

6th February 2017

Administration
 Environmental Licensing Programme
 Office of Environmental Sustainability
 Environmental Protection Agency
 Headquarters PO Box 3000
 Johnstown Castle Estate
 County Wexford

RECEIVED	
Time	
- 8 FEB 2017	
Signature	<i>MH</i>
Environmental Protection Agency HQ. P.O. Box 3000, Johnstown Castle Estate, Co. Wexford.	

Our Ref: 501.00271.00004
 Your Ref: W0291-01

Dear Ms. Murphy,

RE: WASTE LICENCE APPLICATION – W0291-01 FORGE HILL RECYCLING LTD

Further to the Notice issued on 13th December 2016 in accordance with Article 14(2)(b)(ii) of the Waste Management (Licensing) Regulations, we submit the following information in relation to the above-referenced waste licence application.

1. Applicant's Details

The address registered with the CRO is:

Forge Hill Waste Transfer Station,
 Forge Hill,
 Cork

This is consistent with the address given in Section B.1 under 'Applicant's Details' and under 'Address of registered or principal office of Body Corporate' further on in that section. This is the address that should be used in the waste licence.

The address in B.2 'Location of Activity' also contains the townland and the Postal Address. This additional information is provided in compliance with the guidance, but is not necessary to identify the address of the facility.

2. Wheel Cleaner.

The site will not handle any waste types that create mud or dirt (such as C&D wastes), so the yard areas are clean and the need for a wheelwash is debatable. However, the existing small wheelwash, located on the exit route at the northern boundary of the site, was not decommissioned when the extension was constructed, so it remains active (See Photo 1 below).

The wheelwash will be well maintained and used by vehicles that deliver wastes to the facility (via the back of the site). The bulk haulage vehicles collecting baled recyclables from

the front of the facility will only visit clean storage areas and will have no need for wheel cleaning.



Photo 1 – Wheelwash

3. Sprinkler Heads

Appendix 1 contains details of the Fire Detection and Suppression System that is being installed in Building 3. A similar system will be installed in Buildings 1 and 2.

This system is an upgrade on the original proposed sprinkler system included in the waste licence application. The system in Building 3 has 480 nozzles that can each deliver 6 litres of water per minute, giving a total delivery of 2,880 litres per minute. A drawing is provided in Appendix 1 that shows the layout in Building 3. A similar drawing for Buildings 1 and 2 will be submitted to the Agency when the design of the system to be installed in those buildings is finalised.

4. Tables E.5(i) and G.1

Tables E.5(i) and G.1 have now been completed and are included below.

Table E.5 (i): NOISE EMISSIONS - Noise sources summary sheet

Source	Emission point Ref. No*	Equipment Ref. No	Sound Pressure dBA at reference distance	Octave bands (Hz) Sound Pressure ¹ Levels dB(unweighted) per band								Impulsive or tonal qualities	Periods of Emission	
				31.5	63	125	250	500	1K	2K	4K			8K
Bag opener	NS1	BO1	75 dB at 1 m	84	81	85	73	77	79	72	69	69	No	Continuous during working hours**
PPK separator	NS1	PPK1	85 dB at 1 m	90	87	94	81	86	88	81	78	77	No	Continuous during working hours
Ballistics 1	NS1	Ball 1	85 dB at 1 m	90	87	94	81	86	88	81	78	77	No	Continuous during working hours
Ballistics 2	NS1	Ball 2	85 dB at 1 m	90	87	94	81	86	88	81	78	77	No	Continuous during working hours
Titechs sorter 1	NS1	TT1	85 dB at 1 m	90	87	94	81	86	88	81	78	77	No	Continuous during working hours
Titechs sorter 2	NS1	TT2	85 dB at 1 m	90	87	94	81	86	88	81	78	77	No	Continuous during working hours
Titechs sorter 3	NS1	TT3	85 dB at 1 m	90	87	94	81	86	88	81	78	77	No	Continuous during working hours
Titechs sorter 4	NS1	TT4	85 dB at 1 m	90	87	94	81	86	88	81	78	77	No	Continuous during working hours
Titechs sorter 5	NS1	TT5	85 dB at 1 m	90	87	94	81	86	88	81	78	77	No	Continuous during working hours
Titechs sorter 6	NS1	TT6	85 dB at 1 m	90	87	94	81	86	88	81	78	77	No	Continuous during working hours
Eddy current 1	NS1	EC1	80 dB at 1 m	89	84	89	77	82	84	77	73	73	No	Continuous during working hours
Eddy current 2	NS1	EC2	80 dB at 1 m	89	84	89	77	82	84	77	73	73	No	Continuous during working hours

Bailer 1	NS1	B1	85 dB at 1 m	90	87	94	81	86	88	81	78	77	No	Continuous during working hours
Bailer 2	NS1	B2	85 dB at 1 m	90	87	94	81	86	88	81	78	77	No	Continuous during working hours
Liebherr grab	NS1	LG	80 dB at 1 m	89	84	89	77	82	84	77	73	73	No	Intermittent***
JCB teleporter	NS1	TP	82 dB at 1 m	90	85	90	79	83	85	79	74	73	No	Intermittent
Clamp truck	NS1	CLT	75 dB at 1 m	84	81	85	73	77	79	72	69	69	No	Intermittent
Forklift truck	NS1	FLT	75 dB at 1 m	84	81	85	73	77	79	72	69	69		Intermittent
Conveyors (25 no)	NS1	CVR	75 dB at 1 m	84	81	85	73	77	79	72	69	69	No	Continuous during working hours
Compressor 1	NS1	CMP1	84 dB at 1 m	87	81	84	85	82	79	75	72	66	No	Continuous during working hours
Compressor 2	NS1	CMP2	86 dB at 1 m	78	82	89	88	84	79	75	68	59	No	Continuous during working hours
Articulated trucks	-	-	71 dB at 1 m	80	91	81	76	77	73	72	70	62	No	Intermittent

*As all sources listed, other than trucks, are confined to the building, a single noise source designator (NS1) is applied, referring to the overall building.

** Working hours: 24/7 proposed. Sources may be shut down during breaks, stoppages, holidays, and maintenance periods.

***Intermittent use throughout working hours, outside breaks.

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Table G.1 Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site

Ref. N ^o or Code	Material/ Substance ⁽¹⁾	CAS Number	Danger ⁽²⁾ Category	Amount Stored	Annual Usage	Nature of Use	R ⁽³⁾ - Phrase	S ⁽³⁾ - Phrase
1	Diesel Fuel (DERV)	68334-30-5	Carcinogenic, Dangerous to the environment	0	70,000 litres	Used to operate mobile plant	R20, R38, R51/53, R65, R66	S36/37, S61, S62
2	Electricity	Not applicable	Not applicable	0	1.2 million daytime units 350,000 night-time units	Used to operate plant and machinery	None	None
3	Engine Oils	None	Prolonged and repeated skin contact may cause dermatitis.	40 litres	300 litres	Used for maintenance of plant and machinery	R36/38	None
4	Hydramax Oils (Hydraulic Oils)	None	Prolonged and repeated skin contact may cause dermatitis.	500 litres	2,000 litres	Used for maintenance of plant and machinery	None	None
5	Multipurpose Grease	None	Harmful. Prolonged or extensive contact with this product may cause irreversible skin disorders.	40 litres	750 litres	Used for maintenance of plant and machinery	R40	S24

Notes:

1. In cases where a material comprises a number of distinct and available dangerous substances, please give details for each component substance.
2. c.f. Article 2(2) of SI N^o 77/94
3. c.f. Schedules 2 and 3 of SI N^o 77/94

5. Vehicle Refuelling

Road vehicles will be refuelled off site.

Mobile plant operating on the site will be refuelled at the back door of the main processing building (East side of building). The building is fully contained, so any spillage inside the building can be cleaned up in-situ with spill kits that will be available in this area.

The apron outside the building drains to foul sewer via a hydrocarbon interceptor, so any spillage outside the back door that is not contained by spill kit material will drain to foul sewer, rather than to surface water.

6. Building 3

Building 3 has been constructed and is now available for use. The building will be used for storage of bales of segregated wastes including paper, cardboard, plastics and metals.

We include some additional layout drawings in the 'Drawings' section at the end of this submission, showing schematic layouts of the processes carried out and the storage areas. This shows the interaction between the activities in the original buildings and the new building.

Now that all construction is complete at the site and the doors have been ramped to provide fire-water containment, we have refined our calculations of fire-water likely to be generated in a serious fire at the facility and the fire-water retention capacity available on site. This now includes available capacity in trenches that have been constructed in the main processing building to facilitate some of the new equipment. The refined calculations are provided in Appendix 2.

7. Table H.1(a)

We confirm that the disposal class D15 was selected solely for the disposal of waste resultant and arising from the treatment processes at the facility. No waste will be accepted for disposal activities at the facility.

In normal circumstances, the non-recyclable materials that are rejected by the process at the MRF are used as a fuel in waste to energy facilities such as cement kilns (with further processing) and incinerators. The material is generally dry with an attractive calorific value, so is well suited for use as a fuel. However, in the event of a difficulty with accessing cement kilns and incinerators, even temporarily, there is a possibility that the rejected wastes could be sent to landfill for disposal.

The lower figure in Table H.1(a) (0 to 3,000 tpa) reflects the fact that cement kilns and/or incinerators should be available most of the time to take this material as a fuel, so the quantity of waste sent for disposal should be less than 3,000 tpa.

However, in view of your correct observation of a potential inconsistency between the two Tables, we revise Table H.1(a) as follows:

Table H.1 (a) rev1. Quantities of Waste in Relation to Each Class of Activity Applied for

Waste Management Act 1996, as amended. 3rd Schedule (Disposal) Operations		Waste Management Act 1996, as amended. 4th Schedule (Recovery) Operations	
Class of Activity Applied For	Quantity (tpa)	Class of Activity Applied For	Quantity (tpa)
Class D 1		Class R 1	
Class D 2		Class R 2	
Class D 3		Class R 3	43,680 to 68,040
Class D 4		Class R 4	2,100 to 4,080
Class D 5		Class R 5	0 to 1,200
Class D 6		Class R 6	
Class D 7		Class R 7	
Class D 8		Class R 8	
Class D 9		Class R 9	
Class D 10		Class R 10	
Class D 11		Class R 11	
Class D 12		Class R 12	72,000 to 82,000
Class D 13		Class R 13	60,000 to 70,000
Class D 14			
Class D 15	0 to 14,400		

8. Waste Storage

Having discussed this issue with Forge Hill Recycling Ltd (FHR), the operator does not expect to receive any materials at the site other than mixed dry recyclables (MDR) for the foreseeable future. The facility will operate at full capacity handling only MDR, so there are currently no proposals to handle or store textiles, wood/timber, glass or metal (other than aluminium and steel cans).

In the event that the operator wishes to handle these additional materials at the site in the future, we suggest that a request would be made to the Agency by the licensee with details provided and amendments made to plans and reports where relevant, including fire-water retention, ELRA and Closure Plans. The EPA would have the final say on whether the processing and/or storage of those materials would be acceptable under the licence at that time or whether a technical amendment or licence review is warranted.

We included these materials in the waste licence application in order to avoid ruling them out completely in the future. It is possible that the company could decide to expand recyclable collections in response to demand or in response to future waste policy, so it is preferable to include them now, but it is not currently an issue for the licensee.

Any material returned to the site will be included in the storage volumes listed in the revised Table B9 (rev1) below. The licensee would dispatch stored waste in advance to make room for returned waste.

Now that Building 3 has been completed and the plant and equipment fully installed, the site has been surveyed to more accurately re-calculate the firewater retention capacity available in the buildings. Based on these new calculations, the storage quantities have been revised as detailed in Table B.9 (rev1) below.

Table B.9 (Rev 1). – Waste Storage Quantities.

Location of waste	Tonnes	Cubic metres	Unit cost (per tonne) for removal AND disposal in case of sudden closure	Cost (euro)	Disposal route and/or technique	Notes, rationale, clarifications
Quarantine areas	1	4	150	150	Landfill (125) plus transport (25)	Dry recyclables only, so quarantine area is likely to have non-recyclable municipal waste
Inspection areas	5	21	60	300	Dry Recyclable MRF (35) plus transport (25)	Assume Dry Recyclables sent to alternative MRF
Storage areas (untreated waste)	100	417	60	6000	Dry Recyclable MRF (35) plus transport (25)	Assume Dry Recyclables sent to alternative MRF
Waste on Process Line	10	42	60	600	Dry Recyclable MRF (35) plus transport (25)	Assume Dry Recyclables sent to alternative MRF
Storage area (baled paper & card)	400	769	0	0	Dry Recyclable MRF or broker (collected)	Assume bales of paper/card are collected from site for free
Storage area (baled plastic)	260	650	0	0	Dry Recyclable MRF or broker (collected)	Assume bales of plastic are collected from site for free
Storage area (baled metal cans)	200	400	0	0	Dry Recyclable MRF or broker (collected)	Assume baled metal cans are collected from site for free
Non-Recyclable Residues	20	80	150	3000	Landfill (125), WtE or SRF production plus transport (25)	One compactor of non-recyclable municipal waste. Replaced several times per day.
Total	996	2,383		10,050		

There is adequate fire-water retention capacity on site to address a fire in either building, as detailed in Appendix 2. A fire-break wall separates the two buildings and the door between the buildings will be closed in the event of a fire. Currently, the door is operated manually and a procedure is in place to ensure that it is closed when the site is not operational and to ensure that operatives are aware that it must be closed in the event of a fire. It is planned to connect this door to the Fire Detection and Suppression System as this is installed in the main processing building. This will ensure that the door is closed automatically as the fire alarm is raised.

The quantities of paper bales and plastic bales have been reduced in this revision. However, the cost of removing materials after closure has not been altered as these materials have a positive value and would be collected from site free of charge in the event of closure or would be sold by the company or a receiver. For this reason, there is no need to revise the Closure Plan that was submitted with the application.

The costs presented in the ELRA are reduced slightly based on the plan to store less material on site. Table 3-8 of the ELRA is revised below. The reduced time of fire and fire-water volumes are both explained in the updated fire-water retention calculations presented in Appendix 2.

