

Attachment E.1 – Emissions to Atmosphere

There are no planned emissions to atmosphere from the operation of the MRF. Fugitive emissions such as dust and odour are unlikely due to the nature of the materials that will be processed on site (dry recyclables).

Tables E.1(i), E.1(ii), E.1(iii) and E.1(iv) are therefore not applicable to this facility.

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Attachment E.2 – Emissions to Surface Waters

Clean run-off from roofs and clean yard areas will be discharged to a local stream via SW1. The yard run-off will pass through a full retention Class 1 interceptor as discussed in Section D.1(k) of this application.

Tables E.2(i) and E.2(ii) are not fully relevant as it is not intended to discharge trade effluent or any other contaminated water to surface water. Table E.2(i) has been partially completed, but flow rate and assimilative capacity are not relevant where it is intended to discharge clean water. An emission limit value of 5mg/l for mineral oil has been specified in the Waste Facility Permit issued by Cork County Council and that is noted in Table E.2(ii).

The surface water drainage system serves approximately 8,000m² of the site including roofs and yard areas. Average annual rainfall at Cork Airport, which is close to the Forge Hill site, was 1,228mm for the period 2012 to 2015. Using this data, the average daily run-off to the local stream via SW1 is estimated at **26.9m³**.

The data below, from the Met Office shows the Return Period Rainfall Depths at Cork Airport. The maximum daily rainfall in a 20 year return period is 78.3mm. This would generate **626m³** of water to be discharged from site. In the event of downstream flooding, this could be held back by switching off the pumps, which would result in some on site storage of water during this period.

Return Period Rainfall Depths for sliding Durations
Location: CorkCity, Easting: 168356, Northing: 74985,
Average Annual Rainfall(1961-1990) for CorkCity: 1105mm

Average Recurrence Interval	Return Period Years															
	6months	1year	2	3	4	5	10	20	30	50	75	100	150	200	250	500
5 mins	3.3	4.3	4.8	5.6	6.1	6.5	7.6	8.9	9.7	10.9	11.8	12.6	13.7	14.5	15.2	N/A
10 mins	4.6	6.0	6.7	7.8	8.5	9.0	10.6	12.4	13.6	15.1	16.5	17.5	19.1	20.3	21.2	N/A
15 mins	5.4	7.1	7.9	9.2	10.0	10.6	12.5	14.6	16.0	17.8	19.4	20.6	22.5	23.8	25.0	N/A
30 mins	7.2	9.3	10.4	12.0	13.0	13.8	16.2	18.9	20.5	22.8	24.8	26.3	28.6	30.3	31.7	N/A
1 hours	9.6	12.3	13.7	15.7	17.0	17.9	21.0	24.3	26.4	29.2	31.7	33.5	36.3	38.4	40.2	N/A
2 hours	12.8	16.3	18.0	20.5	22.2	23.4	27.2	31.4	34.0	37.5	40.5	42.8	46.2	48.8	50.9	N/A
3 hours	15.1	19.1	21.1	24.0	25.9	27.3	31.7	36.4	39.4	43.4	46.8	49.4	53.2	56.2	58.5	N/A
4 hours	17.0	21.5	23.7	26.9	28.9	30.5	35.3	40.5	43.7	48.1	51.8	54.6	58.9	62.0	64.6	N/A
6 hours	20.1	25.2	27.8	31.5	33.8	35.6	41.1	47.0	50.7	55.6	59.8	63.0	67.8	71.4	74.3	N/A
9 hours	23.7	29.7	32.7	36.6	39.5	41.6	47.9	54.5	58.7	64.3	69.1	72.7	78.1	82.1	85.4	N/A
12 hours	26.7	33.3	36.6	40.2	44.2	46.4	53.3	60.6	65.2	71.3	76.6	80.5	86.3	90.7	94.3	N/A
18 hours	31.6	39.2	43.0	48.3	51.7	54.2	62.1	70.4	75.6	82.6	88.5	92.9	99.5	104.4	108.4	N/A
24 hours	35.6	44.0	48.2	54.0	57.7	60.6	69.2	78.3	84.0	91.6	98.0	102.8	110.0	115.4	119.7	134.3
2 days	44.9	54.8	59.6	66.3	70.6	73.8	83.6	93.8	100.1	108.6	115.7	121.0	128.9	134.7	139.5	155.3
3 days	52.6	63.7	69.0	76.4	81.2	84.7	95.5	106.6	113.5	122.7	130.4	136.1	144.6	150.9	156.0	172.9
4 days	59.5	71.5	77.4	85.4	90.6	94.4	106.0	118.0	125.4	135.2	143.4	149.5	158.5	165.3	170.7	188.5
6 days	71.7	85.6	92.2	101.4	107.2	111.5	124.6	138.1	146.3	157.2	166.4	173.1	183.1	190.5	196.5	216.1
8 days	82.8	98.2	105.5	115.7	122.1	126.8	141.2	155.9	164.9	176.8	186.7	194.1	204.9	212.9	219.3	240.5
10 days	93.0	109.9	117.9	128.9	135.8	141.0	156.5	172.4	182.0	194.8	205.4	213.3	224.9	233.4	240.3	262.8
12 days	102.7	120.9	129.5	141.3	148.8	154.3	170.9	187.8	198.1	211.7	223.0	231.3	243.6	252.6	259.9	283.7
16 days	121.0	141.5	151.2	164.6	172.9	179.1	197.6	216.5	227.9	242.9	255.4	264.6	278.2	288.1	296.1	322.3
20 days	138.2	160.9	171.6	186.3	195.4	202.2	222.5	243.1	255.6	271.9	285.5	295.5	310.1	320.9	329.6	357.8
25 days	158.6	183.8	195.7	211.9	222.0	229.5	251.8	274.4	288.0	305.9	320.7	331.6	347.6	359.3	368.7	399.3

