ARLCONSULTING

Document ref: 5701-410

MEG Derby Ltd

Dove Valley Park Soft drinks production facility

EPR Application

Reference: EPR/RP3904MC/A001

Emissions to water description

The following supporting information should also be read in conjunction with the following three drawings – all of which are attached:

WIL_01_FPAW_4_AW_UP_PF_xx_ABW_3f (Effluent Plant PFD)

WIL_01_FPAW_4_AW_UP_LA_xx_ENTWG_3f (Effluent Plant Layout)

WIL_01_FPAW_4_AW_UP_WB_xx_xx 3f (Water balance)

1.0 Summary of manufacturing process

A detailed description of the process activities being carried out on site has separately been provided in supporting document reference: *'P9408-EA05-01 Process Description Section 1'*. A list of all raw materials used on site has also been provided in supporting document reference: '*5701-409 (Raw Materials Storage)'*

As would be expected for a site manufacturing soft drinks and mineral waters, the raw materials are mainly sugars and flavourings which are used in the product. It can therefore be confirmed that **there will be no substances present in any of the effluent discharges described below which could be described as hazardous or included in any of the EA lists of 'at risk' substances. Essentially all pollutants potentially in the discharges are accounted for and screened out as insignificant**.

There are also a number of proprietary food grade cleaning products used which are based on organic and mineral acids. It is the use of these cleaning products that results in the generation of trade effluent which will be disposed of to the Severn Trent Water foul sewer. This is described in more detail below in section 3.0

2.0 Water Treatment Plant

There are two main elements to the site water treatment plant that can be described as follows:

2.1 Water filtration plant

The majority of production on site will use abstracted ground water as the main raw material. A separate abstraction licence has been granted by the Environment Agency. In common with many ground waters in the UK, the water at Dove Valley Park has levels of soluble iron and manganese compounds that must be removed prior to the water being used for production.

The filtration plant first oxidises the soluble iron and manganese compounds to the insoluble oxides which are then removed on the actual filter bed.

Regeneration of the filter beds involves the iron and manganese precipitates being washed off the filter beds. This waste stream will pass to the Severn Trent Water foul sewer.

The filter bed is then subject to a number of rinses before coming back into service. The final rinse is, by definition, clean water – which has to be clean before it can come back into service.

2.2 Reverse Osmosis (RO) plant.

Water is passed through the RO plant prior to the manufacture of soft drinks. The RO plant operates on an ionic basis and essentially removes the vast majority of Total Dissolved Solids (TDS) in the feed water.

The feed water to the RO plant can be from one of two sources:

- The ground water post filtration plant as described above.
- Severn Trent Water towns mains water.

In terms of the identification of any potential pollutants in the discharge to the environment, it should be noted that the final rinse water has been passed through an RO plant and therefore will actually be of **higher quality than the abstracted ground water** in terms of TSS and TDS.

The feed to the RO plant will also have been through the water treatment plant and therefore there are considerably lower levels of dissolved iron and manganese within the RO reject water than in the abstracted ground water. The only materials of note in the RO reject water will again be TDS – which are all naturally occurring ions already present in the ground water – such as bicarbonate, chloride, sulphate, sodium, calcium and magnesium.

There will be minimal or no COD or suspended solids in the discharge to surface water.

It is important to also emphasise that because of the nature of the raw material used on site **there is no possibility of contaminating any discharges from the site with other dangerous or hazardous materials**.

3.0 Discharge to STW foul sewer.

As mentioned above, it has always been recognised that there will be certain effluent streams that will not be of suitable quality to pass to the environment. These streams will be segregated, flow balanced and pH corrected to allow discharge to the STW foul sewer. They will enter the sewer at emission point SW1 as shown on the layout drawing.

The actual STW consent document has also been provided – see doc ref: 'Consent - 15.10.19'

The COD of the effluent will mainly be comprised of organic sugars and other similar materials that have been removed from the vessels and pipework as part of the standard site cleaning procedures. The COD of the effluent discharged to the foul sewer will always contain a COD of less than the consented value of 4,000 mg/l

As described in 2.1 above there will also be levels of insoluble salts of iron and manganese which will be within the STW consent limit for TSS of 1,000 mg/l

Importantly there will be no other specific substances within the effluent which would be listed in the EA guidance document on 'Risk Assessment for treated sewage or trade effluent discharges '.

It is also important to highlight the following paragraph from the TW consent that will be complied with at all times:

7. The trade effluent shall not contain any substance or substances which either alone, or in combination with any matter in any sewers or receiving sewage treatment works vested in and/or under the control of Severn Trent Water Limited, would give rise to obnoxious, poisonous or inflammable gases, or otherwise a statutory nuisance as defined by the Environmental Protection Act 1990 in such sewers or works, would be deleterious to such sewers or to the processes in use at such works or to the disposal of effluents and sludges produced by such works.

