

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

**Community Ambient Air Quality Monitoring Programme Report
Quarter 1, 2020**





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 (NO₂) and particulate matter (as PM₁₀). Monitoring of NO₂ is carried out at ten locations in the area, while a PM₁₀ 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 NO₂ in the atmosphere. NO₂ 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 NO₂ within an area. These are small plastic tubes containing a chemical absorbent which reacts with NO₂ present in the air. The tubes are changed each month and then sent away to a laboratory for analysis. The results give a NO₂ 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 PM₁₀ represents particles of 10 µm diameter or less. PM₁₀ occurs naturally, originating from volcanoes, dust storms, forest and grassland fires, living vegetation and sea spray. Human activities also generate PM₁₀, from sources such as road transport, power plants, agriculture, various industrial processes and local domestic heating.

A specialised air quality monitoring unit measures small particulate matter as they are 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 figures can then be compared to the National Standards.

Locations

The NO₂ 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. The PM₁₀ real time monitor is 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 ($\mu\text{g}/\text{m}^3$)	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

2020 Quarter 1

This quarterly update presents the results of monitoring carried out during January, February, and March 2020.

1. Operational or Other Activity

During this time, the EfW CHP facility was operating normally with scheduled periods of upkeep, maintenance and repair.

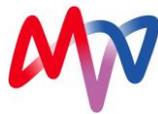
During this period there have been occasional observed disruptions or re-routing of traffic vehicular movements in the vicinity of the site. Periodically and dependent on security state, traffic will back up from the HMNB Camels Head entrance due to enhanced security inspections and checks. On the 20th March 2020, the government implemented a national lockdown to curb transmission of Covid-19 resulting in a vast reduction of vehicular movements.

2. NO₂ Diffusion Tubes

Jan: 10 tubes deployed 06/01/2020, 10 recovered 03/02/2020, results received 14/02/2020.

Feb: 10 tubes deployed 03/02/2020, 10 recovered 03/03/2020, results received 04/03/2020.

Mar: 10 tubes deployed 03/03/2020, 10 recovered 01/04/2020, results received 20/04/2020.



3. PM₁₀ Monitor maintenance, service or down time

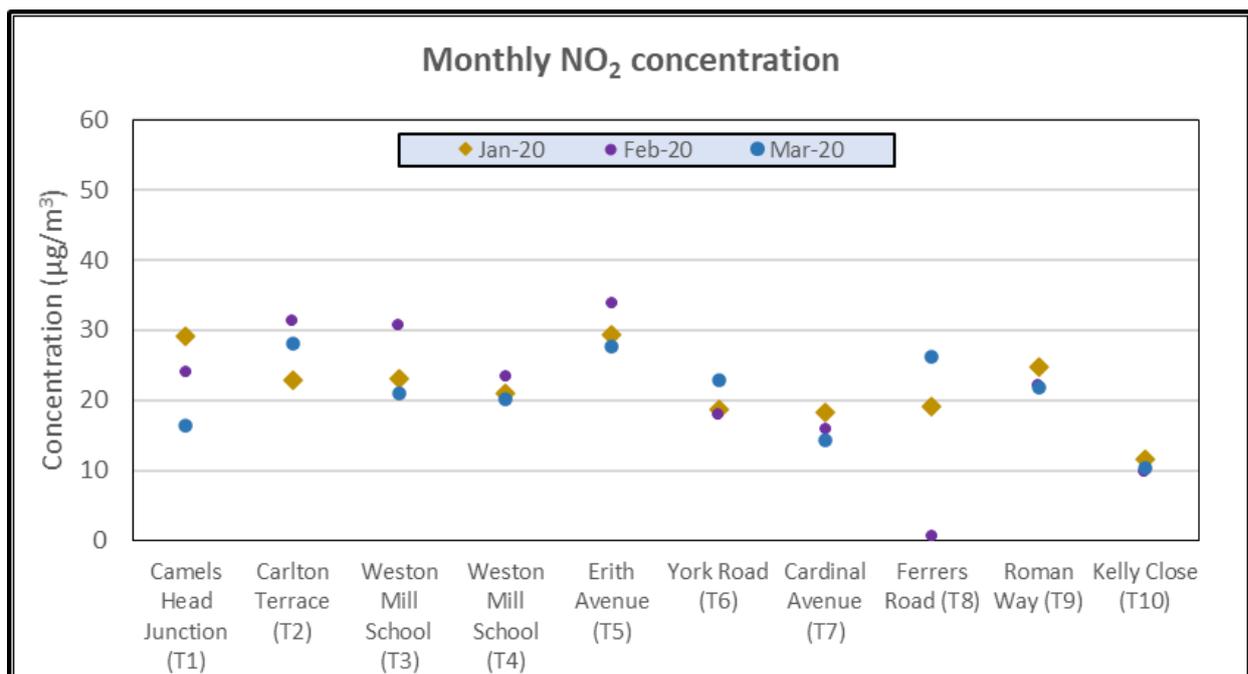
Monitor operational throughout quarter, defect identified 9th December on the Wolseley Rd monitor. Service call out to rectify.

