



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

**Community Ambient Air Quality Monitoring Programme Report
Quarter 3, 2018**





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 particles of 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 of these 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



(which could be affected by emissions of NO₂ from the main chimney of the EfW CHP Facility). The PM₁₀ 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 ($\mu\text{g}/\text{m}^3$) | 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 |



2018 Quarter 3

This quarterly update presents the results of monitoring carried out during July, August and September 2018.

1. Operational or Other Activity

During this time the EfW CHP facility operated normally.

No road works or other activity noted in the vicinity of the monitoring devices.

Significant growth of trees and shrubs in vicinity of tube positioned by Camels Head Junction.

2. NO₂ Diffusion Tubes

Jul: 10 tubes deployed 04/07/2018, 10 recovered 02/08/2018, results received 24/08/2018.

Aug: 10 tubes deployed 02/08/2018, 10 recovered 06/09/2018, results received 01/11/2018.

Sep: 10 tubes deployed 06/09/2018, 10 recovered 02/10/2018, results received 01/11/2018.

3. PM₁₀ Monitor maintenance, service or down time

Monitor fully operational throughout quarter.

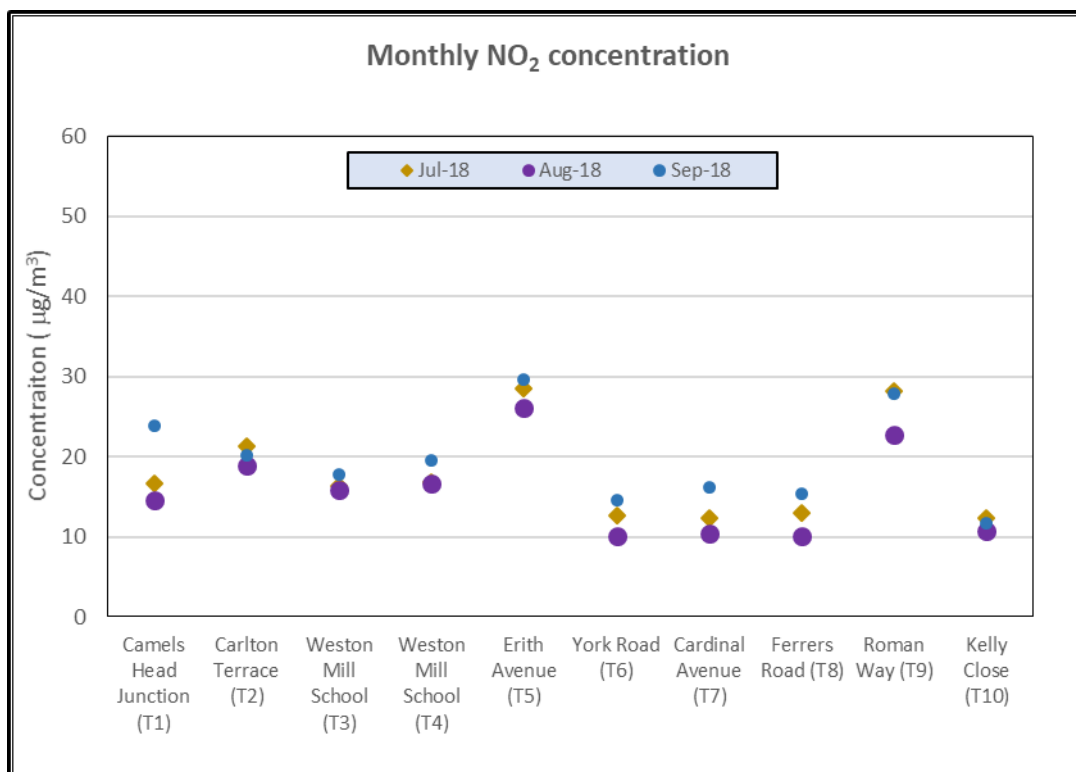


4. NO₂ Diffusion Tube Monitoring

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 July to September 2018 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 µg/m³ at all the monitoring sites.