NOTES:

N/A Data not available

These values are derived from a Depth Duration Frequency (DDF) Model

For frequencies less than two years Average Recurrence Intervals (ARI) are used

For details refer to:

'Fitzgerald, D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin', Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

The Met Office data shows the maximum hourly rainfall in a 20 year return period is 24.3mm. This would generate **194m³** of water to be discharged from site. It is expected that this water would be pumped over several hours, with temporary storage in the balancing tank, to alleviate downstream flooding in such an intensive rainfall event.

In compliance with the existing waste facility permit¹ for the site, SW1 will be monitored for the following parameters to ensure that the surface water run-off is not contaminated:

¹ WFP-CK-15-0148-01 issued by Cork County Council

C.4 Surface Water Emissions

Table C.4.1 Surface Water Monitoring Frequency and Techniques

Parameter	Monitoring Frequency	Analysis Method/Technique
pH	Quarterly	Electrometry
Biological Oxygen Demand	Quarterly	Standard Methods ^{Note 1}
Suspended Solids	Quarterly	Standard Methods ^{Note 1}
Heavy metals	Bi-annually	Standard Methods ^{Note 1}
Total Petroleum Hydrocarbons	Quarterly	Standard Methods ^{Note 1}
Ammonical Nitrogen	Quarterly	Standard Methods ^{Note 1}
Mineral Oils	Quarterly	Standard Methods ^{Note 1}
Fats, Oils, Grease	Quarterly	Standard Methods ^{Note 1}
Odour / Visual Inspection	Daily	Sample and examine for odour and colour

Note 1: "Standards Methods for the Examination of Water and Wastewater", (prepared and published jointly by A.P.H.A., A.W.W.A & W.E.F) 20th Ed., American Public Health Association, 1015 Fifteenth Street, Washington DC 20005, USA.

The permit sets the following limit for mineral oils:

B.3 Surface Water Discharge Limits (Measured at the monitoring point SW-1 indicated on drawing no 4348-WP04 Rev 3)

Parameter	Emission Limit Value
Mineral oils	5mg/l

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Attachment E.3 – Emissions to Sewer

The expected dry water flow for wastewater from the office building was estimated at 30l/d per person, which is 1,800l/d, or 1.8m³/d. Additionally, all of the site water around the entrance to the recycling plant and around the wash area, wheelwash and exit weighbridge is directed to the foul water lines. This water is directed to a petrol/oil interceptor prior to discharge to the municipal sewer.

An estimation of the north and northeast area of the site for which surface water runoff is directed to sewer has been made at 1,650m².

The proposed maximum volume of surface water run-off in one day is based on a 1 in 5 year rainfall event of 60.6mm/d. This would result in **100m³** of effluent being generated from the north and north-eastern areas. This is the proposed limit for the site.

The proposed maximum volume of surface water run-off in one hour is also based on a 1 in 5 year event, which is 17.9mm/hr. This would result in c. **30m³** of effluent being generated.

The Waste Licence allows for a maximum daily discharge volume of 60m³, however this was exceeded a number of times in 2010 and 2009.

