Section II: Technical Description

This section of the application provides a Technical Description of the proposed MCP to be operated at the site.

The Information provided in this section should be viewed in parallel with:

- Section I: Application Forms
- Section III: Supporting Information

Introduction and permitting context

Founded in 1842, the Mondelez Sheffield site is among the UK's primary producers of confectionery products, including liquorice-based confectionery, mints and jellies.

Site activities fall within Schedule 1, Section 6.8 Part A(1) (d)(iii) of the Environmental Permitting Regulations 2016 (as amended).

"Treatment and processing of….. animal and vegetable raw materials…"

Products are primarily manufactured from vegetable raw materials, however gelatine, which is classified as an animal raw material, is a constituent of certain products in varying amounts. Sites with a mixed animal and vegetable raw material feedstock must calculate the applicable permitting threshold on the basis of the percentage of animal material in the finished product, with the permitting threshold ranging from 75 to 300 tonnes per day (tpd) of finished product. Food manufacturing sites must hold an environmental permit if their maximum theoretical production capacity exceeds this calculated permitting threshold.

For the Mondelez Sheffield site the maximum theoretical production output, assuming all production plants operate for 24 hours per day (reduced to allow for daily cleaning in each plant), is calculated to be approximately 286 tpd. The gelatine content of site products varies from 0% to 9.23%, depending on the recipe. Based on the product type with the highest gelatine content, the adjusted permitted threshold for the site as a whole is 191 tpd. On this basis, it has been determined that since the theoretical maximum production of 286 tpd exceeds the permitting threshold of 191 tpd an environmental permit is required for the site.

Process effluent generated from site activities is discharged for treatment at Yorkshire Water (YW) Wastewater Treatment Works (WwTW). Prior to sewer discharge, most process effluent is conveyed to an on-site effluent treatment plant (ETP) for effluent pre-treatment comprising effluent balancing and pH correction. This effluent pre-treatment activity falls within Schedule 1, Section 5.4 (a)(ii) of the Environmental Permitting Regulations 2016 (as amended).

"Disposal of non-hazardous waste….. involving…physico-chemical treatment"

This environmental permit will also incorporate the existing boiler plant permit, which is regulated as a standalone Medium Combustion Plant by the Environment Agency (EA) (permit reference: EPR/CP3126SW).

The Mondelez Sheffield site holds three consents to discharge to the River Don related to previously operated process outfalls (reference numbers: NE/WRA7289/001, NE/WRA6752/001 and NE/3181/003). These consents exist for historic purposes and are no longer required due to changes on site; Mondelez requests that these are surrendered as part of this application.

Description of site activities

The Mondelez Sheffield site is located to the northwest of Sheffield city centre in an area predominantly industrial / commercial in nature. The site sits either side of River Don and comprises a series of production buildings, warehousing/storage (raw materials and finished product), offices and car parking. There are four process departments on site, which produce a range of confectionery products. These are:

- Hard mints;
- Soft mints;
- Jellies; and
- Continuous Liquorice Process (CLP)

In addition to manufacturing processes operating on site, there are a number of associated ancillary and utility activities including: steam raising boilers, air compressors, operation of refrigeration and cooling equipment, effluent pre-treatment plant operations, cleaning activities, waste storage and handling and raw materials storage and handling.

A more detailed description of principal site activities is provided in the sections below.

Hard mints production plant

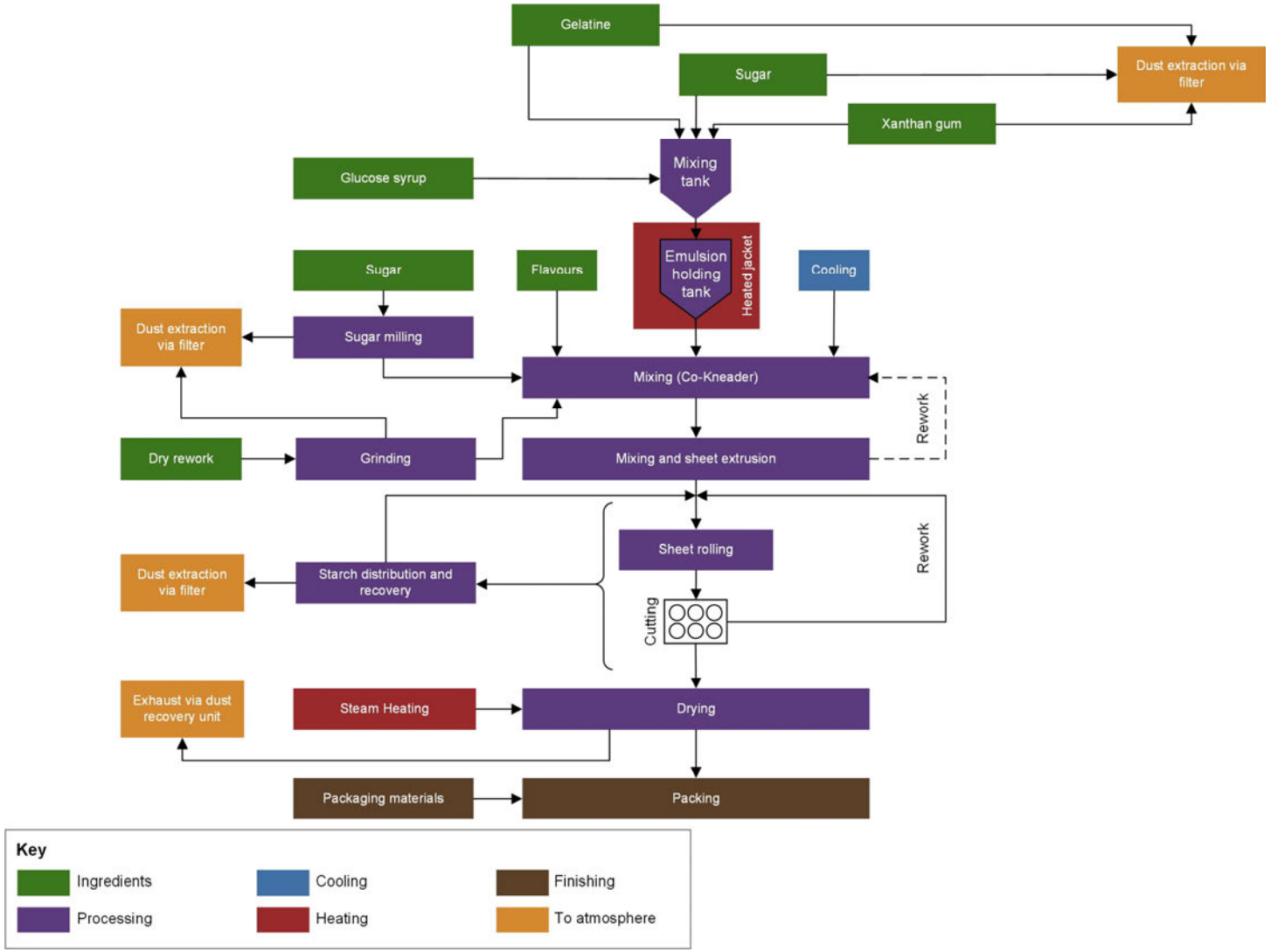
The manufacturing process for hard mints (Trebor Extra Strong (TES) mints) involves the following key steps:

- **Ingredients handling and weighing**
  Liquid glucose, sugar (bagged), gelatine and xanthan gum are weighed and fed into a mixing tank to form an emulsion. The emulsion is sieved and passed forward to the emulsion holding tank, which is heated with a water jacket. In order to minimise dust build up around dry material hoppers (for ATEX / DSEAR compliance), air is extracted and exhausted through the side of the building via a filter.
- **Sugar milling**
  Bulk granulated sugar from the external sugar silos is blown to a 1000kg sugar day silo located in the sugar milling room. The granulated sugar is ground to form a fine sugar powder before being passed forward to the Co-Kneader mixing machine. In order to minimise dust build-up from sugar milling activities (for ATEX / DSEAR compliance), air is extracted from the building via a filter.
- **Co-Kneader**
  From the emulsion holding tank, the mixture is passed to the Co-Kneader machine, which is cooled with a water jacket. Powdered sugar from sugar milling is added to the mixture at this point, as well as mint flavours. The material is mixed to form a dough-like consistency and is pushed forward to the Winkworth machine.
- **Mixing and sheet extrusion**
  The dough mixture is mixed within the Winkworth machine, extruded and then cut into lumps which are lifted up to the Sasib machine hopper where the dough is extruded to a continuous sheet.

- **Sheet extrusion and rolling**
  The extruded dough sheet is then rolled by a series of rollers, becoming progressively thinner. Starch powder is layered onto the conveyor before the sheet is extruded, with a second starch layer sprinkled on top of the dough sheet to prevent sticking. A starch recovery unit is used to collect starch from the process and return the powder for reuse. Air from starch recovery activities is exhausted through the side of the building via a filter.
- **Cutting**
  Circular discs are stamped out of the sheet, with a product branding stamp added to the surface. Unused dough is fed back to the Winkworth mixer and used to form further product.
- **Drying**
  The circular mint sweets are then passed forward on conveyors to the hot air dryer. Within the dryer, fans are used to circulate hot air. The sweets pass very slowly through the dryer, with a total residence time of approximately 12 hours. The dryer is heated using steam coil 'batteries' with excess hot air exhausted through the side of the building via a dust recovery unit.
- **Product re-work**
  Waste product (i.e. mints rejected for quality control purposes, for instance mis-shapes) are recovered, ground to a powder and added back into the process as product re-work. A grinder is located at the sugar milling area to grind the mints. Air from this process is extracted and exhausted to atmosphere via a filter. The ground powder is added to the mixture at the Co-Kneader, as an alternative to powdered sugar.
- **Packing**
  On leaving the dryer, the mints pass through a vibration unit to shake off dust (which is disposed of as a waste material) and the finished mints are then passed forward to the packing hall where the mints are packed before being shipped to customers.
- **Cleaning**
  Dry cleaning, comprising sweeping to remove excess debris and starch, is undertaken on a weekly basis. Following the dry cleaning stage, conveyors and other equipment are manually cleaned with hot water to remove hardened product residue. The emulsion tank is Cleaning in Place (CIP) cleaned weekly with a caustic solution and the mixing tank is manually cleaned with hot water only. There is no water or chemical recovery as part of these systems. An automatic washer machine (hot water only, no detergent) is used to clean the cutting heads. This system is run daily as required and also operates on a once-through basis with effluent discharged to drain after the washing cycle finishes.

Figure 1 below shows a process flow for the hard mints production plant.

Figure 1 Hard Mints Production Process



Soft mints production plant

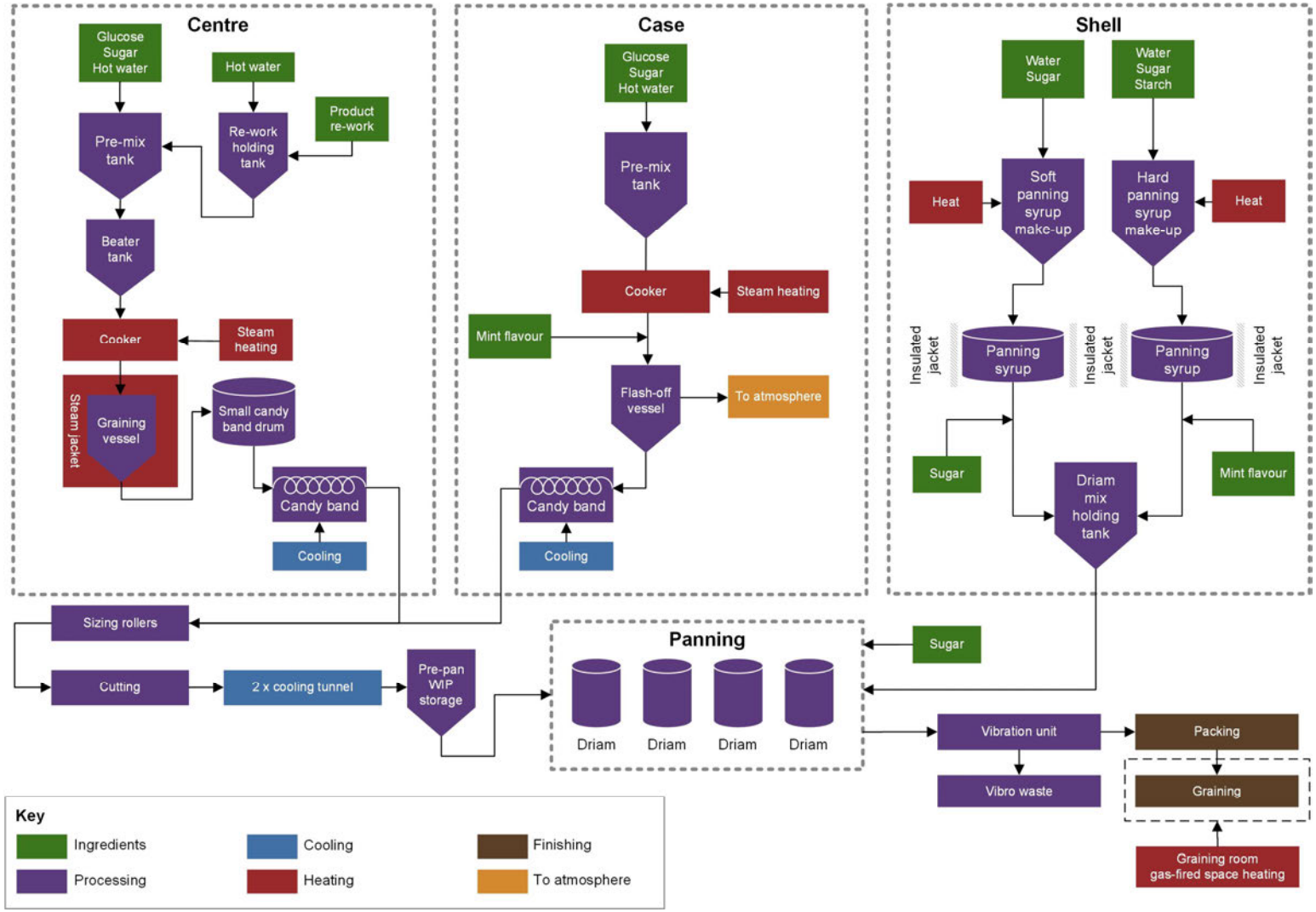
The manufacturing process for soft mints (Trebor Softees) involves production of the mint centre, case and shell which are combined to produce the final product. This is described in more detail below:

- **Ingredients storage and handling**
  The principal raw materials for the manufacture of soft mints includes hot water, liquid glucose (which is stored within a heated tank in order to reduce its viscosity), sugar, essence (peppermint, spearmint) and starch. Glucose and sugar are supplied to the soft mints manufacturing area from external bulk storage tanks, hot water is piped into the area and other products are provided in small and intermediate sized portable containers and bags.
- **Manufacture of mint components**
  There are three components to each soft mint, which are separately prepared as follows:
  - **Centre**
    Glucose and sugar are pumped from the external bulk storage tanks to day silos/hoppers within the soft mints manufacturing area. Glucose, sugar and hot water are automatically weighed and transferred to the pre-mix tank, where the ingredients are mixed. The pre-mix tank has an insulated jacket to maintain a warm temperature (heat being provided from the hot water and hot glucose). The mixture is further mixed in a beater tank before being transferred to a cooker. A steam filled coil within the cooker heats the mixture to a high temperature and the mixture is then transferred to the graining vessel which has a steam jacket to maintain the temperature. From here the mixture is transferred to the small candy band drum. The drum contains a cold water-cooled central section. As the mixture hits the cold surface it cools, hardens and falls off onto the small candy band, which is also cold water-cooled from below. The centre mixture is conveyed as an extruded rope and then encased within extruded case mixture (described below) to form what is referred to as the 'carrot'.
    Product re-work is also incorporated into the manufacturing process for soft mints centres. Re-work comprises finished mints only i.e. mints rejected for quality control purposes, for instance mis-shapes. The sweets are mixed with hot water and dissolved in a holding tank to create a solution. This solution is then added to the centre pre-mix tank along with the other centre ingredients. The proportion of re-work incorporated within the pre-mix tank ranges from 20-40%.
  - **Case**
    The principal ingredients of hot water, glucose and sugar are combined according to the recipe and mixed within a second insulated pre-mix tank. From the pre-mix tank the mixture is transferred to a steam spiral heated cooker where the case mixture is heated. From the cooker the mixture is transferred to the flash off vessel, which is also steam heated. Mint flavour is also added to the mixture at this point. The flash off vessel drives off excess water, venting water vapour to atmosphere. The mixture is then transferred as an extruded rope to the large candy band, which is also cold water-cooled from below, and conveyed to join the centre mixture. The case mixture encases the centre mixture to form the 'carrot'.
    The combined 'carrot' of centre and case mixture is passed through sizing rollers in a continuous rope and then sliced into small disc shapes. The individual disc-shaped sweets are passed through two sequential cooling tunnels, where cooled and dehumidified air supplied by an air handling unit acts to lock in moisture and harden the sweets.

- **Shell**
  The soft mint shell is formed by a combination of soft panning syrup and hard panning syrup. Soft panning syrup is manufactured from water and sugar, heated and then transferred to a holding tank with insulated jacket (to maintain the temperature). The hard panning syrup follows the same manufacturing process as for soft panning syrup, but with the addition of starch. The two types of syrup are then mixed to create a driam mix and held within a holding tank. Prior to mixing mint flavour is added to the hard panning syrup and additional sugar is added to the soft panning syrup.
- **Panning**
  Soft mint panning takes place within one of four driams. Driams are large machines containing a rotating drum. The drums are filled with confectionery discs (comprising the combined centre and case mixtures) and rotated, as driam syrup (shell mixture) and granulated sugar are sprayed into the drum. Each batch is rotated in a driam to create the final shape and texture of the sweet with its hard shell exterior. The humidity and temperature within the driams is maintained by air handling units. From the driams the sweets are transferred to the packing area via a vibro unit which shakes off excess material.
- **Packing and graining**
  Sweets are packed in consumer and secondary packaging before being transferred to the graining area. Within the graining area, the packed mints are held in a temperature and humidity-controlled environment for a minimum of 10 days, in a process known as 'graining', where sugar crystals form and the sweets soften into their final texture.
- **Cleaning**
  Cleaning within the soft mints production area is undertaken on a weekly basis. This comprises dry cleaning only or, if there is a product changeover e.g. flavour then wet cleaning will also be undertaken. There is no CIP cleaning undertaken within the soft mints production area. Cleaning activities are summarised as follows:
  - Dry cleaning is used in general production areas prior to wet cleaning. This includes sweeping floors and equipment to remove debris and product residues.
  - Tanks are rinsed with hot water (no cleaning chemicals) if required i.e. if there is a product changeover as part of the weekly cleaning regime.
  - A portable skid-mounted CIP system is used to clean tanks as part of deep cleaning process undertaken approximately once per year.
  - Manual wet washing is carried out if required i.e. if there is a product changeover, as part of the weekly cleaning regime. Conveyors and other equipment are cleaned with hot water in situ, whilst equipment components such as removable guards and catch trays are removed and washed in sinks using a trigger gun with spray head.
  - Floors are also manually mopped according to established cleaning schedules.
  - Driams are washed with hot water at every weekly clean. Hot water is delivered to the driams via the spray bars in order to clean the pipework at the same time.

Figure 2 below shows a process flow for the soft mints production plant.

Figure 2 Soft Mints Production Process



Jellies production plant

The manufacturing process for jellies (including Jelly Babies, Wine Gums and other jellies sweets) involves the following key steps; it is operated on a batch basis with different products and recipes run through three similar production lines:

- **Ingredients**
  The primary ingredients (depending on product and recipe) include sugar, artificial sweeteners, glucose syrup, starch, water, gelatine, flavourings (including fruit juices), colourings, and acids (citric, acetic and malic).
- **Pre-Mixing and gelatine preparation**
  Heated glucose syrup, water and (for some recipes) cooking starch and artificial sweeteners (sorbitol or polydextrose) are combined and mixed in the heated pre-mix tank. Gelatine, dissolved in boiling water in a separate vessel, is also added at this stage; this ingredient is crucial for creating the chewy texture of jelly sweets. No vegetarian jellies are currently manufactured at site; if these are added in future, the process would be very similar to that currently employed, although an alternative vegetable-based food grade gelling agent, such as pectin, would be used.
- **Cooking**
  From the pre-mix tank the ingredients are transferred first to a slurry tank and then to a cooking vessel. Depending on the product, the mixture is jet cooked (via direct steam injection) or cooked indirectly (via the use of heated jackets) within the cooking vessel. The cooked mixture is transferred to a holding vessel and from there is transferred to the base product ring main on each production line. The slurry tank, holding vessel and transfer lines are kept warm via water jackets to allow product to flow.