| NO ₂ MONITORING | | | | | | | | | | | | | | | |
|---|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------|--------------------------------|
| Monthly NO ₂ Concentration (µg/m ³) 2018 | | | | | | | | | | | | | | | |
| Locatic | Description | Jan-18 | Feb-18 | Mar-18 | Apr-18 | May-18 | Jun-18 | Jul-18 | Aug-18 | Sep-18 | Oct-18 | Nov-18 | Dec-18 | 2018 Average | Average of all results to date |
| T1 | Camels Head Junction | 22.19 | 24.79 | 27.15 | 26.54 | 25.90 | 19.35 | 16.67 | 14.60 | 23.87 | | | | 22.34 | 26.48 |
| T2 | Junction of Weston Mill Drive & Carlton Terrace | 21.74 | 22.39 | 21.07 | 22.64 | 17.94 | 24.03 | 21.3 | 18.87 | 20.15 | | | | 21.13 | 21.00 |
| T3 | Weston Mill School | 20.25 | 19.35 | 20.43 | 19.02 | 17.18 | 13.68 | 16.31 | 15.79 | 17.81 | | | | 17.76 | 20.07 |
| T4 | Weston Mill School | 19.46 | 20.1 | 20.93 | 19.86 | 18.56 | 14.64 | 16.78 | 16.65 | 19.46 | | | | 18.49 | 20.42 |
| T5 | Erith Avenue | 30.87 | 27.78* | | 35.29 | 30.36 | 24.84 | 28.55 | 26.03 | 29.69 | | | | 29.18 | 31.39 |
| T6 | York Road | 15.72 | 17.09 | 15.2 | 14.94 | 12.46 | 11.32 | 12.65 | 10.05 | 14.50 | | | | 13.77 | 14.57 |
| T7 | Cardinal Avenue | 16.53 | 18.44 | 15.65 | 13.86 | 13.02 | 12.23 | 12.31 | 10.36 | 16.11 | | | | 14.28 | 15.62 |
| T8 | Ferrers Road, St Budeaux | 15.69 | 17.3 | 12.69 | 14.9 | 12.24 | 9.76 | 13.04 | 10.16 | 15.36 | | | | 13.46 | 15.07 |
| T9 | Roman Way, adjacent Plaistow Hill Infant & Nursery Sch. | 23.89 | 27.78 | 31.66 | 26.43 | 32.67 | 24.67 | 28.24 | 22.70 | 27.91 | | | | 27.33 | 27.86 |
| T10 | Kelly Close, Barne Barton | 12.29 | 15.81 | 13.16 | 14.59 | 13.09 | 11.21 | 12.25 | 10.67 | 11.64 | | | | 12.75 | 13.77 |

