}
SELENIUM & COMPOUNDS	2.1x10^{-01}	2.2x10^{-04}	6.5x10^{-05}	2.1x10^{-03}	2.1x10^{-01}
STYRENE (ETHENYLBENZENE)	9.2x10^{-01}	1.3x10^{-01}	4.2x10^{-02}	2.1x10^{-01}	1.3x10^{+00}
SULFUR DIOXIDE	4.8x10^{+01}	8.6x10^{-01}	1.2x10^{-00}	2.1x10^{+01}	7.1x10^{+01}
SULFUR TRIOXIDE	9.9x10^{-04}	0.0x10^{+00}	1.4x10^{-04}	1.2x10^{-03}	2.3x10^{-03}
SULFURIC ACID	2.6x10^{-07}	0.0x10^{+00}	0.0x10^{+00}	1.9x10^{-01}	1.9x10^{-01}
T-BUTYLBENZENE	3.8x10^{-02}	1.9x10^{-03}	1.5x10^{-03}	5.4x10^{-03}	4.7x10^{-02}
TEREPHTHALIC ACID (P-BENZENEDICARBOXYLIC ACID)	1.0x10^{-05}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	1.0x10^{-05}
TETRAFLUOROMETHANE {CARBON TETRAFLUORIDE} {R 14}	7.5x10^{-05}	0.0x10^{+00}	0.0x10^{+00}	0.0x10^{+00}	7.5x10^{-05}