Line designation	Line 1	Line 3	Line 6
Cooking method	Direct or indirect	Direct or indirect	Direct
Typical products (at time of application)	Wine Gums, Sports Mix, Mini Gems	Jelly Babies, The Natural Confectionery Company	Sour Patch Kids, Sports Mix, Mini Gems

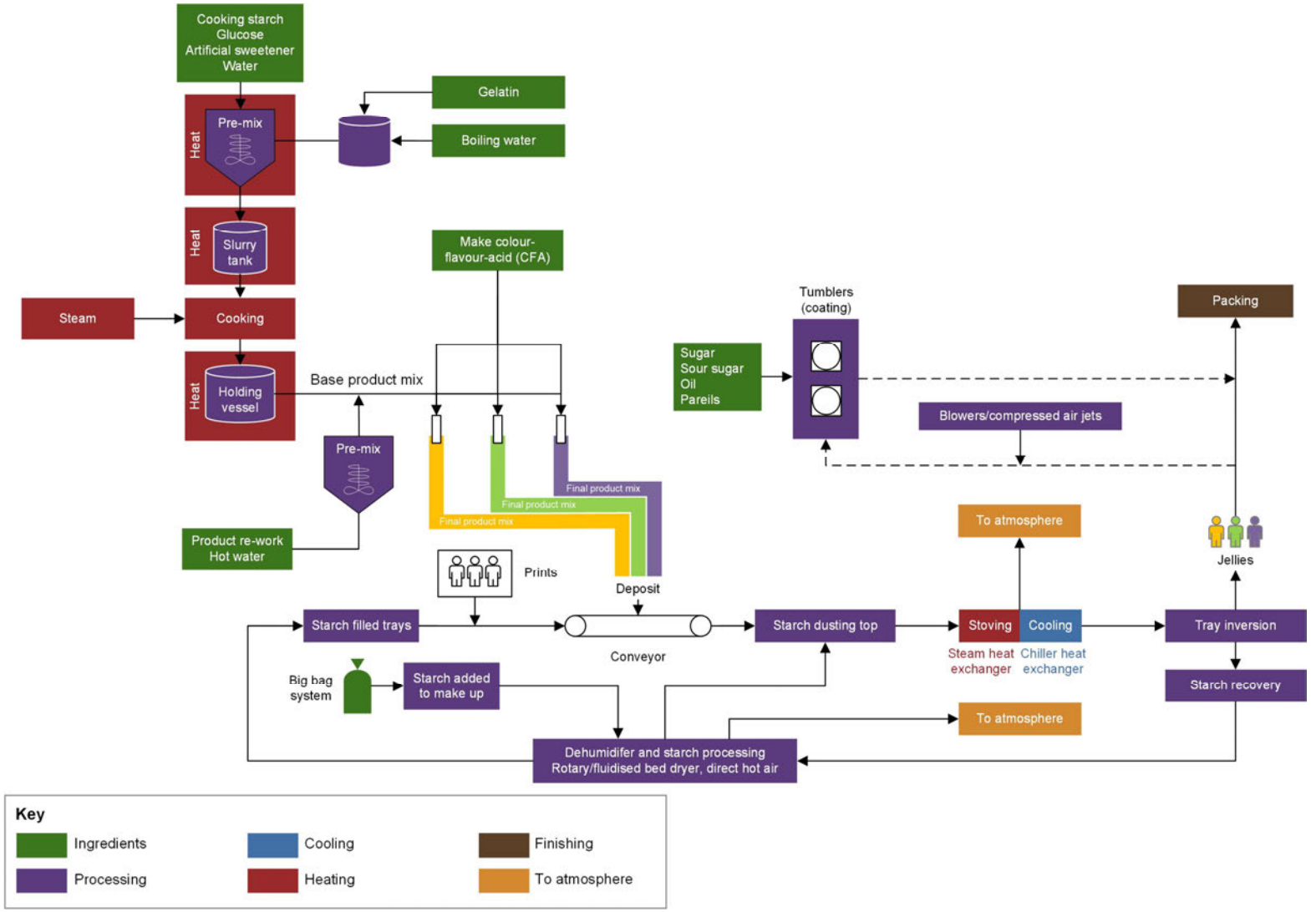
- **Flavouring and Colouring**
  A wide range of flavouring and colouring mixes, known as CFA (colours, flavours, acids), are mixed in small batches in fume cupboards in a blending room according to product recipes. This step determines the taste and appearance of the final product. The flavourings and colourings are dosed into the base product ring main to form lines of separate colours and flavours, prior to depositing.
- **Depositing**
  The warm jelly mixture is deposited into starch moulds to shape the jelly sweets. The moulds are formed by making (or 'printing') depressions into trays of starch powder. The moulds can create a variety of shapes, such as babies, snakes, or fruits. The full moulds are then further dusted with starch, prior to stoving.

- **Stoving and cooling**
  The filled jellies moulds are transferred to enclosed bays where they are stoved by circulating hot air around stacks of tray moulds. The jellies are held in these ovens for a number of hours (depending on the recipe) as part of the process. The finished product is then cooled in the stove bays by the circulation of chilled air.
- **Demoulding**
  Once stoved, the jelly mould trays are inverted to tip out the product onto conveyors, which then drop to the packing room below. The starch is reused following processing.
- **Starch handling and processing**
  Starch handling is a recirculating system, where starch is used to make the deposit moulds in trays, and support the product during stoving, before being reclaimed on inversion of the trays. The starch undergoes warm air drying and processing in an enclosed rotary or fluidised bed dryer (depending on the production line) to dehumidify it for reuse in the process. As starch is lost as a coating on the product, the system is made up via a tote bag ('big bag') mechanised unloading system to add extra material to the system. Extraction is provided to maintain a safe working environment for operators and manage explosive atmospheres risks (ATEX / DSEAR).
- **Coating**
  Some jelly products are coated for added texture and flavour or to enhance appearance. This coating can also help prevent the product sticking when packaged. Coatings are either sour sugar (sugar and malic acid mix), granulated sugar, oil or pareils (small sugar spheres). Other products do not undergo separate coating, instead retaining a starch dusted finish from demoulding. Prior to coating, blowers or compressed air jets are used to 'clean' excess starch from the sweets. Conveyors divert the product to the desired coating line where tumblers (rotary pan systems) are used to coat the sweet according to the recipe.
- **Packaging**
  The final products are inspected for quality, sorted and transferred to storage prior to being packed in moisture-proof bags or boxes to maintain freshness.
- **Product re-work**
  Sweets that fail quality inspection for any reason can be re-boiled and used to manufacture black jellies no matter what colour or flavour the product was originally. The sweets are dissolved in hot water in a pre-mix tank to create a solution which is added to the base product ring main.
- **Cleaning**
  A variety of cleaning techniques are used within the jellies production area. These are summarised as follows:
  - Dry cleaning is used in general production areas prior to wet cleaning. This includes regular cleaning to remove starch residues from production areas, including floors in the tray inversion and starch processing areas. Debris is swept or sucked up using a central vacuum system and transferred to a collection vessel prior to disposal.
  - CIP systems are operated, according to cleaning schedules (typically weekly, or when recipes change over). Hot water or hot water / caustic detergent mix washes are circulated within the mixing, cooking, product transfer and depositing lines. There is no recovery of final rinse water or cleaning chemicals. If required, and where possible, vessels are manually cleaned prior to CIP to scrape out excess residue.
  - Processing lines from pre-mix to the base product ring main are purged with steam, then washed through with hot water prior to daily start up.

- Manual washing in sinks using a trigger gun with spray head is used to clean some equipment components. This activity takes place daily, depending on production tasks and recipes. Floors are also manually mopped according to established cleaning schedules.

Figure 3 below shows a process flow for the jellies production plant.

