MVV Environment
Devonport Ltd

Energy from Waste Combined Heat and Power Facility,
North Yard, Devonport

Community Ambient Air Quality Monitoring Programme Report Quarter 4, 2014

Overview of Monitoring Programme

MVV started ambient air quality monitoring in the vicinity of the EfW CHP Facility in August 2014. Two pollutants are measured in the on-going survey, Nitrogen Dioxide (NO_2) and particulate matter (as PM_{10}). Monitoring of NO_2 is carried out at ten locations in the area, while a PM_{10} real time monitoring station has been installed in the vicinity of Camels Head junction and began monitoring in October 2014.

Nitrogen Dioxide

Oxides of nitrogen (NO_X) are formed at the high temperatures and pressures found within vehicle engines and other combustion processes. Some of the nitrogen in the air and the fuel, mainly in the form of nitric oxide (NO), is oxidised to form NO_2 in the atmosphere. NO_2 is associated with adverse effects on human health and it is this pollutant for which air quality standards have been set in the UK and elsewhere within the EU.

Diffusion tubes are used to measure levels of NO_2 within an area. These are small plastic tubes containing a chemical absorbent which reacts with NO_2 present in the air. The tubes are changed each month and then sent away to a laboratory for analysis. The results give a NO_2 level for each calendar month and these are used to derive an annual average which can be compared against the National Standards annual average air quality objective.

Particulate Matter

Particulates, alternatively referred to as particulate matter (PM), are tiny solid particles or liquid droplets suspended in a gas. Sources of particulate matter can be man-made or natural. Concentrations of particulate matter within the air can be expressed in terms of their size, for example PM_{10} represents particles of 10 µm diameter or less. PM_{10} occurs naturally, originating from volcanoes, dust storms, forest and grassland fires, living vegetation and sea spray. Human activities also generate PM_{10}, from sources such as road transport, power plants, agriculture, various industrial processes and local domestic heating.

A specialised air quality monitoring unit measures small particles of matter as they as drawn into the machine. The dust particles pass through a light, from a long life LED source, and as they do so generate a scattered light impulse. Measuring the deflection and intensity of this light impulse allows the size and number of particles to be detected. Measurement is continuous and a result is generated every five minutes. These results allow a daily average to be generated from which an annual average can be determined, both of these figures can then be compared to the National Standards.

Locations

The NO_2 monitoring sites have been divided between the area around the Camels Head junction (which could potentially be affected by emissions from site-related road traffic) and other locations representative of the urban background in St Budeaux and King's Tamerton (which could be affected by emissions of NO_2 from the main chimney of the EfW CHP Facility). The PM_{10} real time monitor is located in the vicinity of Camels Head junction.

National Standards

The national air quality objective values, against which the monitoring results are compared, are shown in the Table below:

AIR QUALITY OBJECTIVES SET IN UK REGULATIONS			
Pollutant	Averaging Period	Objective Value ($\mu g/m^3$)	Maximum Permitted Exceedances
Nitrogen dioxide(NO_2)	Annual average	40	None
	Hourly average	200	18 hours per year
Particulate matter(PM_{10})	Annual average	40	None
	Daily average	50	35 days per year

2014 Quarter 4

This quarterly update presents the results of monitoring carried out during October, November and December 2014.

1. Operational or Other Activity

During this time, the EfW CHP facility was still in the construction phase.

Dockyard Open Day 26 Oct 2014.

Low-noise road surfacing works at Weston Mill Drive and Camels head Junction took place over four nights between 27 Oct 2014 and 30 Oct 2014.

Activity associated with Bonfire Night occurred between Saturday 01 Nov 2014 and Sunday 08 Nov 2014.

2. NO_2 Diffusion Tubes

Oct: 10 tubes deployed 03/10/2014, 8 recovered 05/11/2014, T6 (York Road) and T9 (Roman Way) missing. Results reported 13/11/2014.
Nov: 10 tubes deployed 05/11/2014, 10 recovered 05/12/2014, results reported 11/12/2014.
Dec: 10 tubes deployed 05/12/2014, 10 recovered 03/01/2015, results received 20/01/2015

