

Alfreton Monitoring Methodology

Monitoring is carried out for the discharge to foul sewer through rainwater runoff at least every 12 months.

The trade effluent discharges into the public sewer which runs along the right-hand side of the site. The discharge /monitoring point is located in the manhole (marked in red) on the EMR Alfreton Site Drainage Plan.

The trade effluent shall consist solely of waste waters derived from rainfall dependant site runoff.

The maximum volume of trade effluent to be discharged during a 24-hour period shall not exceed 45 cubic meters.

5 litres per second is the highest rate at which the trade effluent shall be discharged.

Discharge Sampling and Analysis

Assessment is undertaken to determine if the trade effluent discharges (represented by the samples) are compliant with relevant conditions set out in their respective Trade Effluent Discharge Consent.

Samples are submitted for analysis of parameters with concentration thresholds provided within the relevant permit consent. The samples are analysed for: pH, electrical conductivity, chemical oxygen demand (COD), biochemical oxygen demand (BOD), hydrocarbon oil index, mineral oil, total and dissolved metals - As, Cd, Cr, Cu, Hg, Ni, Pb, Zn, total organic carbon (TOC) and total suspended solids (TSS).

Laboratory analysis details

EMR normally use Mayer Environmental Ltd to collect samples from the outfall and arrange laboratory analyses with EMR's approved and accredited laboratories (Chemtest). All Chemtest laboratories are UKAS accredited to ISO/IEC 17025:2017 and where applicable hold the Environment Agency MCERTS Performance standard.

Surface Water Analysis

pH: Measurement of pH using a pH meter.

Electrical conductivity: Measurement of the electrical conductivity using a conductivity meter.

Suspended Solids (TOS): Filtration of a mixed sample through a GF/C 1.2µm glass fibre filter and determination of the mass of residue retained dried at 105°C.

BOD (Biological Oxygen Demand): ATU BOD5 - electrometric determination of dissolved oxygen in a seeded sample initially and after 5 days incubation at 20°C.

COD (Chemical Oxygen Demand): Dichromate (potassium dichromate) oxidation of organic matter in sample followed by colorimetric determination of residual Cr (VI).

Anions: (Fluoride; chloride; nitrite; nitrate; total oxidisable nitrogen (TON); sulphate; phosphate; alkalinity; ammonium): Automated colorimetric analysis using a discrete analyser.

Total nitrogen (organic nitrogen and inorganic nitrogen): An alkaline persulphate digestion converts all forms of nitrogen to nitrate. The nitrate then reacts with chromotropic acid under strongly acidic conditions to form a yellow complex. Its absorbance is measured at 420nm.

Metals and semi-metals (iron; aluminium antimony; arsenic; barium; beryllium; boron; cadmium; chromium; cobalt; copper; lead; manganese; mercury; molybdenum; nickel; selenium; tin; vanadium; zinc): Filtration of samples followed by direct determination by inductively coupled plasma – mass spectrometry (ICP-MS).

Hexavalent chromium Cr (VI): Automated colorimetric analysis by a discrete analyser using 1,5 diphenyl carbazide.

Total Organic Carbon (TOC): Instrumental catalytic oxidation of organic (and inorganic) carbon and subsequent measurement of the carbon dioxide liberated by infra-red (IR) detection. Inorganic carbon is determined separately and the total organic carbon is derived by difference.

Total petroleum hydrocarbons (TPH): Total petroleum hydrocarbons in the range C6–C40 with optional carbon banding and/or Gasoline Range Organics (GRO), Diesel Range Organics (DRO).

Lubricating oil Range Organics LRO: Methodology – Liquid/liquid solvent extraction of a water sample into pentane followed by determination of total petroleum hydrocarbons by gas chromatography using flame ionisation detection (GC-FID).

Aliphatic and aromatic hydrocarbons: Methodology – Liquid/liquid solvent extraction of a water sample into pentane followed by determination of hydrocarbons by two-dimensional gas chromatography using flame ionisation detection (GCxGC-FID).

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Polycyclic Aromatic Hydrocarbons (PAH) in Waters by GC-FID: Anthracene; benzo[a]anthracene; benzo[a]pyrene; benzo[b]fluoranthene; benzo [ghi] perylene;

benzo[k]fluoranthene; chrysene; dibenz [ah]anthracene; fluoranthene; fluorene; indeno[123cd] pyrene; naphthalene; phenanthrene; pyrene: Methodology – Liquid/liquid solvent extraction of a water sample into pentane followed by the determination of polynuclear aromatic hydrocarbons by gas chromatography with flame ionisation detection (GC-FID).

Volatile Organic Compounds: Analysis of a water sample for volatile organic compounds by automated headspace gas chromatography with mass spectrometric detection (HS-GC-MS), based upon USEPA Method 8260.

Polychlorinated Biphenyls (PCB): GC-MS / GC-ECD Methodology – Liquid/liquid solvent extraction of a water sample followed by the determination of PCBs by gas chromatography using mass spectrometric (GC-MS) detection for identification and electron capture detection (GC-ECD) for quantitation if present.

Phenols: The method includes 24 substituted phenols (including chlorophenols). Methodology – Liquid/liquid solvent extraction of a water sample followed by the determination of phenols by gas chromatography using mass spectrometric detection (GC-MS) and determination by high-performance liquid chromatography (HPLC) using electrochemical detection.