



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

**Community Ambient Air Quality Monitoring Programme Report
Quarter 2, 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. A PM₁₀ real time monitoring station was installed in 2014 in the vicinity of Camels Head junction and is required to monitor until October 2020.

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 2

This quarterly update presents the results of monitoring carried out during April, May, and June 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 has been a reduction in vehicular movements in the local vicinity due to the national lockdown imposed by government on the 20th March until early June.

2. NO₂ Diffusion Tubes

Apr: 10 tubes deployed 06/04/2020, 10 recovered 11/05/2020, results received 03/06/2020.
May: 10 tubes deployed 11/05/2020, 10 recovered 11/06/2020, results received 13/07/2020.
Jun: 10 tubes deployed 11/06/2020, 10 recovered 09/07/2020, results received 06/08/2020.

**(minor disruptions to issue of tubes, deploying, recovery and analysis during lockdown period)*

3. PM₁₀ Monitor maintenance, service or down time

Monitors operational and serviced throughout quarter.

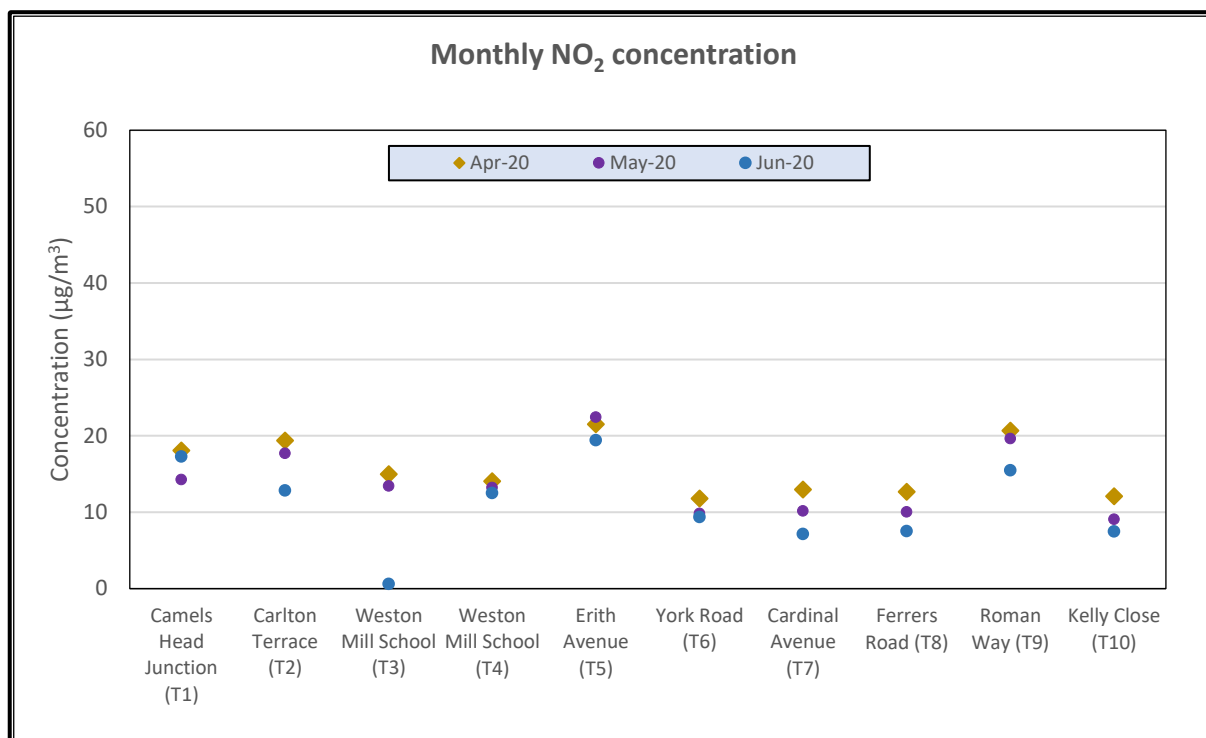


4. NO₂ Diffusion Tube Monitoring

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 April to the end of June 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 | | | | | | | | | | | | | | | |
|----------------------------|---|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------|--------------------------------|
| | | Monthly NO ₂ Concentration ($\mu\text{g}/\text{m}^3$) 2020 | | | | | | | | | | | | | |
| Location | Description | Jan-20 | Feb-20 | Mar-20 | Apr-20 | May-20 | Jun-20 | Jul-20 | Aug-20 | Sep-20 | Oct-20 | Nov-20 | Dec-20 | 2020 Average | Average of all results to date |
| T1 | Camels Head Junction | 29.14 | 23.96 | 16.39 | 18.08 | 14.28 | 17.3 | | | | | | | 19.86 | 25.95 |
| T2 | Junction of Weston Mill Drive & Carlton Terrace | 22.91 | 31.25 | 28.03 | 19.38 | 17.70 | 12.86 | | | | | | | 22.02 | 21.30 |
| T3 | Weston Mill School | 23.07 | 30.68 | 20.92 | 15 | 13.43 | 0.63 | | | | | | | 17.29 | 19.89 |