**Table Error! No text of specified style in document.-1 of the ELRA (Rev 1)
Quantification and Costing of Worst Case Scenario**

Task	Description	Quantity (No.)	Measurement Unit	Unit Rate (€)	Cost (€)	Source of Unit Rates	
Response to: Risk I.D. 1, 2 and 7 Major Fire incorporating hydrocarbon drums stored in the MRF and diesel in mobile plant.	Fire-fighting	50 (assume 5 engines for 10 hours each)	Engine Hours	480	24,000	Rate based on consultation with Cork Fire Service. Largest fee ever charged was €35,000	
	Testing of Fire-water	5	samples	150	750	SLR	
	Pumping of fire-water to sewer	2	days	1,000	2,000	Conservative rate for a man, diesel and pump-hire	
	Discharge of fire-water to sewer	860	m ³	2.13	1,832	http://www.water.ie/business/pricing/cork-county-council/ including water supply and wastewater disposal	
	Removal of residual solid wastes / ash	400	tonnes	150	60,000	Transport and landfill gate fee including levy.	
	Environmental Consultants Report	1	report	5,000	5,000	SLR	
	Total (€)					93,582	
	Plus Contingency @ 20% (€)					112,299	
Plus VAT @ 23% (€)					138,127		

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9. Noise Sensitive Locations

The noise sensitive locations were selected as the nearest residential properties to the facility. Neighbouring premises are industrial and commercial in nature and are not considered to be particularly sensitive to noise. Compliance noise monitoring was carried out by Damian Brosnan Acoustics (dBA) during October 2016 and that report is included in Appendix 3 along with a letter that accompanied the report. The report and the attached letter have recommended moving the on-site boundary monitoring locations for reasons given in the report. The letter also explains the logic behind selecting the noise sensitive receptors.

The noise levels recorded at the site boundaries will assist in estimating any impact beyond the boundary at offices, factories or commercial premises in the area. These premises are less sensitive and in particular are less sensitive to night time noise emissions, so we suggest that the combination of monitoring at the site boundary and at the residential noise sensitive receptors will allow a good assessment of the impact from noise emissions on both sensitive and less-sensitive receptors in both daytime and night-time.

The revised site-boundary locations are shown on Drawing 4348-WL17 (Rev.2) in the 'Drawings' section of this submission and the new grid co-ordinates are provided in the revised Table below, which replaces the Table included in Section F (page 38) of the Waste Licence Application Form.

Grid References for Proposed Monitoring Points at Forge Hill (revised January 2017)

Medium	Location	Monitoring Point Reference	Irish Transverse Mercator	
			Easting	Northing
Surface Water	Site Discharge Point	SW1	566,793	568,771
Foul Water	Trade Effluent Discharge Point	FW1	566,799	568,771
Groundwater	Back yard of site	GW1	566,905	568,827
Dust	SW of site	D1	566,837	568,772
Dust	NW of Site	D2	566,768	568,816
Dust	SE of Site	D3	566,901	568,790
Dust	NE of Site	D4	566,900	568,859
Noise (on site)	Site Boundary – Southwest (revised location)	N1	566,800	568,768
Noise (on site)	Site Boundary – Northwest (revised location)	N2	566,768	568,802
Noise (on site)	Site Boundary – Northeast (revised location)	N3	566,913	568,859
Noise (on site)	Site Boundary – Southeast (revised location)	N4	566,901	568,794
Noise (receptor)	ESE of site - bungalow at Ferrero Factory	NSL1	567,005	568,771
Noise (receptor)	NW of site - 2 storey house on Forge Hill Rd.	NSL2	566,693	568,860
Noise (receptor)	WSW of site - No.20 Manor Park	NSL3	566,632	568,620

10. Article 13 Compliance Requirements

The waste licence application contains updates to the EIS that was prepared in 2002 for the original facility operated by IPODEC. The following text provides references to these updates in relation to the requirements of Article 94 and Schedule 6 of the Planning and Development Regulations 2001. The text in blue is taken directly from Schedule 6 of the regulations.

SCHEDULE 6

INFORMATION TO BE CONTAINED IN AN EIS

1. (a) A description of the proposed development comprising information on the site, design and size of the proposed development.

Chapter 2 of the 2002 EIS provided a description of the development including information on the site location and size with associated drawings. However, the design has altered somewhat since that time, so updates have been provided in the Waste Licence Application (WLA). The 2002 description of facility design and operations is now outdated.

Section A.1.2 of the WLA provides an updated description of the site and surrounds. The site dimensions have not changed since 2002, but there have been changes to the surrounding area and to the infrastructure on and off site.

Section A.1.3 of the WLA provides an update on the site drainage and trade effluent management and further details of this infrastructure is provided in Attachment D.1 of the WLA.

Section A.1.4 of the WLA provides an update on the site operation and further details of this is provided in Attachment D.2 of the WLA.

The Drawings provided with the WLA show the current site layout, building plans/elevations, the traffic layout, the stormwater collection system, the foul drainage layout and the monitoring locations. Now that the extension building is constructed and the plant and equipment have been fully installed at the facility, we include some new drawings at the end of this submission. These provide more detail than the drawings that were submitted with the WLA. All these drawings should be considered as updates on the original EIS.

Section D and Attachment D of the WLA provide details on the site infrastructure and the facility operation. These are also updates on the original descriptions provided in the 2002 EIS.

(b) A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.

Chapters 3 to 12 of the 2002 EIS described the measures envisaged in order to avoid, reduce and remedy significant adverse effects associated with the development. These chapters addressed the following topics:

- human beings (including noise, traffic, air and nuisances)
- geology and hydrogeology
- hydrology
- climate
- cultural heritage
- ecology (flora and fauna)

- landscape and visual assessment
- land use
- material assets
- Interaction of the foregoing

In each section, the authors identified likely emissions and potential impacts and then proposed measures to avoid, reduce and remedy any potential significant effects.

Section E of the WLA updates the details on emissions from the facility. Section F updates the monitoring plans for those emissions and Attachment F.1 details measures that are employed at the facility to control emissions from the site operation.

Section I of the WLA details the potential impacts of emissions and includes details of mitigation measures employed to avoid, reduce and remedy these emissions. Several reports carried out by relevant experts are included in this section of the WLA. The topics covered are air, climate, odours, hydrology, geology, hydrogeology and noise.

These sections of the WLA should be seen as updates to the original EIS addressing the current site details and operation with respect to the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.

Some EIS topics such as traffic, flora and fauna, cultural heritage and landscape are unaffected by the changes since 2002.

Traffic numbers accessing the site are currently lower than originally proposed (36 to 38 movements per hour proposed in 2002 EIS), as the waste is brought in and out in heavier loads. Originally, the site received a lot of light loads in skips and this generated a large number of HGV movements, so the current impact is lower than that assessed in the original application. There has been no change in the limit of 82,000 t/a and no increase in traffic volumes, so there is no intensification that would justify an update of traffic impacts.

As the site was fully paved as part of the earlier development, the current facility has no further impact on Flora and Fauna compared to the development that was subject to the 2002 EIS, so the original analysis stands and there is no justification in updating the Flora and Fauna section of the EIS. However, an Appropriate Assessment Screening report was carried out by Glas Ecology and was included in Section B.3.1 of the WLA.

In terms of Landscape and Visual Assessment, a new building has been attached to the existing waste processing buildings. This was granted planning permission by Cork County Council, who considered the potential visual impact of the structure prior to granting planning permission. The visual impact of the building is a matter for the planning authority rather than the EPA, so we suggest that this issue is not relevant to the WLA and hence has not been specifically addressed in the application. The building itself will be used for storage of already approved quantities of waste and does not facilitate an intensification of the development, so it did not attract an updated EIS and that argument was accepted by the Planning Authority during the course of their consideration of the planning application.

The impact on Cultural Heritage has not changed since the 2002 plans as the site has been fully paved since that time and no virgin ground has been excavated to facilitate the current site operation.

(c) The data required to identify and assess the main effects which the proposed development is likely to have on the environment.

The 2002 EIS provided such data throughout the document. The description of the development in Chapter 2 provided relevant data and the subsequent chapters assessed the impacts and effects of the development on the environment based on that data.

The WLA updated that data in many different sections, as follows:

- Updated information on facility operation and site management was provided in Section C.
- Updated information on site infrastructure was provided in Section D.
- Updated data on emissions were provided in Section E.
- Updated details on the waste types and quantities processed at the facility were provided in Section H.
- Updated data on the impacts and effects on air, climate, odours, hydrology, geology, hydrogeology and noise were provided in Section I.
- Updated details on accident prevention and emergency response were provided in Section J.
- Updated details on remediation, decommissioning, restoration and aftercare were provided in Section K.

(d) An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment.

Section 1.5.4 of the 2002 EIS addressed the alternatives considered at that time by IPODEC.

A number of alternatives were considered by Killarney Waste Disposal (KWD) before developing the Forge Hill site as a MRF to be operated by Forge Hill Recycling Ltd. These were not detailed in the WLA, but are included here as an update to the original EIS.

KWD has operated a waste management facility at Aughacureen near Killarney, Co. Kerry for many years, initially under a waste permit and more recently under a waste licence issued by the EPA (ref: W0217-01). That licence was granted on 1st August 2006, following an application that was made in 2005. By 2008 it was clear that the 40,000 t/a limit was inadequate as dry recyclable collections increased in the Region and these materials required segregation at a suitable facility such as Aughacureen that had the best available technology for this purpose.

Do-nothing was not an alternative in these circumstances as the dry recyclable waste had to be collected and processed and other facilities in the region did not have adequate capacity to take these wastes for processing.

On 8th July 2008, KWD requested a Technical Amendment to increase the tonnage at the Aughacureen facility, but the Agency replied on 1st October 2008 that this would be a significant change that could not be accommodated by way of Technical Amendment. The correspondence from the Agency recommended that KWD apply for a licence review to increase the licensed tonnage.

KWD applied to the EPA on 12th November 2008 for a waste licence to operate a new facility at Scart/Caherdean, Farranfore, Co. Kerry (EPA Ref: W0250-01). It was hoped that this new facility would alleviate the problem, but the application had to be withdrawn after planning permission was refused.

KWD subsequently submitted an application for a review of the Aughacureen waste licence on 16th July 2010. The EPA has not yet reached a decision on that application.

In the absence of a decision on the Aughacureen licence review application, KWD sought a viable alternative for processing the dry recyclables from the region and selected the Forge Hill site for the following good reasons:

- The site is very well located to serve the sources of the Dry Recyclables, which are Cork, Kerry, Limerick and Clare. Most of the products are exported from Cork with minor quantities transported by road to Dublin and elsewhere in Ireland.
- The site was operated as a licensed waste facility for many years at a similar scale with a good compliance record.
- There were no complaints made about site operations for four years prior to its closure in 2011.
- The site infrastructure is well designed to manage environmental emissions.
- The processing of dry recyclables has less potential environmental impact, compared to previous activities at the site.
- The facility employs best practice environmental controls and is well designed to accommodate the installation of the best available technology for processing dry recyclables.
- The addition of Building 3 allows better management of wastes on site with no need for outdoor storage of wastes, which was a feature of the historical operation of the site. This was easily accommodated at the Forge Hill site and it provides better protection for the environment.
- The use of an existing waste facility that has been unoccupied for a number of years has a lower environmental impact when compared with a completely new development on a greenfield site.

Forge Hill Recycling Ltd has installed the best available technology for processing dry recyclables at the facility. No other processes were considered as suitable alternatives.

Once the facility was up and running under the waste permit, Attachment D.2 to the WLA addressed the alternatives to operating at the higher tonnage of 82,000tpa under a waste licence compared with the current restriction of 49,999tpa under the waste permit that was issued by Cork County Council in December 2015.

2. Further information, by way of explanation or amplification of the information referred to in paragraph 1, on the following matters:-

(a) (i) a description of the physical characteristics of the whole proposed development and the land-use requirements during the construction and operational phases;

The 2002 EIS addressed physical characteristics of the proposed development and the land-use requirements in Chapter 2.

The Drawings and Attachment D in the WLA provided updates on this. No additional land was required for the extension to the buildings (Building 3).

(ii) a description of the main characteristics of the production processes, for instance, nature and quantity of the materials used;

Section 2.5 of the 2002 EIS provided details on the waste types, quantities and processes.

This was updated in the WLA in Section H which described the quantities and types of wastes to be handled at the site and in the EMS provided in Section C which describes the processes engaged at the facility. The EMS also describes the good environmental practices engaged by the operator to ensure that the facility does not impact negatively on the surrounding environment.

(iii) an estimate, by type and quantity, of expected residues and emissions (including water, air and soil pollution, noise, vibration, light, heat and radiation) resulting from the operation of the proposed development;

Chapters 3 to 12 of the 2002 EIS include details of emissions and residues likely to arise from the operation of the facility at that time.

This has been updated in Section E of the WLA where the emissions are detailed and in Section I where further detail on the potential impact of emissions and residues are addressed.

(b) a description of the aspects of the environment likely to be significantly affected by the proposed development, including in particular:

- human beings, fauna and flora,
- soil, water, air, climatic factors and the landscape,
- material assets, including the architectural and archaeological heritage, and the cultural heritage,
- the inter-relationship between the above factors;

These aspects were addressed in Chapters 3 to 12 in the 2002 EIS.

As detailed above, updates, where relevant, have been provided in Section I of the WLA. These updates include expert reports on human beings (noise and odour), flora/fauna (AA Screening report in Section B.3.1) soil, water, air and climatic factors. Other impacts on human beings by way of nuisances are addressed in Section E.6 of the WLA.

As the facility is an existing waste management facility, there are no updates provided in the WLA in terms of material assets, cultural heritage or landscape. The facility is a positive material asset for waste management in the region and the use of the facility does not impact negatively on landscape, cultural heritage or other material assets in the area.

In updating the assessments of human beings, flora/fauna, soil, water, air and climatic factors, the WLA did not address the inter-relationship between these factors, so for completeness, we address that here.

Human Beings / Flora and Fauna

Outdoor waste facilities that manage residual waste containing food, such as landfills, can attract birds and this can have a negative effect on human beings living close to the site.

However, the Forge Hill MRF does not handle residual waste or food waste and all wastes are managed inside buildings, so this is not an issue at this site.

Residual waste and food waste can also attract flies and rodents, but the nature of the waste materials handled at the Forge Hill site is not attractive to flies and rodents. However, as detailed in Attachment E.6 of the WLA, the operator is commissioning a vermin control company to employ control measures and to monitor the situation for an initial 12 month period, with a review thereafter.