Substance	Emissions (tonnes/year)				
	Sydney	Newcastle	Wollongong	Non-Urban	GMR
TETRAMETHYLBENZENES	$4.5x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.5x10^{-05}$
TETRAMETHYLCYCLOBUTENE	$4.5x10^{-06}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.5x10^{-06}$
TETRAMETHYLCYCLOPENTANE	$6.8x10^{-02}$	$3.5x10^{-03}$	$2.7x10^{-03}$	$9.7x10^{-03}$	$8.4x10^{-02}$
TETRAMETHYLTHIOUREA	$6.2x10^{-03}$	$3.1x10^{-04}$	$2.5x10^{-04}$	$8.8x10^{-04}$	$7.6x10^{-03}$
TOLUENE	$1.3x10^{+03}$	$8.4x10^{+01}$	$6.1x10^{+01}$	$2.2x10^{+02}$	$1.6x10^{+03}$
TOTAL SUSPENDED PARTICULATES (TSP)	$5.3x10^{+03}$	$3.9x10^{+02}$	$1.5x10^{+02}$	$4.2x10^{+03}$	$1.0x10^{+04}$
TOTAL VOCS	$1.0x10^{+04}$	$8.0x10^{+02}$	$6.2x10^{+02}$	$2.5x10^{+03}$	$1.4x10^{+04}$
TRANS 1-METHYL-3-PROPYL CYCLOHEXANE	$3.6x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$3.6x10^{-05}$	$3.6x10^{-03}$
TRANS 1-METHYL-4-ETHYLCYCLOHEXANE	$3.5x10^{-01}$	$4.3x10^{-02}$	$3.3x10^{-02}$	$1.5x10^{-01}$	$5.8x10^{-01}$
TRANS,CIS-1,2,4-TRIMETHYLCYCLOHEXANE	$2.9x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-05}$	$2.9x10^{-03}$
TRANS,TRANS-1,2,4-TRIMETHYLCYCLOHEXANE	$5.3x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.3x10^{-05}$	$5.3x10^{-03}$
TRANS,TRANS-1,3,5-TRIMETHYLCYCLOHEXANE	$2.7x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.7x10^{-05}$	$2.7x10^{-03}$
TRANS-1,2-CIS-4-TRIMETHYLCYCLOPENTANE	$1.0x10^{+00}$	$1.3x10^{-01}$	$9.8x10^{-02}$	$4.5x10^{-01}$	$1.7x10^{+00}$
TRANS-1,2-DIMETHYLCYCLOHEXANE	$2.9x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.9x10^{-06}$	$2.9x10^{-04}$
TRANS-1,3-DIMETHYLCYCLOHEXANE	$3.6x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$3.6x10^{-05}$	$3.6x10^{-03}$
TRANS-1,3-DIMETHYLCYCLOPENTANE	$2.4x10^{+00}$	$3.0x10^{-01}$	$2.3x10^{-01}$	$1.1x10^{+00}$	$4.0x10^{+00}$
TRANS-1,4-DIMETHYLCYCLOHEXANE	$3.7x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$3.7x10^{-05}$	$3.8x10^{-03}$
TRANS-1,CIS-2,3-TRIMETHYLCYCLOPENTANE	$1.4x10^{+00}$	$1.7x10^{-01}$	$1.3x10^{-01}$	$6.0x10^{-01}$	$2.3x10^{+00}$
TRANS-1-2-DIMETHYLCYCLOPENTANE	$1.7x10^{+00}$	$2.2x10^{-01}$	$1.6x10^{-01}$	$7.5x10^{-01}$	$2.9x10^{+00}$
TRANS-1-ETHYL-2-METHYLCYCLOHEXANE	$5.7x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.7x10^{-06}$	$5.8x10^{-04}$
TRANS-1-ETHYL-3-METHYLCYCLOHEXANE	$1.0x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.0x10^{-05}$	$1.0x10^{-03}$
TRANS-1-METHYL-3-ETHYLCYCLOPENTANE	$4.3x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.3x10^{-06}$	$4.3x10^{-04}$
TRANS-2-BUTENE	$9.9x10^{+01}$	$1.2x10^{+01}$	$9.2x10^{+00}$	$4.3x10^{+01}$	$1.6x10^{+02}$
TRANS-2-ETHYLMETHYLCYCLOPENTANE	$1.0x10^{+00}$	$1.3x10^{-01}$	$9.8x10^{-02}$	$4.5x10^{-01}$	$1.7x10^{+00}$
TRANS-2-PENTENE	$1.0x10^{+02}$	$1.3x10^{+01}$	$9.6x10^{+00}$	$4.4x10^{+01}$	$1.7x10^{+02}$
TRICHLOROETHYLENE (TCE)	$2.8x10^{+00}$	$1.2x10^{-04}$	$0.0x10^{+00}$	$1.5x10^{-02}$	$2.8x10^{+00}$
TRICHLOROFLUOROMETHANE	$5.8x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$5.8x10^{-04}$
TRICHLOROTRIFLUOROETHANE-F113	$4.5x10^{-05}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$4.5x10^{-05}$
TRIFLUOROMETHANE (F-23)	$6.8x10^{-04}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$6.8x10^{-04}$
TRIMETHYLBENZENES	$4.0x10^{+00}$	$2.4x10^{-01}$	$1.8x10^{-01}$	$1.0x10^{+00}$	$5.4x10^{+00}$
TRIMETHYLCYCLOHEXANES	$2.9x10^{+01}$	$1.9x10^{+00}$	$1.4x10^{+00}$	$4.5x10^{+00}$	$3.6x10^{+01}$
TRIMETHYLCYCLOHEXANOL	$2.1x10^{-02}$	$1.1x10^{-03}$	$8.5x10^{-04}$	$3.0x10^{-03}$	$2.6x10^{-02}$
TRIMETHYLCYCLOPENTANE	$8.8x10^{+00}$	$5.9x10^{-01}$	$4.3x10^{-01}$	$1.4x10^{+00}$	$1.1x10^{+01}$
TRIMETHYLCYCLOPENTANONE	$1.9x10^{-02}$	$9.4x10^{-04}$	$7.5x10^{-04}$	$2.6x10^{-03}$	$2.3x10^{-02}$
TRIMETHYLDECANE	$3.1x10^{+00}$	$1.3x10^{-04}$	$2.1x10^{-01}$	$1.7x10^{-01}$	$3.5x10^{+00}$
TRIMETHYLDECENES	$2.1x10^{-01}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$2.8x10^{-06}$	$2.1x10^{-01}$
TRIMETHYLHEPTANES	$7.3x10^{-01}$	$3.7x10^{-02}$	$2.9x10^{-02}$	$1.0x10^{-01}$	$9.0x10^{-01}$
TRIMETHYLHEXENE	$4.3x10^{-02}$	$2.2x10^{-03}$	$1.7x10^{-03}$	$6.1x10^{-03}$	$5.3x10^{-02}$
TRIMETHYLOCTANES	$8.3x10^{+00}$	$2.2x10^{-03}$	$5.8x10^{-01}$	$4.5x10^{-01}$	$9.4x10^{+00}$
VINYL ACETATE	$1.2x10^{-03}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$0.0x10^{+00}$	$1.2x10^{-03}$
VINYL CHLORIDE MONOMER	$1.1x10^{-01}$	$4.6x10^{-06}$	$0.0x10^{+00}$	$2.6x10^{-04}$	$1.1x10^{-01}$
ZINC & COMPOUNDS	$1.2x10^{+00}$	$1.9x10^{+00}$	$9.5x10^{-02}$	$1.6x10^{-01}$	$3.3x10^{+00}$

Appendix C:
Default Organic Speciation Profiles

Table C1: Default Organic Speciation Profiles

EET_Name	Speciation Profile	Reference
Acrylic (dry spun) manufacturing	CHEMICAL MANUFACTURING - AVERAGE (EPA 9004)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1404) (Profile ID=9004)
Acrylic (inorganic wet spun) manufacturing	CHEMICAL MANUFACTURING - AVERAGE (EPA 9004)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1404) (Profile ID=9004)
Acrylic (wet spun) manufacturing	CHEMICAL MANUFACTURING - AVERAGE (EPA 9004)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1404) (Profile ID=9004)
Baking (fermentation)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Activated carbon regeneration)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Aging tank filling)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Bottle crusher with water sprays)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Bottle crusher)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Bottle filling line)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Bottle soaker and cleaner)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Brewers grain dryer)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Can crusher with pneumatic conveyer)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Can filling line)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Fermenter venting: closed fermenter)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Keg filling line)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Sterilized bottle filling line)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Beer Production (Sterilized can filling line)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Boiler (Bark, FBC Boiler)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Boiler (Bark, Fuel cell/Dutch oven burner)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Boiler (Bark, Stoker Boiler)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Boiler (Coal - Bituminous, Cell burner fired, Dry Bottom)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Cyclone furnace)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Fluidised bed combustor, bubbling bed)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Fluidised bed combustor, circulating bed)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Hand-fed unit)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous,	Coal-Fired Boiler - Electric	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)