| T4 | Weston Mill School | 21.07 | 23.33 | 20.24 | 14.05 | 13.22 | 12.51 | | | | | | | 17.40 | 20.45 |
| T5 | Erith Avenue | 29.3 | 33.84 | 27.64 | 21.54 | 22.43 | 19.43 | | | | | | | 25.70 | 30.98 |
| T6 | York Road | 18.65 | 17.97 | 22.79 | 11.79 | 9.84 | 9.36 | | | | | | | 15.07 | 14.82 |
| T7 | Cardinal Avenue | 18.24 | 15.78 | 14.27 | 12.99 | 10.17 | 7.15 | | | | | | | 13.10 | 15.68 |
| T8 | Ferrers Road, St Budeaux | 19.21 | 0.55 | 26.15 | 12.69 | 10.02 | 7.53 | | | | | | | 12.69 | 15.02 |
| T9 | Roman Way, adjacent Plaistow Hill Infant & Nursery Sch. | 24.75 | 22.12 | 21.92 | 20.7 | 19.64 | 15.48 | | | | | | | 20.77 | 27.81 |
| T10 | Kelly Close, Barne Barton | 11.53 | 9.77 | 10.26 | 12.09 | 9.06 | 7.47 | | | | | | | 10.03 | 13.75 |

Key
 Air quality standard not exceeded
 Air quality standard exceeded



| NO ₂ MONITORING | | | | | | | | | | | | | | |
|----------------------------|---|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| | | 12-month rolling average NO ₂ Concentration ($\mu\text{g}/\text{m}^3$) | | | | | | | | | | | | |
| Location | Description | Jan-20 | Feb-20 | Mar-20 | Apr-20 | May-20 | Jun-20 | Jul-20 | Aug-20 | Sep-20 | Oct-20 | Nov-20 | Dec-20 | Mean |
| T1 | Camels Head Junction | 21.22 | 19.83 | 23.16 | 21.89 | 20.37 | 19.86 | | | | | | | 21.06 |
| T2 | Junction of Weston Mill Drive & Carlton Terrace | 16.18 | 15.55 | 27.40 | 25.39 | 23.85 | 22.02 | | | | | | | 21.73 |
| T3 | Weston Mill School | 19.18 | 19.13 | 24.89 | 22.42 | 20.62 | 17.29 | | | | | | | 20.59 |
| T4 | Weston Mill School | 12.93 | 11.69 | 21.55 | 19.67 | 18.38 | 17.40 | | | | | | | 16.94 |
| T5 | Erith Avenue | 27.55 | 27.12 | 30.26 | 28.08 | 26.95 | 25.70 | | | | | | | 27.61 |
| T6 | York Road | 13.77 | 12.83 | 19.80 | 17.80 | 16.21 | 15.07 | | | | | | | 15.91 |
| T7 | Cardinal Avenue | 13.77 | 12.77 | 16.10 | 15.32 | 14.29 | 13.10 | | | | | | | 14.22 |
| T8 | Ferrers Road, St Budeaux | 14.38 | 12.04 | 15.30 | 14.65 | 13.72 | 12.69 | | | | | | | 13.80 |
| T9 | Roman Way, adjacent Plaistow Hill Infant & Nursery Sch. | 25.06 | 23.34 | 22.93 | 22.37 | 21.83 | 20.77 | | | | | | | 22.72 |
| T10 | Kelly Close, Barne Barton | 11.82 | 10.54 | 10.52 | 10.91 | 10.54 | 10.03 | | | | | | | 10.73 |