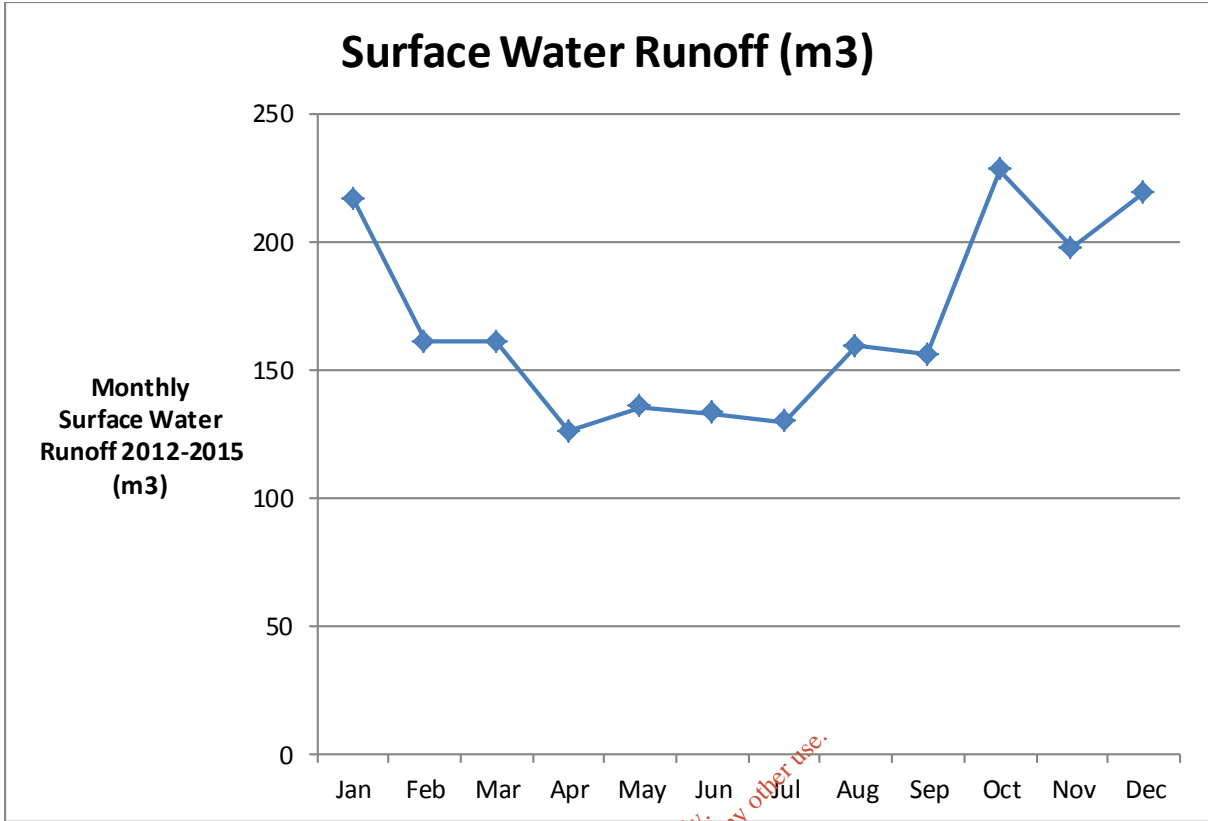
Mean monthly rainfall from 2012-2015 has been used to estimate the surface water runoff from these areas. The monthly volume of surface water runoff varies from 126.23m³ in April to 228.03m³ in October. The tabulated and graphed data is presented below.

The average daily runoff for the 2012-2105 period is 5.6m³/d. The daily dry water flow for wastewater is 1.8m³/d.

Therefore, the combined discharge to sewer of average daily surface water runoff and wastewater from the office buildings is **7.4m³/d**. This is well below the proposed limit of 100m³/d.

Rainfall for Cork Airport

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
mean (2012-2015) mm	131.4	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120	133.1
mean (2012-2015) m	0.1314	0.0978	0.0976	0.0765	0.0823	0.0809	0.0788	0.0968	0.0946	0.1382	0.12	0.1331
Surface Water Runoff m ³	216.81	161.37	161.04	126.22	135.79	133.48	130.02	159.72	156.09	228.03	198	219.61



Monthly
Surface Water
Runoff 2012-2015
(m3)

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Schedule A of the discharge licence from Irish Water contains details of required emission limit values, monitoring parameters, frequency and methods, as follows:

LICENCE NO.: IW-DTS-728357-01 CONDITIONS

Schedule A

The Licensee shall discharge trade effluent in compliance with the emission limit values (ELVs) and sample at the prescribed monitoring frequency below.