EET_Name	Speciation Profile	Reference
Overfeed stoker)	Generation	
Boiler (Coal - Bituminous, Spreader stoker)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Tangentially-fired, Dry Bottom, Post-1971)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Tangentially-fired, Dry Bottom, Pre-1971)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Tangentially-fired, Dry Bottom, Pre-1971, Low-NOx)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Tangentially-fired, Wet Bottom, Pre-1971)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Underfeed stoker)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Wall-fired, Dry Bottom, Post-1971)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Wall-fired, Dry Bottom, Pre-1971)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Wall-fired, Dry Bottom, Pre-1971, Low-NOx)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Bituminous, Wall-fired, Wet Bottom, Pre-1971)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Cell burner fired, Dry Bottom)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Cyclone furnace)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Fluidised bed combustor, bubbling bed)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Fluidised bed combustor, circulating bed)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Hand-fed unit)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Overfeed stoker)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Spreader stoker)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Tangentially-fired, Dry Bottom, Pre-1971)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Tangentially-fired, Dry Bottom, Pre-1971, Low NOx)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Underfeed stoker)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Wall-fired, Dry Bottom, Post-1971)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)

EET_Name	Speciation Profile	Reference
Boiler (Coal - Sub-Bituminous, Wall-fired, Dry Bottom, Pre-1971)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Wall-fired, Dry Bottom, Pre-1971, Low NOx)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Coal - Sub-Bituminous, Wall-fired, Wet Bottom, Pre-1971)	Coal-Fired Boiler - Electric Generation	USEPA (2002) SPECIATEv3.2 (Profile ID=1178)
Boiler (Diesel, Commercial Boiler)	External Combustion Boiler - Distillate Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0002)
Boiler (Diesel, Industrial Boiler (< 100 GJ/h))	External Combustion Boiler - Distillate Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0002)
Boiler (Diesel, Industrial Boiler (> 100 GJ/h))	External Combustion Boiler - Distillate Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0002)
Boiler (Diesel, Industrial Boiler (> 100 GJ/h), Low NOx Flue gas recirculation)	External Combustion Boiler - Distillate Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0002)
Boiler (Heavy Fuel Oil, Commercial Boiler)	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Heavy Fuel Oil, Industrial Boiler (< 100 GJ/h))	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Heavy Fuel Oil, Industrial Boiler (> 100 GJ/h), Normal Firing)	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Heavy Fuel Oil, Industrial Boiler (> 100 GJ/h), Normal Firing, Low NOx)	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Heavy Fuel Oil, Industrial Boiler (> 100 GJ/h), Tangential Firing)	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Heavy Fuel Oil, Industrial Boiler (> 100 GJ/h), Tangential Firing, Low NOx)	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Heavy Fuel Oil, Utility Boiler (< 100 GJ/h))	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Heavy Fuel Oil, Utility Boiler (> 100 GJ/h), Normal Firing)	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Heavy Fuel Oil, Utility Boiler (> 100 GJ/h), Normal Firing, Low NOx)	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Heavy Fuel Oil, Utility Boiler (> 100 GJ/h), Tangential Firing)	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Heavy Fuel Oil, Utility Boiler (> 100 GJ/h), Tangential Firing, Low NOx)	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Light Fuel Oil, Commercial Boiler)	External Combustion Boiler - Distillate Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0002)
Boiler (Light Fuel Oil, Industrial Boiler (< 100 GJ/h))	External Combustion Boiler - Distillate Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0002)
Boiler (Light Fuel Oil, Industrial Boiler (> 100 GJ/h), Normal Firing)	External Combustion Boiler - Distillate Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0002)
Boiler (Light Fuel Oil, Industrial	External Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=0002)