4. NO₂ 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 January to the end of March 2020 are shown in the graph below.





Summary of Results

A summary of results to date are shown in the Tables below where the rolling 12-month average can be directly compared with the Annual Air Quality mean objective. The mean concentrations to date are seen to be within the air quality objective of 40 $\mu\text{g}/\text{m}^3$ at all the monitoring sites.



NO ₂ MONITORING															
Locatio	Description	Monthly NO ₂ Concentration ($\mu\text{g}/\text{m}^3$) 2020												2020 Average	Average of all results to date
		Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20		
T1	Camels Head Junction	29.14	23.96	16.39										23.16	25.95
T2	Junction of Weston Mill Drive & Carlton Terrace	22.91	31.25	28.03										27.40	21.30
T3	Weston Mill School	23.07	30.68	20.92										24.89	19.89
T4	Weston Mill School	21.07	23.33	20.24										21.55	20.45
T5	Erith Avenue	29.3	33.84	27.64										30.26	30.98
T6	York Road	18.65	17.97	22.79										19.80	14.82
T7	Cardinal Avenue	18.24	15.78	14.27										16.10	15.68
T8	Ferrers Road, St Budeaux	19.21	0.55	26.15										15.30	15.02
T9	Roman Way, adjacent Plaistow Hill Infant & Nursery Sch.	24.75	22.12	21.92										22.93	27.81
T10	Kelly Close, Barne Barton	11.53	9.77	10.26										10.52	13.75

Key
 Air quality standard not exceeded
 Air quality standard exceeded



NO ₂ MONITORING														
Locatio	Description	12-month rolling average NO ₂ Concentration ($\mu\text{g}/\text{m}^3$)												Mean
		Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	
T1	Camels Head Junction	21.22	19.83	23.16										21.40
T2	Junction of Weston Mill Drive & Carlton Terrace	16.18	15.55	27.40										19.71
T3	Weston Mill School	19.18	19.13	24.89										21.06
T4	Weston Mill School	12.93	11.69	21.55										15.39
T5	Erith Avenue	27.55	27.12	30.26										28.31
T6	York Road	13.77	12.83	19.80										15.47
T7	Cardinal Avenue	13.77	12.77	16.10										14.21
T8	Ferrers Road, St Budeaux	14.38	12.04	15.30										13.91
T9	Roman Way, adjacent Plaistow Hill Infant & Nursery Sch.	25.06	23.34	22.93										23.78
T10	Kelly Close, Barne Barton	11.82	10.54	10.52										10.96