Parameter	ELV*	ELV*	Monitoring Frequency**	Method
Flow	100 m3 /day		Continuous	On-line continuous flow monitor & recorder
Flow	30 m3 /hour		Continuous	" "
pH	6.0– 9.0		Continuous	On-line pH probe & recorder
Temperature	25 Celsius		Continuous	On-line Temp probe & recorder
BOD	2000 mg/l	200 kg/day	Monthly	Standard Method
COD	4000 mg/l	400 kg/day	Weekly	Standard Method
Suspended Solids	500 mg/l	50 kg/day	Weekly	Standard Method
VOCs	1 mg/l		Quarterly	Standard Method
Total Nitrogen	100 mg/l		Bi-annually	Standard Method
Sulphates (as SO4)	750 mg/l		Quarterly	Standard Method
Detergents(as MBAS)	10 mg/l		Quarterly	Standard Method
FOG	100 mg/l		Monthly	Standard Method
Total Heavy Metals	1 mg/l		Annually	Standard Method
Mineral Oils	5 mg/l		Bi-annually	Standard Method
Total Hydrocarbons	5 mg/l		Bi-annually	Standard Method
Toxicity***	10 Toxicity Units		As requested	Standard Method

*

Note: All samples with the exception of Flow, pH and Temperature shall be taken on a 24 hour flow proportionate composite sampling basis. In this regard, a composite sample for testing purposes shall be defined as any sample extracted from the sampling apparatus between 8.00 am and 12.00 noon on any day for which normal operational activities have been ongoing for the previous 24 hours.

**

Note: Sampling shall take place on alternate week days on a rolling basis to ensure representative samples are obtained for site operations which may vary across the working week.

Note: Toxicity Units (TU) are defined as: $TU = (100/x \text{ Hour EC50})$ where x is the relevant period of exposure and EC50 is expressed as % vol/vol

Monitoring will take place at FW1, which is at the last manhole on the Trade Effluent line, before the Trade Effluent mixes with sewage from the site office. The waste permit for the site makes reference to the requirements of the Discharge to Sewer Licence as follows:

B.4 Emission Limits for Foul Water Emissions to Sewer

Emission Point Reference No.	FW1
Volume to be emitted:	In accordance with Irish Water requirements
Emission Limit Values:	In accordance with Irish Water requirements

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Attachment E.4 – Emissions to Groundwater

There are no planned emissions to groundwater. Fugitive emissions to groundwater are highly unlikely due to the following factors:

- The waste types handled at the site will be restricted to dry recyclables and these materials, when kept dry, have little potential to contaminate groundwater.
- Any potentially polluting materials found within the dry recyclables will be quarantined on a banded pallet and removed off site for recovery or disposal at an appropriately licensed or permitted facility.
- All waste materials will be contained within buildings with concrete floors and will not be exposed to rainwater.
- All yard areas are finished with concrete surfaces with rapid drainage to the surface water or foul drainage system, as appropriate for the nature of the run-off.

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Attachment E.5 – Noise Emissions

The Plant and equipment used to process the dry recyclables will emit noise, as will the vehicles accessing the facility. AWN Consulting has carried out a noise assessment based on proposed operations of the site as a MRF. This report was prepared in April 2015 to be submitted with the waste permit application for the facility and is also relevant to this application. The assessment is included as Attachment I.6.1.

In the noise assessment, AWN took a worst case view and modelled a scenario whereby 13 vehicles arrive in an hour when all equipment is operating. Traffic movements will be certainly less frequent. The likely noise sources contained in Appendix C at the back of the AWN report are similar and more or less equivalent to the plant described in Attachment D.1(d) of this application.

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Attachment E.6 – Environmental Nuisances

Bird Control:

The facility will only handle dry recyclables. This is comprised mainly of paper, plastic and metals, with a potential also for other recyclables such as glass, wood and textiles. None of these materials will attract birds and experience at other MRFs processing dry recyclables has confirmed that birds are not attracted to such sites.

All waste materials will be delivered, processed and stored inside fully contained buildings and this will exclude birds. No additional bird control measures are considered necessary.

Dust Control:

The facility will only handle dry recyclables. This is comprised mainly of paper, plastic and metals, with a potential also for other recyclables such as glass, wood and textiles.

Wood chipping creates dust, but there are no plans to chip wood at the site.