No other interactions between impacts on Human Beings and impacts on Flora & Fauna are envisaged at the site.

Human Beings / Soil

Contamination of soils and subsoils can impact human health, but the materials handled at the Forge Hill site are non-hazardous dry recyclables and have no such potential to cause human health issues by way of soil contamination. Hydrocarbon fuels and lubricants are used in the plant and machinery on site, but bulk storage of these materials is not planned and the risk of a large spill is therefore unlikely. In the event of a spill, the underlying soils and subsoils are protected by concrete and paved surfaces, so the risk of soil contamination is further reduced.

Human Beings / Water

Similarly, contamination of water can impact human health if people are using groundwater or surface water supplies located within the zone of influence downstream or down-gradient of the facility. However, as detailed above, the materials handled at the Forge Hill site are unlikely to cause contamination due to their dry non-hazardous nature. Hydrocarbon fuels and lubricants are used but not stored in bulk at the site, so the risk of a large spill is therefore unlikely.

In the event of a spill, the underlying groundwater is protected by concrete and paved surfaces, so the risk of groundwater contamination is further reduced. The downstream surface water is protected by the drainage system on site which separates potentially contaminated water from clean yard and roof water and provides silt traps, oil interceptors and emergency shut-off valves.

Human Beings / Air

Airborne pollutants in the form of dust, odour and noise were all assessed in Attachment I of the WLA. In each case, the interaction between the potential airborne pollutants and human beings, in the form of local residents, was considered and fully assessed.

Human Beings / Climatic Factors

There are no air emissions from the facility that could impact significantly on the local or global climate. The waste materials are dry and do not decompose on site, so they do not generate methane, carbon dioxide, SO_x, NO_x, H₂S or other greenhouse gases during processing or storage at the facility. Processing comprises physical separation rather than thermal or biological degradation, so this facility has a benign impact on climate and the interaction between human beings and climatic factors is considered insignificant.

Flora & Fauna / Soil

The assessments in Attachment I of the WLA concluded that there will be no significant impacts on either flora & fauna or on soil at the site or due to the facility operations, so there is no need to further consider this interaction.

Flora & Fauna / Water

Contamination of surface water or groundwater at the facility could impact on Flora & Fauna downstream or down-gradient of the site. The potential impact on Natura 2000 site by such water pollution was addressed in the AA Screening report prepared by Glas Ecology and included in Attachment B.3.1 of the WLA. Contamination of groundwater could have negative impacts on flora local to the site, but as explained above the groundwater is well protected by concrete and paved surfaces on site and the potential contaminant load is relatively modest.

Flora & Fauna / Air

Potential airborne contaminants such as odour and dust are unlikely to have any impact on the flora & fauna in the area, particularly because such emissions are expected to be very low.

Noise can impact on fauna, but as the facility is located in a built-up industrial area, the likelihood of noise-sensitive fauna existing in the area is low. There are no protected habitats close enough to the site to be impacted by noise emissions from site operations.

Flora & Fauna / Climatic Factors

As the facility has very little potential to impact on either flora & fauna or on climate, this interaction is considered irrelevant or at most, insignificant.

Soil / Water

Impacts on soils and geology can also impact on groundwater. This potential interaction is addressed in the Assessment of Ground/Groundwater Emissions in Attachment I.4 of the WLA.

Soil / Air

The potential impacts on soil at the facility are quite different from the potential impacts on air, so no interaction between these impacts is envisaged.

Soil / Climatic Factors

There are no likely significant impacts on climate from the operation of the facility, so no interaction between these impacts is envisaged.

Water / Air

The potential impacts on water at the facility are quite different from the potential impacts on air, so no interaction between these impacts is envisaged.

Water / Climatic Factors

There are no likely significant impacts on climate from the operation of the facility, so no interaction between these impacts is envisaged.

Soil / Climatic Factors

There are no likely significant impacts on climate from the operation of the facility, so no interaction between these impacts is envisaged.

(c) a description of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from:

- the existence of the proposed development,
 - the use of natural resources,
 - the emission of pollutants, the creation of nuisances and the elimination of waste,
- and a description of the forecasting methods used to assess the effects on the environment;

The 2002 EIS addressed the likely significant effects under individual topics in Chapters 3 to 12.

The Table presented in Section A of the WLA summarises the likely effects identified with the project and the mitigation measures proposed to control those effects. For completeness the likely significant effects of the operation of the facility under a waste licence are listed below in Table A.1.

Table A.1 - Likely Significant Effects of Operation of the Facility under a Waste Licence

Aspect of Environment	Likely Significant Effects
Human Beings (noise)	Direct, long-term, negative , but within specified limits so considered acceptable in this industrial area. No very noisy operations nearby, so no significant cumulative effects identified.
Human Beings (nuisances)	None Expected – no birds due to waste type, vermin control in place, dust is minor (no C&D waste), low risk of fire due to controls and low risk of litter due to controls.
Human Beings (odour)	Not Significant - Expert SLR report in Attachment I concluded ' <i>negligible risk of effect at surrounding receptors from onsite odour</i> ' and in final conclusion ' <i>The residual effect on surrounding receptors is therefore considered to be not significant</i> '. There are no other waste facilities or sewage treatment works proximal to the site, so cumulative effects are not expected.
Human Beings (traffic)	None – The original EIS predicted 36 to 38 traffic movements <u>per hour</u> and planning permission was granted on that basis. The operation as a MRF under a waste licence will attract approximately 30 truck movements <u>per day</u> , so the traffic impact will be well below the previously approved levels. This is therefore a positive impact. A potential cumulative effect was recognised in the 2002 EIS as another waste facility was proposed to be developed by Greenstar across the road from the subject site, but that facility was not developed.
Flora & Fauna	None – No development of previously undeveloped land and the AA Screening Report in Attachment B.3.1 of the WLA concluded that the facility will have no significant effects on the closest Natura 2000 sites (Cork Harbour SPA and Great Island Channel SAC).

Soil	None – This was addressed in Attachment I.4 and I.5, where it was concluded that no residual impacts will arise.
Water	Low to insignificant – This was addressed in Attachment I.2, I.3, I.4 and I.5, where it was concluded that residual impacts would be low to insignificant.
Air	None – Attachment I.1 addressed this and concluded that there would be no residual impacts on air.
Climatic Factors	None – Attachment I.1 addressed this and concluded that there would be no residual impacts on climate.
The Landscape	None – The facility is already fully developed with appropriate planning approvals, so operation under a waste licence will not affect the local landscape.
Material Assets	Positive – The facility is needed to manage the dry recyclables collected from households in Cork, Kerry, Clare and Limerick.
Architectural Heritage	None – Facility already developed.
Archaeological Heritage	None – Facility already developed.
Cultural Heritage	None – Facility already developed.

Natural resources are used to operate the facility, as detailed in Attachment G.1 of the WLA. There is currently no practical available alternative to such use of natural resources to operate the plant and machinery.

Attachment G.2 of the WLA addresses energy efficiency and refers to the operators efforts to reduce the demand for use of natural resources in operating the site.

In overall terms, there is a positive impact on natural resources as the facility is used to segregate up to 82,000 tonnes of waste materials as part of the recycling process whereby these materials will ultimately replace natural resources.

The forecasting methods used to assess the effects on the environment are detailed in the various expert reports in the WLA. These are standard methods for each environmental aspect, as recommended in relevant guidelines.

(d) an indication of any difficulties (technical deficiencies or lack of know-how) encountered by the developer in compiling the required information.

There were no difficulties encountered in compiling the required information on behalf of the developer.

Revised Non-Technical Summary (Applicable to both to WLA and to the EIS)

Attachment A.1. (Rev.1) – Non Technical Summary

A.1.1. Introduction

SLR Consulting has prepared this Waste Licence Application on behalf of Forge Hill Recycling Ltd (FHR). The company is currently operating a Materials Recovery Facility (MRF), at Forge Hill Road at the southern edge of Cork City, with a limit of 49,999 t/a regulated by a waste permit issued by Cork County Council. The applicant proposes to process up to 82,000 tonnes of mixed dry recyclables each year under a waste licence.

The application site was previously operated as a licensed MRF and waste transfer station by IPODEC, Onyx, Veolia and Greenstar (EPA Ref: W0173). The site was closed in 2011 and the previous licence has now expired. The site has now been purchased by Mr. Sean Murphy, the Managing Director of FHR and also the Managing Director of Killarney Waste Disposal Ltd.

The source of the feedstock is mostly from households and commercial dry recyclable collections in Cork, Limerick, Clare and Kerry. The mixed materials are sorted into different single stream materials using state of the art plant and equipment as well as quality control picking staff. The main materials to be sorted at the facility comprise paper, card, plastic bottles, plastic film, steel cans and aluminium cans. There is the possibility of temporary storage of other recyclables such as textiles and wood in the future, but this would be ancillary to the main function of the MRF and would require the agreement of the EPA.

Prior to the opening of this facility, dry recyclables collected in Cork were processed in Kerry and Tipperary. Many of the single stream materials were then returned to Cork for shipment abroad. The development of the MRF in Forge Hill has therefore a number of environmental benefits including additional recycling capacity as well as reduced transport emissions.

Cork County Council granted planning permission in 2004 to operate a MRF at the site processing 82,000 tonnes per annum. FHR has been granted planning consent to add a new building to the front of the existing waste processing buildings and this is now constructed.

Cork County Council has also issued a waste facility permit to FHR to operate the MRF to a maximum throughput of 49,999 tonnes per annum. A waste licence is now required to bridge the gap between the permitted tonnage and the planning permission tonnage.

A.1.2. Site Details

The MRF is located on the southern fringe of Cork City, within the townland of Ballycurreen. The facility covers an area of approximately 1.03 hectares (2.48 acres) and is accessed from the Forge Hill Road via a junction on the N27 National Primary Road (Kinsale Road) leading from the N40 Southern Ring Road to Cork Airport.

The MRF is bounded to the north and south by other industrial and commercial premises. It is bounded to the west by a public road (Forge Hill) with other industrial premises on the opposite side of the road. To the east of the site is an area of undeveloped Greenfield land and beyond that is the N27 Kinsale Road. Figure A.1.1 below shows an aerial view of the site and the surrounding area.

Site security is provided by secure fencing, secure gates and CCTV surveillance and a monitored alarm system.

The yard areas are all hardstanding with mix of concrete and tarmacadam surfaces.

Figure A.1.1 – Aerial View of Site and Surrounding Area



The site has a one-way traffic management plan whereby vehicles enter at the southernmost gate and exit at the northernmost gate. There are two separate weighbridges that accommodate that arrangement.

There are a number of buildings on site. The two main waste processing buildings are adjoining steel portal frame structures with a shared concrete wall where waste activities will be carried out. Waste inspection and waste quarantine areas are provided within the buildings.

The two storey site offices are located in the southwestern corner of the site. A small building which is used to store modest quantities of hydraulic oils and engine oils on banded pallets is located in the northeast corner of the site.

On the western boundary of the site close to the exit is an ESB substation. All stationary plant and equipment will be fuelled by electricity. Mobile plant will be fuelled with diesel that is delivered direct to the plant in a mobile road tanker or mobile bowser.

There is a weighbridge located to the south of Building 1 (the westernmost waste recovery building) and another situated in the north western corner of the site. With the exception of a gravelled area around the offices, the open areas are paved with either tarmacadam or concrete.

FHR has recently extended the waste processing and storage area by constructing an additional building (Building 3) in the front (western part) of the site.

Figure A.1.2 below shows an aerial view of the site taken from Microsoft's Bing Maps website. The photograph pre-dates the construction of Building 3.

Figure A.1.2 – Aerial View of Site



In the past there were waste processes and storage in outdoor yards around the site, but FHR plans to process and store all wastes inside the waste processing buildings.

There are no fuel tanks on site and no plans to store fuel. Relatively small quantities of hydrocarbon oils and other potentially polluting materials are kept on site for maintenance purposes. These materials are stored in a small shed at the wash-bay in the back of the site, with containment provided in the shed in case of spillages. The drainage outside the shed is to foul sewer via a hydrocarbon interceptor.

The site is served with the following services:

- Foul Sewer
- Water mains, including fire hydrants
- Electricity, including an ESB substation
- Telecommunications

A.1.3. Site Drainage and Trade Effluent

The site drainage has been designed to separate clean run-off from potentially contaminated run-off. Run-off from the roofs of the building discharges to the local stream to the west of the site via a balancing tank that has a pumped outflow. Run-off from clean yard areas is directed to a hydrocarbon interceptor and silt trap prior to flowing to the balancing tank and pumping to the local stream.

Run-off from areas that could potentially be soiled by waste materials, such as the wash areas and the apron of the building exit doors, is directed to the foul sewer line and through a hydrocarbon interceptor. This is then discharged as trade effluent to the local authority sewer under a discharge licence issued by Irish Water in 2015. Sewage from the site offices is also discharged to the foul sewer.

The waste processing buildings have ramps at the doors to contain minor spillages of potentially polluting liquids such as engine oil, hydraulic oil, etc. These ramps also provide containment for fire-fighting water within the buildings. Existing drains from the buildings to the foul sewer line have been plugged to ensure full containment of fire-fighting water.

A.1.4. Site Operation

The operator has developed an Environmental Management System (EMS) for the site. This system will ensure that the site is operated in a manner that achieves a high level of environmental performance and poses minimal risk of environmental pollution.

The EMS includes accident prevention measures and emergency procedures to address any incidents that happen at the site.

The applicant is seeking a 24 hour, 7 day licence to operate the facility to ensure that there is availability of processing capacity at all times. However, normal operation will be from 6am to 10pm on Monday to Saturday, with reduced hours on Sundays and Bank Holidays.

The facility employs approximately 32 people, including a facility manager(s), environmental health and safety manager(s), foremen, drivers, machine operators, maintenance staff and general operatives.

The following Plant & Equipment is used to process the dry recyclables at the facility:

- Grab Machine – to load materials into the process line.
- Metering Bunker – to regulate the feed rate.
- OCC Screen – to remove large flat fractions from the mix (e.g. large sheets of cardboard).
- OCC Optical Sort – to capture cardboard.
- Ballistic Separator – to separate materials by size and shape (2D, 3D and fines).
- Optical Separators (5 No.) – to separate plastic and paper fractions using the reflection and refraction properties of each material. Each optical separator is strategically placed and set up differently to capture different materials.
- Eddy Current Separator – to capture non-ferrous metals, particularly aluminium cans.
- Over-band Magnet – to capture ferrous metals, particularly steel cans.
- Balers (2 No.) – to produce bales of paper, cardboard, plastic film, plastic bottles, aluminium cans, steel cans, etc.
- Forklifts (2 No.) – to move bales to storage and to haulage vehicles.
- Teleporter – to move material to the balers.