Because of the nature of the raw materials used on site and the treatment processes employed in the bespoke effluent plant, it can therefore be confirmed that **all pollutants in the discharge to sewer are adequately treated by the WWTW so as to cause insignificant impact upon the receiving environment.**

4.0 Discharges to Surface Water

The intention is that the discharge to surface water will be a combination of rain water and the 'clean' effluent streams as described above.

The two streams will flow in to the site attenuation pond prior to discharge to the Severn Trent Water owned surface water sewer – highlighted as emission point W1 on the layout drawing.

4.1 Rain water volumes and discharge rate

The average rain water flow has been calculated according to the following calculations.

Based on the CIRIA 736 UK rainfall map (page 45) Dove Valley Park would be in region 2, with a rainfall average of 600-800 mm/annum.

Thus, based on a worst case average of 800 mm/day, this equates to 2.2 mm/day.

Based on a site area of approximately 12 Ha (or 120,000 m^2) rain water volume would be 0.0022 x 120,000 = 264 m^3/d (excluding any inflation for climate change).

The instantaneous flow rate from the site into the surface water sewer will be limited to 135 litres/second.

4.2 'Clean' effluent volumes

The RO reject water at 107 m^3/day and the water filtration plant final rinse water (also referred to as 'Backwash' on the Water Balance drawing) at 84m^3/day would give a total of 191 m^3/day.

Importantly **there will be no other specific substances within the discharge to surface water which would be listed in the EA guidance document on 'Risk Assessment for treated sewage or trade effluent discharges to surface water or ground water'.**

It can therefore be confirmed that all pollutants potentially in the discharges are accounted for and screened out as insignificant.

5.0 Control and monitoring of all discharges

The effluent plant outline design and operational logic is shown on the attached Process Flow Diagram (PFD). The plant operation includes for a high level of automation to ensure that the protocol as described above is followed at all times. This is supported by suitably trained and qualified operators and management.

The operational logic described below can be followed on the PFD.

All instrumentation will be MCerts approved.

5.1 Discharge to STW surface water sewer.

All influent flows to be directed to the environment will first be received into drainage sump B. Discharge to the attenuation pond (ie 'clean' effluent discharges only) will be measured for flow and samples will automatically be taken for analysis.

There are also on-line instruments within the sump (including Brix which is a measure of sugar content) which would indicate if there has been any contamination of the sump contents. This is very unlikely as by definition there is no route for contamination of these clean water streams.

However, if for whatever reason the operators do not wish to discharge these streams to the attenuation pond then they will turn off the transfer pumps. This can also be automated in response to the installed instrumentation within the sump. Sump B will then overflow into sump A and discharge will be diverted through the effluent treatment plant and then to the foul sewer and then to the sewage treatment works.

The setting of the hydraulic and qualitative levels in the STW consent were arranged according to this exact scenario.

5.2 Discharge to STW foul sewer

The discharge to the foul sewer will be a combination of domestic waste and trade effluent. The trade effluent element is as described above in section 3.0

The process effluent will fall by gravity into sump A where again there is instrumentation to check for key qualitative parameters. If there are any issues with

the quality, whereby it is outside certain key influent parameters, then there is the opportunity to divert the material into a standby divert tank. A decision is then taken whether to introduce the effluent back into the main stream at a controlled rate, or for serious contamination issues it can be tankered off-site for specialist processing.

Following balancing and pH correction the treated effluent is discharged into the foul sewer. Before it combines with the domestic waste there will be:

- Flow monitoring
- Automatic sampling for subsequent analysis
- Further instrumentation including online TOC (as an indication of COD)

It can be seen above in 5.1 and 5.2 that the overriding philosophy behind the design and operation of the environment is to ensure that the quality of discharge to both the environment and the foul sewer are carefully monitored and controlled at all times. There are a number of fail safe systems in place such that any accidental spillages on site are controlled and managed effectively to protect both the environment and the integrity of the STW trade effluent consent.

It should again be emphasised that, irrespective of the control systems as described above, the site does not use any materials or substances that could enter into either of the discharges which may be described as hazardous or dangerous.

Any accidental discharges within the process are likely to result in an effluent being passed to the treatment plant causing extremes of:

- pH (due to mineral acid or cleaning acid/caustic materials)
- COD (due to spills of high sugar containing materials)

As has been described the effluent plant is designed to manage any such spills through on site containment, identification and subsequent disposal pathway – to foul sewer or to off-site tankering.