C&D waste processing is a significant generator of dust and this was historically carried out on site under the previous waste licence. However, there are no plans currently to process C&D waste at this site.

Shredding of waste also generates dust and this activity is not planned at the site.

Minor levels of dust are likely to be generated by the processing of the dry recyclables. This will be controlled by the following measures:

- All waste materials will be delivered, processed and stored inside fully contained buildings.
- The floors of the buildings will be swept, as necessary to keep dust under control.
- A roadsweeper will be used to sweep the yard areas, as necessary to minimise dust levels.

Fire Control:

There will be a significant amount of combustible material handled at the facility and that clearly poses a fire risk. There have been several large fires at waste processing facilities in Ireland in recent years and many fires at UK waste processing sites and elsewhere in Europe. Lessons have been learnt from these fires and Guidance is now provided in a number of Reports including the following:

- *'Fire Safety at Non Hazardous Waste Transfer Stations'* EPA Guidance Note, December 2013.
- *'Fire Prevention Plans'* UK Environment Agency, Version 2, March 2015.
- *'Treatment and Storage of Waste and Combustible Secondary Raw Materials'* (CFPA-E No. 32: 2014 F), Confederation of Fire Protection Associations in Europe, May 2014.
- *'Reducing Fire Risk at Waste Management Sites - Issue 1 October 2014'* Waste Industry Safety and Health Forum (UK).

Fire control at the site will be implemented in a manner consistent with these guidance documents. Attachment D.1(o) contains details of fire-water retention, which includes details of storage quantities and compartmentalisation. That attachment should be read in conjunction with the fire control procedures provided in this section of the application (below).

Relevant site personnel will be trained for Fire Control and will be familiar with the site's Emergency Response Procedures. All staff will be familiarised with evacuation procedures in the event of a fire at the facility.

Fire Safety Management

Fire safety management at the facility will comprise the following elements:

- Fire prevention
- Fire containment
- Fire detection and response
- Fire suppression

Fire Prevention

Fire Prevention will be achieved by:

- Safe storage of combustible and flammable materials (see below for more details).
- Limiting quantities of combustible and flammable materials (see Attachment D.1(o) for more details).
- Prevention of mobile sources of ignition in areas with combustible and flammable materials
- Suitable equipment
- Hot work permits will be introduced for proposed welding operations
- Good housekeeping
- Regular maintenance and competent repair of equipment
- Efficient emergency response and communications plan
- Regular safety audits

Storage of Combustible and Flammable Materials

The following principals are applied to the storage of combustible materials and flammable liquids.

- Good housekeeping and prompt consignment of dry recyclables off the site to prevent the build-up of combustible materials
- Regular inspection of plant and equipment for leaks and other miscellaneous problems to prevent spillage of flammable liquids
- Removal of any gas containers or unidentified liquids/chemicals from the off-loading areas to the quarantine area immediately such items are noticed
- Provision of adequate bunds in the waste quarantine area.

Control of Sources of Ignition

The controls measures applied to minimise ignition sources include:

- No smoking policy within the site unless in designated safe smoking area
- Hot work permit system
- Only authorised personnel will be permitted within the waste handling areas
- Secure site access and 24 hour site security to prevent unauthorised entry

Fire Detection

The fire detection system/alarm at the facility will consist of the following:

- Site staff or security officer will alert the Facility Manager in the event of a fire,
- Any shut off valves on the foul and surface drains will be closed immediately and all pumps turned off.
- The Facility Manager and Environmental Manager are the designated Site Incident Controllers, with responsibility for assessing the scale of an incident, informing fire service, directing localised rescue and fire abatement services. If an incident occurs outside normal operating hours, the security staff will contact the relevant authorities
- The local fire brigade will be contacted by the Facility Manager or security officer if necessary

Fire Suppression

The fire suppression capability is a combination of on-site fire-fighting equipment combined with emergency response plans and off-site fire service.

On Site Fire Suppression Facilities

The on-site fire abatement equipment includes:

- Fire Extinguishers
- Hose reels
- Fire Hydrants
- The operator also intends to install a sprinkler system, similar to the one currently operated at the KWD facility in Killarney (see below for details).
- The fire water compartment of the underground balancing tank can also be used as a source of fire-fighting water.

Off Site Fire Suppression Facilities

Cork County Council Fire Service can also bring water to site. The volume of water varies depending on number of tenders or tankers.