Key
 Air quality standard not exceeded
 Air quality standard exceeded

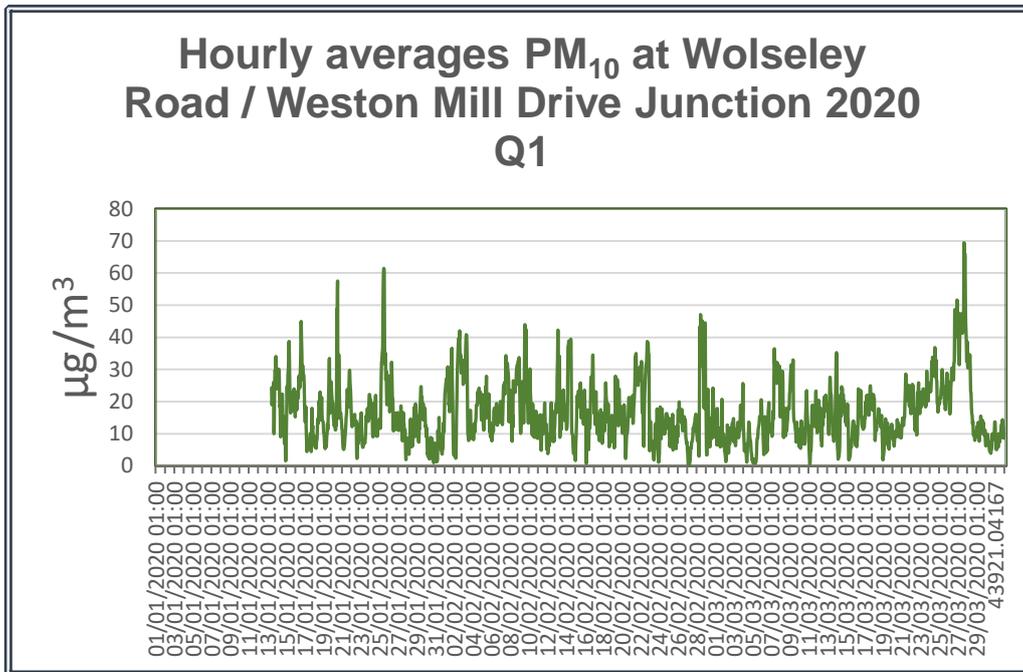


5. PM₁₀ Monitoring

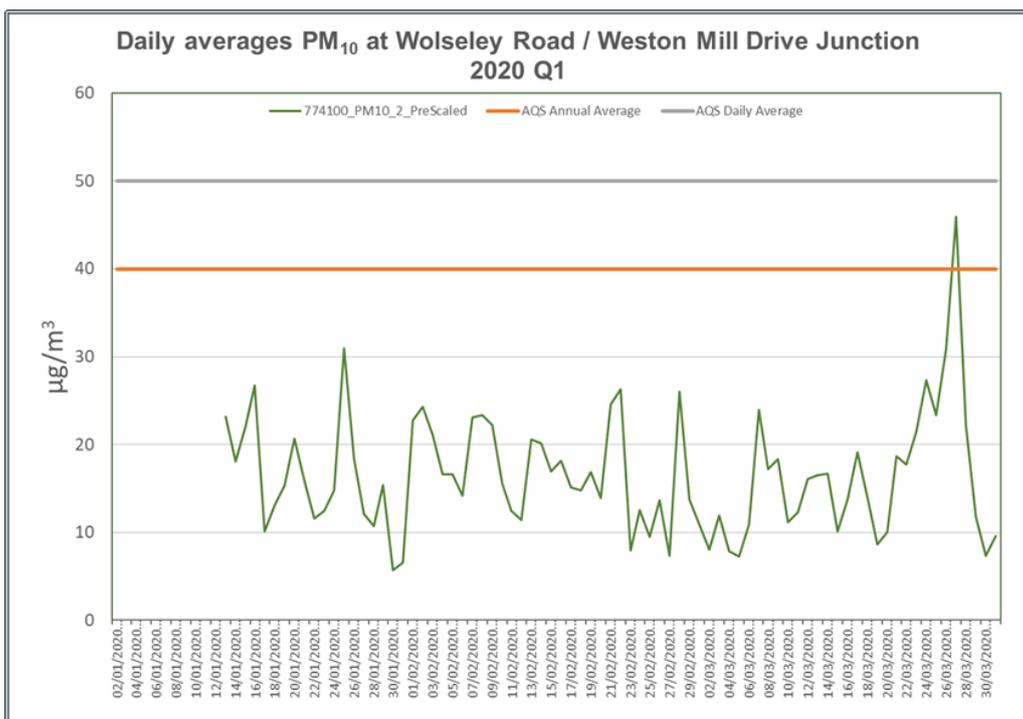
Note 1: All results shown are provisional until calibration has taken place.

Note 2: Defect identified and repair effected 13th Jan 2020

Hourly PM₁₀ Concentrations



24-hour PM₁₀ Concentrations





Summary of Results

A summary of results to date are shown in the table below. The mean concentration for this quarter is seen to be within the AQS annual air quality mean objective of 40 $\mu\text{g}/\text{m}^3$.

The highest individual value recorded in 2020 was 45.9 $\mu\text{g}/\text{m}^3$ on 27th March. The AQS 24-hour average of 50 $\mu\text{g}/\text{m}^3$ was not exceeded during this period.

Data capture for Jan, Feb and Mar was 71.8%.

PM₁₀ Monitoring at Camels Head Junction		
Results from 1st Jan-31st Mar 2020		
Maximum recorded value		45.93 $\mu\text{g}/\text{m}^3$
Minimum recorded value		5.69 $\mu\text{g}/\text{m}^3$
Average		16.52 $\mu\text{g}/\text{m}^3$
Data Capture		71.8%
No of 24 hour periods exceeding 50 $\mu\text{g}/\text{m}^3$		0
Summary to date		
2014	Average	15.23 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50 $\mu\text{g}/\text{m}^3$	0
2015	Average	12.56 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50 $\mu\text{g}/\text{m}^3$	0
2016	Average	10.59 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50 $\mu\text{g}/\text{m}^3$	0
2017	Average	6.51 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50 $\mu\text{g}/\text{m}^3$	0
2018	Average	4.84 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50 $\mu\text{g}/\text{m}^3$	0
2019	Average	14.93 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50 $\mu\text{g}/\text{m}^3$	1
2020	Average	16.52 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50 $\mu\text{g}/\text{m}^3$	0

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

Chimney Emission Data

Chimney emission data for the MVV Environment Devonport EfW CHP Facility is published weekly on the MVV website

https://www.mvv.de/en/mvv_energie_gruppe/mvv_umwelt/beteiligungen/mvv_environment_1/devonport/links_downloads/index.jsp