

DIAGEO

Diageo Ireland

St. James's Gate

IE Licence Registration No. P0301-04

Annual Environmental Report 2018

Revision 1

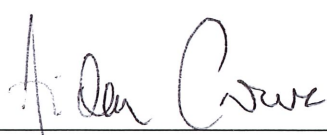
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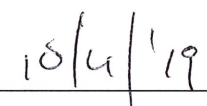
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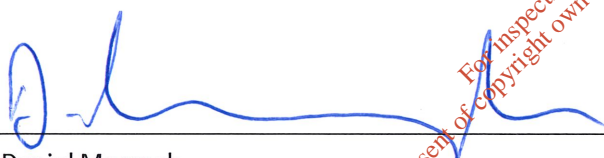
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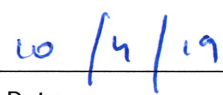
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Site Operations Director


Date


Daniel Morrogh
Site Environmental Manager


Date

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Contents

1	INTRODUCTION	1
1.1	Overview.....	1
1.2	Description of Activity.....	2
1.3	Management Structures	3
1.4	Environmental Policy	3
1.5	Organisational Structures – Environmental Management	4
2	SUMMARY INFORMATION	6
2.1	Emissions from the Installation	6
2.2	Monitoring and Enforcement	12
2.3	Energy and Water Consumption.....	13
2.4	Environmental Incidents and Complaints.....	15
2.5	European Pollutant Release and Transfer Register (E-PRTR).....	17
3	ENVIRONMENTAL & ENERGY MANAGEMENT PROGRAMME	17
3.1	Overview.....	17
3.2	Review and Update.....	18
4	LICENCE SPECIFIC REPORTS.....	36
4.1	Noise.....	36
4.2	Testing and Inspection of Bunds, Underground Tanks and Pipelines.....	37
4.3	Groundwater.....	38
4.4	Efficiency of Use of Raw Materials.....	40
4.5	Minimisation of Water Demand	40
4.6	Decommissioning Management Plan.....	40
4.7	Environmental Liability Risk Assessment	41

ANNEXES

Annex 1: Summary of Groundwater Monitoring Results

Annex 2: Summary of Waste Consignments in 2018

1 INTRODUCTION

1.1 Overview

Licensee:	Diageo Ireland	
Location of Activity:	St. James's Gate, Dublin 8	
Licence Register Number:	4 th July 2000 – 1 st June 2012	P0301-01
	1 st June 2012 – 18 th April 2013	P0301-02
	18 th April 2013 – 12 th August 2015	P0301-03
	12 th August 2015	P0301-04

Diageo Ireland's St. James's Gate site is located in Dublin at National Grid Reference E310488, N233869. It covers an area of approximately 24 hectares.

Diageo Ireland was granted an Integrated Pollution Control (IPC) licence on 4th July 2000. This licence was converted to an Integrated Pollution Prevention and Control (IPPC) Licence on 9th November 2005 through the addition of Amendment A to the licence. In June 2012, Diageo Ireland was granted a new licence, P0301-02, to accommodate the installation of a third roasting plant at the site. In August 2012, the Agency issued Technical Amendment A to the licence.

In August 2012, Diageo submitted an application for a review of licence P0301-02 to accommodate the construction of Brewhouse 4 and the associated development works. The revised licence (P0301-03) was granted in April 2013. In December 2013, the Agency amended the licence to bring it into conformity with the requirements of the Industrial Emissions Directive. Following this amendment, the licence is now referred to as an Industrial Emissions Licence.

In April 2015, Diageo submitted an application for a review of licence P0301-03 to accommodate the installation of a fourth roasting plant and the re-designation of emission points to atmosphere at Brewhouse 4. The Agency granted a new licence (P0301-04) to Diageo in August 2015. In October 2015, the Agency issued a clerical amendment (Amendment A) to the licence.

In 2017, Diageo submitted an application for a technical amendment of licence P0301-04 to extend the derogation on mean flow per day and concentration of suspended solids, and to increase the emission limit value for total nitrogen, both at SE-1. The Agency granted the amendment (Amendment B) in February 2018.

Diageo completed the decommissioning of redundant operational areas, Brewhouse 3, GFE1/1A and 2, in 2017. In 2018, Diageo submitted a request to amend the boundary of the "installation", i.e. the SJG site, authorised by licence P0301-03 in order to remove the decommissioned areas. The Agency granted the amendment (Amendment C) in September 2018.

Condition 11.8 of the licence requires Diageo to prepare an Annual Environmental Report (AER) for submission to the Agency. This AER summarises the environmental performance at the site for the period January to December 2018.

1.2 Description of Activity

1.2.1 St. James's Gate Site

Diageo Ireland is engaged in brewing for the domestic and global market. The St. James's Gate site has undergone a number of capacity changes in recent years as outlined below.

- A capacity expansion programme during 2005 following the closure of the Guinness Park Royal Brewery in London in mid-2005.
- In July 2010, kegging of all ales and lagers in Diageo's Island of Ireland portfolio was transferred from the St. Francis Abbey Brewery, Kilkenny; and the Great Northern Brewery, Dundalk, to the St. James's Gate site. The logistics operations were also reorganised to cater for the increase in activity.
- Planning permission for Brewhouse 4 on the lower level of the site was granted in April 2012, following which construction commenced and commissioning activities commenced in the third quarter of 2013.
- During 2014, brewing operations were moved from the upper level of the site to Brewhouse 4.
- A fourth roasting plant was installed in 2015.
- An extension of the raw material tower at Brewhouse 4 was completed in 2017.
- The redundant operations buildings on the upper level were decommissioned and an exit audit for the same was carried out by the EPA in 2017.
- Planning permission was granted for the installation of a visitor experience centre and micro distillery at the vacant power station building. Work began in 2017 and continued through 2018.

Beer is produced using traditional brewing materials: malt, barley, roast barley, hops, water and yeast. In the brew house, the raw materials are milled into coarse flour (grist), keeping the husk material as intact as possible. The milled grist is then mixed with hot water in a process known as mashing, in which the starches in the malt are converted into fermentable sugars. The porridge-like mash is transferred to a lauter tun and the sweet wort is filtered off to a third vessel, the kettle. In the kettle, hop extract is added and the wort is boiled. After boiling in the kettle the wort is decanted and pumped, with cooling en-route, to the fermentation plant.

The fermentation plant receives chilled wort directly from the brew house. Yeast is added to carry out the primary fermentation, converting the sugars in the wort into alcohol and carbon dioxide, which is a by-product of the fermentation process. Afterwards, the liquid is filtered and the green beer is matured in maturation vessels, clarified and blended to bright beer tanks for subsequent packaging in the keg plant or bulk dispatch from the tank station.

In the keg plant, beer from bright beer tanks is pasteurised before racking into kegs for distribution to the domestic and export markets, or is dispatched in bulk via tankers to packaging sites in Ireland and the UK.

Production takes place 24 hours per day, 365 days per year.

1.2.2 Beverage Blending Agents Plant

The Beverage Blending Agents (BBA) Plant consists of a brew house, evaporation / concentration unit, a storage tank farm and a packaging facility. It is designed to produce a concentrate, which is

exported to over 50 countries worldwide. The concentrate is produced using malt, roast barley, yeast, hops and water and is exported in unitanks, flexitanks and road tankers via Dublin port.

1.3 Management Structures

Diageo Ireland is part of Diageo International Supply Centre, which in turn is a subsidiary of Diageo plc. The site has a structured management approach to the operation of the business in terms of product quality, environment, process control, safety and analytical capability. Management systems for quality, environment, energy, safety and food safety are audited on an on-going basis through internal audits and external third-party audits.

Registration to specific management systems has been achieved as follows:

- ISO 9001 Quality Management
- ISO 14001 Environmental Management
- OHSAS 18001 OH&S Occupational Health and Safety Management
- FSSC 22000 Food Safety Management (including ISO 22000)
- ISO 50001 Energy Management Standard

1.4 Environmental Policy

The Leadership Team at St. James's Gate Brewery will manage its operations, products and services in a way which supports environmental sustainability and local biodiversity. They will operate in an environmentally responsible way to protect and enhance our people, brands and the communities in which we work and live. They will strive to become a truly sustainable organisation, by reducing our carbon footprint and contribute zero harm to the environment in line with our corporate strategy.

They will:

- Comply with the requirements of the Industrial Emissions licence and the Environmental management standard ISO14001.
- Ensure the Environmental Management system is effective and is aligned to both the site strategy and the processes undertaken at St James Gate.
- Comply with all relevant Environmental legislation, legal and other requirements, that relate to the Environmental Aspects.
- Have a framework for establishing and reviewing site specific KPI's which are aligned with Diageo Global KPI's and in particular the Diageo 2020 targets.
- Comply with all Diageo corporate policies and procedures, such as the Global Risk Management Standards and the Global Environmental Policy.
- Maintain an effective Emergency Response & Crisis Management Procedure for the site
- Minimise energy and water use, minimise solid waste, greenhouse gas, air and effluent emissions at source and optimise CO₂ recovery.
- Optimise the use of raw materials.
- Undertake a programme of continuous improvement in environmental performance, with an emphasis on pollution prevention.

- Train and motivate employees to conduct their work in an environmentally-responsible manner.
- Ensure that adequate resources are deployed to enable the environmental policy to be implemented.
- Communicate the environmental policy to all interested parties and make it publicly available.

Our commitment to the Environmental Policy is underpinned by the Company's core values, which include "Proud of What We Do" and "Be the Best".

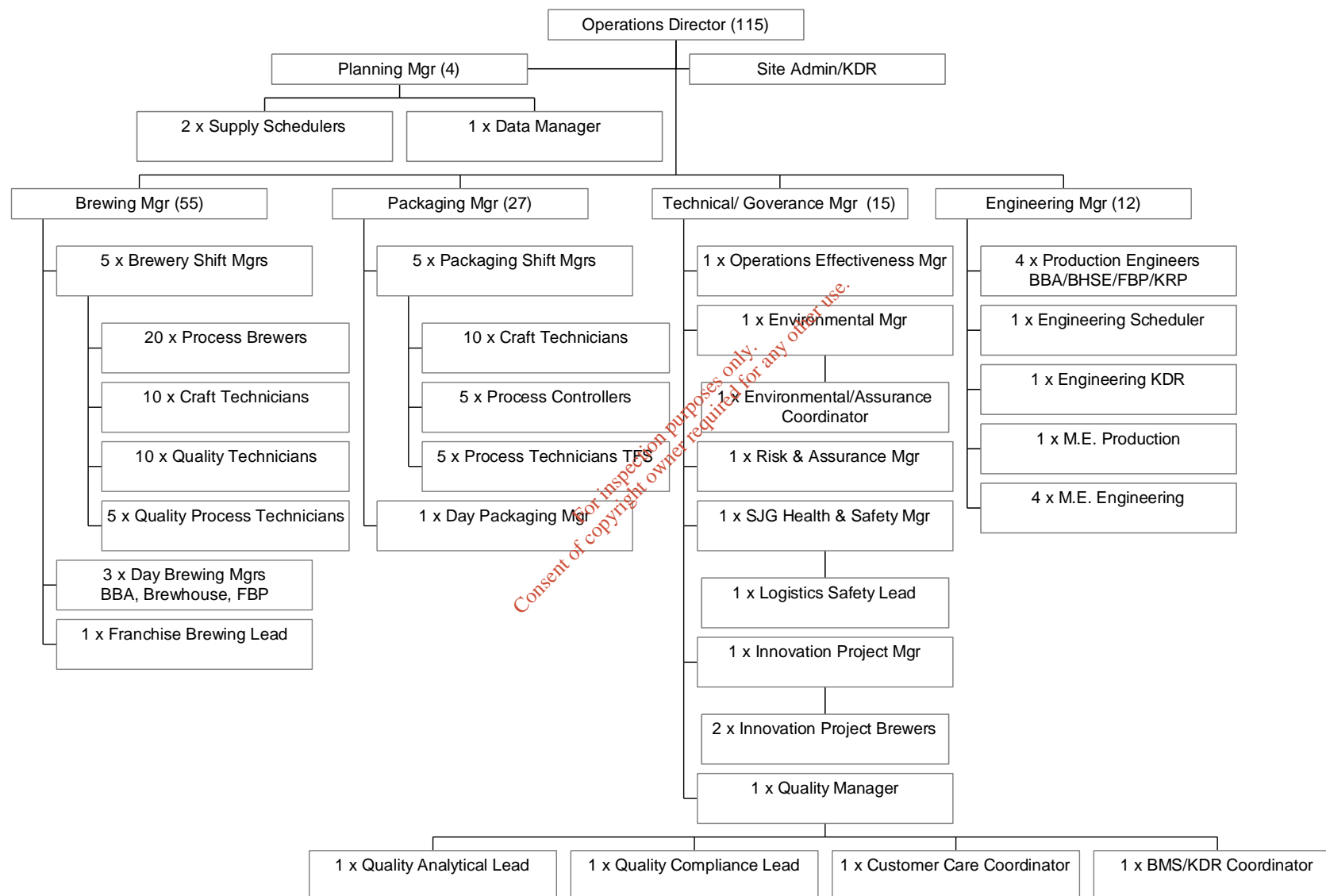
Aidan Crowe
Operations Director St. James's Gate & BBA
St James's Gate Brewery
May 2017