Key
 Air quality standard not exceeded
 Air quality standard exceeded



| NO ₂ MONITORING | | | | | | | | | | | | | | |
|---|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 12-month rolling average NO ₂ Concentration (µg/m ³) | | | | | | | | | | | | | | |
| Locatic | Description | Oct-17 | Nov-17 | Dec-17 | Jan-18 | Feb-18 | Mar-18 | Apr-18 | May-18 | Jun-18 | Jul-18 | Aug-18 | Sep-18 | Mean |
| T1 | Camels Head Junction | 27.43 | 27.43 | 26.53 | 25.46 | 25.00 | 24.70 | 25.15 | 25.51 | 23.88 | 23.60 | 23.54 | 23.85 | 25.17 |
| T2 | Junction of Weston Mill Drive & Carlton Terrace | 22.80 | 22.54 | 21.98 | 21.30 | 21.20 | 21.10 | 21.49 | 21.41 | 20.92 | 21.41 | 21.33 | 21.63 | 21.59 |
| T3 | Weston Mill School | 21.23 | 21.19 | 20.93 | 20.49 | 20.21 | 20.23 | 20.31 | 20.40 | 18.95 | 19.09 | 19.14 | 19.17 | 20.11 |
| T4 | Weston Mill School | 21.68 | 21.84 | 21.45 | 21.02 | 20.75 | 20.88 | 20.96 | 21.03 | 19.61 | 19.64 | 19.65 | 19.69 | 20.68 |
| T5 | Erith Avenue | 32.16 | 32.42 | 32.15 | 31.70 | 31.23 | 30.85 | 31.64 | 32.05 | 30.54 | 30.55 | 30.66 | 30.79 | 31.39 |
| T6 | York Road | 15.85 | 15.87 | 15.36 | 15.47 | 15.44 | 15.35 | 15.60 | 15.53 | 14.28 | 14.53 | 14.59 | 14.90 | 15.23 |
| T7 | Cardinal Avenue | 16.78 | 16.89 | 16.46 | 15.83 | 15.66 | 15.65 | 15.63 | 15.62 | 15.02 | 15.24 | 15.25 | 15.63 | 15.81 |
| T8 | Ferrers Road, St Budeaux | 16.65 | 16.57 | 16.22 | 15.79 | 15.83 | 15.57 | 15.71 | 15.68 | 14.25 | 14.56 | 14.50 | 14.73 | 15.51 |
| T9 | Roman Way, adjacent Plaistow Hill Infant & Nursery Sch. | 31.00 | 30.86 | 29.90 | 28.92 | 28.63 | 28.73 | 28.81 | 29.36 | 27.95 | 28.41 | 28.39 | 28.69 | 29.14 |
| T10 | Kelly Close, Barne Barton | 16.39 | 16.21 | 15.52 | 14.85 | 14.66 | 14.42 | 14.65 | 14.64 | 13.32 | 13.23 | 13.27 | 13.32 | 14.54 |

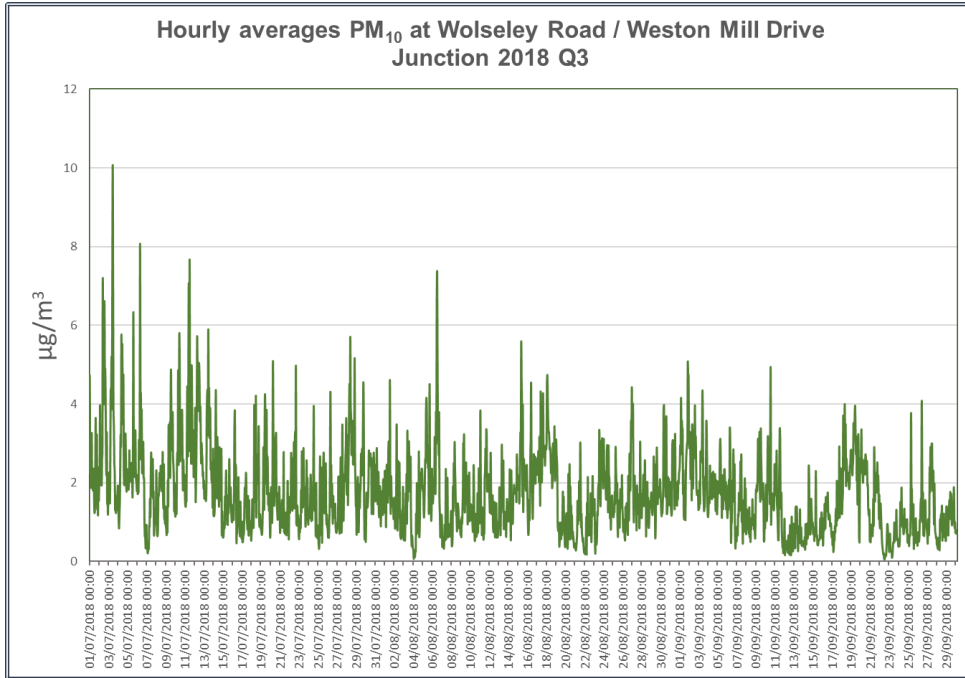
Key
 Air quality standard not exceeded
 Air quality standard exceeded