All materials are handled and stored inside the waste processing buildings with no waste handling in the yard areas.

Waste is delivered into the buildings in enclosed vehicles and the products are loaded into bulk haulage vehicles either inside the buildings or in a contained manner at the doors of the buildings, where the material is not exposed to the elements.

The floors of the buildings and yard areas are kept clean by sweeping rather than washing in order to minimise the generation of waste water. The dry recyclables are not odorous and have little potential to pollute.

The facility operation will incorporate significant fire control measures including the following:

- Implementation of a Fire Safety Management Plan consistent with relevant guidelines.
- Restriction on storage volumes for combustible wastes.
- Strategic location of Fire Hydrants.
- An underground accessible water tank that is available for fire-fighting.
- Education and awareness of site personnel.
- Emergency Response Procedures
- A state of the art Fire Detection and Suppression System.
- Containment measures for fire-water to prevent uncontrolled discharge.

A.1.5. The Operator

FHR is a new company, but is managed by the owner of Killarney Waste Disposal (KWD) and operates as a sister company to KWD using the technical competence and experience gained by that company. KWD has operated a licensed waste facility at Aughacureen, Killarney for many years, processing a large quantity of dry recyclables. The development of the Forge Hill site will result in the relocation of much of KWD's recycling from Killarney to Cork, which is closer to the source of much of the input material and closer to the international markets for the baled products.

The waste licence application includes independent reports addressing potential environmental liabilities and likely future closure costs, including the cost of unforeseen liabilities or closure. FHR will ensure that there is adequate financial provision in place to cover those potential future costs.

A.1.6. Emissions and Monitoring

The only planned emission from the facility to the water environment is trade effluent in the form of run-off from wash areas and yard areas that could be exposed to soiling from waste materials. This emission discharges to foul sewer and is controlled by a discharge licence granted by Irish Water. The quantity and frequency of this emission will be rainfall dependent.

The trade effluent will be tested for flow, temperature and pH continuously and tested for a wider range of parameters at frequencies specified in the discharge licence (weekly, monthly, quarterly and bi-annually).

Clean water is discharged to the local stream via a hydrocarbon interceptors, silt trap and balancing tank. This will be inspected daily and tested quarterly for a range of parameters.

There are no discharges to ground at the site, but there is an existing on-site groundwater well that will be tested bi-annually for a range of indicator parameters.

Dry recyclables have little potential to emit odour, dust or other pollutants to air. Dust levels have been monitored at the site in the past and will continue to be monitored at site boundary locations on a quarterly basis.

SLR Consulting carried out an odour assessment based on the type and volume of materials handled at the MRF. The assessment concluded that there will be no significant odour impact on the sensitive receptors in the vicinity of the site.

There will be noise emissions from the plant operating in the waste processing building. A report by AWN Consulting assessed the potential impact of these noise emissions on sensitive receptors in the vicinity of the site. The assessment concluded that there will be no significant impact at these locations. Noise levels are monitored at site boundary locations and at the nearest sensitive receptors on an annual basis.

A.1.7. Environmental Impacts

All potential environmental impacts were assessed by experts and these assessments are included in this waste licence application. It is clear that the operation of the site will not have significant impacts on the environment or on the local community.

The polluting potential of the materials handled on site is low. The quantity of hydrocarbon or other hazardous materials used on site will be very low, with no fuel storage tanks located on site. The control measures that are incorporated in the site design and in the operational plan, which will incorporate the EMS, are deemed adequate to control any unforeseen event at the site without causing significant environmental pollution.

Yours sincerely

SLR Consulting Ireland



Conor Walsh
Technical Director

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Appendix 1

Details of Fire Detection and Suppression System

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QUOTATION AND SYSTEM DESCRIPTION

KWD Recycling Ltd.
QUOTATION NUMBER: 111574
Date: 2016-10-14



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Storage hall fire protection

Firefly AB
Phone +46 (0)8 449 25 00, Fax +46 (0)8 449 25 01
Textbigatan 31, SE-120 30 Stockholm, Sweden
www.firefly.se



Date: 2016-10-14
Our Ref: 111574
MMA
2(8)

Thank you for inquiring a quotation for a Firefly protection system. With more than 40 years of experience in the industry, Firefly has specialized in creating customer adapted system solutions of the highest technical standards and quality. We hereby have the pleasure to send you our quotation based on the information received.

SCOPE OF SUPPLY

COMPLETE FIREFLY SYSTEM, INCLUDING:

- Control panel (Eximio-C-M IntuVision™)
- Detection
- Extinguishing/Suppression
- Documentation
- Commissioning and functionality review
- Supervision

KEY EQUIPMENT



Eximio-C-M IntuVision™ - Control panel
Including Firefly user-friendly operator interface IntuVision™



FD-UVIR – UV/IR flame detector
Detects flames



FD-4IR – Five channel IR flame detector
Detects flames



WNFP7 – Water mist nozzle
Capacity approx. 5.6 l/min.

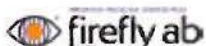


W540 – Solenoid valve
Activates water extinguishing

SYSTEM DESCRIPTION

Zone	Description	Detection	Extinguishing/Suppression	ATEX Zone (inside/outside)	Process Temp (°C)
Network 1	Control unit EXIMIO IntuVision™ with accessories				
Zone 1	Storage hall	4xFD-4IR	480xWNFP7-SS-N	-/-	Max 60°C

Note – Components listed above may be part of integrated packages (see separate 'system components' list)

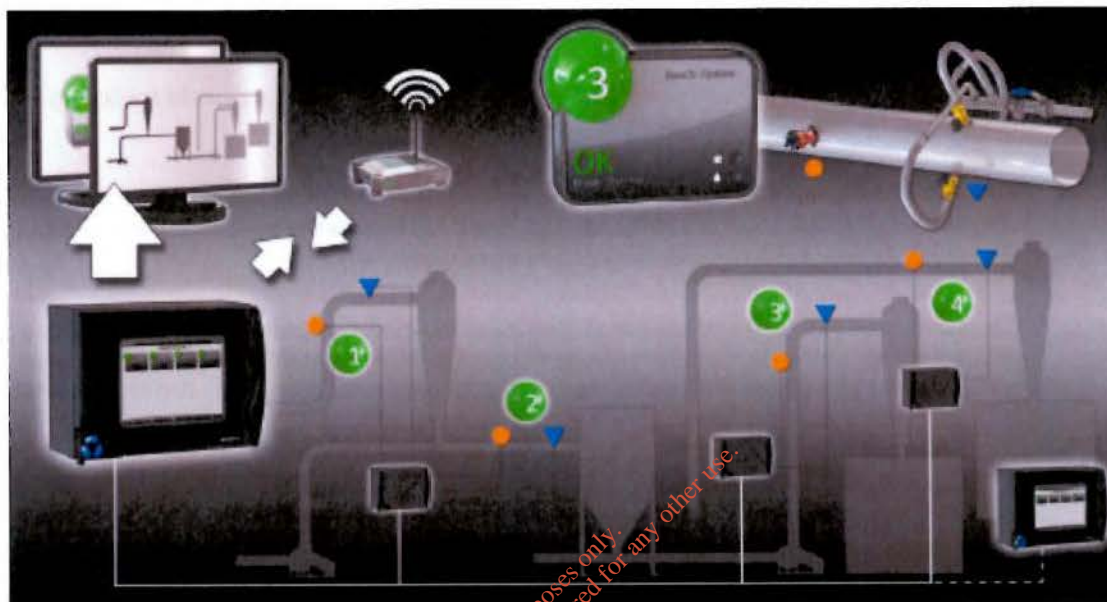


Date
2016-10-14

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111574
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PRINCIPLE OF EXIMIO NETWORK WITH DETECTION AND EXTINGUISHING ZONES



Eximio is based on a network structure where detection, extinguishing and control functionalities are connected to the network through locally placed hubs. Whenever needed, additional protection zones can easily be added to the network without pre-defined limits.

The 12" color touch screen with the user-friendly IntuVision™ operator interface provides a quick one-screen overview of all the installed protection zones and their status.

Supervision

The supervision cost includes practical help on site with placement of detectors, extinguishing equipment and control panels. When placement has been determined we will also mark the agreed location for the equipment. Advice on mechanical and electrical installation plus piping will be given upon request. The cost for supervision in this proposal includes one (1) day for a service engineer/technical project leader on site, including travel expenses (for one trip) and all other related travelling costs. Any withholding tax or any other local taxes are not included in the proposal.

COMMISSIONING AND FUNCTIONALITY REVIEW

The commissioning includes inspection and approval of all mechanical and electrical installations of the Firefly equipment; the control panel, the detectors, the extinguishing/suppression system and their functionality, as well as the start-up of the system. It also includes a functionality review together with relevant staff.



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	MMA	

TERMS & CONDITIONS

To schedule your commissioning, we require you to contact us at least four (4) weeks ahead of time.

The installation of all Firefly equipment and related material, such as water pipes (if applicable) and cabling must be fully completed, based on specification, prior to our arrival.

If the installation is not fully completed and this leads to Firefly not being able to finish the commissioning on time according to the contract, there will be a surcharge of 1000 Euro per day. The same daily rate plus travel cost apply on additional visits if required.

The cost for commissioning and functionality review in this quotation includes two (2) day for one service engineer on site during regular business hours, travel expenses (for one trip) and all other related travelling costs. Any withholding tax or any other local taxes are not included in the quotation.

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2016-10-14

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DETECTION, GENERAL

Firefly have a number of suitable detectors for different usage areas.

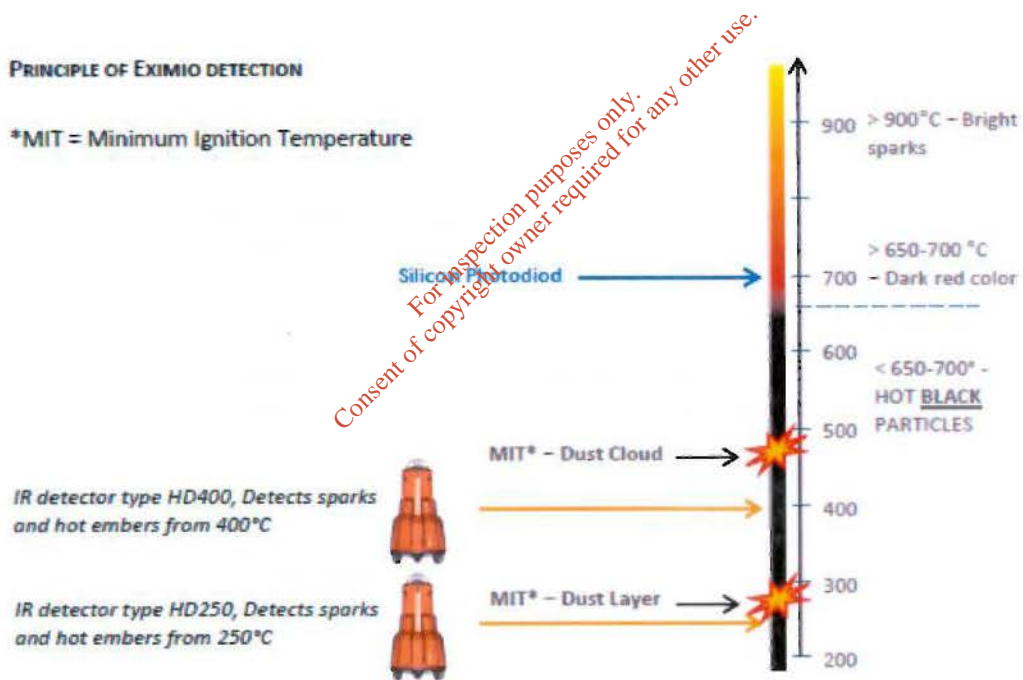
Firefly's detectors for hot particles, glow and flames are using IR-sensors working in the long wave infrared spectrum leaving them insensible for daylight.

It's important to determine the minimum ignition temperatures (MIT) for the material to protect before the correct detector is selected. Note that material can have different MIT depending if it's in a dispersed in air, like in a cyclone or filter, or stored in layers, like in a silo. For example wood dust have a MIT of 470°C when dispersed in air but about 260°C when stored in layers.

The following detectors are included in this offer: FD-4IR

PRINCIPLE OF EXIMIO DETECTION

*MIT = Minimum Ignition Temperature





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RISK ASSESSMENT

This quotation is based on the information received. A fire protection risk analysis covering the entire process has not been performed.

INSTALLATION

Installation and installation material are not included in this quotation.

PARAMETERS

Voltage: 230 or 115V, 50 or 60Hz
400V, 50Hz three-phase for the hydro press pump

Water pressure: 7 – 9 bar

Water supply: Clean water without solid particles or fibres.
The water should not attack the systems components chemically.

Water flow: WNFP7QC nozzle: 6 liters/minute at 7 bar

Incoming water pressure 0.5 – 5 bar when using the Firefly hydro press equipment. Water flow up to 23.6 liters/sec for pump HPP15.

Cooling air: If the temperature inside the detector exceeds 60°C for detector type HD and MD, the detectors must be equipped with cooling air. The temperature inside the detector depends on the temperature of the process and the ambient temperature around the detector housing. For example, a process temperature of 90°C and ambient temperature of 20°C normally results in a temperature of approx. 60°C inside the detector.

Heating/Insulation: If there is a risk that the surrounding temperature at the extinguishing zone decreases below +5°C the water pipes and extinguishing zone must be equipped with heating equipment and insulation.

Connection: For communication with the systems' built-in modem, access to a network with stable signal is required.