1.5 Organisational Structures – Environmental Management

The organisational chart for the site, including the elements of environmental management, is given in Figure 1.

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Figure 1: Management Structure



2 SUMMARY INFORMATION

2.1 Emissions from the Installation

Unless otherwise stated, summary information is provided for the period from January 2018 to December 2018 inclusive. The information is presented as annualised emission figures, derived from the average measured mass emission value multiplied by the duration of the emission.

2.1.1 Emissions to Sewer

The following sub-sections present the site's self-monitoring data for emissions to sewer. Historically, there were three licensed emission points to sewer from the site, at SE-1, SE-2 and SE-3. Over the years, a number of changes have taken place that have resulted in changes to the nature and quantity of effluent discharged from the site.

In late 2005, the process emission from SE-2 was diverted to the waste water neutralisation plant (WWNP), ultimately discharging via SE-1. Therefore since 2006, only surface water run-off has been discharged via SE-2. The discharge of process emissions from SE-3 was also discontinued in late 2005 and only surface water run-off has been discharged from this point since then. As a result of these two changes, Diageo only operates one process emission point from the site, at SE-1. The discharges of storm water via SE-2 and SE-3 are monitored in accordance with the requirements of the revised licence. Results of the storm-water monitoring for SE-2 and SE-3 are presented in Section 2.1.2.

The licensed emission point to sewer for process effluent from the site is SE-1. The effluent is screened and then pH-adjusted in the on-site WWNP before being discharged, via SE-1, to the municipal sewer for final treatment in the Ringsend wastewater treatment plant. SE-2 and SE-3 only discharge storm water run-off to the municipal combined sewer.

Historically, Diageo has implemented an aggressive water reduction programme at the site, with the successful reductions in water consumption influencing the concentration profile of the effluent. Diageo applied for a technical amendment of the emission limit values in licence P0301-02 and this was approved by the Agency in August 2012; licence P0301-03 set the same amended limits for emissions to sewer as P0301-02.

Licence P0301-04 came into force on 12th August 2015 and introduced new emission limit values at SE-1. In addition, derogations were granted on mean volume discharged per day (averaged over a month) and the daily mean concentration of suspended solids. Both derogations were granted for a period of twelve months from the date of grant of licence P0301-04 and both Dublin City Council / Irish Water and the EPA have consented to extensions to these derogations.

All samples, other than flow, temperature and pH, are collected on a 24-hour flow-proportional composite basis and are monitored for the parameters set out in Table 1.

Table 1: Monitoring Frequency at SE-1

Continuous	Daily	Monthly	
Flow	BOD	Sulphates (as SO ₄)	Ammoniacal nitrogen
Temperature	COD	Fats, oils & grease	Total oxidised nitrogen
pH	Suspended solids	Detergents (as MBAS)	Total phosphorus (as P)
		Total nitrogen (as N)	

Table 2 summarises the discharge from the main emission point to sewer, SE-1, during 2018 of BOD, COD, suspended solids, sulphates, fats, oils & grease, detergents, total nitrogen, and total phosphorous. The annual loads of these parameters were all below the limits set out in the licence.

Table 2: Emissions to Sewer for Reference Point SE-1

Parameter	Emission Quantity (2017)	Emission Quantity (2018)	Licensed Emission ^{Note 1}
Volume (m ³) ^{Note 2}	1,560,187	1,587,510	1,714,200
BOD (kg)	4,490,853	4,569,898	5,307,000
COD (kg)	7,059,626	7,222,111	8,601,000
Suspended Solids (kg)	1,133,676	989,288	1,244,400
Sulphates (as SO ₄) (kg)	136,720	152,746	1,024,800
Detergents (as MBAS) (kg)	8,224	17,893	256,200
Fats, oils and grease (kg)	68,258	36,840	256,200
Total Nitrogen (kg)	76,856	101,294	128,100
Total Phosphorous (kg)	24,516	28,557	128,100
Parameter	Average Concentration (mg/l) 2017	Average Concentration (mg/l) 2018	Emission Limit Value (mg/l)
Ammoniacal Nitrogen	1.51	2.43	-
Total Oxidised Nitrogen	2.73	8.20	-

Note 1: Licensed emission quantities are based on the mean loading limits for each parameter under licence P0301-04.

Note 2: Licence P0301-04 included a temporary derogation on the mean volume to be emitted (averaged over a month) from 4,500 m³ to 4,800 m³ for a period of 12 months from 12th August 2015. This derogation was subsequently extended to the 31st December 2017 by agreement with the Agency. Technical Amendment B to the licence, issued on 14th February 2018, extended this derogation to 31st December 2018.

The daily average loads for November and December for total nitrogen were both greater than 1.2 times the daily mean load set out in schedule B.3 of the licence.

2.1.2 Emissions of Storm Water

Prior to the grant of licence P0301-03 in April 2013, there was a single licensed emission point to water from the site, SW-1, together with the two former sewer emission points (SE-2 and SE-3), which now only convey storm water. Up to March 2007, emission point SW-1 discharged cooling water which originated from an underground well at the site. However, in March 2007, the discharge of cooling water ceased and only surface water from north east corner of the Lower Level is discharged via an interceptor at SW-1.

The development of the Lower Level to accommodate Brewhouse 4 introduced a second licensed emission point to water, designated as SW-2. Discharges of surface water from this new emission point commenced in July 2015.

Discharges of storm water from the four licensed emission points (SW-1, SW-2, SE-2 and SE-3) are monitored in accordance with Schedule C.2.3 of the licence, which requires daily visual inspection and pH monitoring, weekly monitoring for conductivity, and quarterly monitoring of COD and suspended solids. In October 2013 Diageo submitted its proposal for the establishment of trigger values for storm-water discharges, and the proposal was accepted by the Agency. The flow of storm water to SE-3 has been diverted to SE-1 since January 2014.

The results from the storm-water monitoring programme are summarised in Table 3.

Table 3: Summary of Storm-Water Monitoring (2018)

Parameter	Monitoring Frequency	Average Measured Value			
		SW-1 ^{Note 2}	SW-2	SE-2	SE-3 ^{Note 1}
pH	Daily	7.68	7.52	7.87	-
Visual inspection	Daily	-	-	-	-
Conductivity (µS/cm)	Weekly	435	408	368	-
COD (mg/l)	Quarterly	100.2	15.2	15.3	-
Suspended Solids (mg/l)	Quarterly	39	6	8	-

Note 1: Storm water discharge was diverted from SE-3 to the WWNP from 31st January 2014 onwards.

Note 2: Due to low and intermittent flow at SW-1, it was not possible to obtain a representative sample from the emission point.

2.1.3 Emissions to Atmosphere

2.1.3.1 Overview

The following subsections summarise the emissions to atmosphere from the licensed emission points:

- the combined heat & power (CHP) plant (A1-3, A1-4, A1-5, A1-6 and A1-7)
- the afterburners at the roasthouse (A2-1, A2-2, A2-6 and A2-18)
- the cooling stacks at the roasthouse (A2-7, A2-8, A2-9 and A2-19)
- the grain intake area on the upper level (A2-3, A2-4 & A2-5)

- the grain handling systems at the raw material handling building on the lower level (A2-10, A2-11, A2-12, A2-13, A2-14 and A2-17)

2.1.3.2 Combined Heat & Power Plant

There are three main emission points associated with the CHP turbines (A1-3, A1-4 and A1-5). There is also a bypass stack on Turbine 1 (A1-6) and a stand-by boiler (A1-7). Licence P0301-04 requires that the emission from the five CHP plant emission points be monitored for nitrogen oxides and, since 1st January 2016, carbon monoxide on an annual basis.

Monitoring of the emissions was carried out in June 2018. Table 4 summarises the monitoring results.

Table 4: Emissions of NO_x from CHP Plant (2018)

Emission Point	NO _x Concentration (mg/Nm ³)	Licence Limit (mg/m ³)	Mass Emission (kg) ^{Note 1}	Licence Limit (kg/year)
A1-3	31.50	75	12,768	41,096
A1-4	42.27	75	7,729	41,096
A1-5	25.10	75	9,178	41,096
A1-6 ^{Note 2}	31.10	75	4,205	41,096
A1-7	49.28	66	30	13,754

Note 1: The mass emission is based upon the measured concentration, the maximum permitted volumetric flow rate and the operational hours for each stack.

Note 2: A1-6 is the bypass stack on Turbine 1 (A1-3) and only operates at low load.

Table 5: Emissions of CO from CHP Plant (2018)

Emission Point	CO Concentration (mg/Nm ³)	Licence Limit (mg/m ³)	Mass Emission (kg) ^{Note 1}	Licence Limit (kg/year)
A1-3	1.72	100	698	54,795
A1-4	3.61	100	660	54,795
A1-5	1.62	100	592	54,795
A1-6 ^{Note 2}	19.10	100	2,582	54,795
A1-7	0.39	100	0.2	20,840

Note 1: The mass emission is based upon the measured concentration, the maximum volumetric flow rate and the operational hours for each stack.

Note 2: A1-6 is the bypass stack on Turbine 1 (A1-3) and only operates at low load.

There were no non-compliances of emissions to atmosphere from the CHP plant during 2018. Table 6 summarises the historical performance of the CHP plant.

Table 6: CHP Plant Summary (2018)

	2015	2016	2017	2018
NO _x emissions (kg)	45,677	51,201	47,880	33,910

	2015	2016	2017	2018
Energy input (MWh) ^{Note 1}	273,233	268,957	263,145	268,073
Electricity generated (MWh)	64,031	62,645	61,670	62,054
CO ₂ emissions (tonnes)	49,741	49,563	48,676	48,607

Note 1: includes natural gas (primary fuel) and gas oil (secondary fuel)

2.1.3.3 Roasthouse

There are four licensed emission points from the afterburners at the roasthouse (A2-1, A2-2, A2-6 and A2-18), each of which is monitored for total organic carbon and nitrogen oxides. Annual monitoring at emission points A2-1 and A2-2 was carried out in August 2018 and at A2-6 in November 2018. A2-18 (roaster 4) is monitored on a quarterly basis; it was in operation in the fourth quarter of 2018 and was monitored in November. The monitoring results are summarised in Table 7 and Table 8.