Figure 3 Jellies Production Process



CLP production plant

The Continuous Liquorice Production (CLP) manufacturing process for Liquorice Allsorts comprises the manufacture of the two basic component materials: liquorice and sugar paste. These components are then passed forward to three separate production lines where the materials are formed into the various individual shaped sweets that comprise a packet of Liquorice Allsorts. These three production lines are known as: line 2, chug and rock. The production stages are summarised below:

- **Manufacture of component mixtures**
  There are two distinct material types that are used in CLP manufacture, these are liquorice and sugar paste.
  - **Liquorice manufacture**
    Ingredients for the liquorice component includes flour, treacle, caramel, liquorice, and water. These ingredients are pumped to a pre-mix tank from bulk storage silos, other than liquorice flavouring which is manually added to the pre-mix tank. The pre-mix tank has a heated jacket to maintain the temperature and liquid consistency. The tank contents are mixed prior to being pumped to a buffer tank via a sieve, metal detector and homogeniser.
    Product re-work is also incorporated into the liquorice manufacturing process. Product off-cuts, mis-shaped or otherwise rejected sweets (including a mixture of liquorice and sugar paste-based elements) are transferred to the re-work area. The sweets are fed into the rework pre-breaker which chops up the material and then, with the addition of water, this is transferred to one of two rework tanks. The rework mixture is then fed into the pre-mix tank.
  - **Sugar paste manufacture**
    Sugar paste is manufactured with a variety of colourings and flavourings, and may also include desiccated coconut. The first stage in the manufacture of sugar paste is production of liquid mucilage. Gelatine powder is mixed with water to produce liquid gelatine and is transferred to one of two liquid mucilage tanks along with glucose (which is pumped from the glucose tank on the ground floor) and ground coconut. The mucilage mixture is then transferred to one of four mixers where powdered sugar, colours and flavours are added according to individual recipes. Mixer 4 also has desiccated coconut added and feeds the chug line.
    Both desiccated coconut and granulated sugar are milled within the department to produce coconut and sugar powders required for sugar paste manufacture. Bulk sugar and bagged coconut are fed into dedicated hoppers which feed the grinding process. Dust generated through this activity is extracted and exhausted to atmosphere via filters.
  - **Product forming lines**
    The sugar paste and liquorice mixtures are transferred to one of three individual production lines for product forming.
    - **Line 2**
      Line 2 produces a cube shaped sweet comprising a series of alternate liquorice and sugar paste layers. Liquorice from the liquorice buffer tank is transferred to a Votator cooker at the front of the production line, which has a steam jacket to cook the liquorice mixture. Hot liquorice is then extruded as a continuous sheet on to a conveyor coated in oil to prevent sticking. Cooling water is sprayed on to the underside of the conveyor to cool the liquorice. Sugar paste mixture is rolled into a continuous flat sheet which is then layered on top of the liquorice sheet. A second continuous flat sheet of sugar paste (of the same or different flavour/colour as the first) is rolled and layered below the liquorice layer to create an alternate three-layered sheet. Starch is sprinkled below the bottom sugar paste layer to

prevent sticking. This sheet may be further processed by cutting along the centre of the sheet and laying the cut sheets on top of each other to create a sheet with more alternate layers. The sheet of confectionery is then passed on the conveyor through a cold air cooling tunnel and before being cut into layered cubes.

- **Chug line**
  The chug line produces two basic types of extruded and co-extruded cylindrical sweets. Liquorice from the liquorice buffer tank is transferred to a Votator cooker at the front of the production line, which has a steam jacket to cook the liquorice mixture. Hot liquorice is then extruded as a continuous rope with either a standard circular profile or a star-shaped profile. To produce the coconut 'wheel' shaped sweets the circular profile liquorice rope is passed on a conveyor through a cold air cooling tunnel and then through an extruder where it is encased by a thick layer of coconut sugar paste mixture (i.e. sugar paste with added desiccated coconut). The ropes of confectionery materials (i.e. star-shaped liquorice-only variety or coconut paste encased variety) are then passed on the conveyor through a second cold air cooling tunnel before being cut into shapes. Finally, the individual sweets are rotated in a drum to coat with a light layer of oil to prevent sticking during packing and storage.
- **Rock line**
  The rock line produces two basic types of co-extruded sweets. Liquorice from the liquorice buffer tank is transferred to a Votator cooker at the front of the production line, which has a steam jacket to cook the liquorice mixture. For Battenburg style sweets, hot liquorice and sugar paste are both extruded as a continuous rope. Two ropes of each material type are extruded alternately alongside each other to create a chequerboard type sweet once cut. Alternatively a rope of extruded sugar paste filling is encased by an outer liquorice layer. The extruded ropes of material are then passed on a conveyor through a cold air cooling tunnel and before being cut into bite sized chunks. Finally, the individual sweets are rotated in a drum to coat with a light layer of oil to prevent sticking during packing and storage.
  At the time of application the rock line is not operational pending a decision on future manufacturing requirements.

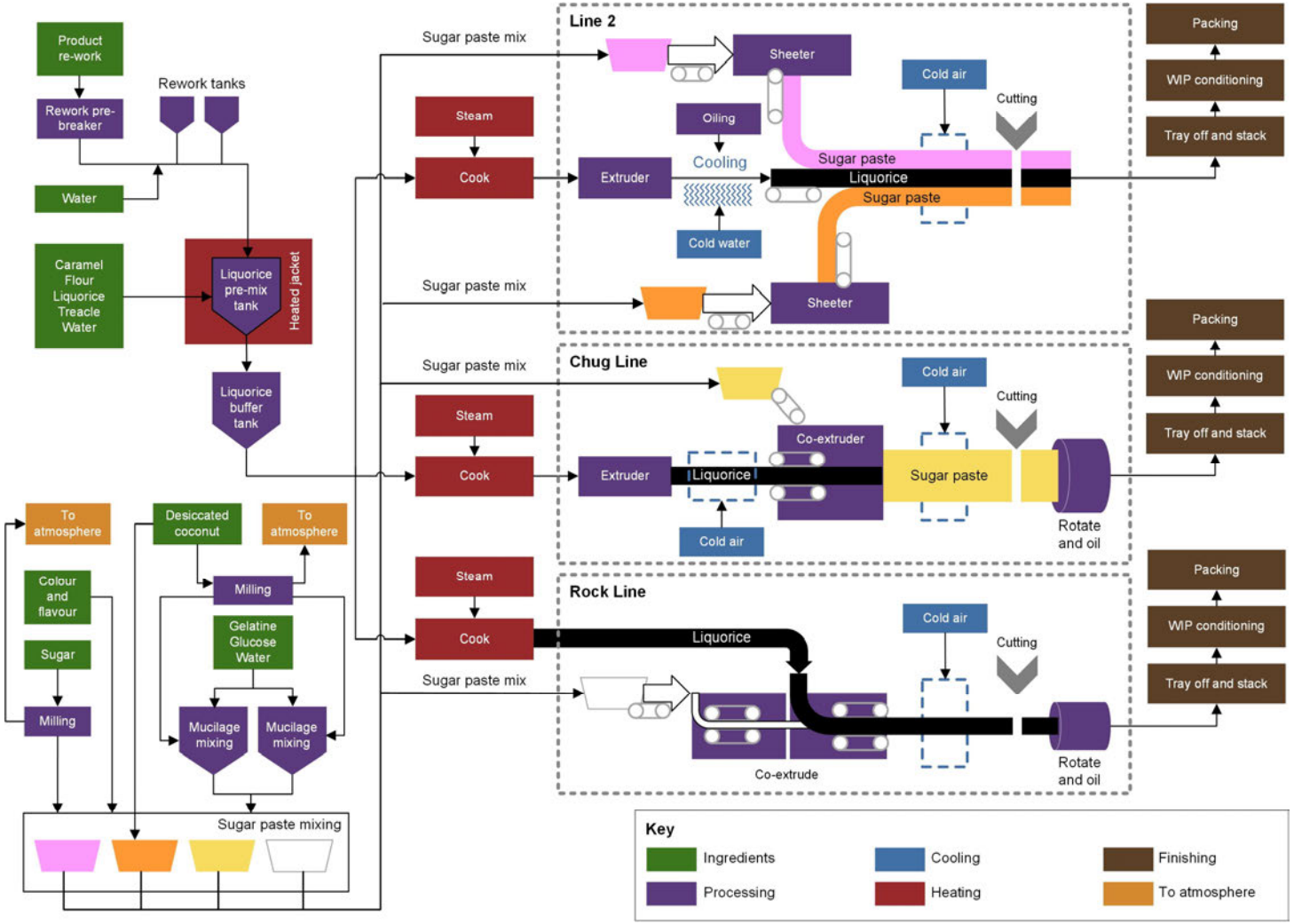
- **Packing**
  Once cooled and cut into shape, the sweets are transferred to trays and taken to the storage area where they are conditioned within a temperature-controlled environment for a period of time. Following this they are packed, with a mixture of each type of sweet within each individual packet.
- **Cleaning**
  A variety of cleaning techniques are used within the CLP production area. These are summarised as follows:
  - Dry cleaning e.g. sweeping is used in general production areas to remove gross debris prior to wet cleaning.
  - CIP systems are operated, according to cleaning schedules (typically weekly, or when recipes change over). There are two CIP circuits which use a hot water or hot water and caustic detergent mix. The first CIP system cleans the measuring vessel, pre-mix tank and buffer vessel. The second CIP system is used to cleaned mucilage tanks 1 and 2 and associated pipework. Both systems operate on a once through basis with a hot water / caustic mix held in tanks to soften and dissolve residual products and then recirculated through the system followed by two similar once-through rinse cycles.
    The pre-mix tank is filled with hot water and left for a period of time to soften and dissolve