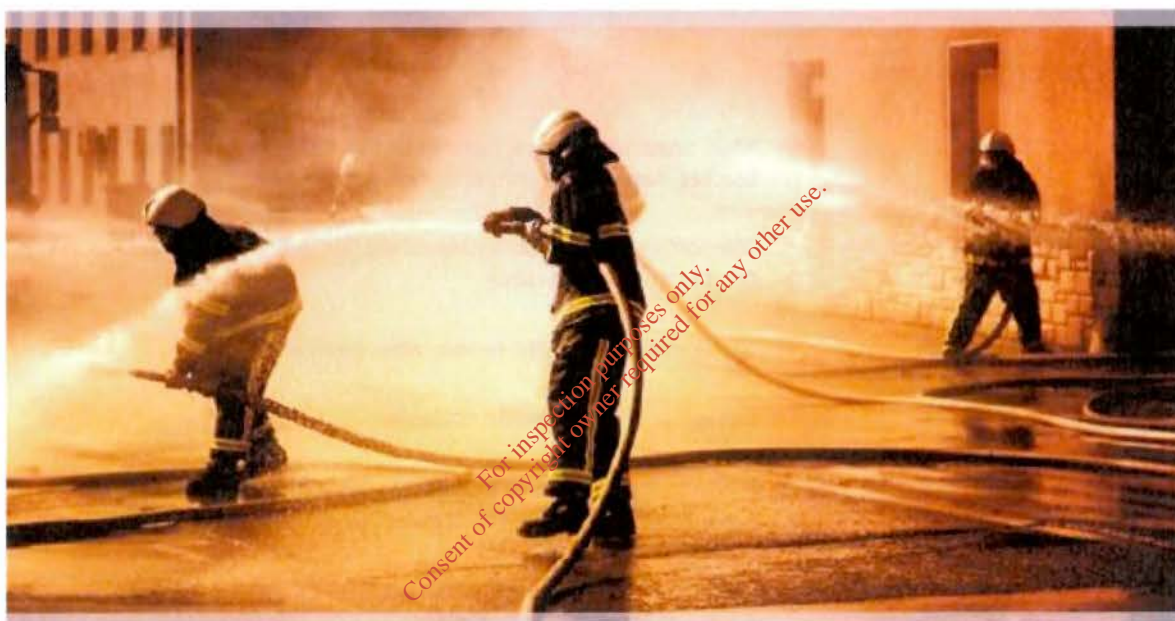


System components

KWD Recycling Ltd.

Quotation number: 111574

Date: 2016-10-14



Firefly AB

Phone +46 (0)8 449 25 00, Fax +46 (0)8 449 25 01
Textilgatan 31, SE-120 30 Stockholm, Sweden
www.firefly.se

Date 2016-10-14
Our ref 111574
MMA 2(3)

QTY TYPE DESCRIPTION

CONTROL UNIT EXIMIO INTUVISION WITH ACCESSORIES

1	pc	-EXIMIO-C IntuVision	Control panel including 12" colour touch-screen with graphic user interface IntuVision™. Provides status overview of all protection zones in the network. Available languages: ENG, DEU, FRA, SPA, SWE, RUS, POL, FIN, NLD, LAV, POR, SLK, EST, LIT, CMN, TUR.
1	pc	AHL-Eximio	Audible/visible alarm, 110 dB. 24 V DC.

ZONE 1 - STORAGE BAY 1

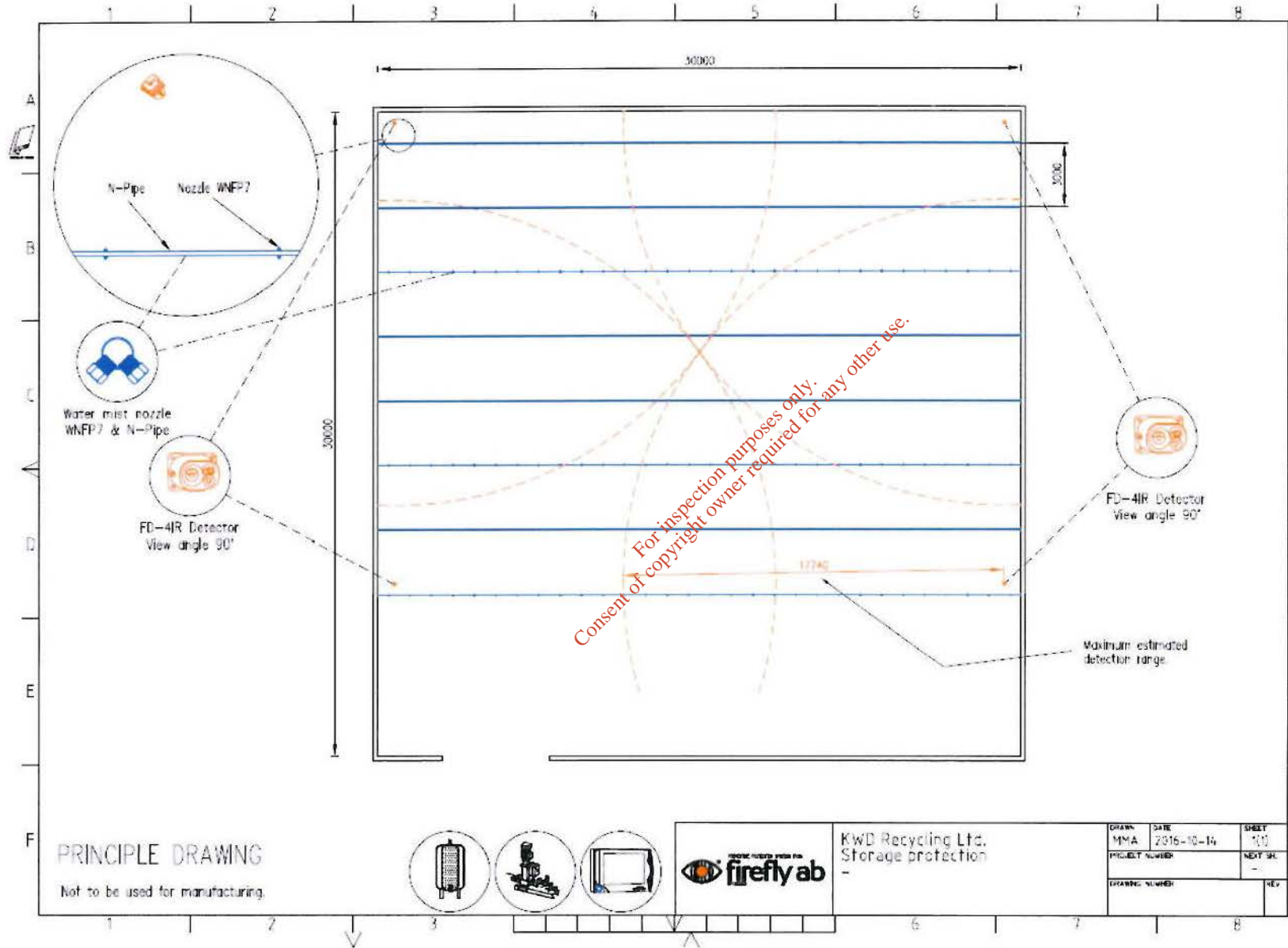
4	pcs	FD-4IR-SET	Multi-spectrum infrared flame detector. Including mounting bracket, detector cable (5m) and connection box.
8	pcs	WS40	Solenoid valve for water extinguishing. 1½" BSP female. 24 V DC. 12 W. Incl. 15 m cable.
8	pc	FX40-BSP	Water strainer. 1½" BSP female. Max. 230 l/min. Brass.
8	pc	BV40-BSP	Ball valve. 1½" BSP female. Lockable.
480	pcs	WNFP7-SS-N	Water mist nozzle. M10x1mm for WNFP-PIPE. Capacity 6,8 l/min at 6 bar (K-factor 2,8). Stainless steel.
40	pcs	WNFP-PIPE28-2V	Water pipe for mist nozzles in pairs (M10x1 mm). C-C distance 1.5 m. Length 6 m. Inside diameter 28 mm. Stainless steel.
1	pc	PB-1-1	Push button for manual release of the system. Including connection box with a NO/NC contact with cable glands for cable diameter 2-7 mm.

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Date 2016-10-14 Our ref 111574 3(3)
MMA

QTY	TYPE	DESCRIPTION
DETECTOR AND NETWORK CABLE		
1	pc BC-250	Cable for detector and Eximio bus communication, 250 m.
HYDRO PRESS UNIT		
2	pcs HPP15-400V	Hydro press pump. Capacity: 23.6 l/sec at 7 bar. Normal working pressure 7-9 bar. Three-phase motor. 380-415 V, 50 Hz, 22 kW.
1	pc HPT150-10	Water tank. Water capacity: 150 l. Max. working pressure 10 bar. 2 1/2" BSP female.

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Appendix 2

Revised Attachment D.1 (o) addressing revised Fire-Water Retention Calculations

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Attachment D.1 (o) – Fire Control System, including Water Supply

The following issues are relevant to Fire Control at the site:

- storage of combustible materials,
- compartmentalisation of these storage areas,
- fire-fighting water and
- fire-water retention.

These issues were previously addressed in both the existing scenario (without the extension) and the proposed scenario (including the extension). Now that the extension is constructed, the issue is only addressed here in the context of the entire facility, including the extensions.

Storage of Combustible Materials

Chapter 2 of The EPA Guidance Note : 'Fire Safety At Non-Hazardous Waste Transfer Stations', outlines Fire Prevention measures for such facilities and Forge Hill recycling Ltd intends to comply with all the measures recommended by the EPA.

In relation to stockpiling of waste, the EPA Guidance Note recommends the following actions:

- *manage size and spacing of stockpiles/stacks;*
- *consider enclosing stockpiles/stacks,*
- *consider whether to turn or not turn stockpiles/stacks.*

Forge Hill Recycling Ltd, intends to operate the existing site in a manner that would limit the extent of a major fire by limiting the size of stockpiles, as detailed here.

The incoming waste stockpile would be limited to **100 tonnes**. We estimate that the density of incoming waste is 0.24 tonnes per m³, based on the size and payload of the large trailers that transport this material (20 tonnes in 84m³). This stockpile would therefore have a volume of **417 m³**.

Enclosure of this stockpile is not practical as it will be subject to continual deposition and loading on to the process line.

The incoming waste stockpile will be moved around as it is loaded on to the process line, so turning will not be required. It will not be stationary for long periods of time.

Product storage in the waste processing buildings (Buildings 1 and 2) will be kept as far as practicable away from the incoming waste stockpile. This will be restricted by the operator to **200 tonnes** of combustible materials. It is expected that 50% of this material would be paper and cardboard and 50% would be plastics (PET, HDPE, plastic film).

The paper and cardboard bales have an estimated density of 0.52 tonnes per m³, based on weights and measurement of current bales produced by the licensee, whereas the plastic bales have an estimated density of 0.40 tonnes per m³, using the same calculation method. The paper/card stockpile would therefore be 192 m³ and the plastic stockpile would be 250

m³ at their maximum extent. The combustible bales would therefore have a maximum extent of **442 m³** (192 m³ + 250 m³) in Buildings 1 & 2.

Bales of product are not expected to act as a source of spontaneous combustion due to their compacted nature and the fact that these materials have been through a process that has separated them from any potentially flammable or hot materials (e.g. aerosol cans or hot ashes).

Compartmentalisation

In Buildings 1 & 2, compartmentalisation is not a practical option as the process lines will link the incoming wastes to the product. However, it is proposed to compartmentalise the new building (Building 3) from the original buildings (Buildings 1 & 2) by way of a fire break wall. Therefore a fire in the original buildings should not spread to the new building and vice-versa.

Bales of product will be carried by forklift from one building to the other, through an open door, but this door will close automatically in the event of a fire and will be kept closed during the night and at other times when the process lines are not operating.

Fire-Fighting Water

In the event of a fire, the shut-off valve on the storm-water line will be activated and storm water will be contained on site. The surface water in the balancing tank is clean and will remain clean for at least 4 hours as contaminated water is kept within the building.

In this scenario, the fire service can use the water in the balancing tank for fire-fighting, should they require it (in addition to the water in the adjacent fire-fighting water storage tank). If flooding occurs in the yard due to heavy rainfall, the fire service can and should alleviate the build-up of floodwater in the yard areas by using the clean water in the balancing tank for fire-fighting, leaving further capacity for surface water containment in the tanks rather than the yard areas.

Total stockpiled combustible material in the original buildings would have a maximum volume of **859 m³** (417 m³ + 442 m³) split into two areas, front and back of the facility.

According to UK Environment Agency Guidance¹, a 300 m³ pile of combustible material will normally require a water supply of at least 2,000 litres per minute for a minimum of 3 hours [360 m³ in total].

Based on this rule of thumb, we calculate that 1,031m³ of water would be required to extinguish a fire that extends to all stockpiles in the original buildings (Buildings 1 & 2).

Forge Hill Recycling Ltd intends to install a sprinkler system that will be zoned to target particular areas of the process and the stockpiles will be targeted in this way. Early operation of the sprinkler system is expected to prevent a fire spreading from the stockpile at one end of the process to the stockpile at the other end, which will be in an adjacent building. However, our calculations are based on full spread of the fire to all stockpiles in the original buildings or to all combustible bales in the new building and this is considered to represent the worst case scenario.

¹ Fire Prevention Plans, Version 2, UK Environment Agency, March 2015. (Page 12)

The source of water for firefighting will be from the water mains servicing the site and an underground fire water storage tank, located close to the northernmost site entrance/exit (See Drawings WL10 and WL11 for tank location – these were submitted with the Waste Licence Application). There is a ring main around the site that feeds 5 no. fire hydrants located in the site yards. Water is supplied to the ring main from a Cork County Council mains water supply and is reported to be designed to discharge 2,200 litres per minute through the hydrants. At this rate, it would take 469 minutes to extinguish the worst case fire [$1,031\text{m}^3 \div 2.2\text{m}^3/\text{min} = 469$ minutes].

However, an additional 82m^3 of fire-fighting water is stored permanently on site in an underground tank located in the north-western part of the yard, close to the northern-most entrance/exit gate. The Fire Service would have access to this water supply during a fire as it is easily accessible from the public road. The availability of this water should reduce the time of a fire to 431 minutes [$(1,031\text{m}^3 - 82\text{m}^3) \div 2.2\text{m}^3/\text{min} = 431$ minutes, i.e. 7hrs and 11 minutes].

Re-filling this storage tank using mobile tankers, if requested by the fire service, would reduce the time of a fire further. The availability of the underground storage tank allows for flexibility in the management of a fire at the site and the site operator can assist the fire service, by arranging the re-filling of this tank, as required.