Table 7: Emission of Total Organic Carbon (TOC) from Afterburners (2018)

Emission Point	TOC (as C) (mg/m ³)	Licence Limit (mg/m ³)	Mass Emission (kg)	Licence Limit (kg)
A2-1	68.47	40	1,624	1,889
A2-2	50.92	75	1,468	3,541
A2-6	49.95	50	354	3,504
A2-18	8.74	50	73	3,504

Table 8: Emission Nitrogen Oxides (as NO_x) from Afterburners (2018)

Emission Point	NO _x (as NO ₂) (mg/m ³)	Licence Limit (mg/m ³)	Mass Emission (kg)	Licence Limit (kg)
A2-1	52.1	61	1,236	2,880
A2-2	50.8	75	1,463	3,541
A2-6	36.4	75	258	5,256
A2-18	13.7	75	115	5,256

There was one non-compliance attributable to the afterburners in 2018. Monitoring conducted on 21st August showed TOC concentrations of 68.5 mg/m³ at A2-1 (roaster 1), which is above the licence limit of 40 mg/m³. Diageo removed roaster 1 from service for investigation and identified a mechanical fault with the afterburner. Repair work was undertaken on the unit and it did not re-enter service in 2018.

The cooling stacks associated with each of roaster 1, 2, 3 and 4 (A2-7, A2-8, A2-9 and A2-19, respectively) are monitored for total particulate matter on an annual basis. The concentration and mass emissions of particulate matter at the roaster cooling stacks in 2018 are presented in Table 9.

Table 9: Emission to Atmosphere from Roaster Cooling Stacks

Emission Point	Total Particulate Matter (mg/m ³)	Licence Limit (mg/m ³)	Volumetric Flow Rate (m ³ /h)	Licence Limit (m ³ /h)	Mass Emission (kg/year)	Licence Limit (kg/year)
A2-7	10.8	20	7,720	15,000	87	2,628
A2-8	8.8	20	7,314	15,000	67	2,628
A2-9	4.7	20	8,379	15,000	20	2,628
A2-19	9.6	20	8,477	15,000	41	2,628

2.1.3.4 Grain Intake & Handling

There are three licensed emission points at the grain intake area on the upper level (A2-3, A2-4 & A2-5) and six licensed emission points at Brewhouse 4 on the lower level (A2-10, A2-11, A2-12, A2-13, A2-14 and A2-17). The results of the annual monitoring are summarised in Table 10.

The operational hours and mass emissions relating to grain intake emission points on the upper level (A2-3, A2-4 and A2-5) have reduce significantly since 2014. As of 2017, only one emission point at the grain intake is still operational: A2-3. Monitoring at this point was due to take place in late 2018 but was delayed until early 2019. Monitoring was carried out in June 2018 at Brewhouse 4.

Table 10: Emission of Total Particulate Matter (TPM) from Grain Intake & Handling (2018)

Emission Point	TPM (mg/m ³)	TPM Licence Limit (mg/m ³)	Volumetric Flow Rate (m ³ /h)	Flow Rate Licence Limit (m ³ /h)	TPM Mass Emission (kg/year)	TPM Licence Limit (kg/year)
A2-3 ^{Note 1}	0.21	50	7,068	28,900	1.2	12,658
A2-4 ^{Note 2}	-	50	-	24,450	-	10,709
A2-5 ^{Note 2}	-	50	-	14,650	-	6,417
A2-10	1.45	30	29,891	33,000	297.1	8,672
A2-11	0.60	30	17,303	20,000	71.2	5,256
A2-12	4.88	30	16,011	20,000	378.7	5,256
A2-13	0.44	30	7,567	13,000	8.0	3,416
A2-14	0.31	30	19,149	20,000	5.5	5,256
A2-17	0.66	30	1,729	2,200	2.8	578

Note 1: This the concentration and flow rate data from monitoring conducted in May 2017; Monitoring was conducted in March 2019 of which Diageo are currently awaiting the results.

Note 2: A2-4 and A2-5 were not in operation in 2018.

2.1.4 Waste Management Record

Condition 11.9 of the licence requires Diageo to maintain a waste register to record the following details:

1. the tonnages and List of Waste (LoW) code (formerly referred to as the EWC code) for the waste materials sent off-site for disposal / recovery;
2. the names of the agent and carrier of the waste, and their waste collection permit details, if required (to include issuing authority and vehicle registration number);
3. details of the ultimate disposal / recovery destination facility for the waste and its appropriateness to accept the consigned waste stream, to include its permit / licence details and issuing authority, if required;
4. written confirmation of the acceptance and disposal / recovery of any hazardous waste consignments sent off-site;
5. details of all waste consigned abroad for Recovery and classified as 'Green' in accordance with the EU Shipment of Waste Regulations (Council Regulation EEC No. 1013/2006, as may be amended). The rationale for the classification must form part of the record;
6. details of any rejected consignments;
7. details of any approved waste mixing;
8. the results of any waste analyses required under Schedule C: Control & Monitoring, of this licence; and
9. the tonnage and LoW Code for the waste materials recovered/disposed on-site.

The hazardous and non-hazardous waste consignments from the site in 2018 are presented in Annex 2. There were no rejected consignments in 2018.

During 2012, Diageo notified the Agency that a number of the materials generated as part of the brewing / production process met the requirements of Article 27 of the *European Communities (Waste Directives) Regulations 2011*. As a result, Diageo submitted determinations of by-product status for the following materials, which were accepted by the Agency:

- spent grain (pale or black) destined for use as animal feed;
- black spent grain destined for use as compost;
- grain dust destined for use as compost;
- surplus yeast destined for use as animal feed;
- discarded beer destined for use as animal feed or application on willow plantation as an organic fertiliser; and
- trub destined for use as animal feed or as compost.

2.2 Monitoring and Enforcement

2.2.1 Agency Visits

The Agency carried out a single unannounced visit to the site on 5 May 2018. The site visit report was issued by the Agency on 31 May (SV14551); it identified one non-compliance and three observations. Diageo provided a response to the agency via EDEN.

2.2.2 Agency Monitoring – Emissions to Sewer

The Agency visited the site in July and October to collect composite samples from emission point SE-1. Temperature and pH readings were taken from a grab sample at SE-1. The results of these samples are summarised in Table 11.

Table 11: EPA monitoring at SE-1 (2018)

Parameter	July	October	P0301-04 Licence Limit
Temperature (°C)	30.3	27.2	42
pH	6.9	7.0	6 – 10
BOD (mg/l)	3,700	3,800	6,000
Conductivity (µS/cm)	3,420	3,410	-
COD (mg/l)	5,090	6,390	11,100
SS (mg/l)	500	342	1,700 ^{Note 1}
Sulphate (mg/l)	91	120	400
Total nitrogen (mg/l)	73	52	100
Total phosphorus (mg/l)	19	18	50

Note 1: The Agency has granted Diageo a derogation for the SS daily limit from 1,400 mg/l to 1,700 mg/l until 31st December 2018 (licence amendment B).

2.2.3 Agency Monitoring – Emissions to Atmosphere

The Agency did not conduct any monitoring of emissions to atmosphere at the site during 2018.

2.2.4 Third-party audits

DNV carried out a periodic audit on the Environmental Management System on 5th and 6th February 2019. The auditor determined that Diageo's management system continues to conform to the requirements of ISO 14001.

2.3 Energy and Water Consumption

2.3.1 Energy Audit

A comprehensive energy review which encompassed electricity, steam, water, compressed air and process gases (nitrogen & CO₂) was undertaken in the final quarter of 2016. This exercise was carried out in accordance with Conditions 7.1, 7.2 & 7.3 of the IE licence (P0301-04).

The review concluded that despite the increase in brewing at St James Gate over recent years with the closure of breweries in Waterford, Dundalk and Kilkenny there has not been a corresponding increase in electricity demand. Steam usage has also decreased with the adoption of efficient energy management system in Brewhouse 4. The review identified a number of potential energy, water and process gas efficiency opportunities which Diageo plans to further investigate. Diageo

added the initiatives to its opportunities register, which is managed as part of the Energy Management System.

A comprehensive metering, sub-metering, data collection and reporting system is in place. Diageo continue to evaluate and implement, where appropriate, the recommendations of the 2016 energy review.

2.3.2 Energy Consumption

Steam and electricity are generated in the combined heat and power (CHP) Plant operated on site by GatePower. In addition, Diageo imports electricity from the grid. Table 12 summarises the energy consumption at the site in 2018, while Table 13 summarises the energy inputs to and outputs from the CHP plant.

Table 12: Energy Consumption (MWh) (2018)

Energy Source	2015	2016	2017	2018
Natural Gas for CHP plant	272,817	268,923	263,115	268,053
Natural Gas for roasthouse	18,694	16,850	16,305	14,925
<i>Total Natural Gas</i>	<i>291,511</i>	<i>285,773</i>	<i>279,420</i>	<i>282,978</i>
Gasoil for CHP plant	443	34	29	20
Diesel / gas oil for logistics	3,077	3,575	1,420	2,325
Electricity imported from the grid	211	117	144	383
LPG for forklift trucks	386	343	809	359
Total Site Energy Consumption	292,807	289,843	280,402	286,065

Table 13: Summary of Energy Inputs to and Outputs from the CHP Plant (MWh) (2018)

Energy Source	2015	2016	2017	2018
Inputs				
<i>Natural Gas for electricity exported to grid</i>	<i>54,828</i>	<i>22,244</i>	<i>23,025</i>	<i>24,066</i>
<i>Natural Gas for electricity & steam exported to the site</i>	<i>236,683</i>	<i>246,679</i>	<i>240,089</i>	<i>243,987</i>
Total Natural Gas input	291,511	268,923	263,115	268,053
Outputs				
<i>Electricity exported to the grid</i>	<i>15,961</i>	<i>14,351</i>	<i>14,855</i>	<i>15,526</i>
<i>Electricity exported to the site</i>	<i>48,070</i>	<i>48,294</i>	<i>46,815</i>	<i>46,528</i>
Total electricity generated	64,031	62,645	61,670	62,054
Steam exported to the site	118,608	105,007	105,860	109,558

Diageo operates an Energy Management System certified to ISO 50001, which is used to manage energy consumption and the efficient use of energy across the site.

2.3.3 Water Consumption

Both potable and service water is supplied to the site by Dublin City Council. In 2013, Diageo invested in a water treatment plant that utilises water extracted from the Cooperage Well, located at the site, to provide additional potable water. Potable water is used during the brewing process and service water is used in fire hoses and other ancillary activities. Specific water consumption at the site is summarised in Table 14.

Table 14: Specific Water Usage (2018)

Year	Total (hl/hl)
2012	3.1
2013	3.6
2014	3.7
2015	3.0
2016	3.1
2017	3.2
2018	2.83

2.4 Environmental Incidents and Complaints

2.4.1 Environmental Incidents

Table 15 summarises the environmental incidents that occurred during 2018, setting out the cause and corrective action.