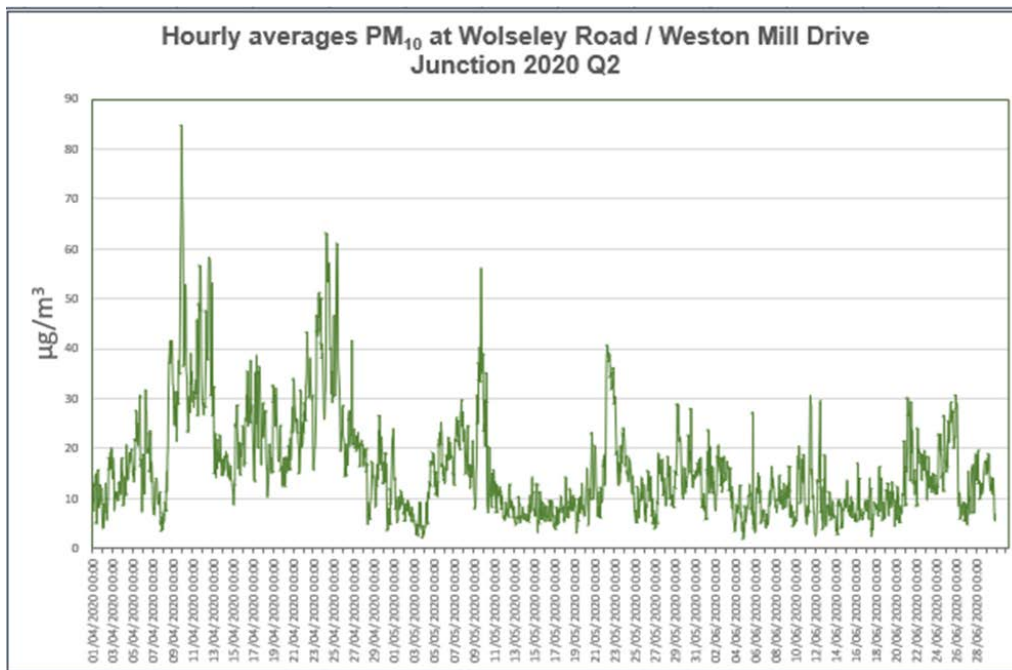
Key
 Air quality standard not exceeded
 Air quality standard exceeded



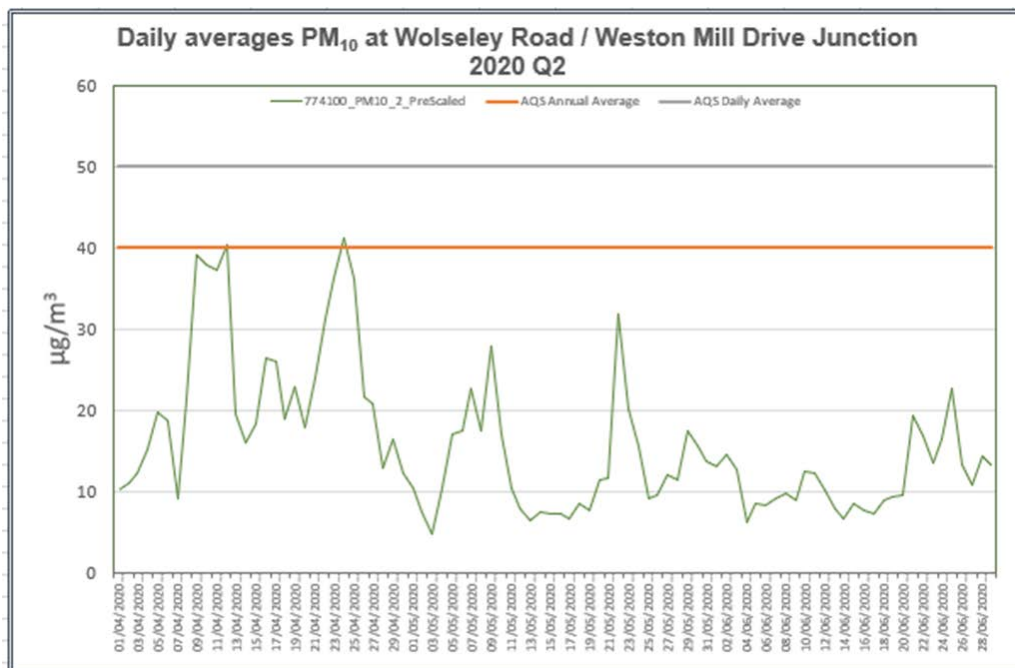
5. PM10 Monitoring

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

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 µg/m³.

The highest individual value recorded in 2020 was 45.9 µg/m³ on 27th March. The AQS 24-hour average of 50 µg/m³ was not exceeded during this period.

Data capture for Apr, May and Jun was 100%.

| PM ₁₀ MONITORING AT THE CAMELS HEAD JUNCTION | | | |
|--|---|--|--------|
| Results April - June 2020 | | | |
| Minimum recorded value | (µg/m ³) | | 4.821 |
| Maximum recorded value | (µg/m ³) | | 41.308 |
| Average | (µg/m ³) | | 15.89 |
| Standard Deviation | (µg/m ³) | | 3.438 |
| 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 | | 5.14 |
| | Number of 24-hour periods with average >50 (mg/m ³) | | 0 |
| 2019 | Average | | 14.93 |
| | Number of 24-hour periods with average >50 (mg/m ³) | | 1 |
| 2020 | Average | | 16.2 |
| | Number of 24-hour periods with average >50 (mg/m ³) | | 0 |

KEY:

- Air quality standard not exceeded
- Air quality standard exceeded

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