Sprinkler Installation Report KWD Recycling Killarney Co. Kerry

Date: 04.11.13

Title: **Review and comment on Sprinkler system installation**

Report to: Brian Bruton

System Type / Layout

From the site survey, it was noted that the roof of the main plant is served by 6 pipework systems, each system is supplied from a bank of two pumps in the plant room.

The pumps are rated at 700 L/min at 6 bar (approximate figures) and there are two pumps installed. The pump suction is supplied from the town mains which has a standing pressure of 6 bar.

From the pumps, there is a 65mm pipe to a 65mm header with 6 no. ¼ turn isolation valves, one for each system. These are labelled and a drawing identifies which system will operate from each valve.

From the valve manifold, there is a 65mm pipe to each fire protection system. Each system has a bank of 5 no. 50mm ranges, each with 6 no. open sprayers and 6 no. closed sprayers on each. The ranges are spaced at 4m apart and the sprayers are spaced at 3m apart, every second sprayer is open or closed alternatively.

There is a hose reel system installed also, the supply point for these is the incoming town main pipe, at 6 bar.

Operation

From the layout and photos it was concluded that the following sequence of operation occurs:

1. Fire is identified in the plant
2. An operator goes to the plant room and identifies the zone where the fire is located.
3. The corresponding valve is opened and the drop in pressure starts the electric pump
4. Water flows from the open heads in the area where the fire is located.
5. If the fire is too large for the system, the sprinklers that are closed will operate and assist the ones that are operating.

Photographs



Pumps



Pump Room





Pipe Work and Sprinkler Heads

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Project Data and Design Parameters

Project name : KWD

Area reference : Waste

Address / location : Killarney

Project number : ---

Installation number(s) : 01

Drawing number(s) : ---

Issue no / date : ---

Designers reference : CW

Hazard classification : Eh1

Specified density of discharge : 10.20 mm/min (l/min/m²)

Assumed maximum area of operation : 420.00 m²

Number of operating sprinkler heads : 35

Maximum area covered per head : 12.00 m²

Highest head / nozzle above source : 12.89 m

Number of pipes in system : 89 from 50 to 65 mm

Pressure loss equation used : Hazen-Williams

Fluid : Water

Pipe Data Table : STD_PIPE.PDT

Maximum fluid velocity : 20.80 m/s in pipe 100 105

Volume of pipework and fittings : 0.69 m³

Elbows are welded for : 65 mm and above

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Litter Control:

The facility will process light materials such as paper and plastics that are a potential source of litter. Litter will be controlled in the following manner:

- All vehicles transporting waste materials to and from the site will be fully contained.
- All vehicles delivering waste will be unloaded inside the waste processing building.
- Segregated paper and plastics will be baled before loaded into vehicles exiting the site.
- Site staff will patrol the site and surrounds daily for signs of litter escaping from the buildings and will collect any such litter should it arise.
- Good housekeeping in the waste processing building will reduce the potential for litter.

Traffic Control:

There is a one way anti-clockwise system designed for truck movements around the site. Trucks will enter the site through the southernmost gate on Forge Hill road and stop on the incoming weighbridge, located close to the site office, prior to entering into the waste delivery or collection areas. The trucks will then proceed to delivery or collection areas and will pass through the wheelwash and the outgoing weighbridge prior to exiting the site at the northernmost gate on Forge Hill road.

Drawing WL06 shows the truck management route at the existing site and Drawing WL07 shows the truck management route after the buildings are extended.

Cars will enter the site at the southernmost gate and exit at the northernmost gate. At the existing site there are 36 (No.) parking spaces in the tarmac area at the front of the site. The building extension will encroach upon these spaces, so additional spaces for staff parking will be provided close to the office building at the southern boundary of the site. These cars will use the one-way anti-clockwise system to exit at the northernmost gate. The wheelwash is shallow enough for cars to drive through slowly.

Vermin Control:

The facility will only handle dry recyclables. This is comprised mainly of paper, plastic and metals, with a potential also for other recyclables such as glass, wood and textiles. None of these materials will attract vermin. However, there is a risk that small quantities of food will be found as contaminants in the dry recyclables, so the operator will employ a vermin control company at the facility from the start of operations. The need for vermin control will be reviewed a year or two after the commencement of operations.

Road Cleansing:

The yards and roads at the site will be swept with a road-sweeper, as necessary. As the materials to be processed are limited to dry recyclables and all materials will be processed and stored indoors, road-sweeping on a daily basis will not be necessary. This frequency of road-sweeping will be reviewed on an ongoing basis and may be influenced by the level of suspended solids measured in the surface water and foul water discharges.