Table 15: Environmental Incidents (2018)

Date	Description
January	None
February	None
March	None
April	None
May	None
June	None
July	None
August	Monitoring undertaken on 21 st August indicated a total organic carbon (TOC) concentration in excess of 1.2 times the ELV at A2-1 (roaster 1). The roaster was removed from service for inspection and repair works.
September	None
October	None

Date	Description
November	The daily average loads for November and December for total nitrogen at SE-1 were both above 1.2 times the mean daily load set out in schedule B.3 of the licence. The concentrations of total nitrogen for both November and December were below the ELV.
December	

2.4.2 Environmental Complaints

Table 16 summarises the complaints received during 2018, the identified cause and the corrective actions taken.

Table 16: Summary of Complaints Received in 2018

Date	Complaint	Cause	Corrective Action
10 th March	A resident at Bow Lane raised a complaint regarding noise from the logistics yard at night time.	Forklift trucks (FLT) were operating in an area that is not normally activity at night time. Noise was identified as coming from the FLT reversing beacon.	FLT personnel were provided with noise awareness training and instructed not to operate in the relevant area after 21:00.
19 th March	A resident at Bow Lane raised a complaint regarding noise from the logistics yard at night time.	FLTs were operating near the garage area. Noise was identified as coming from the FLT reversing beacon.	Diageo undertook to source and install new 'white noise' reversing beacons on all FLTs.
26 th & 27 th March	A resident at Watling Street raised a complaint regarding noise from the logistics yard before 7 am.	Truck movements on the logistics yard, near Watling Street, before 7 am.	Diageo instructed the relevant contractor that trucks collecting spent grain would be allowed on to site before 7 am. Logistics staff were instructed to stop any keg trucks from being driven through the relevant area of the site before 7 am.
18 th April	A resident at Bow Lane raised a complaint regarding noise from the logistics yard at night time.	Noise was identified as coming from the reversing beacons on FLTs operating in the garage area.	Diageo continued to source and install new 'white noise' reversing beacons on all FLTs.
25 th April	A resident at Usher's Island raised a complaint regarding a noise from the site.	The doors were open in the tank station to facilitate application of non-slip lining to floors of the tank bay. While no activity was being undertaken in the bay where the works were being carried out, other bays were active.	The system for automatically opening and closing the doors at the tank station was repaired.

Date	Complaint	Cause	Corrective Action
10 th October	A resident at Marrowbone Lane raised a complaint regarding noise from the roast house.	Diageo reviewed the operational areas and external processes at the roast house. A rotary valve on a bin was found to be squeaking, but it was not established that this was the source of the reported noise.	Rotary valve was greased.
26 th October	A resident at Marrowbone Lane raised a complaint regarding an increase in noise from the roast house	Following an investigation, no abnormal operation or noise was identified. Diageo reviewed operations and shift pattern at the roast house but could not identify the source of the noise.	No cause was found.
28 th November	A resident at Watling Street raised a complaint regarding noise from the movement of trucks in the vicinity of the tank station between 23:00 and 00:00.	There were no truck operations at the tank station at the time. Diageo could not identify the cause of the noise.	No cause was found.
10 th December	A resident at Echlin Street raised a complaint regarding noise from the upper level, described as similar to an aeroplane.	Following an investigation, Diageo could not identify the noise. No further complaint was made.	No cause was found.

2.5 European Pollutant Release and Transfer Register (E-PRTR)

Diageo completed and submitted the Environmental Performance Report (EPR) on the EPA's web portal as part of the process of preparing this AER. The EPR fulfils the role of the pollutant release and transfer register (PRTR) that Diageo is required to prepare and submit in accordance with its licence and EC Regulations No. 166/2006.

3 ENVIRONMENTAL & ENERGY MANAGEMENT PROGRAMME

3.1 Overview

The site is certified to the international standard for Environmental Management Systems (ISO 14001) and for Energy Management System (ISO 50001). The Environmental & Energy Management Plan (EEMP) is a combined plan covering both environmental and energy targets. It defines a set of objectives and targets for the company to work towards. Of its nature, it is liable to alteration in the light of changing circumstances and the company's future plans. It is also subject to revision from time to time and proposals, plans, targets and goals may vary accordingly. Therefore, progress on a particular objective or target is subject to change. Progress on the objectives and targets achieved during the previous year is reported in the Annual Environmental Report.

In addition to the EEMP, a register of opportunities (or ideas log) is maintained for potential energy usage, resources, water and effluent reduction initiatives as part of the management systems.

The EEMP is prepared in accordance with the requirements of ISO 14001, ISO 50001 and with the conditions of the site's licence. It has also been developed taking into account the Agency's guidance, the register of environmental aspects and impacts, the register of energy aspects and impacts, and in particular the significant impacts identified in these registers.

3.2 Review and Update

This section sets out the EEMP for the site. The programme is broken down into a number of categories as follows.

1. Soil, surface water and groundwater
2. Emissions to atmosphere
3. Waste reduction
4. Management and control of effluent discharges
5. Noise
6. Resource usage
7. Energy usage
8. Sustainable development of the site

For each of these headings the following information is outlined.

- Objective
- Rationale behind objective
- Specific target to achieve objective
- Plan to achieve targets
- Timescale
- Person(s) / department(s) responsible

The following tables provide a report on the EEMP for 2018 and sets out the tasks for 2019. This programme includes continuing the ongoing targets across the site and the introduction of new targets that were identified during 2018.

Objective 1.0		To protect soil, surface waters and groundwater from pollution.				
Rationale		Specific requirements relating to the protection of groundwater and surface water are contained in Licence Reg. No. P0301-04.				
Five Year Programme		As part of the migration of brewing operations to the lower level, significant new infrastructure, including process and surface water drainage has been installed. All operations have ceased on the upper level north zone of the site, it is critical that the quality of the underlying soil and groundwater is understood and all residual materials with polluting potential are removed. Inspection and repair programme for underground drains to be implemented together with repair programme for concrete surfaces.				
No.	Target	Plan	Time scale	Responsibility	Department	Comment
1.1	Complete the corrective actions outlined in the 'Interim Report on Contamination Encountered in MW8 at St. James's Gate' dated 31 st January 2013.	URS /AECOM to monitor the groundwater condition at MW8 and evaluate the impact of corrective actions taken on behalf of Diageo. Re test drains in the CIP centre to demonstrate that there are no leaks from this area.	2018-2019	Environmental Manager	Lower Site	Most recent testing indicated a reduction in temperature – a further leak has been remedied, so next monitoring should show further reductions.
1.2	To protect soil, surface waters and groundwater from contamination from materials stored on the site.	Drains in the tank station area of the site to be relined together with drains from the utility block. Complete drain integrity testing on due lines at the site.	2017 - 2020	Engineering Manager/Environmental Manager	Overall Site	Scheduled to start in April 2019. Unable to complete sooner due to high production levels

Objective 1.0		To protect soil, surface waters and groundwater from pollution.				
Rationale		Specific requirements relating to the protection of groundwater and surface water are contained in Licence Reg. No. P0301-04.				
Five Year Programme		As part of the migration of brewing operations to the lower level, significant new infrastructure, including process and surface water drainage has been installed. All operations have ceased on the upper level north zone of the site, it is critical that the quality of the underlying soil and groundwater is understood and all residual materials with polluting potential are removed. Inspection and repair programme for underground drains to be implemented together with repair programme for concrete surfaces.				
No.	Target	Plan	Time scale	Responsibility	Department	Comment
1.3	Implement the recommendations in the 2014 EPA Site Inspection report in relation the integrity of hard standing areas where raw materials are delivered	Concrete hard standing repairs to be undertaken on a risk basis. Concrete yard at the back of the tank station to be taken up and replaced in 2018. Cracked sections of concrete from Gate 6 to be repaired	2018-2019	Engineering Manager	Lower level	Complete
1.4	Groundwater quality in MW13 appears to be influenced by brackish water intrusion by the River Liffey. Nitrate concentration continues to rise at MW14, it is suspected by consultants that the contamination is arising from sewers outside the boundary.	Continue to monitor the trend on groundwater sampling results, explore possibility of including additional analysis to establish source of contamination (caffeine to establish if sewer waste).	2018	Environmental Manager	Lower Level	Ongoing

Objective 1.0		To protect soil, surface waters and groundwater from pollution.				
Rationale		Specific requirements relating to the protection of groundwater and surface water are contained in Licence Reg. No. P0301-04.				
Five Year Programme		As part of the migration of brewing operations to the lower level, significant new infrastructure, including process and surface water drainage has been installed. All operations have ceased on the upper level north zone of the site, it is critical that the quality of the underlying soil and groundwater is understood and all residual materials with polluting potential are removed. Inspection and repair programme for underground drains to be implemented together with repair programme for concrete surfaces.				
No.	Target	Plan	Time scale	Responsibility	Department	Comment
1.5	Update the site drawings to reflect site layout and associated positions of drainage network.	Although site drainage drawings were updated in 2016/17, given works undertaken in the keg plant in 2017, the site drainage map needs to be updated to reflect the changes made.	2018	Engineering Manager	Overall Site	Updated, and new drawings handed over
1.6	Inspection and repairs of concrete bunds	Review all bunded structures on the site to ensure that they are correctly classified. Put programme in place for implementation of recommendations to repair bunded structures.	2018	Engineering Manager	Overall Site	Review complete.

Objective 1.0		To protect soil, surface waters and groundwater from pollution.				
Rationale		Specific requirements relating to the protection of groundwater and surface water are contained in Licence Reg. No. P0301-04.				
Five Year Programme		As part of the migration of brewing operations to the lower level, significant new infrastructure, including process and surface water drainage has been installed. All operations have ceased on the upper level north zone of the site, it is critical that the quality of the underlying soil and groundwater is understood and all residual materials with polluting potential are removed. Inspection and repair programme for underground drains to be implemented together with repair programme for concrete surfaces.				
No.	Target	Plan	Time scale	Responsibility	Department	Comment
1.7	Maintain Underground tanks at the site.	Ensure that new wet well is inspected when plant is switched back over to old wet well.	2018	Utilities & 3 rd Party Contracts Manager		
		Complete repair works on underground wet well at keg plant.	2018	Engineering Manager		

Objective 2.0		To improve control of air emissions from the site.				
Rationale		Specific requirements relating to the control of air emissions are contained in Diageo Ireland IE Licence Reg. No. P0301-04.				
Five Year Programme		Continue to manage and drive improvements for all emissions on site. Reduce carbon dioxide emissions by 50% by 2020 in line with Diageo mission.				
No.	Target	Plan	Time scale	Responsibility	Department	Comment
2.1	Roaster 4 afterburner was removed in 2018 and found to be compromised. Temporary tube bundle fitted to the Roaster, new tube bundle to be fitted to Roaster.	Repair or replace tube bundle for Roaster 4 afterburner.	2018	Contracts and Utility Manager	Engineering	Complete
2.2	Control of air emissions from new equipment on site	Review checks and maintenance of afterburner units, establish if there are opportunities for improvement	2018	Environmental Manager	Technical support	Complete
2.3	F-Gas register is maintained by facilities, system is partially paper based. Plan to have full electronic record of F-Gas Register in place in 2018.	By Q1 2018, full electronic F-Gas register to be in place.	2018	Facilities	Overall site	Complete
2.4	Ensure fugitive emissions are correctly identified and any necessary controls are taken to address.	To continue to report any fugitive emissions on site as part of the H&NM reporting system and to implement any repairs as required. Revise fugitive emissions survey for the site.	Ongoing Q1 - 2018	Environmental Manager	Overall site	Ongoing