any residual product are circulated within the pre-mix, mucilage and holding vessels. There is no recovery of final rinse water or cleaning chemicals. If required, and where possible, vessels are manually cleaned prior to CIP to scrape off excess residue.

- Manual washing in situ or in sinks using a trigger gun with spray head is used to clean some equipment components. This activity takes place at the end of every shift. Floors are also manually mopped according to established cleaning schedules and belts are cleaned with sanitising wipes.

Figure 4 below shows a process flow for the CLP production plant.

Figure 4 CLP Production Process



Steam raising boilers

In 2025 Mondelez completed a programme of improvements to the boiler plant on site, which has allowed for the phased decommissioning and removal of four legacy MCP boilers and their replacement with three new MCP boilers as summarised in Table 1 below. This represented a significant investment in emissions reduction and carbon intensity. This programme was fully approved, with orders placed and detailed design complete in 2022-2023, with staged commissioning in 2024-2025 and site works completed in 2025. The replacement boilers are regulated as standalone MCP (medium combustion plant) (permit reference: EPR/CP3126SW). It is assumed that the MCP permit will be revoked and the current boilers will be incorporated into the new site-wide installation permit.

Table 1 Site Steam Raising Boilers

Current Programme Date	Air emission reference	Historical (pre-2025)		Current operations (2025-)	
MCP Boiler Name	**If applicable**	**Status / maximum thermal input capacity MWth**			
MCP Boiler 1 (historical)	N/A	4.97	Not permitted (2029 MCP phase in date)	Decommissioned	
MCP Boiler 2 (historical)	N/A	4.97		Decommissioned	
MCP Boiler 3 (historical)	N/A	9.8	Permitted as standalone MCP	Decommissioned	
MCP Boiler 4 (historical)	N/A	9.8		Decommissioned	
MCP Boiler 1 (current)	712	N/A	Permitted as standalone MCP, but not commissioned at time of original MCP application	5.5 *	Permitted as standalone MCP
MCP Boiler 2 (current)	711	N/A		5.5 *	
MCP Boiler 3 (current)	710	N/A		5.5 *	
Total boilers commissioned and permitted		**4**		**3**	
Total commissioned capacity		**29.54**		**16.5**	

* Burner rating; boiler shell 100% rating 4.66 MWth

The boiler investment programme has seen the total thermal input capacity of the boilers reduced from 29.54 MWth to 16.5 MWth (a reduction of by 13 MWth, or 44%). The three replacement boilers are of a high efficiency design (with economisers) offering significant gains in efficiency and reductions in carbon dioxide (CO_2) emissions. They are also 'new plant' MCPD emission limit compliant, with 'low NOx burners'. The current (newly installed) Boilers 1, 2 and 3 utilise the chimney stacks used for historical Boilers 1, 2 and 3, so there has been no change in the location of emissions points. All of the boilers run on natural gas only.

Under normal circumstances two boilers operate in parallel with the third boiler providing standby capacity. However, there are occasions when all three boilers would be fired simultaneously as part of a running changeover operation, although only two boilers will be on load. A boiler load sharing system is in place to manage operations efficiently, ensuring that the most efficient combination of boilers / boiler loading is used with one unit available to provide standby capacity.

An air emissions impact assessment is provided in Appendix 6.

Other combustion plant

In addition to the three main steam raising boilers described above, there are a number of small combustion plant on site. These are summarised in Table 2 below.

Table 2 Other combustion plant

Name	Location	Emission point ref	Fuel type	Thermal input capacity (MW)	Comments
Gas heater 1	Mints graining room	715	Natural gas	0.01	
Gas heater 2	Mints graining room	716	Natural gas	0.01	
Firewater sprinkler engine	Northwest corner of the jellies production building	717	Gas oil	0.06	Under normal circumstances (i.e. excluding emergency use), use is for testing purposes only.
Standby generator	Southeastern corner of main ancillary building	718	Gas oil	0.63	Under normal circumstances (i.e. excluding emergency use), use is for testing purposes only. The generator is located within the permit area and provides back up power for essential IT servers and emergency lighting only. Not considered to be directly related to permitted processes.

Cooling processes

Equipment is located across the site providing cooling and chilling for site production processes including cooling tunnels, air handling units and a variety of other cooling or chilled water demands. All process refrigeration plant used on site contains refrigerant gases with zero ozone depletion potential (ODP). A number of the large chillers have been upgraded in the last few years and replaced by systems containing ultra-low global warming potential (GWP) refrigerant gases; others have been upgraded to replace very high GWP gases with lower GWP alternatives. The Mondelez global HSE standard E7 Refrigerants and Halons establishes requirements for all sites to phase out use of CFCs, HCFCs, HFCs and halons. In compliance with this standard, all process refrigeration equipment on site which do not already use ultra-low GWP gases will be replaced with low GWP gas alternatives at the end of their economic life.

Regular maintenance, including leak checks, are carried out on equipment and systems containing HFC gases by appropriately qualified refrigeration engineers, in accordance with regulatory requirements. The frequency of leak checks is determined by the tonnes of CO2 equivalent (tCO2eq) of gas in the system.

Process refrigeration plant is listed in 0 below.