EET_Name	Speciation Profile	Reference
Boiler (> 100 GJ/h), Tangential Firing)	Boiler - Distillate Oil	
Boiler (Natural gas, Large, wall-fired, Fuel gas recirculation)	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Boiler (Natural gas, Large, wall-fired, Low-NOx)	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Boiler (Natural gas, Large, wall-fired, Post-1971)	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Boiler (Natural gas, Large, wall-fired, Pre-1971)	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Boiler (Natural gas, Residential (<0.3 GJ/h))	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Boiler (Natural gas, Small boiler)	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Boiler (Natural gas, Small boiler, Low NOx & flue gas recirculation)	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Boiler (Natural gas, Small boiler, Low NOx)	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Boiler (Natural gas, Tangential-fired)	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Boiler (Waste Oil, Small Boiler (0.3 - 100 GJ/h))	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Waste Oil, Space Heater, Atomising Burner)	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Waste Oil, Space Heater, Vapourising Burner)	External Combustion Boiler - Residual Oil	USEPA (2002) SPECIATEv3.2 (Profile ID=0001)
Boiler (Wood, FBC Boiler)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Boiler (Wood, Fuel cell/Dutch oven burner)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Boiler (Wood, Stoker Boiler)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Boiler (Wood/Bark, FBC Boiler)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Boiler (Wood/Bark, Fuel cell/Dutch oven burner)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Boiler (Wood/Bark, Stoker Boiler)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Brick - Dryer with supplement gas burner	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Brick - Kiln and dryer - Sawdust fired	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Cellulose acetate manufacturing	CHEMICAL MANUFACTURING - AVERAGE (EPA 9004)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1404) (Profile ID=9004)
Cement Kiln - Precalcinator Kiln - Gas - ESP	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Cement Kiln - Precalcinator Kiln - Gas - Fabric Filter	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Cement Kiln - Wet and semi-wet process - Gas - ESP	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Cement Kiln - Wet and semi-wet process - Gas - Fabric Filter	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)

EET_Name	Speciation Profile	Reference
Ceramic - Firing-natural gas fired kiln	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Coke Production (Oven charging (larry car))	By Product Coke Oven Stack Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0011)
Coke Production (Oven door leaks)	By Product Coke Oven Stack Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0011)
Coke Production (Oven pushing)	By Product Coke Oven Stack Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0011)
Cremation	Cremation	CARB (1992) "Evaluation Test on Two Propane Fired Crematories at Camellia Memorial Lawn Cemetery" (Profile ID=9015)
Dry cleaning (perchloroethylene)	Drycleaning	USEPA (2002) SPECIATEv3.2 (Profile ID=1193)
Dry cleaning (white spirit solvent)	Drycleaning	USEPA (2002) SPECIATEv3.2 (Profile ID=1193)
Fibreglass (Filament Winding)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Fibreglass (Gel Coat Application)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Fibreglass (Manual Resin Application (non-vapour suppressed))	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Fibreglass (Manual Resin Application (vapour suppressed))	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Fibreglass (Mechanical Resin Application (non-vapour suppressed))	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Fibreglass (Mechanical Resin Application (vapour suppressed))	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Fuel storage - diesel	Diesel Vapour	Pers. Comm. Peter Jones, Bulwer Refinery (2001) Average Diesel Vapour Concentration from diesel produced at BP refineries around Australia
Fuel storage - ethanol	Ethanol	Engineering calculation
Fuel storage - heavy fuel oil	Fixed Roof Tank - Crude Oil Refinery	USEPA (2002) SPECIATEv3.2 (Profile ID=0297)
Fuel storage - light fuel oil	Diesel Vapour	Pers. Comm. Peter Jones, Bulwer Refinery (2001) Average Diesel Vapour Concentration from diesel produced at BP refineries around Australia
Fuel storage - petrol	Petrol Vapour	Pers. Comm. Peter Jones, BP Bulwer Refinery (2001) (Average profile (measured and calculated) from a range of BP petrol batches across Australian BP refineries)
Glass Production (Forming and Finishing (Container))	MINERAL PRODUCTS - AVERAGE (EPA 9011)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1411) (Profile ID=9020)
Glass Production (Melting Furnace (Container))	MINERAL PRODUCTS - AVERAGE (EPA 9011)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1411) (Profile ID=9020)
Glass Production (Melting Furnace (Float))	MINERAL PRODUCTS - AVERAGE (EPA 9011)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1411) (Profile ID=9020)
Glass Production (Pressed and Blown)	MINERAL PRODUCTS - AVERAGE (EPA 9011)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1411) (Profile ID=9020)
Incineration (Biomedical Waste)	Bar Screen Waste Incinerator	USEPA (2002) SPECIATEv3.2 (Profile ID=0122)