For example, if the tank was re-filled once per hour during the course of a fire, the time of the fire could theoretically be reduced to **under 5 hours** [$1,031\text{m}^3 - (5 \times 82\text{m}^3) = 621\text{m}^3$] [$621\text{m}^3 \div 2.2\text{m}^3/\text{min} = 282$ mins].

Fire-Water Retention – Buildings 1 & 2

The dry recyclable materials will absorb water and evaporation rates will be high in an intense fire. It is difficult to source data on the likely absorption rates and evaporation rates during such an event. For the purpose of this exercise and in the absence of data, we take a conservative view that 30% of the water used on the fire will be lost through evaporation and/or absorption, given the intensity of the heat generated in such a serious fire. We therefore assume that **722m^3** of fire-water would be generated in a fire in the existing building (70% of input water – $0.7 \times 1,031\text{m}^3$).

We assume that 50mm of rain falls on the site as the fire is extinguished and we assume that the roof is off, so a total of 142m^3 would land on the building ($2,830\text{m}^2$) and be contaminated in this worst case scenario [$2,830\text{m}^2 \times 0.05\text{m} = 142\text{m}^3$]. However, approximately 10% of this rainfall would land on the burning stockpiles and can be considered already included in the volume of fire-fighting water discussed above. The other 90% rainwater (127m^3) would be subjected to evaporation, but not absorption, so we reduce this by a further 15% (conservative estimate rather than 30% used above) to leave 108m^3 of contaminated rainfall.

Total contaminated fire-water is therefore estimated at **830m^3** in the **original** buildings ($722\text{m}^3 + 108\text{m}^3$) in a worst case scenario.

The original building was designed with small ramps on the doors and these provide some fire-water retention. The levels of the floor and the ramps have been reviewed in light of the small extensions that have been constructed to the north of the original building and it is estimated that 166m^3 of containment is provided by these ramps. We allow 10% unavailability due to material and equipment on the floor of these buildings, leaving 149m^3 of containment available in this way.

In addition, three new trenches have been constructed in the original building to facilitate new plant. This provides additional containment, as follows:

	L	W	D	Volume	Availability	Available Volume
Trench 1	29.1	2.75	1.61	129	75%	97
Trench 2	39.36	3.17	1.64	205	75%	153
Trench 3	14.13	2.86	2.9	117	75%	88
						338

Containment in the original buildings is therefore **487 m³** (149 + 338). This is not adequate to address the worst case scenario in the original building (Buildings 1 & 2). However, water will overflow from this building via an underground drain to the new building, where a further **261m³** of containment is provided, as detailed below, giving total containment of **748m³** (487+261) within the buildings. This will be adequate for all but the worst case fire.

In a worst case fire in the original building, an estimated 82m³ (830-748) fire-fighting water will discharge via the doors of Building 3 to the foul and surface water collection systems. The original fire-water retention tank that was provided in the northwest part of the site, close to the public road, has a capacity of **90m³**, so this should be sufficient to hold that contaminated water.

If that tank is not completely empty, due to rainwater from the yard, the new docking bay will be next to fill and that has a capacity of **27m³**. If that fills and spills over, the firewater would back-up into the yard and would be contained on site as the public road is higher than the yard.

Total containment including the original fire-water retention tank and the docking bay is calculated at **865m³**, which is more than adequate to manage the predicted 830m³ generated in a worst case fire in the original buildings. The details of the calculations are provided below:

Floor Area					
L	W	less (m2)	add (m2)	m2	
36	30	60	0	1020	New building
60	46	35	105	2830	Original building including extensions 2 and 3 and part of 1.
				3850	Total

	Weight	density	Volume	Average Height	Area
Existing Building	t	t/m3	m3	m	m2
Incoming Waste	100	0.24	417	5	83
Paper Storage Existing Building	100	0.52	192	6	32
Plastic Storage Existing Building	100	0.4	250	6	42
Subtotal EB	300		859		157
				% of building	6%

New Building

Paper Storage New Building	300	0.52	577	6	96
Plastic Storage New Building	160	0.4	400	6	67
Metal Storage	200	0.5	400	6	67
Subtotal NB	660		1377		229
				% of Building	22.5%
Total	960		2236		387

Existing Building

Firewater Needed			1031		m3
Hydrant Discharge			2.200		m3 per minute
Water in Tank			82		m3
Time of Fire			431		minutes
Time of Fire			7.2		hours
Estimated Evaporation & Absorption			30%		
Rainfall			50		mm
Rainfall on building			141.5		m3
Rainfall on fire (included already)			10%		
Rainfall not already included			127		m3
Estimated Evaporation Rate for Rainfall			15%		
Firewater generated from rainfall after evaporation			108		m3
Total Firewater			830		m3

Containment in Existing Building

Original Containment			166		m3
Floor area not available due to stockpiles and equipment			10%		
Effective containment			149		m3
Additional containment in new building			261		mm
Additional containment from trenches			338		m3
Containment in Docking Bay			27		m3
Containment in Firewater Retention Tank			90		m3
Available Containment			865		m3

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Fire-Water Retention – New Building (Building 3)

The maximum volume of each material to be stored in Building 3 is detailed above.

Using the same assumptions discussed above, it is estimated that **857m³** of fire-water would be generated in a fire in Building 3. Details are presented as follows:

New Building (Building 3)

Firewater Needed	1,172	m ³
Hydrant Discharge	2.2	m ³ per minute
Water in Tank	82	m ³
Time of Fire	496	minutes
Time of Fire	8.3	hours
Estimated Evaporation & Absorption	30%	
Rainfall	50	mm
Rainfall on building	51	m ³
Rainfall on fire (included already)	16%	
Rainfall not already included	43	m ³
Estimated Evaporation Rate for Rainfall	15%	
Firewater generated from rainfall after evaporation	36	m ³
Total Firewater	857	m³

As mentioned earlier, the time of the fire can be reduced by using the on-site balancing tanks for additional storage and use of fire-fighting water.

Containment of firewater generated in a fire in Building 3 will be managed as follows:

Containment in New and Existing Buildings

Ramps at Doors	330	mm
Building containment with ramps	336.6	m ³
Floor area not available due to stockpiles	22.5%	
Effective containment	261	m ³
Additional containment from Existing Building	487	m ³
Containment in Docking Bay	27	m ³
Containment in Firewater Retention Tank	90	m ³
Available Containment	865	m³

Total containment would therefore be **865m³** which is more than adequate to contain the worst-case fire-water from Building 3. The firebreak wall will be designed to ensure that the fire is compartmentalised and does not spread to both new and original buildings.

Fire Certificates for the Site

Cork County Council Fire Services and Operations section has issued a number of fire certificates for the site. These are:

- Fire Certificate 06/BC/S/1500 granted in August 2006 for the Administration Building
- Fire Certificate 07/BC/S/1014 granted in January 2007 for Building 3
- Fire Certificate 08/BC/S/1129 granted in March 2008 for the new extension to the building.

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Appendix 3

Noise Report Prepared by Damian Brosnan Acoustics

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O'Callaghan Moran & Associates		
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Model Farm Road		
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regarding

Forge Hill Recycling Ltd. – Selection of noise monitoring stations

Dear Jim,

dBA report 107.1.3 dated 21.10.16 describes daytime and night-time surveys undertaken earlier this month at the Forge Hill Recycling (FHR) facility at Forge Hill, Cork. Seven monitoring stations were used as follows:

- 4 onsite stations, designed N1-N4 in the report. These represent a continuation of previously used measurement positions, although repositioned to the four site corners.
- 3 offsite stations, designated NSL1-NSL3, selected to represent the nearest noise sensitive locations (NSLs), respectively consisting of dwelling houses to the northwest, east, and southwest of the FHR facility.

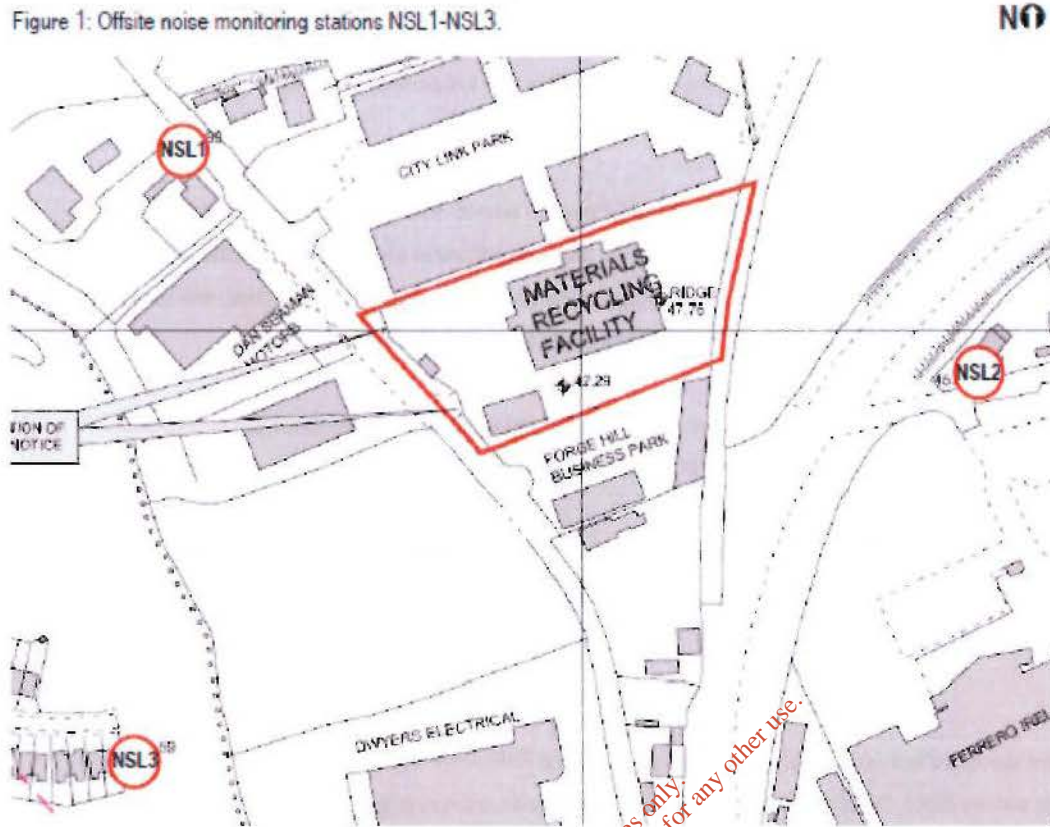
It is understood that the FHR waste facility permit is currently under review by Cork County Council. I propose that the opportunity be taken here to revise the noise monitoring positions. Condition 6.23 of the current permit allows for noise monitoring stations to be agreed with the local authority. Although the current permit refers to four measurement stations, the absence of local sensitive receptors is such that the three offsite stations NSL1-NSL3 are adequately representative. It is thus recommended that noise monitoring be undertaken in the future solely at the offsite stations NSL1-NSL3. These positions are shown in figure 1 over.

The proposal to replace the onsite noise stations used previously with three offsite stations is consistent with the current approach to noise monitoring adopted by the EPA. In this regard, the following should be noted:

1. The EPA document *NG4 Guidance note for noise: Licence applications, surveys and assessments in relation to scheduled activities* (2016) states:

Given that the [noise] locations selected at [licensing] stage will influence the noise measurement locations that will be defined in any licence issued to an operator, appropriate positions should be selected with reference to the definition of 'NSL'. The choice of measurement location is often not straightforward. Generally the main issue to be addressed is quantifying the noise level experienced by affected people. This usually implies measurement outside the 'most exposed' window of the building they occupy.

Figure 1: Offsite noise monitoring stations NSL1-NSL3.



2. The NG4 document notes that measurement directly outside the window of a NSL is not always practical, and recommends that representative measurement positions close to relevant NSLs will be more appropriate. In this regard, the document refers to *British Standard BS 4142:2014 Method for rating industrial noise affecting mixed residential and industrial areas* (1997) (revised in 2014 but in essence unaltered). BS 4142:1997 notes:

Choose measurement positions that are outside buildings that will give results that are representative of the levels at the buildings where people are likely to be affected.

In the vicinity of the FHR facility, the most vulnerable receptors in this regard are dwellings represented by the proposed noise stations NSL1, NSL2 and NSL3.

3. The EPA defines a noise sensitive location (NSL) as:

Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.

It is noted that the definition does not refer to commercial or industrial units such as those located adjacent to the boundaries of the FHR facility. The nearest NSLs are considered to be residential dwellings represented by stations NSL1, NSL2 and NSL3 proposed above.

4. For the above reasons, the EPA has moved away from the use of boundary measurement stations in IPPC, IED and waste licences. Indeed, their NG4 document notes that at certain facilities, 'a boundary measurement location may not be representative of the sound levels at the receptor', adding that 'it is preferable to enforce noise criteria by measurement at NSLs'.

5. IPPC, IED and waste licences currently issued by the EPA typically refer to measurement stations at offsite NSLs. A large number of such facilities are routinely surveyed by the undersigned, and in almost all cases, noise monitoring is required at representative offsite stations only, without any requirement for onsite monitoring. Indeed, with respect to routine monitoring, the NG4 document notes that 'generally, limits will be specified for NSLs', adding:

Given that the primary objective of the annual noise survey is to determine the level of compliance, the measurement positions should include those positions which are most affected by the site's emissions.

In the vicinity of the FHR site, the most vulnerable positions consist of residential receptors represented by stations NSL1, NSL2 and NSL3 proposed above. There are no NSLs located in proximity to the boundary, and thus measurement at boundary positions is superfluous.

It is therefore concluded that (a) noise limits specified in the revised FHR permit will be most relevant if applied only to the offsite stations NSL1, NSL2 and NSL3, and that (b) routine noise monitoring should thus focus only on these receptors. It is also concluded that measurement at FHR boundary positions, and application of noise limits to same, will not be of any benefit to sensitive receptors, and will therefore be entirely superfluous and irrelevant.

Please contact me if you have any queries.

Yours sincerely,



Damian Brosnan

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October 2016 noise compliance
survey at Forge Hill Recycling
facility, Forge Hill, Cork

Permit ref. WFP-CK-15-0148-01

Client	O'Callaghan Moran & Associates OBO Forge Hill Recycling		
Prepared by	Damian Brosnan BSc MSc MICE MGI		
Report no	Date	Status	
107.1.1	11.10.16	Release 1	
107.1.2	14.10.16	Night survey added	
107.1.3	21.10.16	Clarification comments	

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Summary

On 07.10.16, Damian Brosnan Acoustics carried out a daytime environmental noise survey at the Forge Hill Recycling facility at Forge Hill, Cork. The survey is a requirement of waste facility permit WFP-CK-15-0148-01 issued by Cork County Council in respect of the facility. Operations were underway at the facility throughout the survey. A night-time survey was undertaken from 2300 h on 13.10.16 while internal operations were in progress.