Table 3 Process refrigeration plant

Description	Use	Refrigerant type	Charge (kgs)	GWP (tCO_2eq)	ODP	Comments
Munters 1	Mints packing hall and production	R134a	116	166	0	These systems will be replaced with an ultra-low GWP gas alternative at the end of their economic life.
Munters 2		R134a	124	177	0	
Munters 3		R1234ze	150	0.9	0	These systems contain an ultra-low GWP gas.
Stoves 1	Cooling water for jellies stoves	R1234ze (and glycol)	122	1.1	0	
Stoves 2		R1234ze (and glycol)	122	1.1	0	
WIP 1	Cooling for WIP 1 area, using chiller and AHU	R407c	82	145	0	These systems will be replaced with an ultra-low GWP gas alternative at the end of their economic life.
WIP 4	Cooling, via AHU for WIP 4 area and jellies finishing	R407c	50	89	0	
WIP 5	Cooling for WIP 5 area and liquorice 1st floor	R454b	8.5	4	0	These systems contain refrigerant gas with a lower GWP (466); this is a replacement gas for R410a and has a 78% lower GWP (compared to R410a). These systems will be replaced with an ultra-low GWP gas alternative at the end of their economic life.
WIP 6	Cooling for WIP 6 area, 1st floor	R454b	21	10	0	
WIP 7	Cooling, via combined chiller and AHU, for WIP 7 area and jellies ground floor	R454b	16	8	0	
LAN 1	Chilled water for rock and chug lines, liquorice ground floor	R407a (and glycol)	24	51	0	These systems will be replaced with an ultra-low GWP gas alternative at the end of their economic life.
LAN 2		R407a (and glycol)	24	51	0	
Dehumid chiller	Chilled water for Munters tower dehumidification system	R410a	26	54	0	
Jellies lab X 3	Small units to cool walk-in fridges for storage of jellies flavours / colours, 1st floor	R449a	3 x 1.7kg each	3 x 2.4	0	These systems will be replaced with an ultra-low GWP gas alternative at the end of their economic life.

Description	Use	Refrigerant type	Charge (kgs)	GWP (tCO_2eq)	ODP	Comments
WIP 2a	WIP 2a cooling	R404a	12.5	49	0	These systems will be replaced with an ultra-low GWP gas alternative at the end of their economic life.
WIP 2b	WIP 2b cooling	R407c	12.5	22	0	
WIP 2c	WIP 2c cooling	R407c	15	27	0	
WIP 4	WIP 4 cooling	R407c	15	27	0	
Chug line 2 compressor	Chug line 2 tunnel cooling	R134a	3.5	5	0	
Chug line 1 compressor	Chug line 1 tunnel cooling	R134a	3.5	5	0	
Chug line system 3	Chug line 3 tunnel cooling	R134a	3.5	5	0	
Rock line 1	Rock line 1 tunnel cooling	R134a	8.6	12	0	
Rock line 2	Rock line 2 tunnel cooling	R134a	8.6	12	0	
Rock line 3	Rock line 3 inclined tunnel cooling	R134a	17	24	0	
Cold store 1	Storage: colours and flavours	R134a	10	14	0	
Cold store 2	Storage: colours and flavours	R407c	12	21	0	

Management of process effluent

All process effluent generated by site activities is discharged to Yorkshire Water (YW) Sewage Treatment Works (STW), with the exception of small volumes of wastewater from the hard mints manufacturing plant, which is separately tankered off site. There are three emissions points to sewer (S1, S2 and S3), four YW trade effluent discharge consents and four effluent monitoring locations (C1, C2, C3, C4) covering site activities (further details of discharges to sewer and consents is provided in Section III: Supporting Information in response to Form B3, Questions 2 and 4). Process effluent comprises the following:

- Process effluent from CLP, soft mints and jellies manufacturing areas is discharged from site via emission point S1. Prior to discharge, this effluent is pumped from collection sumps at each manufacturing area, via overland pipes (lagged, stainless steel), to an on-site effluent pre-treatment plant (ETP) for partial treatment comprising effluent balancing and pH correction. A description of the ETP operation is provided below.
- Smaller quantities of other process effluent (e.g. small quantities of general cleaning effluent from 'dry' processing areas such as packing areas) as well as surface water runoff from some hardstanding areas of the site (e.g. areas where raw materials are handled and stored) is also separately discharged from site via emissions point S1 and S2 without receiving pre-treatment at the ETP.
- Wastewater from the hard mints manufacturing plant, generated during weekly cleaning, is a lower volume (approximately 800-900 litres/week), is collected in a dedicated sump and is removed from site by tanker for off-site treatment and disposal.

Emissions to sewer via emissions point S3 does not include process effluent (comprising only uncontaminated surface water runoff and wastewater from toilets/washrooms).

ETP operations: CLP effluent

Effluent from the CLP operations is collected in a below ground sump located in the yard adjacent to the CLP department. The sump is a concrete construction, lined with a GRP coating and with a capacity of approximately 21 m^3.

Two submersible pumps are installed in this sump to deliver the CLP effluent to the ETP via above ground lagged stainless steel pipework. A hydrostatic level sensor is installed in the sump to monitor the level in the sump and control the operation of the transfer pumps. The pumps operate at a fixed speed between level set points with automatic change over on each duty cycle. An in-line magnetic type flowmeter is provided to measure and totalise the flow passed forward to the ETP.

In case of an emergency (e.g. pumping failure), this sump would discharge directly to sewer at emission point S2 via a designated overflow. An alarm with data logging is provided to indicate if any effluent overflows to the sewer. In addition, an effluent sampler, continuous flow monitoring (via v-notch weir) and continuous pH monitoring probe is installed at this monitoring location, referred to as C2 and shown in Section IV Figure 4. In the event of a direct discharge to sewer this facility would record the volume and pH of the effluent discharged and would automatically collect a sample of the effluent for subsequent testing, if required.

All above ground pipework is lagged but not trace heated. An automatic drain point is provided to drain the pipeline should it not be used during the winter for prolonged periods of time.

ETP operations: soft mints effluent

Effluent from soft mints operations is collected in a small sump containing a v-notch weir. This sump has two self-priming pumps to draw effluent and deliver it to the ETP via above ground lagged stainless steel pipework. A hydrostatic type level sensor is provided in the sump to monitor the level and control the operation of the transfer pumps. These pumps operate at a fixed speed between level set points with automatic change over on each duty cycle. An in-line magnetic type flowmeter is provided to measure and totalise the flow passed forward to the ETP.

In case of an emergency (e.g. pumping failure), this sump would discharge directly to sewer at emission point S2 via a designated overflow. An alarm with data logging is provided to indicate if any effluent overflows to the sewer. In addition, an effluent sampler, continuous flow monitoring (via v-notch weir) and continuous pH monitoring probe is installed at this monitoring location, referred to as C3 and shown in Section IV Figure 4. In the event of a direct discharge to sewer this facility would record the volume and pH of the effluent discharged and would automatically collect a sample of the effluent for subsequent testing, if required.

ETP operations: jellies effluent

Effluent from jellies operations is collected in a sump located in the jellies effluent room. Self-priming pumps deliver this effluent to the ETP via above ground lagged stainless steel pipework. The pumps are installed on a frame at high level to avoid the risk of flooding. A hydrostatic type level sensor is provided to monitor the level in this sump and control the operation of the above pumps. An in-line magnetic type flowmeter is provided to measure and totalise the flow passed forward to the ETP. In case of an emergency (e.g. pumping failure), this sump would discharge directly to sewer via the same route as for treated effluent (via emission point S1).