EET_Name	Speciation Profile	Reference
Incineration (Sewage Sludge)	Bar Screen Waste Incinerator	USEPA (2002) SPECIATEv3.2 (Profile ID=0122)
Internal Combustion Engine (Diesel, P<450kW)	Reciprocating Diesel Fuel Engine	USEPA (2002) SPECIATEv3.2 (Profile ID=0008)
Internal Combustion Engine (Diesel, P>450kW)	Reciprocating Diesel Fuel Engine	USEPA (2002) SPECIATEv3.2 (Profile ID=0008)
Internal Combustion Engine (Duel fuel - Natural gas (95%) & Diesel (5%), P>450kW)	Internal Combustion Engine - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=1001)
Internal Combustion Engine (Landfill Gas, 2-Stroke Lean-Burn)	Internal Combustion Engine - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=1001)
Internal Combustion Engine (Landfill Gas, 4-Stroke Lean-Burn)	Internal Combustion Engine - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=1001)
Internal Combustion Engine (Landfill Gas, 4-Stroke Rich-Burn)	Internal Combustion Engine - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=1001)
Internal Combustion Engine (LNG, 2-Stroke Lean-Burn)	Internal Combustion Engine - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=1001)
Internal Combustion Engine (LNG, 4-Stroke Lean-Burn)	Internal Combustion Engine - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=1001)
Internal Combustion Engine (LNG, 4-Stroke Rich-Burn)	Internal Combustion Engine - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=1001)
Internal Combustion Engine (Natural Gas, 2-Stroke Lean-Burn)	Internal Combustion Engine - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=1001)
Internal Combustion Engine (Natural Gas, 4-Stroke Lean-Burn)	Internal Combustion Engine - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=1001)
Internal Combustion Engine (Natural Gas, 4-Stroke Rich-Burn)	Internal Combustion Engine - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=1001)
Iron Production (Furnace, Electric Arc)	Basic Oxygen Furnace	USEPA (2002) SPECIATEv3.2 (Profile ID=0016)
Landfills (digestion)	LANDFILLS, USEPA LANDFILL EMISSION MODEL	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9017)
Medium density fibreboard (board cooler)	MEDIUM DENSITY FIBREBOARD MANUFACTURING	Table 10.6.3-3, USEPA (1998) AP42 Chapter 10.6.3 Medium Density Fiberboard Manufacturing (mixed species) (Profile ID=9022)
Medium density fibreboard (hot press)	MEDIUM DENSITY FIBREBOARD MANUFACTURING	Table 10.6.3-3, USEPA (1998) AP42 Chapter 10.6.3 Medium Density Fiberboard Manufacturing (mixed species) (Profile ID=9022)
Medium density fibreboard (tube dryer - wood fired)	MEDIUM DENSITY FIBREBOARD MANUFACTURING	Table 10.6.3-3, USEPA (1998) AP42 Chapter 10.6.3 Medum Density Fiberboard Manufacturing (mixed species) (Profile ID=9022)
Modacrylic (dry spun) manufacturing	CHEMICAL MANUFACTURING - AVERAGE (EPA 9004)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1404) (Profile ID=9004)
Modacrylic (wet spun) manufacturing	CHEMICAL MANUFACTURING - AVERAGE (EPA 9004)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1404) (Profile ID=9004)
Nylon 6 manufacturing	CHEMICAL MANUFACTURING - AVERAGE (EPA 9004)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1404) (Profile ID=9004)

EET_Name	Speciation Profile	Reference
Nylon 66 manufacturing	CHEMICAL MANUFACTURING - AVERAGE (EPA 9004)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1404) (Profile ID=9004)
Paint Production (Paint Grinding & Mixing)	Paint Manufacture - Blending Kettle	USEPA (2002) SPECIATEv3.2 (Profile ID=1094)
Paint Production (Solvent reclamation - Condensor vent)	Paint Manufacture - Blending Kettle	USEPA (2002) SPECIATEv3.2 (Profile ID=1094)
Paint Production (Solvent reclamation - Fugitive (Spills & Loading))	Paint Manufacture - Blending Kettle	USEPA (2002) SPECIATEv3.2 (Profile ID=1094)
Paint Production (Solvent reclamation - Storage tank vent)	Paint Manufacture - Blending Kettle	USEPA (2002) SPECIATEv3.2 (Profile ID=1094)
Paint Production (Varnish Grinding & Mixing)	Paint Manufacture - Blending Kettle	USEPA (2002) SPECIATEv3.2 (Profile ID=1094)
Paper Production (Bleaching (Kraft))	Pulp and Paper Industry - Plywood Veneer Dryer	USEPA (2002) SPECIATEv3.2 (Profile ID=1189)
Paper Production (Bleaching (Sulphite))	Pulp and Paper Industry - Plywood Veneer Dryer	USEPA (2002) SPECIATEv3.2 (Profile ID=1189)
Paper Production (Digestion (Kraft))	Pulp and Paper Industry - Plywood Veneer Dryer	USEPA (2002) SPECIATEv3.2 (Profile ID=1189)
Paper Production (Drying Paper Pulp)	Pulp and Paper Industry - Plywood Veneer Dryer	USEPA (2002) SPECIATEv3.2 (Profile ID=1189)
Paper Production (Recausticising (Kraft))	Pulp and Paper Industry - Plywood Veneer Dryer	USEPA (2002) SPECIATEv3.2 (Profile ID=1189)
Paper Production (Recausticising (Sulphite))	Pulp and Paper Industry - Plywood Veneer Dryer	USEPA (2002) SPECIATEv3.2 (Profile ID=1189)
Paper Production (Recovery Boiler (Kraft))	Pulp and Paper Industry - Plywood Veneer Dryer	USEPA (2002) SPECIATEv3.2 (Profile ID=1189)
Paper Production (Washing (Kraft))	Pulp and Paper Industry - Plywood Veneer Dryer	USEPA (2002) SPECIATEv3.2 (Profile ID=1189)
Particle board manufacturing (Board Cooler)	Particle Board Manufacturing - Board Cooler	Table 10.6.2-3, USEPA (1998) AP42 Chapter 10.6.3 Particleboard Manufacturing (Profile ID=9023)
Particle board manufacturing (Hot Press)	Particle Board Manufacturing - Hot Press	Table 10.6.2-3, USEPA (1998) AP42 Chapter 10.6.3 Particleboard Manufacturing (Profile ID=9024)
Particle board manufacturing (Rotary dryer - natural gas fired)	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Particle board manufacturing (Rotary dryer - wood fired)	Particle Board Manufacturing - Dryer-wood fired	Table 10.6.2-3, USEPA (1998) AP42 Chapter 10.6.3 Particleboard Manufacturing (Profile ID=9025)
Petroleum product distribution - petrol	Petrol Vapour	Pers. Comm. Peter Jones, BP Bulwer Refinery (2001) (Average profile (measured and calculated) from a range of BP petrol batches across Australian BP refineries)
Petroleum Refining (Blowdown System)	PETROLEUM INDUSTRY - AVERAGE (EPA 9012)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1412) (Profile ID=9021)
Petroleum Refining (Compressor Engines - Gas Turbine)	Natural Gas Turbine	USEPA (2002) SPECIATEv3.2 (Profile ID=0007)
Petroleum Refining (Compressor Engines - Internal Combustion Engine)	PETROLEUM INDUSTRY - AVERAGE (EPA 9012)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1412) (Profile ID=9021)
Petroleum Refining (Flare)	Flares - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0051)
Petroleum Refining (Fluid	PETROLEUM INDUSTRY -	CARB (2003) ARB Organic Gas Speciation Profiles