3. PM_{10} Monitor maintenance, service or down time

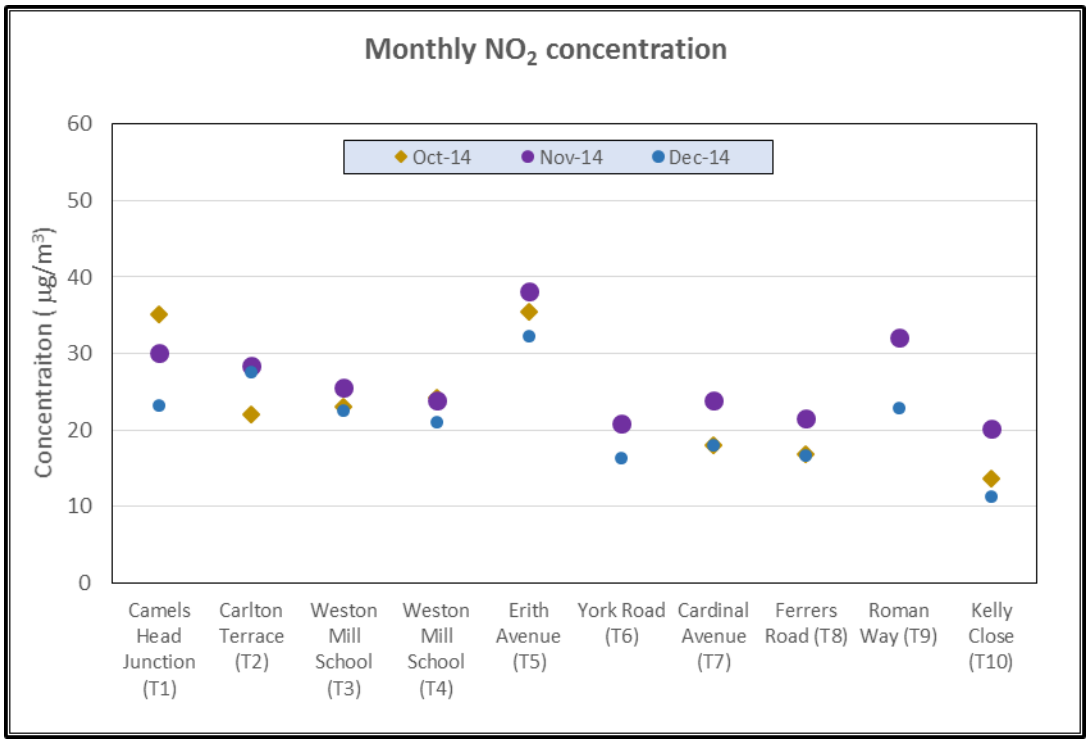
The particulate monitor was activated and began recording data on 14th October 2014.

4. NO_2 Diffusion Tube Monitoring

Note: *Results shown include an adjustment for laboratory blank but are provisional until bias adjustment has taken place.*

Three Monthly Monitoring

The results of the monitoring for the three month period October to December 2014 are shown in the graph below.



Summary of Results

A summary of results to date are shown in the Table below where the rolling 12 month average (not yet available) can be directly compared with the annual Air Quality Standard (AQS) mean objective. The mean concentrations to date are seen to be within the air quality objective of 40 µg/m^3 at all the monitoring sites.

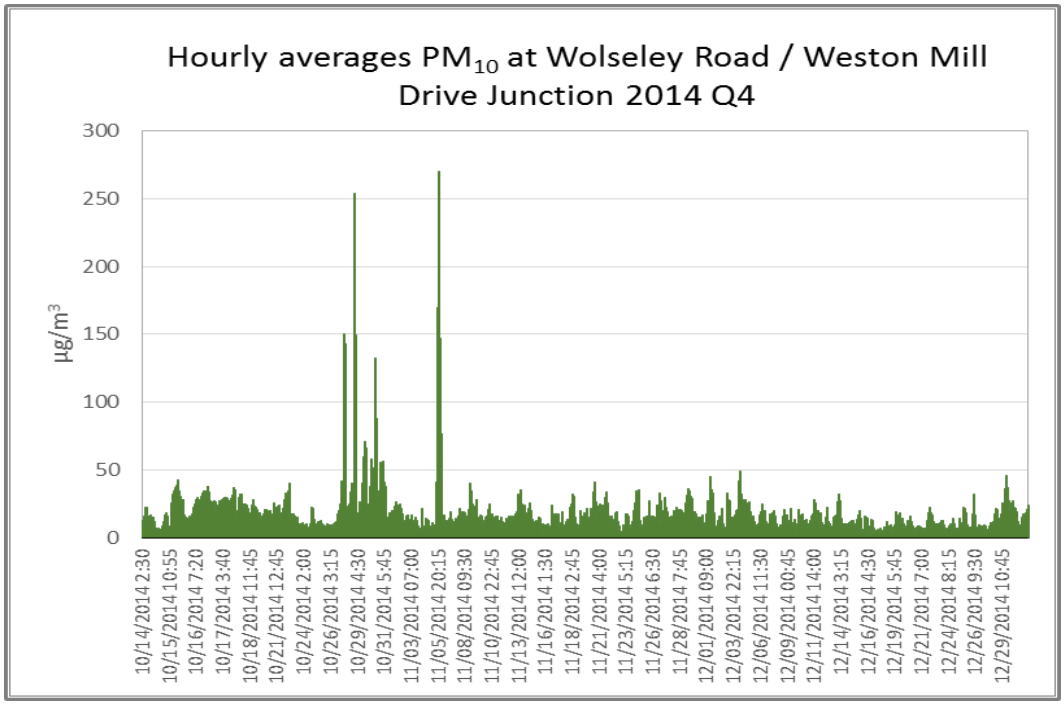
NO_2 MONITORING								
		Monthly NO_2 Concentration (µg/m^3) 2014						
Location	**Description**	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	2014 Average	12 month rolling average
T1	Camels Head Junction	24.57	31.41	35.08	30.08	23.14	28.86	
T2	Junction of Weston Mill Drive & Carlton Terrace	16.21	26.15	22.03	28.35	27.5	24.05	
T3	Weston Mill School	17.41	21.00	23.11	25.51	22.49	21.90	
T4	Weston Mill School	19.20	20.07	24.28	23.81	21.06	21.68	
T5	Erith Avenue	30.38	32.59	35.45	38.12	32.25	33.76	
T6	York Road	9.31	13.20	-	20.92	16.33	14.94	
T7	Cardinal Avenue	11.50	15.51	18.00	23.83	17.93	17.35	
T8	Ferrers Road, St Budeaux	8.76	15.41	16.87	21.54	16.62	15.84	
T9	Roman Way, adjacent to Plaistow Hill Infant and Nursery School	18.02	29.32	-	32.03	22.86	25.56	
T10	Kelly Close, Barne Barton	8.08	13.42	13.71	20.18	11.21	13.32	