Noise monitoring was carried out at four onsite and three offsite stations. The onsite stations are slightly altered from those used previously. It is considered that the new stations more adequately represent the current site layout.

The local noise environment is entirely dominated by road traffic noise. Daytime facility emissions ranged from ≤ 48 dB to ≤ 53 dB at the onsite stations. Site emissions therefore did not exceed the 55 dB daytime criterion specified in the site waste permit. Night-time levels at the four onsite stations were 45 dB or less, and thus complied with the 45 dB night-time limit.

Site emissions were inaudible at the three offsite stations during daytime and night-time hours. Night-time measurements indicated that the site contribution ranged from ≤ 34 dB to ≤ 40 dB. These levels are lower than the 45 dB night-time limit. No tones or impulses were noted in site emissions at any station.

1 Introduction

1.1 Damian Brosnan Acoustics was instructed by O'Callaghan Moran & Associates, on behalf of their client Forge Hill Recycling Ltd. (FHR), to carry out an environmental noise survey at the FHR recycling facility at Forge Hill, Cork. The survey is an annual requirement of waste facility permit WFP-CK-15-0148-01 issued 21.12.15 by Cork County Council in respect of the facility. The objectives of the survey were as follows:

- To undertake daytime and night-time noise monitoring in accordance with *International Standard ISO 1996-2:2007 Acoustics - Description, measurement and assessment of environmental noise, Part 2: Determination of environmental noise levels (2007)*.
- To measure noise levels at four onsite and three offsite stations as discussed in **section 2** below, and shown in **appendix 1**.
- To assess measured levels in the context of noise limits specified by permit WFP-CK-15-0148-01, reproduced in **appendix 2**.

1.2 The daytime noise survey was undertaken Friday 07.10.16 at the four onsite stations discussed in **section 2**. Subsequent aural checks at the three offsite stations indicated that site emissions were not audible here, and that the noise environment at all three stations was dominated by road traffic. Daytime monitoring was therefore not undertaken at the offsite stations. The night-time survey was carried out Thursday 13.10.16 from 2300 h. Monitoring was undertaken at all four boundary stations and the three offsite stations. Survey methodology, equipment specifications and weather conditions are listed in **appendix 3**.

1.3 Operations progressed at the FHR facility throughout both surveys. Noise emissions arose from the following sources:

- Compressor in continuous operation in building.
- Baling plant in continuous operation in building.
- Processing plant in continuous operation in building, apart from breaks at 1200-1220 h and 0000-0020 h.
- Tracked excavator and telescopic handler in alternating use within the building during the daytime survey, with limited use during the night-time survey.
- Occasional truck movements onsite during the daytime survey

1.4 Offsite road traffic noise dominated the ambient noise environment during both surveys, with traffic continuously audible from roads in several directions. Noise emissions from mobile plant at a construction site on the opposite side of Forge Hill were also significant during the daytime survey, particularly emissions from one plant item with a defective exhaust silencer. During the night-time survey, several stations were affected by continuously clearly audible emissions from the Ferrero facility to the southeast.

2 Monitoring stations

2.1 Four onsite noise monitoring stations were agreed previously with Cork County Council, as required by condition 6.23 and schedule C.1 of permit WFP-CK-15-0148-01. The four stations were located close to the midpoints of all four boundaries. Following recent construction of an extension to the onsite waste processing building, Cork County Council has decided to review the site permit. As part of the review, the authority has requested that noise monitoring positions be reassessed in light of the extension, and in particular a compressor louver installed on the southern façade of the building close to the weighbridge.

2.2 It is considered that the original onsite noise stations do not adequately represent the new site layout. It is thus proposed to revise the positions of these stations as follows:

- Original station N1 is not sufficiently close to the recently constructed extension and compressor louver to represent same. In addition, the noise environment at N1 is affected by reflections from a boundary embankment with cladding, and measurements here are not representative of emissions propagated offsite beyond the embankment. Moreover, the proximity of N1 to the onsite weighbridge is such that the permit holder cannot reasonably comply with any noise limit, as a truck on the weighbridge for say 30 seconds is likely to exceed the 55 dB $L_{Aeq, 30 \text{ min}}$ criterion. In this regard, it is noted that any noise limits enforced by Cork County Council must be reasonable, practical, and enforceable (legal precedence exists for these requirements). It is therefore proposed to relocate N1 70 m west to the southwest corner, with a direct line of sight to the compressor louver.
- Original station N3 does not meet health and safety requirements, as any measurement here will place the survey operator and his/her equipment on a regularly used onsite truck access route. It is therefore proposed to relocate N3 70 m east to the northeast corner.
- As a result of the relocation of N1 and N3 towards the nearest corners, it is also proposed to relocate N2 and N4 in order to redistribute the measurement stations around the boundary. Thus N2 is relocated 15 m north to the northwest corner, and N4 50 m south to the southeast corner.

2.3 The revised boundary positions, shown in **appendix 1**, were used during the noise survey described below. Monitoring was also conducted at three offsite stations (NSL1-NSL3), selected to represent the nearest noise sensitive locations, consisting of residential dwellings. The positions of these stations is also shown in **appendix 1**.

3 Results

3.1 Noise data recorded are presented in **appendix 4**, and summarised in **tables 1 & 2** over. Frequency spectra and time history profiles are shown in **appendix 5**.

Table 1: Noise data summary – Daytime.

Station	N1	N2	N3	N4
Ambient $L_{Aeq, 30 \text{ min}}$ (dB)	64	66	61	59
Facility specific $L_{Aeq, 30 \text{ min}}$ (dB)	49	≤48	≤53	52
Tone objectively detected	x	x	x	x
Tone attributable to facility	x	x	x	x
Facility audibly tonal	x	x	x	x
Facility audibly impulsive	x	x	x	x
Facility rated $L_{Aeq, 30 \text{ min}}$ (dB)	49	≤48	≤53	52
Limit (dB)	55	55	55	55
Compliance	✓	✓	✓	✓

Table 2: Noise data summary – Night-time.

Station	N1	N2	N3	N4	NSL1	NSL2	NSL3
Ambient $L_{Aeq, 30 \text{ min}}$ (dB)	55	55	56	53	61	64	46
Facility specific $L_{Aeq, 30 \text{ min}}$ (dB)	45	<40	≤45	≤44	≤39	≤40	≤34
Tone objectively detected	x	x	x	x	x	x	x
Tone attributable to facility	x	x	x	x	x	x	x
Facility audibly tonal	x	x	x	x	x	x	x
Facility audibly impulsive	x	x	x	x	x	x	x
Facility rated $L_{Aeq, 30 \text{ min}}$ (dB)	45	<40	≤45	≤44	≤39	≤40	≤34
Limit (dB)	45	45	45	45	45	45	45
Compliance	✓	✓	✓	✓	✓	✓	✓

3.2 Daytime noise levels at the four onsite stations were dominated by offsite road traffic on Forge Hill and national routes N27 and N40. Traffic noise resulted in elevated $L_{Aeq, 30 \text{ min}}$ levels, peaking at 66 dB at N2 adjacent to Forge Hill. Traffic noise was sufficiently continuous to also affect $L_{AF50, 30 \text{ min}}$ levels, and these were 56-58 dB across the site. The elevated traffic noise masked onsite daytime emissions at all four stations. Inbuilding operations were entirely inaudible at N1, N2 and N4, although the compressor was faintly audible at N1 during lulls in Forge Hill traffic. At N3, inbuilding operations were slightly audible. Occasional truck movements on external yard areas, when present, were clearly audible at the measurement stations.

3.3 Due to traffic noise intrusion, measured $L_{Aeq, 30 \text{ min}}$ levels do not represent daytime FHR emissions. The site contribution at each station was determined using procedures included in appendix 4. Site emissions were calculated at 49 dB at N1, 48 dB or less at N2, 53 dB or less at N3, and 52 dB at N4. These levels are in all cases lower than the 55 dB daytime limit specified in waste permit WFP-CK-15-0148-01. No tones or impulses were noted in site emissions.

3.4 Night-time FHR emissions were slightly audible at the four onsite stations, being almost entirely masked by road traffic noise. Site emissions therefore did not contribute to measured $L_{Aeq, 30 \text{ min}}$ levels of 53-56 dB. The contribution from FHR emissions to these stations was calculated at 45 dB or less, and therefore did not exceed the 45 dB night-time limit specified in the permit. As during the daytime, no tones or impulses were noted.

3.5 At the three offsite stations NSL1-NSL3, FHR noise emissions were inaudible during the daytime inspection, as the noise environment was entirely dominated by traffic noise. Night-time FHR emissions were also inaudible at the three offsite stations. Measurements were conducted at these stations during the night-time survey. The high $L_{Aeq, 30min}$ levels measured (46-64 dB) reflect the dominance of road traffic, entirely masking site emissions. Indeed, the intrusion of road traffic prevented any calculation of the contribution from the FHR facility, and it was possible only to conclude that FHR emissions were less than or equal to the following levels: 39 dB at NSL1, 40 dB at NSL2, and 34 dB at NSL3. No tones or impulses were recorded.

4 Conclusions

4.1 Specific daytime FHR noise emissions ranged from ≤ 48 dB to ≤ 53 dB. Site emissions therefore did not exceed the 55 dB daytime criterion specified in the site waste permit.

4.2 Night-time FHR levels at the four onsite stations were 45 dB or less, and thus complied with the 45 dB night-time limit.

4.3 FHR emissions were inaudible at the three offsite stations during daytime and night-time hours. Night-time measurements indicated that the FHR contribution ranged from ≤ 34 dB to ≤ 40 dB. These levels are lower than the 45 dB night-time limit.

4.4 No tones or impulses were noted in FHR emissions at any stage.

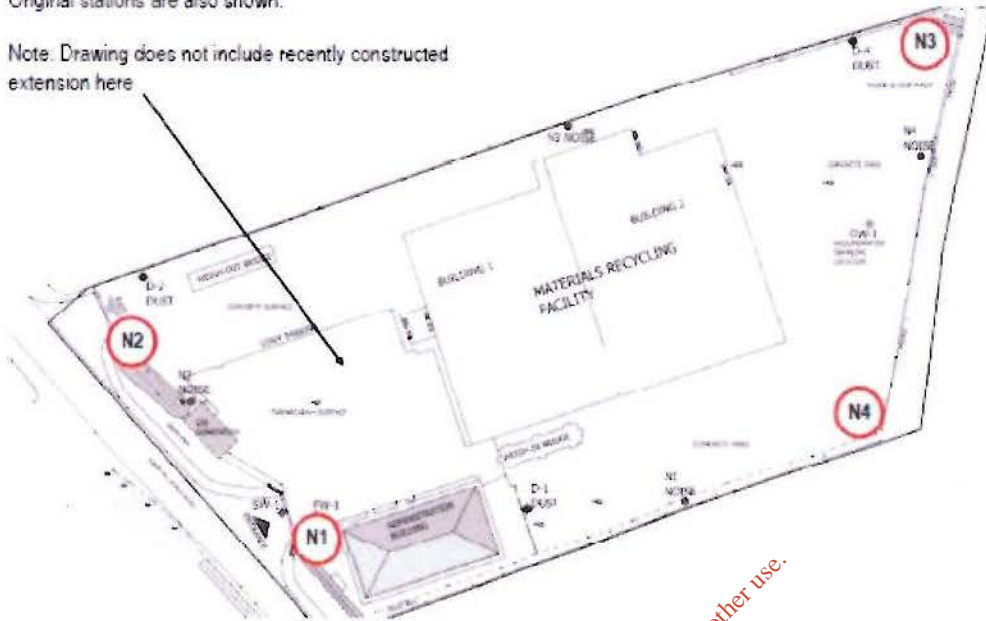
4.5 It is noted that the FHR facility is highly unlikely to give rise to adverse noise impacts at offsite receptors for several reasons:

- All waste processing operations onsite are confined to within the building.
- There are no noise sensitive locations adjacent to the site boundaries.
- Ambient noise levels across the local area are particularly elevated due to road traffic.

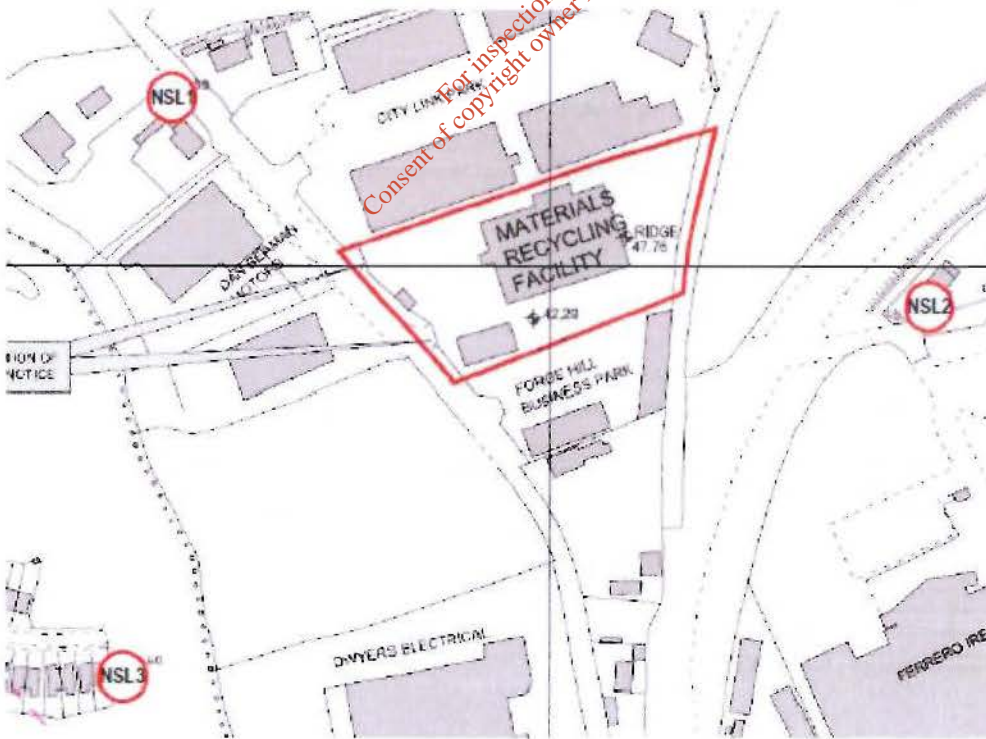
Appendix 1: Noise stations

Proposed new boundary noise stations are shown in red.
Original stations are also shown.