EET_Name	Speciation Profile	Reference
Coking)	AVERAGE (EPA 9012)	19/03/2003 (ID = 1412) (Profile ID=9021)
Petroleum Refining (Fluidised Catalytic Cracking)	Refinery Fluid Catalytic Cracker	USEPA (2002) SPECIATEv3.2 (Profile ID=0029)
Petroleum Refining (Moving Bed Catalytic Cracking)	Refinery Fluid Catalytic Cracker	USEPA (2002) SPECIATEv3.2 (Profile ID=0029)
Petroleum Refining (Process Fugitives, Compressor seals, Gas)	Refinery Fugitive Emissions - Compressor Seals - Refinery Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0039)
Petroleum Refining (Process Fugitives, Compressor seals, Heavy Liquid)	PETROLEUM INDUSTRY - AVERAGE (EPA 9012)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1412) (Profile ID=9021)
Petroleum Refining (Process Fugitives, Compressor seals, Light Liquid)	Refinery Fugitive Emissions - Relief Valves - Liquified Petroleum Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0047)
Petroleum Refining (Process Fugitives, Connectors, Gas)	Refinery Fugitive Emissions - Compressor Seals - Refinery Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0039)
Petroleum Refining (Process Fugitives, Connectors, Heavy Liquid)	PETROLEUM INDUSTRY - AVERAGE (EPA 9012)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1412) (Profile ID=9021)
Petroleum Refining (Process Fugitives, Connectors, Light Liquid)	Refinery Fugitive Emissions - Relief Valves - Liquefied Petroleum Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0047)
Petroleum Refining (Process Fugitives, Drains)	Refinery Fugitive Emissions - Covered Drainage / Separation Pits	USEPA (2002) SPECIATEv3.2 (Profile ID=0031)
Petroleum Refining (Process Fugitives, Flanges, Gas)	Refinery Fugitive Emissions - Compressor Seals - Refinery Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0039)
Petroleum Refining (Process Fugitives, Flanges, Heavy Liquid)	PETROLEUM INDUSTRY - AVERAGE (EPA 9012)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1412) (Profile ID=9021)
Petroleum Refining (Process Fugitives, Flanges, Light Liquid)	Refinery Fugitive Emissions - Relief Valves - Liquefied Petroleum Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0047)
Petroleum Refining (Process Fugitives, Open Ended Lines)	Refinery Fugitive Emissions - Covered Drainage / Separation Pits	USEPA (2002) SPECIATEv3.2 (Profile ID=0031)
Petroleum Refining (Process Fugitives, Pressure Relief Valves)	PETROLEUM INDUSTRY - AVERAGE (EPA 9012)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1412) (Profile ID=9021)
Petroleum Refining (Process Fugitives, Pump seals, Gas)	Refinery Fugitive Emissions - Compressor Seals - Refinery Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0039)
Petroleum Refining (Process Fugitives, Pump seals, Heavy Liquid)	PETROLEUM INDUSTRY - AVERAGE (EPA 9012)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1412) (Profile ID=9021)
Petroleum Refining (Process Fugitives, Pump seals, Light Liquid)	Refinery Fugitive Emissions - Relief Valves - Liquefied Petroleum Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0047)
Petroleum Refining (Process Fugitives, Sampling Connections)	PETROLEUM INDUSTRY - AVERAGE (EPA 9012)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1412) (Profile ID=9021)
Petroleum Refining (Process Fugitives, Valves, Gas)	Refinery Fugitive Emissions - Compressor Seals - Refinery Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0039)