Objective 2.0		To improve control of air emissions from the site.				
Rationale		Specific requirements relating to the control of air emissions are contained in Diageo Ireland IE Licence Reg. No. P0301-04.				
Five Year Programme		Continue to manage and drive improvements for all emissions on site. Reduce carbon dioxide emissions by 50% by 2020 in line with Diageo mission.				
No.	Target	Plan	Time scale	Responsibility	Department	Comment
2.5	Reduce CO ₂ carbon dioxide by 50% by 2020.	Intended to deliver carbon dioxide reduction by using single CHP unit and buying in green electricity from the grid. Design studies currently being undertaken as part of delivery.	2019	Utilities Manager	Utilities	Due to go live in July 2019

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Objective 3.0	To minimise waste on site.					
Rationale	In line with Diageo Corporate Goals, St James's Gate strives to maintain zero waste to landfill. Specific requirements relating to the management of waste are also contained in IE Licence Reg. No. P0301-04. The SJG site needs to reduce waste in general and also ensure that waste segregation allows best environmental use for discarded materials.					
Five Year Programme	Diageo at SJG has achieved zero waste to landfill and now must sustain this performance, the site must now look to eliminate waste in the first instance and where this is not possible the best environmental solution must be sought and implemented.					
No.	Target	Plan	Time scale	Responsibility	Department	Comment
3.1	Ensure that zero waste to landfill achieved each month for 2018	Continue to build awareness of the principles of Reduce, Reuse, and Recycle. Work with waste contract companies to ensure waste is routed away from landfill. Roll out waste segregation awareness.	2018 Feb. 2018	Environmental Manager Facilities	Overall Site	Complete
3.2	Audit waste contractors who remove waste material from the site.	Undertake site visit to Green Generation and Thorntons Recycling	2018	Environmental Manager	Overall Site	2018 audits complete, site visit due in April 2019
3.3	Ensure that waste materials are disposed of in accordance with waste hierarchy. Target for increase in mixed dry recyclables from the site – target 5% reduction in general waste in 2018.	Awareness campaign on waste segregation for all personnel, focus on segregation with Sodexo personnel, spot audits on waste collections.	2018	Environmental Manager	Overall Site	Complete

Objective 3.0	To minimise waste on site.					
Rationale	In line with Diageo Corporate Goals, St James's Gate strives to maintain zero waste to landfill. Specific requirements relating to the management of waste are also contained in IE Licence Reg. No. P0301-04. The SJG site needs to reduce waste in general and also ensure that waste segregation allows best environmental use for discarded materials.					
Five Year Programme	Diageo at SJG has achieved zero waste to landfill and now must sustain this performance, the site must now look to eliminate waste in the first instance and where this is not possible the best environmental solution must be sought and implemented.					
No.	Target	Plan	Time scale	Responsibility	Department	Comment
3.4	Packaging for ingredients and small pack chemical is taken offsite as contaminated packaging. Aim to clean these drums and send offsite directly for recycling.	Install drum washer to clean drums and allow material to be sent offsite as HDPE for recycling.	2018	Facilities Mgr	Facilities	Complete
3.5	The demand element of the business store materials for marketing, packaging etc. on the site. These functions need to adhere to the waste hierarchy.	Engagement session to be undertaken with demand company on materials generated on the site, implementing initiatives such as the removal of straws from campaigns to be discussed.	2018	Environmental Mgr	Technical & Governance	Complete
3.6	Innovation products give rise to higher waste rates than other mainstream beers which presents increased effluent loading, identify means to reducing waste.	Establish if there is potential to improve conversion efficiency of innovation products or recover by products for re use.	2018	Innovation Brewer	Technical & Governance	Ongoing

Objective 4.0	To improve the management and control of effluent discharges from the site.					
Rationale:	In line with good environmental practice and in response to our engagement process with DCC/IW, Diageo Ireland is currently implementing a re-invigorated and targeted effluent reduction programme on site. Furthermore, specific requirements relating to control of effluent are contained in Diageo Ireland Licence Reg. No. P0301-04.					
Five Year Programme	Historically, Diageo has delivered substantial reductions in effluent discharges from the site. Since 2014 significant changes have occurred on the SJG site with Brew house 4 development and the transition of volume from SFAB and GNB, which includes brewing new products at SJG and increased volumes. Following the commissioning and optimisation of Brew house 4. Reducing physical losses is a key element of delivering the site waste targets which will also deliver effluent reductions.					
No.	Target	Plan	Time scale	Responsibility	Department	Comment
4.1	Diageo will engage with the Agency and DCC regarding the agreement of revised ELV limits at SE-1 prior to December 2018.	Diageo to work closely with IW and DCC to provide all relevant information for the development impact assessment model for the area. On agreement of the revised emission limit values, engage with the EPA on formalising the emission limit values in IE Licence.	2018	Environmental Manager	Technical Support Team	Ongoing
4.2	Provide DCC/IW with data through batch file transfer at intervals to be determined and agreed with DCC/IW.	Continue to supply data as agreed in monthly meetings with DCC/IW	2018	Environmental Manager	Technical Support Team	Ongoing- compliant
4.3	As part of the spent grains despatch from the site, liquid is released from the trailers as they are being filled.	Collect samples of liquid which drains from the trailers and undertake mass balance on silo quantity vs. loads exported off site to quantify load associated with discharges.	2018	Environmental Manager	Technical Support Team	Ongoing

Objective 4.0	To improve the management and control of effluent discharges from the site.					
Rationale:	In line with good environmental practice and in response to our engagement process with DCC/IW, Diageo Ireland is currently implementing a re-invigorated and targeted effluent reduction programme on site. Furthermore, specific requirements relating to control of effluent are contained in Diageo Ireland Licence Reg. No. P0301-04.					
Five Year Programme	Historically, Diageo has delivered substantial reductions in effluent discharges from the site. Since 2014 significant changes have occurred on the SJG site with Brew house 4 development and the transition of volume from SFAB and GNB, which includes brewing new products at SJG and increased volumes. Following the commissioning and optimisation of Brew house 4. Reducing physical losses is a key element of delivering the site waste targets which will also deliver effluent reductions.					
No.	Target	Plan	Time scale	Responsibility	Department	Comment
4.4	Diageo will continue to implement a committed programme to reduce effluent. Aim of the site for F18 is to reduce site waste to 7%.	Physical losses focus to be maintained as part of the aim to reduce site waste. Aiming to deliver 5% reduction in waste discharged from the site.	2018	Production Manager	Technical Support Team	Ongoing
4.5	SJG have extensive suite of samplers on the site and have recently made these more visible in control rooms.	Maximise the information we collect from these meters to reduce effluent loads. Identify if additional samplers could be installed to tighten up on where effluent is generated on the site.	2018 2018	Environmental Manager	Technical support team.	Complete- review ongoing to make impact greater, and alarms/targets more stretching, but remain realistic 2019 - Capex requested for extra sampler & flowmeter for FBP

Objective 5.0	To monitor the level of noise emissions on site, at the boundary of St James's Gate Site and at noise sensitive locations off site.					
Rationale	In line with good environmental practice and in accordance with specific requirements relating to the noise emissions contained in Diageo Ireland Licence Reg. No. P0301-04 Diageo Ireland maintains a noise reduction programme on site.					
Five Year Programme	Following the completion of the Brew house 4 development and the mothballing of existing process activities, Diageo will baseline the noise emissions at the boundary of the site. The noise reduction programme will be further developed and implemented accordingly.					
No.	Target	Plan	Time scale	Responsibility	Department	Comment
5.1	To review the level of noise at noise sensitive locations.	Following installation of acoustic cladding to grain elevator and installation of acoustic hoods to fans, evaluate impact and identify any further opportunities.	2018	Environmental Manager	Roasthouse	Compliant – measurements completed
5.2	Prepare a programme to reduce noise emissions including specific goals and a time scale, together with options for modification, upgrading or replacement.	<p>Replace fans and louvers on air intake in CO₂ plant.</p> <p>Review noise data collected in the tank station – use data to establish if amendments can be made to the plant to reduce high pitched noise.</p> <p>Identify improvements projects which may need CAPEX to deliver.</p>	2018	Business Engineering/Environmental Manager	Lower Level	Complete

Objective 6.0	To increase the efficiency of resource use on site.					
Rationale	Specific requirements relating to the protection of groundwater and surface water are contained in Diageo Ireland Licence Reg. No. P0301-04.					
Five Year Programme	The brewery is a major user of cereals, it is critical that the brewery uses these raw materials as efficiently as possible and supports sustainable agriculture. Efficient use of raw material ensures in part reducing losses of high organic loads for treatment. Use of excess chemical increases overall transport and storage of hazardous liquid and generates unnecessary process wastewater, overall agenda to maintain plant quality and reduce chemical demand. Brewery is a significant water user, water use is currently 3.10l/l – target water use of 2.5l/l.					
No.	Target	Plan	Time scale	Responsibility	Department	Comment
6.1	Reduce chemical consumption across the site by 5% over the next two years.	Ecolab were awarded the chemical contract for the site – they have base lined the energy usage on the site and have identified a number of improvement projects.	2018	Brewing Manager	Operations Technical Support Team	Currently moving to different CIP chemicals – which will reduce caustic usage - ongoing
6.2	Reduce water usage at SJG to 2.9l/l in 2018 and put plan in place to deliver water efficiency of 2.5l/l.	Implement water saving projects to deliver water savings of 2.9l/l. Put ITF in place to coordinate and focus water saving projects undertaken by teams and individuals at the brewery. Identify and scope project for delivery of water efficiency of 2.5l/l	2018 2018 2018	Contracts & Utilities Manager	Engineering	Currently at 2.83 L/L conversion, with target for F20 @ 2.4 l/l

Objective 6.0	To increase the efficiency of resource use on site.					
Rationale	Specific requirements relating to the protection of groundwater and surface water are contained in Diageo Ireland Licence Reg. No. P0301-04.					
Five Year Programme	The brewery is a major user of cereals, it is critical that the brewery uses these raw materials as efficiently as possible and supports sustainable agriculture. Efficient use of raw material ensures in part reducing losses of high organic loads for treatment. Use of excess chemical increases overall transport and storage of hazardous liquid and generates unnecessary process wastewater, overall agenda to maintain plant quality and reduce chemical demand. Brewery is a significant water user, water use is currently 3.10l/l – target water use of 2.5l/l.					
No.	Target	Plan	Time scale	Responsibility	Department	Comment
6.4	Optimise the Water Treatment Plant and the abstraction from the Cooperage Well.	Upgrade media filter control to allow reduced flexibility and collection of backwash water.	2018	Contracts & Utilities Manager	Utilities Manager	Complete
		Collection of reject water from well water system and reuse in well water stream for treatment.	2018	Contracts & Utilities Manager	Utilities Manager.	Complete
6.5	All projects and process changes should consider the impact on water use, energy/utility use and wastewater generating potential.	In order to ensure that projects always have energy & water considerations, a process should be put in place to capture the change. Trigger likely to sit in Energy management system.	2018	Contracts & Utilities Manager/Environmental Mgr	Utilities Manager	Ongoing