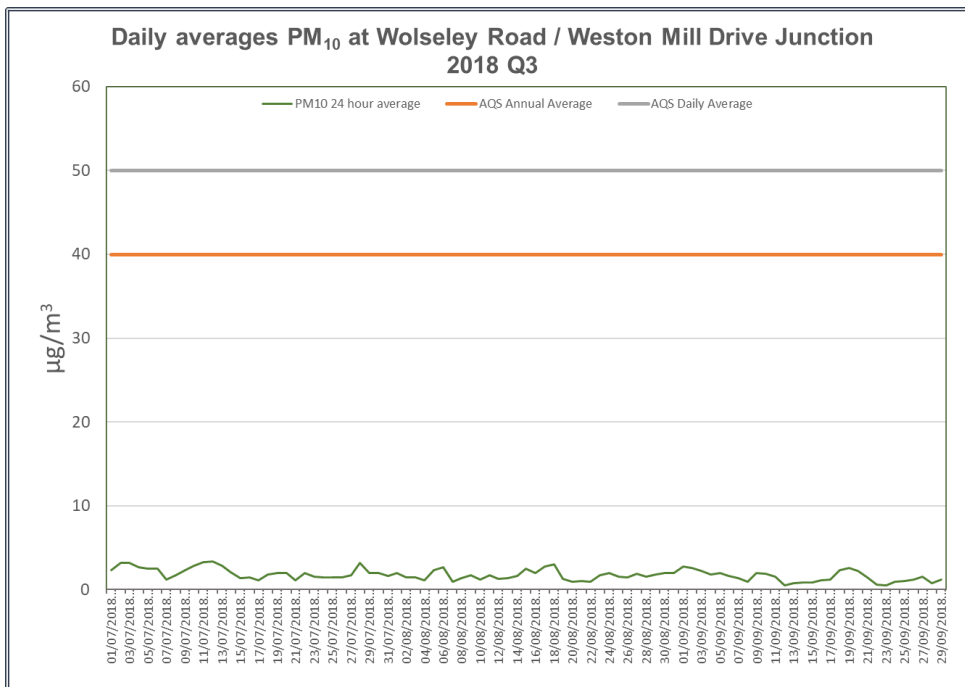
5. PM10 Monitoring

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

Hourly 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 are seen to be within the AQS annual air quality mean objective of 40 µg/m³.

The highest individual value recorded was in July. No daily average value exceeded the AQS 24-hour average of 50 µg/m³.

Data capture for July, August and September was 100%.

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

| PM ₁₀ MONITORING AT THE CAMELS HEAD JUNCTION | | |
|--|---|--------|
| Results July - September 2018 | | |
| Minimum recorded value | (µg/m ³) | 0.056 |
| Maximum recorded value | (µg/m ³) | 10.063 |
| Average | (µg/m ³) | 1.744 |
| Standard Deviation | (µg/m ³) | 1.076 |
| Data Capture | (%) | 100 |
| Number of 24-hour periods with average above 50 (mg/m ³) | | 0 |
| Summary to date | | |
| 2014* | Average | 15.23 |
| | Number of 24-hour periods with average >50 (mg/m ³) | 0 |
| 2015 | Average (to date) | 12.56 |
| | Number of 24-hour periods with average >50 (mg/m ³) | 0 |
| 2016 | Average | 10.49 |
| | Number of 24-hour periods with average >50 (mg/m ³) | 0 |
| 2017 | Average | 6.51 |
| | Number of 24-hour periods with average >50 (mg/m ³) | 0 |
| 2018 | Average | 3.98 |
| | Number of 24-hour periods with average >50 (mg/m ³) | 0 |

KEY:

- Air quality standard not exceeded
- Air quality standard exceeded

* 14 Oct - 31 Dec 2014 only

Stack Emission Data

Stack emission data for the MVV Environment Devonport EfW CHP Facility is published weekly on the MVV website at -

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