EET_Name	Speciation Profile	Reference
Petroleum Refining (Process Fugitives, Valves, Heavy Liquid)	PETROLEUM INDUSTRY - AVERAGE (EPA 9012)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1412) (Profile ID=9021)
Petroleum Refining (Process Fugitives, Valves, Light Liquid)	Refinery Fugitive Emissions - Relief Valves - Liquefied Petroleum Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0047)
Petroleum Refining (Vacuum Distillation Unit Condensers)	PETROLEUM INDUSTRY - AVERAGE (EPA 9012)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1412) (Profile ID=9021)
Plywood press	Pulp and Paper Industry - Plywood Veneer Dryer	USEPA (2002) SPECIATEv3.2 (Profile ID=1189)
Plywood veneer dryer (natural gas fired)	Pulp and Paper Industry - Plywood Veneer Dryer	USEPA (2002) SPECIATEv3.2 (Profile ID=1189)
Plywood veneer dryer (wood fired)	Pulp and Paper Industry - Plywood Veneer Dryer	USEPA (2002) SPECIATEv3.2 (Profile ID=1189)
Polyester manufacturing	PLASTICS PRODUCTION - AVERAGE (EPA 9005)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1405) (Profile ID=9005)
Polyolefin manufacturing	PLASTICS PRODUCTION - AVERAGE (EPA 9005)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1405) (Profile ID=9005)
Polypropylene Manufacturing	Wastewater Treatment (POTWs), AB2588 Data, USEPA 50% unidentif.	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9016)
Polystyrene Manufacturing (Batch)	Plastics Production - Polystyrene	USEPA (2002) SPECIATEv3.2 (Profile ID=1004)
Polystyrene Manufacturing (Continuous - Steam Jets)	Plastics Production - Polystyrene	USEPA (2002) SPECIATEv3.2 (Profile ID=1004)
Polystyrene Manufacturing (Continuous - Vacuum Pump)	Plastics Production - Polystyrene	USEPA (2002) SPECIATEv3.2 (Profile ID=1004)
Polystyrene Manufacturing (In-Site Process)	Plastics Production - Polystyrene	USEPA (2002) SPECIATEv3.2 (Profile ID=1004)
Polystyrene Manufacturing (Post-impregnation suspension process)	Plastics Production - Polystyrene	USEPA (2002) SPECIATEv3.2 (Profile ID=1004)
Printing (heat set)	Graphic Arts - (Printing)	USEPA (2002) SPECIATEv3.2 (Profile ID=1191)
Printing (non-heat set)	Graphic Arts - (Printing)	USEPA (2002) SPECIATEv3.2 (Profile ID=1191)
Printing Ink Manufacturing	Graphic Arts - (Printing)	USEPA (2002) SPECIATEv3.2 (Profile ID=1191)
Rubber Product Manufacturing (Autoclave)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Rubber Product Manufacturing (Calendering)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Rubber Product Manufacturing (Extrusion)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Rubber Product Manufacturing (Grinding - Belt)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Rubber Product Manufacturing (Grinding - Carcass)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Rubber Product Manufacturing (Grinding - Retread)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Rubber Product Manufacturing (Grinding - Sidewall)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)

EET_Name	Speciation Profile	Reference
Rubber Product Manufacturing (Hot Air)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Rubber Product Manufacturing (Milling)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Rubber Product Manufacturing (Mixing)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Rubber Product Manufacturing (Platen Press)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Rubber Product Manufacturing (Tyre)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Smokehouse (Batch smokehouse, smoking cycle)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Smokehouse (Continuous smokehouse, smoke zone with vortex wet scrubber and demister)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Smokehouse (Continuous smokehouse, smoke zone)	Residential Wood Combustion	USEPA (2002) SPECIATEv3.2 (Profile ID=1167)
Solvent usage	Architectural Coatings (Solvent Coating and Thinning Solvent)	USEPA (2002) SPECIATEv3.2 (Profile ID=6003)
Spandex (dry spun) manufacturing	CHEMICAL MANUFACTURING - AVERAGE (EPA 9004)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1404) (Profile ID=9004)
Spandex (wet spun) manufacturing	CHEMICAL MANUFACTURING - AVERAGE (EPA 9004)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1404) (Profile ID=9004)
Spirit Manufacturing (Ageing)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Spirit Production (Fermentation vats)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Surface coating (adhesive)	Surface Coating Operations - Coating Application - Adhesives	USEPA (2002) SPECIATEv3.2 (Profile ID=1020)
Surface coating (enamel)	Surface Coating Operations - Coating Application - Enamel	USEPA (2002) SPECIATEv3.2 (Profile ID=1018)
Surface coating (lacquer)	Surface Coating Operations - Coating Application - Lacquer	USEPA (2002) SPECIATEv3.2 (Profile ID=1017)
Surface coating (paint - solvent based)	Surface Coating Operations - Coating Application -Solvent-Base Paint	USEPA (2002) SPECIATEv3.2 (Profile ID=1003)
Surface coating (primer)	Surface Coating Operations - Coating Application - Primer	USEPA (2002) SPECIATEv3.2 (Profile ID=1019)
Surface coating (thinner)	Surface Coating Operations - Thinning Solvents - Composite	USEPA (2002) SPECIATEv3.2 (Profile ID=1016)
Synthetic rubber manufacturing (emulsion	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)