Objective 7.0	To improve the energy efficiency of the Brewery site.					
Rationale:	Diageo Ireland maintains an Energy Management System, which is accredited to ISO 50001. As part of this system, and in line with good environmental practice, Corporate Targets and the requirements of the Licence, Diageo operates a continuous improvement programme to maximise the energy efficiency of the site and to reduce the greenhouse gas emissions from the business.					
Five Year Programme	Currently the SJG Brewery is at the same or better than the best BAT efficiencies for our sector, as outlined in the European Commission reference document on Best Available Techniques (BAT) in the food, drink and milk industries. Diageo as a whole have committed to a reduction in CO2 emissions of 50% by 2020, given that the Brewery operates with a state of the art Brewhouse and burn natural gas a primary fuel, there will need to be significant changes on the site to deliver a 50% reduction.					
No.	Target	Plan	Time scale	Responsibility	Department	Comment
7.1	Implement recommendations made in the Energy review report undertaken in 2016.	SJG will develop a plan for implementation of the appropriate control measures.	2018	Contracts and Utility Manager	Engineering	Ongoing
7.2	Manage the energy consumption of across all areas of operation to deliver the energy reductions as set out in the ESIM.	Carry out base line of energy consumption for BH4. Review the energy consumption at the ESIM meeting. Use ESIM to drive improvement actions.	2018 2018	Contracts and Utility Manager	Engineering	Ongoing Ongoing
7.3	Reduce CO ₂ generation at the site by 50% (based on 2007 baseline).	High level plan to reduce electricity generation on the site which will see single turbine to be operated for steam demand and additional electricity requirement bought in from the grid. Complete full design and gain business signoff to allow implementation in 2019.	2018	Contracts and Utility Manager	Engineering	Due July 2019

Objective 7.0	To improve the energy efficiency of the Brewery site.					
Rationale:	Diageo Ireland maintains an Energy Management System, which is accredited to ISO 50001. As part of this system, and in line with good environmental practice, Corporate Targets and the requirements of the Licence, Diageo operates a continuous improvement programme to maximise the energy efficiency of the site and to reduce the greenhouse gas emissions from the business.					
Five Year Programme	Currently the SJG Brewery is at the same or better than the best BAT efficiencies for our sector, as outlined in the European Commission reference document on Best Available Techniques (BAT) in the food, drink and milk industries. Diageo as a whole have committed to a reduction in CO2 emissions of 50% by 2020, given that the Brewery operates with a state of the art Brewhouse and burn natural gas a primary fuel, there will need to be significant changes on the site to deliver a 50% reduction.					
No.	Target	Plan	Time scale	Responsibility	Department	Comment
7.4	Obtain a deeper understanding of energy consumption levels in the roast house.	Review the operation of each roaster production stream in conjunction with the ongoing roast quality project to identify the optimum energy consumption model that supports the production of roast material of the quality required to optimise the core production processes.	2018	Contracts & Utility Manager	Engineering	Ongoing
7.5	Carryout complete review of individual energy consumer profiles and update site utilities model with revised targets based on current performance.	Using data collected since completion of plant and process upgrades develop a model for each production area and the sub processes that contribute to energy use in the area. Use the new model to monitor area efficiency and to target ongoing improvement in performance on an ongoing basis.	2017 to 2018	Contracts & Utility Manager	Engineering	Ongoing

Objective 7.0	To improve the energy efficiency of the Brewery site.					
Rationale:	Diageo Ireland maintains an Energy Management System, which is accredited to ISO 50001. As part of this system, and in line with good environmental practice, Corporate Targets and the requirements of the Licence, Diageo operates a continuous improvement programme to maximise the energy efficiency of the site and to reduce the greenhouse gas emissions from the business.					
Five Year Programme	Currently the SJG Brewery is at the same or better than the best BAT efficiencies for our sector, as outlined in the European Commission reference document on Best Available Techniques (BAT) in the food, drink and milk industries. Diageo as a whole have committed to a reduction in CO2 emissions of 50% by 2020, given that the Brewery operates with a state of the art Brewhouse and burn natural gas a primary fuel, there will need to be significant changes on the site to deliver a 50% reduction.					
No.	Target	Plan	Time scale	Responsibility	Department	Comment
7.6	Logistics operations contribute approximately 2% of the overall CO ₂ emissions from the site – logistics identify if there is scope to reduce the overall emission.	Logistics with their partners should review site transport operations (shunters, FLT's) to see what potential exists to reduce the CO ₂ emission associated with logistics (efficiency gain in operation, use of green fuels (biogas/biodiesel/electric).	2018 - 2019	Logistics Compliance Manager	Logistics	Ongoing
7.7	Establish potential for renewable energy generation on the site.	Feasibility study undertaken on the potential for photovoltaic installation on the roofs of buildings at SJG – await announcement of REFIT to establish if project could be implemented	2018-2019	Environmental Manager	Technical & Governance Mgr	Currently being reviewed

Objective 8.0	To carry out development works at the site in accordance with environmental best practice and the principles of sustainable design and development. To mitigate any potential environmental liabilities from the site.					
Rationale:	It is essential that all development works at the site are undertaken in the context of the site's licence and that the construction phase and operational phase of the development are planned to minimise the environmental impact, in line with the site's Environmental Policy.					
Five Year Programme	A number of significant projects are being undertaken (Distillery) on the site, and given nature of the site, ongoing maintenance projects can be significant (drain relining, concrete repair etc). This work will be completed in a manner to minimise the impact of the environment.					
No.	Target	Plan	Time scale	Responsibility	Department	Comment
8.1	To minimise the environmental impact from the construction works at St James Gate.	Implement appropriate environmental controls for all construction works Conduct environmental audits of construction contractors throughout construction works.	2018 - 2019	Environmental Manager	Technical Support Team	Ongoing
8.2	To implement the programme of work outlined in the Decommissioning Management Plan for mothballing Brewhouse 3 and BBA.	Given the site decommissioning has been completed, it is intended to update the sites ELRA & DMP to reflect current liabilities.	2018	Environmental Manager	Technical Support Team	Red line boundary moved to remove BH3/GFE2
8.3	Ensure that the distillery project is implemented in accordance with Environmental best practice and the sites IE Licence	Environmental Manager is involved in the project team implemented the project. Work stream to be established to incorporate the environmental requirements.	2018/2019	Flynn Construction /Env Manager	ISC Engineering	Ongoing

4 LICENCE SPECIFIC REPORTS

4.1 Noise

In accordance with Condition 6.15 of the licence, Diageo carries out annual noise surveys at the eight noise sensitive locations around the site. The results from the most recent noise survey, carried out in September 2018, are summarised in Table 17.

Table 17: Summary of Noise Monitoring Results (LA_{eq})

Location	Day Time	Evening Time	Night Time
1 Ellis Quay	62	61	56
2 Bonham St. / Watling St.	60	57	52
3 Watling St.	59	55	53
4 School St. / Taylor's Lane	60	55	51
5 Marrowbone Lane	54	53	55
6 Bond St.	65	64	54
7 Echlin St.	63	59	55
8 Steeven's Gate	62	58	43
9 Presbytery	56	45	44
10 CHP (Watling Street)	59	57	56

The monitoring results presented in Table 17 are those measured at the noise monitoring locations - not the noise levels attributable to activities at the site. Compliance with the site's noise limits was assessed in the noise monitoring report, summarised below.

The noise survey report concluded the following regarding compliance with the site's licence:

- For measurement periods during the daytime, the dominant noise source in the majority of the noise sensitive locations was that of localised passing traffic and commuter / residential noise levels. Noise measurements on Watling Street and Bonham Street were influenced by audible noise levels from the operating plant. In areas where no specific plant noise was audible during measurement period, the plant noise levels are reported as being in compliance.
- For measurement periods during the evening time, the dominant noise source in the majority of the residential locations was that of passing traffic. Where no specific plant noise was audible during the measurement period, the plant noise levels are reported as being in compliance. Measurement data shows that plant noise was in compliance at the all monitoring locations.
- For measurement periods during the night time, the dominant noise source in the majority of the residential locations was that of local residential noise and passing traffic. At locations where no specific plant noise was audible during the measurement period, the plant noise levels are reported as being in compliance.
- No tonal noise measurement values were noted during the measurement surveys at any locations.

Overall, the noise monitoring report noted that the plant is operating within compliance of its license limits at the majority of its noise sensitive monitoring locations. Measurements at Bonham

Street and Watling Street indicated background noise levels above the 45 dB(A) specification. Although infrequent plant noise was subjectively noted during the evening and night time periods, the measurement data did not indicate any clear tonal noise levels. A subjective audible broadband plant noise was noted at Bonham St., Watling St. and Marrowbone Lane.

As with previous noise monitoring results, Diageo incorporates the findings into its noise management programme and this will continue, taking into account the completion of all development works at the site.

4.2 Testing and Inspection of Bunds, Underground Tanks and Pipelines

4.2.1 Overview

In accordance with Condition 6.11 of the licence, all bunds, interceptors, pipelines are inspected weekly and records are available for inspection on site. Similarly, in accordance with Condition 6.12, inspections of flanges and valves on over ground pipelines used to transport materials other than water for signs of leaks are completed weekly. The findings from the inspections are recorded, including any actions to be taken. In accordance with Condition 6.10, integrity testing is completed on all tanks and bunds every three years.

All records of the testing and inspection programme are maintained at the site.

4.2.2 Bunds

The current bund integrity testing regime commenced in 2011. As outlined to the Agency in July 2012, an accelerated programme of bund testing was implemented in 2012/ 2013 to ensure that all bunds had been tested. A detailed register of all bunds is maintained and the records are available for inspection. There are currently 344 active bunds at the site, with 59 fixed bunds and 283 mobile bunds.

123 active bunds were subject to testing or visual structural inspection in 2018. New bunds that were constructed or installed at the site during 2018 were either delivered with test certificates or were subject to integrity testing prior to entering service.

4.2.3 Underground Tanks

There are five underground storage tanks at the site, each for water storage. There are also two active level-controlled balancing tanks for effluent at the site. These structures are included in the integrity testing programme.

4.2.4 Pipe work inspections

Visual pipe work and drain inspections are carried out on a weekly basis. All findings are noted on 'walk drawings', with notifications raised on the SAP maintenance system for action.

4.2.5 Interceptor Inspections and Work

Inspections of the interceptors across the site are completed on a weekly basis. In addition to the weekly inspections, the interceptors undergo quarterly sample analysis to measure oil content and are regularly cleaned. This occurs on a scheduled basis with the interceptors skimmed annually, while the units are cleaned every two years. Interceptors were either skimmed or cleaned entirely in 2018.

Table 18: Summary of Site Interceptors

Tag Number	Locations
SJG-ICT-001	Near RB Plant
SJG-ICT-002	Near RB Plant
SJG-ICT-003	Gate 6
SJG-ICT-004	Gate 6
SJG-ICT-005	Gate 6
SJG-ICT-007	Gate Power
SJG-ICT-008	Gate Power (ESB sub Station)
SJG-ICT-009	BH4 grain intake
SJG-ICT-010	Waste Water Treatment Plant
SJG-ICT-011	Gate 6 Access Point

4.2.6 Drains

Diageo has continued to investigate the integrity of drains across the site. As outlined in the EEMP, Diageo commenced an accelerated programme for testing of process drains. In 2013, Diageo focused primarily on the drainage networks on the Lower Level. In 2013, the significant redevelopment of the Lower Level was completed as part of the construction of Brewhouse 4. Diageo upgraded the drainage network in the developed areas of the site and installed new stainless-steel drains for process effluent, in line with good practice. All new drainage networks constructed were integrity tested and certified. Refer also to Section 4.2.4.

Diageo completed a comprehensive relining project of underground drains, aco channels and catch pits in 2016 in the fermentation area of the site. A similar programme on the keg plant drainage network was almost completed in early 2018. The works to reline the drains at the utility plant are scheduled to begin in March 2019 and at FBP in April 2019.

4.3 Groundwater

4.3.1 Overview

In accordance with Condition 10.3.3 of the original licence (P0301-01), a hydrogeological investigation was carried out at the site in three phases between 2002 and 2008. Following completion of Phase 2 of the investigation, the hydrogeologist recommended that a programme of Monitored Natural Attenuation be implemented at the site in combination with an ongoing monitoring programme.