Key
Air quality standard not exceeded
Air quality standard exceeded

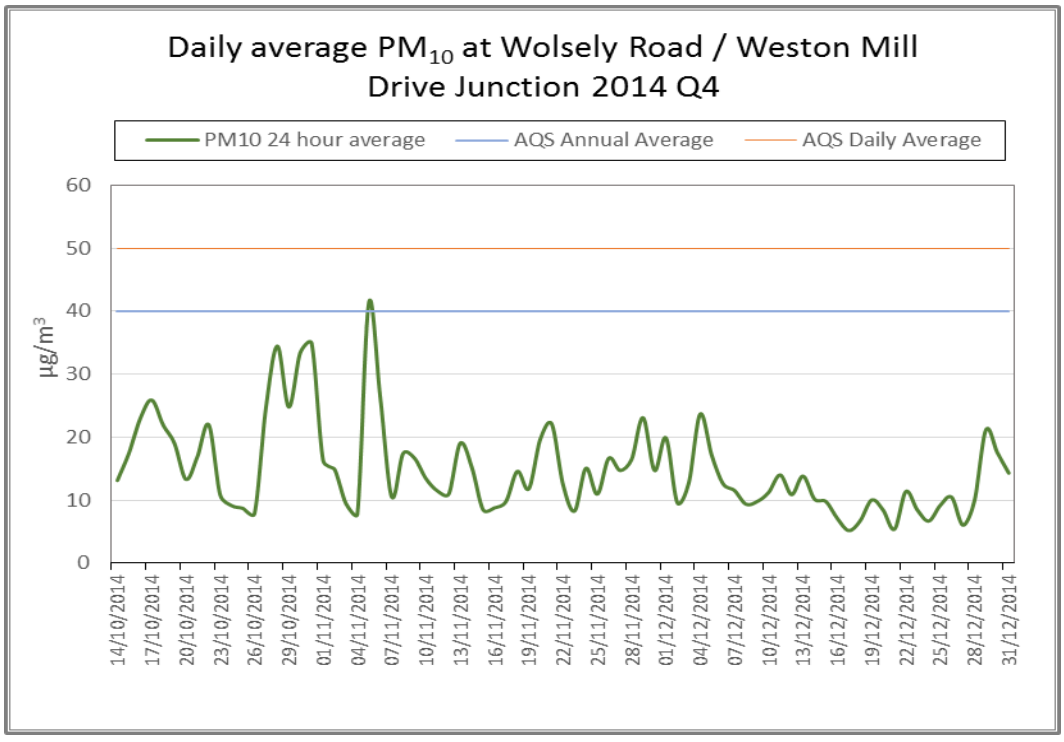
5. PM10 Monitoring

Note: *All results shown are provisional until calibration has taken place.*

Hourly PM_{10} Concentrations



24-hour PM_{10} Concentrations



Summary of Results

A summary of results to date are shown in the table below. The mean concentrations to date are seen to be within the AQS annual air quality mean objective of 40 μg/m^3.

Although high values were recorded on several evenings during the last week of October and first week of November none exceeded the AQS 24-hour average of 50 μg/m^3.

Data capture for November and December was 100%. The machine was commissioned on the 14th of October, data capture was 100% for the remainder of this month.

All results to date are subject to calibration of the machine.

PM_{10} MONITORING AT THE CAMELS HEAD JUNCTION			
Results October - December 2014			
Minimum recorded value		(μg/m^3)	2.18
Maximum recorded value		(μg/m^3)	269.6
Average		(μg/m^3)	15.23
Standard Deviation		(μg/m^3)	13.66
Data Capture		(%)	
Number of 24-hour periods with average above 50 (mg/m^3)			0
Summary			
Rolling average (all months)		(μg/m^3)	15.23
Rolling average for last 12 months		(μg/m^3)	n/a
2014	Average		15.23
	Number of 24-hour periods with average> 50 (mg/m^3)		0
2015	Average		
	Number of 24-hour periods with average> 50 (mg/m^3)		
2016	Average		
	Number of 24-hour periods with average> 50 (mg/m^3)		
2017	Average		
	Number of 24-hour periods with average> 50 (mg/m^3)		

KEY:
Air quality standard not exceeded
Air quality standard exceeded