EET_Name	Speciation Profile	Reference
crumb - adsorber vent)	(EPA 9014)	
Synthetic rubber manufacturing (emulsion crumb - blend/coagulation tank)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Synthetic rubber manufacturing (emulsion crumb - dryers)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Synthetic rubber manufacturing (emulsion crumb - monomer recovery)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Synthetic rubber manufacturing (emulsion latex - blend tanks)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Synthetic rubber manufacturing (emulsion latex - monomer removal condenser vent)	RUBBER/MISC. PLASTICS PRODUCTN - AVERAGE (EPA 9014)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9014)
Textile fabric printing (flat screen)	Graphic Arts - (Printing)	USEPA (2002) SPECIATEv3.2 (Profile ID=1191)
Textile fabric printing (roller)	Graphic Arts - (Printing)	USEPA (2002) SPECIATEv3.2 (Profile ID=1191)
Textile fabric printing (rotary screen)	Graphic Arts - (Printing)	USEPA (2002) SPECIATEv3.2 (Profile ID=1191)
Vinyon manufacturing	CHEMICAL MANUFACTURING - AVERAGE (EPA 9004)	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (ID = 1404) (Profile ID=9004)
Wastewater Treatment (VOC vapourisation (large biomass producing businesses))	Wastewater Treatment (POTWs), AB2588 Data, USEPA 50% unidentif.	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9016)
Wastewater Treatment (VOC vapourisation (municipal wastewater))	Wastewater Treatment (POTWs), AB2588 Data, USEPA 50% unidentif.	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9016)
Wastewater Treatment (VOC vapourisation (other industries))	Wastewater Treatment (POTWs), AB2588 Data, USEPA 50% unidentif.	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9016)
Wastewater Treatment (VOC vapourisation (petrochemical, synthetic resins and textiles))	Wastewater Treatment (POTWs), AB2588 Data, USEPA 50% unidentif.	CARB (2003) ARB Organic Gas Speciation Profiles 19/03/2003 (Profile ID=9016)
Wine Fermentation (red wine)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Wine Fermentation (white wine)	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Wine Manufacturing (Bottling (red wine))	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Wine Manufacturing (Bottling (white wine))	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Wine Manufacturing (Pomace pressing (red wine))	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Wine Manufacturing (Pomace screening (red wine))	Fermentation Processes	USEPA (2002) SPECIATEv3.2 (Profile ID=1188)
Surface coating usage	Surface Coatings - General	USEPA (2002) SPECIATEv3.2 & Carter (2004) Speciation Profile for mineral spirits (Profile ID=2425)
Direct entry - business P&O Ports	External Combustion Boiler - Natural Gas	USEPA (2002) SPECIATEv3.2 (Profile ID=0003)
Fuel storage - jet fuel	Fixed Roof Tank - Commercial Jet Fuel (Jet	USEPA (2002) SPECIATEv3.2 (Profile ID=0100)

EET_Name	Speciation Profile	Reference
	A)	
Loading storage tanks - petrol	Petrol Vapour	Pers. Comm. Peter Jones, BP Bulwer Refinery (2001) (Average profile (measured and calculated) from a range of BP petrol batches across Australian BP refineries)
Service stations (petrol vehicle refuelling)	Petrol Vapour	Pers. Comm. Peter Jones, BP Bulwer Refinery (2001) (Average profile (measured and calculated) from a range of BP petrol batches across Australian BP refineries)
Service stations (spillage of petrol)	Petrol Vapour	Pers. Comm. Peter Jones, BP Bulwer Refinery (2001) (Average profile (measured and calculated) from a range of BP petrol batches across Australian BP refineries)
Service stations (petrol tank breathing losses)	Petrol Vapour	Pers. Comm. Peter Jones, BP Bulwer Refinery (2001) (Average profile (measured and calculated) from a range of BP petrol batches across Australian BP refineries)
Service stations (diesel transfer and storage)	Diesel Vapour	Pers. Comm. Peter Jones, Bulwer Refinery (2001) Average Diesel Vapour Concentration from diesel produced at BP refineries around Australia
Service stations (LPG emissions)	LPG vapour	LPG MSDS Supplied with commercial survey questionnaire