The monitoring programme commenced in Phase 3 of the investigation, and the results over a two-year period were analysed. The analysis indicated that the groundwater quality at the site was improving with regard to general suite parameters, heavy metals (except chromium), diesel range organics, mineral oil and PAH (except naphthalene), although the results of consecutive monitoring rounds show both increases and decreases in the concentrations of individual parameters.

The groundwater monitoring programme has continued since completion of the hydrogeological investigation and in accordance with the requirements of the current licence (P0301-04). During 2018, two rounds of monitoring were carried out: one round in May 2018 (refer to Section 4.3.2) and one round in November 2018 (refer to Section 4.3.3). A summary of the results is provided in Annex 1, showing the comparison against the relevant groundwater quality indicators, the EPA's Interim Guideline Values (IGV) or the Groundwater Threshold Values (GTV), where appropriate.

The full groundwater monitoring reports are available for inspection by the Agency.

4.3.2 Round 1 2018

The first round of groundwater monitoring for 2018 was carried out in May.

The results from the groundwater monitoring indicate that there are no sustained elevated concentrations of organic contaminants (hydrocarbons or PAH), and that elevated concentrations of some major ions (potassium, sodium, magnesium, sulphate and chloride) are related to the site's location adjacent to the River Liffey Estuary Upper, with mixing of groundwater and brackish surface water resulting in higher concentrations.

Other major ion and metal concentrations are largely related to the geology beneath the site or potentially related to offsite sources outside the western boundary.

Groundwater elevations of wells on the lower site, including the MW8-series of wells, show clear evidence of decline since 2014 possibly due to pumping of the Cooperage Well.

Historically, the groundwater elevation in the FBP area (MW8 and MW8a) has been anomalously high together with elevated pH, EC, temperature, sodium, ammoniacal-nitrogen, alkalinity, arsenic and aluminium concentrations. Relining of drains in this area in 2015 did not appear to have altered groundwater conditions; however, repairs to a sump in this area prior to Round 1 2017 appear to have had some effect.

Groundwater elevations declined in the FBP area during 2017, with minimal groundwater present within wells MW8 and MW8c, and the majority of parameters remained lower than historical values. It was noted that hydrocarbon detections in MW8 and MW8a are largely composed of toluene.

4.3.3 Round 2 2018

The second round of groundwater monitoring for 2018 was carried out in November.

As in the case of the results from the first round in 2017, and in previous years, the groundwater data indicates that there are no sustained elevated concentrations of organic contaminants (hydrocarbons or PAH). Again, elevated concentrations of some major ions are considered to be related to the site's location adjacent to the River Liffey Estuary Upper, with mixing of groundwater and brackish surface water resulting in higher concentrations in groundwater close to the river.

Two samples were taken at MW21: one at high tide and one at low tide. The concentrations of major ions at MW21 are higher at high tide than at low tide. It was also noted that there was a reduction in concentrations of major ions overall in MW21 in comparison to the upward trend observed between June 2016 and October 2017.

Repairs to a sump in the FBP area prior to Round 1 2017 appear to have had some effect as groundwater pH, EC, temperature and ammoniacal nitrogen results in well MW8, MW8a and MW8b have shown sustained lower levels through 2017 and 2018, albeit these parameters remain elevated relative to other wells on the site.

Since 2017 groundwater elevations in the FBP wells have been lower than before, though still higher than elsewhere on the site. This may be due to the drain relining and sump repairs in this area or to the influence of pumping at the Cooperage well. Groundwater elevations increased slightly in the FBP area during 2018 relative to 2017, with minimal groundwater present within wells MW8 and MW8c, although the majority of parameters remained lower than historical values.

Diageo will continue its groundwater monitoring programme in 2019.

4.4 Efficiency of Use of Raw Materials

The efficiency of the use of raw materials in processes and the reduction in process waste was assessed as a part of the energy efficiency audit (refer to Section 2.3.1). The quantity of input raw materials and the quantities of production wastes are recorded and tracked against relevant metrics and targets. In addition, the quantity of by-products of production (notified to the Agency in 2012) is recorded and tracked.

4.5 Minimisation of Water Demand

Water consumption reduction initiatives at the site are driven as part of the ISO 50001 Energy Management System. Diageo has an aggressive water reduction programme that has demonstrated significant success over recent years and has led to a significant reduction in specific water consumption. Reductions in water consumption also result in a reduction the process effluent, which is fundamental to the site's effluent reduction plan.

Further opportunities for reductions in water consumption are captured on the Register of Opportunities and are implemented on a systematic basis. Diageo is also continuing to engage with Irish Water and Dublin City Council in relation to reductions in the volume of process effluent discharged from the site.

4.6 Decommissioning Management Plan

Diageo submitted a copy of the decommissioning management plan to the EPA in March 2013, and this plan was approved. In February 2015, the plan was reviewed and updated in accordance with the EPA's *Guidance on assessing and costing environmental liabilities* (2014). The Plan is reviewed on an annual basis and updates to the plan or the associated closure costs are advised to the EPA accordingly.

4.7 Environmental Liability Risk Assessment

In March 2013, Diageo submitted a copy of the Environmental Liability Risk Assessment (ELRA) to the EPA. The EPA approved the technical elements of the ELRA, following which Diageo submitted its proposal for Financial Provisions in May 2013. The EPA requested additional information on Diageo's proposal in September 2013 and Diageo provided the clarifications in October 2013. Diageo and the EPA met in March 2014 to progress agreement on the Financial Provisions. During 2014, the ELRA was revised and updated to reflect the development of Brewhouse 4 and associated areas on the Lower Level of the site.

The most recent revision and update of the ELRA was completed in February 2015 and was carried out in accordance with the EPA's *Guidance on assessing and costing environmental liabilities* (March 2014).

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ANNEX 1: SUMMARY OF GROUNDWATER MONITORING RESULTS

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Parameter	Units	GTV	IGV	MW1			MW1A			MW2			MW3		
				Oct-17	May-18	Nov-18	Oct-17	May-18	Nov-18	Oct-17	May-18	Nov-18	Oct-17	May-18	Nov-18
Arsenic	µg/l	7.5	10	-	6.9	-	13	13.5	-	6	19.2	-	24	9.9	15.3
Cadmium	µg/l	3.75	5	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	µg/l	37.5	30	-	-	-	-	-	-	-	-	-	4	4.1	3.2
Copper	µg/l	1,500	30	-	-	-	8	-	-	-	16	-	18	-	-
Lead	µg/l	18.75	10	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	µg/l	15	-	4	5	4	5	4	4	3	4	5	-	-	-
Zinc	µg/l	-	100	5	3	-	11	5	5	-	-	-	3	-	-
Calcium	mg/l	-	200	154	192	290	262	199	284	134	328	162	85	125	170
Sodium	mg/l	150	150	51	62	78	141	132	136	96	92	99	908	1,378	1,484
Potassium	mg/l	-	5	18	18.9	20.1	9	8.0	9.8	23	24.0	16.3	63	61.4	69.1
Nitrate	mg/l	8.5	5.6	-	-	-	-	-	0.21	-	-	-	3.83	4.50	3.24
Nitrite	mg/l	0.11	0.03	0.01	0.013	0.058	-	-	-	-	-	-	0.01	0.025	0.017
Ammoniacal Nitrogen	mg/l	0.065-0.175	0.12	1.11	1.78	1.69	1.88	1.92	1.63	4.6	1.72	1.93	0.08	0.08	0.09

Parameter	Units	GTV	IGV	MW5A			MW6			MW6A			MW8		
				Oct-17	May-18	Nov-18	Oct-17	May-18	Nov-18	Oct-17	May-18	Nov-18	Oct-17	May-18	Nov-18
Arsenic	µg/l	7.5	10	-	-	-	-	-	-	-	-	-	26	18.9	12.5
Cadmium	µg/l	3.75	5	-	-	-	1	-	1.30	-	-	-	-	-	-
Chromium	µg/l	37.5	30	-	-	-	-	-	-	-	-	-	-	-	-
Copper	µg/l	1,500	30	-	-	-	-	8	-	-	-	-	-	12	19
Lead	µg/l	18.75	10	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	µg/l	15	-	4	-	-	19	7	14	-	-	-	5	12	7
Zinc	µg/l	-	100	-	-	3	15	6	13	-	-	-	5	32	41
Calcium	mg/l	-	200	130	63	74	373	107	384	150	154	135	4	9	5
Sodium	mg/l	150	150	344	153	147	809	446	1,027	1,483	1,791	1,387	871	757	691
Potassium	mg/l	-	5	19	11.3	11.2	35	21.4	32.9	43	47.1	36.1	7	11.3	8.3
Nitrate	mg/l	8.5	5.6	-	-	-	-	-	-	-	-	-	-	-	1.96
Nitrite	mg/l	0.11	0.03	-	-	-	-	-	-	-	-	-	-	-	0.814
Ammoniacal Nitrogen	mg/l	0.065-0.175	0.12	0.19	0.19	1.14	1.76	1.58	1.14	0.22	0.26	0.21	13.75	9.88	4.92

Parameter	Units	GTV	IGV	MW8A			MW13			MW14A			MW21		
				Oct-17	May-18	Nov-18	Oct-17	May-18	Nov-18	Oct-17	May-18	Nov-18	Oct-17	May-18	Nov-18*
Arsenic	µg/l	7.5	10	46	26.0	3.2	-	-	-	-	ns	ns	-	ns	ns; -
Cadmium	µg/l	3.75	5	-	-	-	1	-	1.2	-	ns	ns	-	ns	ns; -
Chromium	µg/l	37.5	30	-	1.6	-	2	-	1.6	3	ns	ns	-	ns	ns; -
Copper	µg/l	1,500	30	15	-	12	-	-	-	18	ns	ns	-	ns	ns; -
Lead	µg/l	18.75	10	18	-	-	-	-	-	-	ns	ns	-	ns	ns; -
Nickel	µg/l	15	-	7	17	10	38	32	27	-	ns	ns	-	ns	ns; -
Zinc	µg/l	-	100	21	32	3	3,630	4,025	3,827	9	ns	ns	-	ns	ns; -
Calcium	mg/l	-	200	3	10	5	369	377	267	169	ns	ns	387	ns	175; 195
Sodium	mg/l	150	150	886	1,121	771	10	641	675	72	ns	ns	3,249	ns	1,842; 2,525
Potassium	mg/l	-	5	8	16.5	11.4	45	39.6	38.2	20	ns	ns	103	ns	69.0; 74.1
Nitrate	mg/l	8.5	5.6	2.91	-	-	-	0.20	0.43	49.07	ns	ns	-	ns	-; -
Nitrite	mg/l	0.11	0.03	4.77	0.013	-	0.03	0.013	0.039	0.04	ns	ns	-	ns	-; -
Ammoniacal Nitrogen	mg/l	0.065-0.175	0.12	1.54	13.12	7.54	1.83	1.96	1.20	0.03	ns	ns	1.91	ns	1.05; 1.19

*: two samples were taken from MW21 in November 2018: the first figure corresponds to the sample taken at low tide, the second figure corresponds to the sample taken at high tide.