ETP operations: effluent balancing

Effluent pumped from the CLP, soft mints and jellies sumps are combined into a single pipe and is conveyed to the ETP. Where the pipeline crosses the river secondary containment has been provided. This is stainless steel construction, fitted with a drain line directing any leaks to the ETP. A sensor is provided in the drain line to alarm should any leakage occur.

Two balance tanks, each with a capacity of 91 m^3, are installed to receive the untreated effluent from the three pumping stations. Automatic valves are provided to direct effluent into one tank while balanced effluent is being discharged from the other.

The vessels are of spiral wound polyethylene (high grade PE100 HDPE) construction and have externally mounted venturi type aerator / mixers. A low-level hydrostatic type level sensor is provided to monitor the level in each balance tank and control the discharge of effluent to sewer.

Connection points are also provided on each balance tank to allow them to be emptied by tanker in the event of a major spillage incident on site (or in the event that the effluent is not suitable for discharge to sewer for any other reason).

The balancing tanks are located within a masonry bund, along with the bunded acid and caustic tanks (described below). The bund has a capacity of 137 m^3 (capacity excluding the footprint of the four tanks within the bund), representing 150% of a single balance tank capacity.

ETP Operations: pH correction

Two semi-bulk storage tanks, each with a capacity of 5 m^3, are provided for storage of acid and caustic (sodium hydroxide). Each chemical storage tank has an integrated bund providing 110% tank capacity (and in addition are located within the main ETP bund). Both chemical storage tanks are fitted with ultra-sonic type level sensors to monitor the tank level and provide a re-order alarm. The dosing pumps draw directly from these vessels.

Duty / standby dosing pumps are provided for dosing of both acid and caustic. These pumps are installed within polypropylene kiosks drawing their supply of chemical directly from the chemical storage tank. Chemicals are dosed into the effluent stream at the inlet to a serpentine mixer, located downstream from the balance tanks. The serpentine mixer is provided for the efficient mixing of the acid & caustic. A removable in-line pH probe at the balance tank outlet monitors the pH of final effluent and controls the operation of the acid or caustic dosing pump. The control system ensures that only one pump can operate to prevent acid and caustic solutions being dosed simultaneously.

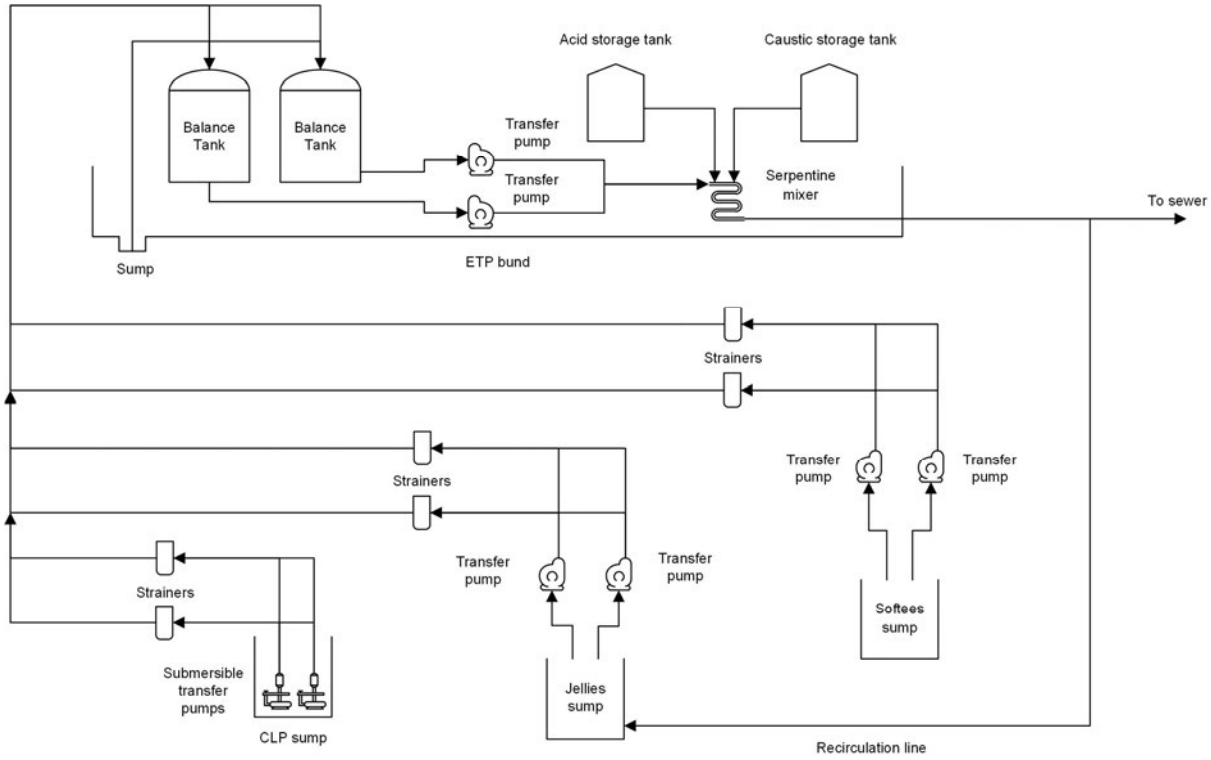
ETP Operations: Discharge to sewer

The balanced and pH corrected effluent is discharged to sewer at a controlled rate. Duty / standby centrifugal effluent discharge pumps pump the treated effluent to the discharge point (located at the jellies sump, in a separate chamber to the untreated jellies effluent) via above ground lagged stainless steel pipework. Where the pipeline crosses the river secondary containment has been provided. This is stainless steel construction, fitted with a drain line directing any leaks to the ETP. A sensor is provided in the drain line to alarm should any leakage occur.

At the jellies treated effluent sump monitoring location, referred to as C1 (location shown in Section IV Figure 4) an effluent sampler, continuous flow monitoring and continuous pH monitoring probe is installed.

In the event that the pH of the effluent does not meet discharge consent requirements (too high or two low) an alarm with recorded log is provided and the effluent is automatically diverted back to the ETP for further pH correction, preventing discharge of high or low pH effluent to sewer.

Figure 5 Overview of effluent treatment plant (ETP)



Warehousing – raw materials and finished product

Materials are stored in the following main areas:

- Raw materials and packaging (dry goods) are stored within the main ancillary building (which also contains offices and meeting rooms) located at the southeast of the site (south of the river).
- The 'Ritz' building to the northwest of the site (north of the river) is the largest storage area and is used for storage of raw materials, including liquids in containers, drums and IBCs. Soft mints graining (storage whilst the texture of the product develops) is also undertaken in a temperature and humidity-controlled room at the northern end of this building.
- To the east of the Ritz building (also to the north of the river) is a building currently used only for storage of ancillary materials such as redundant equipment, engineering and facilities stores.
- Finished packaged products are temporarily stored in internal production areas prior to despatch from site.
- Raw materials including product ingredients and packaging are stored in bulk storage tanks (located internally and externally within and adjacent to production areas on site) and in smaller containers within internal production areas.

Section IV Figure 2 installation layout shows the location of principal storage areas on site.