ns: not sampled

-: indicates result is below the method detection limit

ANNEX 2: SUMMARY OF WASTE CONSIGNMENTS IN 2018

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List of Waste (LoW)					Next Destination		Final Destination	
LoW Code	LoW Description	Respondent's Description	Classification	Quantity (tonnes/year)	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation
06 01 06*	other acids	Acids	Hazardous	0.05	Enva Ireland Limited (Shannon) - W0041 Smithstown Industrial Estate Shannon Co. Clare	R13	Lindenschmidt KG Krombacher Strasse 42-46 Kreutzal D-57223 Germany EFB No. 04 714 98089	R01
06 02 04*	sodium and potassium hydroxide	Potassium hydroxide	Hazardous	1.309	Enva Ireland Limited (Shannon) - W0041 Smithstown Industrial Estate Shannon Co. Clare	R13	Lindenschmidt KG Krombacher Strasse 42-46 Kreutzal D-57223 Germany EFB No. 04 714 98089	R01
08 01 11*	waste paint and varnish containing organic solvents or other hazardous substances	Waste paint and related material	Hazardous	0.372	Enva Ireland Limited (Shannon) - W0041 Smithstown Industrial Estate Shannon Co. Clare	R13	Lindenschmidt KG Krombacher Strasse 42-46 Kreutzal D-57223 Germany EFB No. 04 714 98089	R01

List of Waste (LoW)					Next Destination		Final Destination	
LoW Code	LoW Description	Respondent's Description	Classification	Quantity (tonnes/year)	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation
11 01 13*	degreasing wastes containing hazardous substances	Kerosene	Hazardous	0.638	Safety Kleen Ireland Ltd W0099 Unit 5, Airton Road Tallaght Dublin 24 Ireland	R13	Tradebe Solvent Recycling EPR/TP3334SF Weeland Road Knottingley West Yorkshire UnitedKingdom WF118DZ	R13
11 01 14	degreasing wastes other than those mentioned in 11 01 13	Aqueous degreasing waste	-	0.1	Safety Kleen Ireland Ltd W0099 Unit 5, Airton Road Tallaght Dublin 24 Ireland	R13	-	-
12 01 09*	machining emulsions and solutions free of halogens	Gycol/water	Hazardous	4.144	Enva Ireland Limited (Shannon) - W0041 Smithstown Industrial Estate Shannon Co. Clare	R13	Lindenschmidt KG Krombacher Strasse 42-46 Kreutzal D-57223 Germany EFB No. 04 714 98089	R01
13 02 08*	other engine, gear and lubricating oils	Waste oil	Hazardous	3.835	Enva Ireland Limited (Portlaoise) - W0184 Clonminam Industrial Estate Portlaoise Laois Ireland	R09	-	-

List of Waste (LoW)					Next Destination		Final Destination	
LoW Code	LoW Description	Respondent's Description	Classification	Quantity (tonnes/year)	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation
13 02 08*	other engine, gear and lubricating oils	Oily sludge	Hazardous	2.205	Enva Ireland Limited (Shannon) - W0041 Smithstown Industrial Estate Shannon Co. Clare	R13	Lindenschmidt KG Krombacher Strasse 42-46 Kreutzal D-57223 Germany EFB No. 04 714 98089	R01
13 05 03*	interceptor sludges	Oily water	Hazardous	1.82	Enva Ireland Limited (Portlaoise) - W0184 Clonminam Industrial Estate Portlaoise Laois Ireland	R09	-	
13 05 07*	oily water from oil/water separators	Interceptor waste	Hazardous	21.9	Enva Ireland Limited (Portlaoise) - W0184 Clonminam Industrial Estate Portlaoise Laois Ireland	R09	-	
13 08 02*	other emulsions	Oily waste	Hazardous	0.7	Enva Ireland Limited (Portlaoise) - W0184 Clonminam Industrial Estate Portlaoise Laois Ireland	R09	-	

List of Waste (LoW)					Next Destination		Final Destination	
LoW Code	LoW Description	Respondent's Description	Classification	Quantity (tonnes/year)	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation
15 01 10*	packaging containing residues of or contaminated by hazardous substances	Sharps	Hazardous	0.041	SRCL Limited (Kylemore Road) trading as Eco-Safe Systems Ltd Allied Industrial Estate Kylemore Road Dublin 10 W0054	R12	ATM (Afvalstoffen Terminal Moerdijk) 1538449 12 BV Vasweg Moerdijk Netherlands NL4782PW	R01
15 01 10*	packaging containing residues of or contaminated by hazardous substances	Packaging containing residues (oil containers)	Hazardous	3.129	Enva Ireland Limited (Shannon) - W0041 Smithstown Industrial Estate Shannon Co. Clare	R13	Lindenschmidt KG Krombacher Strasse 42-46 Kreutzal D-57223 Germany EFB No. 04 714 98089	R01
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances	Oily waste	Hazardous	4.991	Enva Ireland Limited (Shannon) - W0041 Smithstown Industrial Estate Shannon Co. Clare	R13	Lindenschmidt KG Krombacher Strasse 42-46 Kreutzal D-57223 Germany EFB No. 04 714 98089	R01

List of Waste (LoW)					Next Destination		Final Destination	
LoW Code	LoW Description	Respondent's Description	Classification	Quantity (tonnes/year)	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation
16 01 07*	oil filters	Filter bin	Hazardous	0.944	Enva Ireland Limited (Portlaoise) - W0184 Clonminam Industrial Estate Portlaoise Laois Ireland	R13	RD Recycling Ovam Approved 3017 Centrum Zuid Industriepark Houthalen-Helchteren Belgium 3530	R01
16 05 04*	gases in pressure containers (including halons) containing hazardous substances	Aerosols	Hazardous	0.25	Enva Ireland Limited (Portlaoise) - W0184 Clonminam Industrial Estate Portlaoise Laois Ireland	R13	SBH 121296753 5 Austrasse Krautheim Germany D74238	R04
16 05 06*	laboratory chemicals, consisting of or containing hazardous substances, including mixtures of laboratory chemicals	Chemical waste (gypsum powder bags)	Hazardous	0.295	Enva Ireland Limited (Shannon) - W0041 Smithstown Industrial Estate Shannon Co. Clare	R13	Lindenschmidt KG Krombacher Strasse 42-46 Kreutal D-57223 Germany EFB No. 04 714 98089	R01

List of Waste (LoW)					Next Destination		Final Destination	
LoW Code	LoW Description	Respondent's Description	Classification	Quantity (tonnes/year)	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation
16 05 07*	discarded inorganic chemicals consisting of or containing hazardous substances	Sodium sulphate	Hazardous	0.006	Enva Ireland Limited (Shannon) - W0041 Smithstown Industrial Estate Shannon Co. Clare	R13	Lindenschmidt KG Krombacher Strasse 42-46 Kreutzal D-57223 Germany EFB No. 04 714 98089	R01
16 05 08*	discarded organic chemicals consisting of or containing hazardous substances	Organic chemicals	Hazardous	2.085	Enva Ireland Limited (Shannon) - W0041 Smithstown Industrial Estate Shannon Co. Clare	R13	Lindenschmidt KG Krombacher Strasse 42-46 Kreutzal D-57223 Germany EFB No. 04 714 98089	R01
16 06 01*	lead batteries	Batteries	Hazardous	0.42	Enva Ireland Limited (Portlaoise) - W0184 Clonminam Industrial Estate Portlaoise Laois Ireland	R13	Campine Ovam Approved 2 Nijverheidsstraat Beerse Belgium 2340	R04
16 07 08*	wastes containing oil	Hoses	Hazardous	0.136	Enva Ireland Limited (Portlaoise) - W0184 Clonminam Industrial Estate Portlaoise Laois Ireland	R13	-	-

List of Waste (LoW)					Next Destination		Final Destination	
LoW Code	LoW Description	Respondent's Description	Classification	Quantity (tonnes/year)	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation
17 05 03*	soil and stones containing hazardous substances	Soil and stones containing hazardous substances	Hazardous	57.62	Rilta Environmental Limited - W0192 Block 402, Grant Drive Greenogue Business Park Rathcoole Dublin	R13	Biffa Waste Management P0090/05A 140 Mallusk Road Newtownabbey Co. Antrim BT364QN	R13
17 06 01*	insulation materials containing asbestos	Asbestos containing material	Hazardous	10.1	Rilta Environmental Limited - W0192 Block 402, Grant Drive Greenogue Business Park Rathcoole Dublin	D15	Biffa Waste Management P0090/05A 140 Mallusk Road Newtownabbey Co. Antrim BT364QN	D5
17 06 05*	construction materials containing asbestos	Asbestos containing material	Hazardous	1	Rilta Environmental Limited - W0192 Block 402, Grant Drive Greenogue Business Park Rathcoole Dublin	D15	-	
20 01 21*	Household waste fluorescent lamps and other mercury containing waste	Fluorescent tubes	Hazardous	0.23	Irish Lamp Recycling Co. Ltd Woodstock Industrial Estate Kilkenny Road Athy Co. Kildare	R04	-	-

List of Waste (LoW)					Next Destination		Final Destination	
LoW Code	LoW Description	Respondent's Description	Classification	Quantity (tonnes/year)	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation
19 12 02	ferrous metal	Metal	-	181.054	Thorntons Recycling Centre (Ballyfermot) - W0044 Thorntons Recycling Centre Killeen Road Ballyfermot Dublin 10	R04	-	-
17 02 01	Wood	Wood	-	37.88	Thorntons Recycling Centre (Ballyfermot) - W0044 Thorntons Recycling Centre Killeen Road Ballyfermot Dublin 10	R03	-	-
20 03 01 C	Municipal mixed dry recyclables	Mixed dry recyclables	-	51.362	Padraig Thornton Waste Disposal Ltd WFP-DC-10-0021-02 Unit 51 Henry Road Park West Business Park Dublin 12	R03	-	-

List of Waste (LoW)					Next Destination		Final Destination	
LoW Code	LoW Description	Respondent's Description	Classification	Quantity (tonnes/year)	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation
20 01 08 B	Non-household biodegradable kitchen & canteen waste	Organic compost	-	555.378	Thorntons Recycling Centre (Ballyfermot) - W0044 Thorntons Recycling Centre Killeen Road Ballyfermot Dublin 10	R03	-	-
20 03 01 B	Municipal mixed residual non-household	General waste	-	282.936	Thorntons Recycling Centre (Ballyfermot) - W0044 Thorntons Recycling Centre Killeen Road Ballyfermot Dublin 10	R12	-	-
20 01 01	paper and cardboard	Paper/cardboard	-	74.938	Padraig Thornton Waste Disposal Ltd WFP-DC-11-0023 Unit 6 S3B Henry Road Park West Business Park Dublin 12	R03	-	-

List of Waste (LoW)					Next Destination		Final Destination	
LoW Code	LoW Description	Respondent's Description	Classification	Quantity (tonnes/year)	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation
17 09 04	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	Soil / stone	-	1,079.39	Thorntons Recycling Centre (Ballyfermot) - W0044 Thorntons Recycling Centre Killeen Road Ballyfermot Dublin 10	R05	-	-
17 09 04	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	C&D waste	-	1,078.29	Thorntons Recycling Centre (Ballyfermot) - W0044 Thorntons Recycling Centre Killeen Road Ballyfermot Dublin 10	R05	-	-
20 03 01 C	Municipal mixed dry recyclables	Plastic	-	0.34	Thorntons Recycling Centre (Ballyfermot) - W0044 Thorntons Recycling Centre Killeen Road Ballyfermot Dublin 10	R12	-	-

List of Waste (LoW)					Next Destination		Final Destination	
LoW Code	LoW Description	Respondent's Description	Classification	Quantity (tonnes/year)	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation
15 01 10*	packaging containing residues of or contaminated by hazardous substances	Toner bottles	Hazardous	0.344	-	-	Mook Environmental Solutions Limited 6A Mid Road Blairlinn Industrial Estate Cumbernauld G67 2TT United Kingdom WML/W/20135	R12

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