Note: Drawing does not include recently constructed extension here



Proposed offsite stations are shown below in red.



October 2016 noise compliance survey at Forge Hill Recycling facility, Forge Hill, Cork

DBA report 107.1

Appendix 2: WFP-CK-15-0148-01 noise conditions

4.17 Noise Control

- 4.17.1 The permit holder shall, in advance of the commencement of waste activities, install and provide adequate measures for the control of noise emissions, including impulsive and tonal emissions, from the facility.
- 4.17.2 Noise abatement and attenuation or absorption measures shall be placed within the waste processing building or on waste processing equipment as appropriate or on items of plant that has the potential to generate excessive noise or when operational in combination with one another have the potential to exceed noise emission limit values at the facility boundary.

5.5 Waste Acceptance Hours and Hours of Operation

- 5.5.1 Waste shall only be accepted at the facility between the hours of 06:30 - 20:00 Monday to Saturday and 09:30 - 18:00 on a Bank Holiday
- 5.5.2 The facility shall only be operated during the hours of 06:00 - 22:00 Monday to Saturday and 09:00 - 18:00 on a Bank Holiday.
- 5.5.3 Waste shall not be accepted at the facility and the facility shall not be operated on Sundays
This condition may be reviewed and amended by the Local Authority at any time.

- 6.8 There shall be no clearly audible tonal component or impulsive component in the noise emissions from the activity at the noise sensitive locations.

- 6.23 The permit holder shall install four monitoring points as specified in Schedule C: Monitoring Table C.1.1. within two months from the date of grant of this waste facility permit.

B.1 Noise Emissions: (Measured at the monitoring points to be agreed- refer to condition 6.23).

Day dB(A) LAeq(30 minutes)	Night dB(A) LAeq(30 minutes)
55	45

C.1 Monitoring Locations

Monitoring locations shall be as specified hereunder.

Table C.1.1 Noise, Surface water, Groundwater, Wastewater, and Dust Monitoring Locations

NOISE	SURFACE WATER	GROUNDWATER	WASTEWATER	DUST
STATIONS	STATIONS	STATION	STATIONS	STATIONS
NS-1 ^{Note 1}	SW-1 ^{Note 2}	GW-1 ^{Note 3}	PW-1 ^{Note 4}	ST-1 ^{Note 5}
NS-2 ^{Note 1}				ST-2 ^{Note 5}
NS-3 ^{Note 1}				ST-3 ^{Note 5}
NS-4 ^{Note 1}				ST-4 ^{Note 5}

Note 1: To be agreed under Condition 6.23 of this waste facility permit

C.3 Noise

Table C.3.1 Noise Monitoring Frequency and Technique

Parameter	Monitoring Frequency	Analysis Method/Technique
L(A) _{eq} [30 minutes]	Annual	Standard ^{Note 1}
L(A) ₁₀ [30 minutes]	Annual	Standard ^{Note 1}
L(A) ₉₀ [30 minutes]	Annual	Standard ^{Note 1}
Frequency Analysis (1/3 Octave band analysis)	Annual	Standard ^{Note 1}

Note 1: "International Standards Organisation, ISO 1996, Acoustics - description and Measurement of Environmental noise: Parts 1, 2 and 3"

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Appendix 3: Survey details

File	Project ref.	107
	Client	O'Callaghan Moran & Associates OBO Forge Hill Recycling
	Location	FHR facility Forge Hill Cork
	Stations	Onsite N1 N2 N3 N4 Offsite: -
	Purpose	Waste facility permit compliance survey
	Comment	Facility operating Station positions revised by agreement with FHR
Event	Period	Daytime
	Date	07.10.16
	Day	Friday
	Time	1000-1330
	Operator	Damian Brosnan BSc MSc MIOA MIEI
	Sound level meter	2250: All stations
Conditions	Cloud cover	Increasing gradually to 100 % by 1100
	Precipitation	0 mm
	Temperature	10 rising to 14 °C
Wind	Direction	SE
	Speed	0-3 m/s
	Measurement	Anemo anemometer 2 m above ground level
Sound level meter	Instrument	Bruel & Kjaer Type 2250
	Instrument serial no.	2506594
	Microphone serial no.	2529531
	Application	BZ7224 Version 2.5
	Bandwidth	Broadband & 1/3 octaves
	Max. input level	141.16 dB
	Broadband weightings	Time: Fast Frequency: 1/3
	Spectrum weightings	Time: Fast Frequency: 1/3
	Windscreen correction	UA-1650
	Sound field correction	Free-field
	UKAS calibration	08.02.16
	Calibrating laboratory	Bruel & Kjaer Denmark
	Calibration certificate	Available on request
Onsite calibration	Time	07/10/2016 09:45:50
	Type	External
	Sensitivity	47.74 mV/Pa
	Post survey check	93.9 dB
Onsite calibrator	Instrument	Bruel & Kjaer Type 4231
	Instrument serial no.	1723667
	UKAS calibration	05.02.16
	Calibrating laboratory	Bruel & Kjaer Denmark
	Calibration certificate	Available on request
Uncertainty	Instrumentation	±1 dB (IEC 61672:2002 Class 1)
	External	±0-3 dB (station & weather dependent, estimated)
	Total	±5 dB (estimated, including expanded uncertainty)
Methodology	Standards	ISO 1996 (2007 & 2016)
	Microphone position	Free field, 1.5 m above ground level
	Intervals	30 min logging at 10 s

October 2016 noise compliance survey at Forge Hill Recycling facility, Forge Hill, Cork

DBA report 107.1

File	Project ref.	107
	Client	O'Callaghan Moran & Associates OBO Forge Hill Recycling
	Location	FHR facility Forge Hill Cork
	Stations	Onsite: N1 N2 N3 N4 Offsite: NSL1 NSL2 NSL3
	Purpose	Waste facility permit compliance survey
	Comment	Facility operating Station positions revised by agreement with FHR
Event	Period	Night-time
	Date	13.10.16—14.10.16
	Day	Thursday night into Friday morning
	Time	2300-0210
	Operator	Damian Brosnan BSc MSc MIOA MIEI
	Sound level meter	2250: N2 N3 NSL1 NSL2 NSL3 2250L: N1 N4
Conditions	Cloud cover	0 %
	Precipitation	0 mm
	Temperature	8 falling to 5 °C
Wind	Direction	E airflow
	Speed	0 m/s
	Measurement	Anemo anemometer 2 m above ground level
Sound level meter	Instrument	Bruel & Kjaer Type 2250
	Instrument serial no.	2506594
	Microphone serial no.	2529531
	Application	BZ7224 Version: 2.5
	Bandwidth	Broadband & 1/3 octaves
	Max. input level	141.16 dB
	Broadband weightings	Time: Fast Frequency: AC
	Spectrum weightings	Time: Fast Frequency: Z
	Windscreen correction	UA-1650
	Sound field correction	Free-field
	UKAS calibration	08.02.16
	Calibrating laboratory	Bruel & Kjaer Denmark
	Calibration certificate	Available on request
	Onsite calibration	Time
Type		External
Sensitivity		45.69 mV/Pa
Post survey check		93.9 dB
Onsite calibrator	Instrument	Bruel & Kjaer Type 4231
	Instrument serial no.	1723667
	UKAS calibration	05.02.16
	Calibrating laboratory	Bruel & Kjaer Denmark
	Calibration certificate	Available on request
Uncertainty	Instrumentation	±1 dB (IEC 61672:2002 Class 1)
	External	±0.3 dB (station & weather dependent, estimated)
	Total	±5 dB (estimated, including expanded uncertainty)
Methodology	Standards	ISO 1996 (2007 & 2016)
	Microphone position	Free field, 1.5 m above ground level
	Intervals	30 min logging at 10 s

File	Project ref.	107
	Client	O'Callaghan Moran & Associates OBO Forge Hill Recycling
	Location	FHR facility Forge Hill Cork
	Stations	Onsite: N1 N2 N3 N4 Offsite: NSL1 NSL2 NSL3
	Purpose	Waste facility permit compliance survey
	Comment	Facility operating Station positions revised by agreement with FHR
Event	Period	Night-time
	Date	13.10.16—14.10.16
	Day	Thursday night into Friday morning
	Time	2300-0210
	Operator	Damian Brosnan BSc MSc MIOA MIEI
	Sound level meter	2250: N2 N3 NSL1 NSL2 NSL3 2250L: N1 N4
Conditions	Cloud cover	0 %
	Precipitation	0 mm
	Temperature	8 falling to 5 °C
Wind	Direction	E airflow
	Speed	0 m/s
	Measurement	Anemo anemometer 2 m above ground level
Sound level meter	Instrument	Bruel & Kjaer Type 2250-L
	Instrument serial no.	2566801
	Microphone serial no.	2571655
	Application	BZ7130 Version 2.0
	Bandwidth	Broadband & 1/3 octaves
	Max. input level	142.66 dB
	Broadband weightings	Time: Fast Frequency: AC
	Spectrum weightings	Time: Fast Frequency: Z
	Windscreen correction	UA1404 outdoor kit with EH-2152 secondary windscreen
	Sound field correction	Free-field
	UKAS calibration	13.01.15
	Calibrating laboratory	Bruel & Kjaer Denmark
	Calibration certificate	Available on request
Onsite calibration	Time	13/10/2016 22:52:32
	Type	External
	Sensitivity	43.68 mV/Pa
	Post survey check	93.9 dB
Onsite calibrator	Instrument	Bruel & Kjaer Type 4231
	Instrument serial no.	1723667
	UKAS calibration	05.02.16
	Calibrating laboratory	Bruel & Kjaer Denmark
	Calibration certificate	Available on request
Uncertainty	Instrumentation	±1 dB (IEC 61672:2002 Class 1)
	External	±0-3 dB (station & weather dependent, estimated)
	Total	±5 dB (estimated, including expanded uncertainty)
Methodology	Standards	ISO 1996 (2007 & 2016)
	Microphone position	Free field, 1.5 m above ground level
	Intervals	30 min logging at 10 s

Appendix 4: Noise data

See glossary at end of report for definition of parameters

Station	Date	Time	Wind vector	Daytime			Night-time
				L _{Aeq} 30 min dB	L _A F10 30 min dB	L _A F90 30 min dB	Specific L _{Aeq} 30 min dB
N1	07.10.16	1007-1037	x	64	67	57	49
	<p>Facility: No waste processing operations audible. Compressor faintly audible during sporadic lulls in road traffic. Several truck movements through entrance dominant when present.</p> <p>Extraneous: Forge Hill road traffic continuously dominant. During sporadic lulls, distant traffic continuously clearly audible in several directions. No other noise audible apart from clearly audible loader/dumper in almost continuous use at construction site across road.</p> <p>Specific L_{AeqT} determination: Compressor faintly audible during traffic lulls, thus estimated at 8 dB < L90.</p>						
N1	13/14.10.16	2340-0010	0	55	55	49	45
	<p>Facility: No emissions audible other than compressor emissions slightly audible through louver.</p> <p>Extraneous: Intermittent Forge Hill road traffic dominant when present. Distant traffic continuously clearly audible, particularly on N27 to S and SE, dominating L90.</p> <p>Specific L_{AeqT} determination: Compressor partially contributing to L90, estimated at 1/3 contribution.</p>						
N2	07.10.16	1038-1108	+	66	69	58	≤48
	<p>Facility: No emissions audible.</p> <p>Extraneous: As N1. Passing road sweeper truck 1045-1047 clearly audible.</p> <p>Specific L_{AeqT} determination: Site inaudible, thus at least 10 dB < L90.</p>						
N2	13/14.10.16	2342-0012	0	55	55	48	<40
	<p>Facility: Processing operations in building faintly audible until 0000 h.</p> <p>Extraneous: Intermittent Forge Hill road traffic dominant when present. Distant traffic continuously clearly audible in several directions, dominating L90. Sporadic clearly audible impulsive clangs from metal dropping or similar at industrial/commercial premises several hundred metres NE.</p> <p>Specific L_{AeqT} determination: Site faintly audible, thus estimated at 8-9 dB < L90.</p>						
N3	07.10.16	1259-1329	x	61	62	58	≤53
	<p>Facility: Processing plant and/or mobile plant in building slightly audible through closed roller shutter doors on E façade. No truck movements on yard during interval.</p> <p>Extraneous: Continuous road traffic noise to SE clearly audible, dominating soundscape. No other noise audible apart from local birdsong and crow calls.</p> <p>Specific L_{AeqT} determination: Inbuilding operations almost entirely masked by road traffic noise. Site contributions at least 5 dB < L90.</p>						
N3	13.10.16	2303-2333	0	56	59	54	≤45 dB
	<p>Facility: Processing operations in building faintly audible, almost entirely masked by traffic. No yard activity.</p> <p>Extraneous: Road traffic continuously clearly audible in several directions, particularly N27 traffic dominating soundscape. No other noise audible apart from continuous Ferrero emissions to SE, clearly audible and distinctive in character. Sporadic clearly audible impulsive clangs from metal dropping or similar at industrial/commercial premises several hundred metres NE.</p> <p>Specific L_{AeqT} determination: Site emissions almost entirely masked by traffic, estimated at least 9 < L90.</p>						
N4	07.10.16	1224-1254	0	59	60	56	52
	<p>Facility: Occasional truck movements on yard dominant when present. Inbuilding operations entirely masked by road traffic noise.</p> <p>Extraneous: Road traffic in several directions continuously clearly audible and dominant. Loader at nearby premises almost continuously quite audible. Local bird calls.</p> <p>Specific L_{AeqT} determination: Leq due to truck movements = Leq(Ambient)-Leq(Residual). Residual determined by excluding truck activity.</p>						

Audibility scale: Inaudible; faintly audible; slightly audible; audible at low level; quite audible; clearly audible; dominant; intrusive; excessive.

See glossary at end of report for definition of parameters

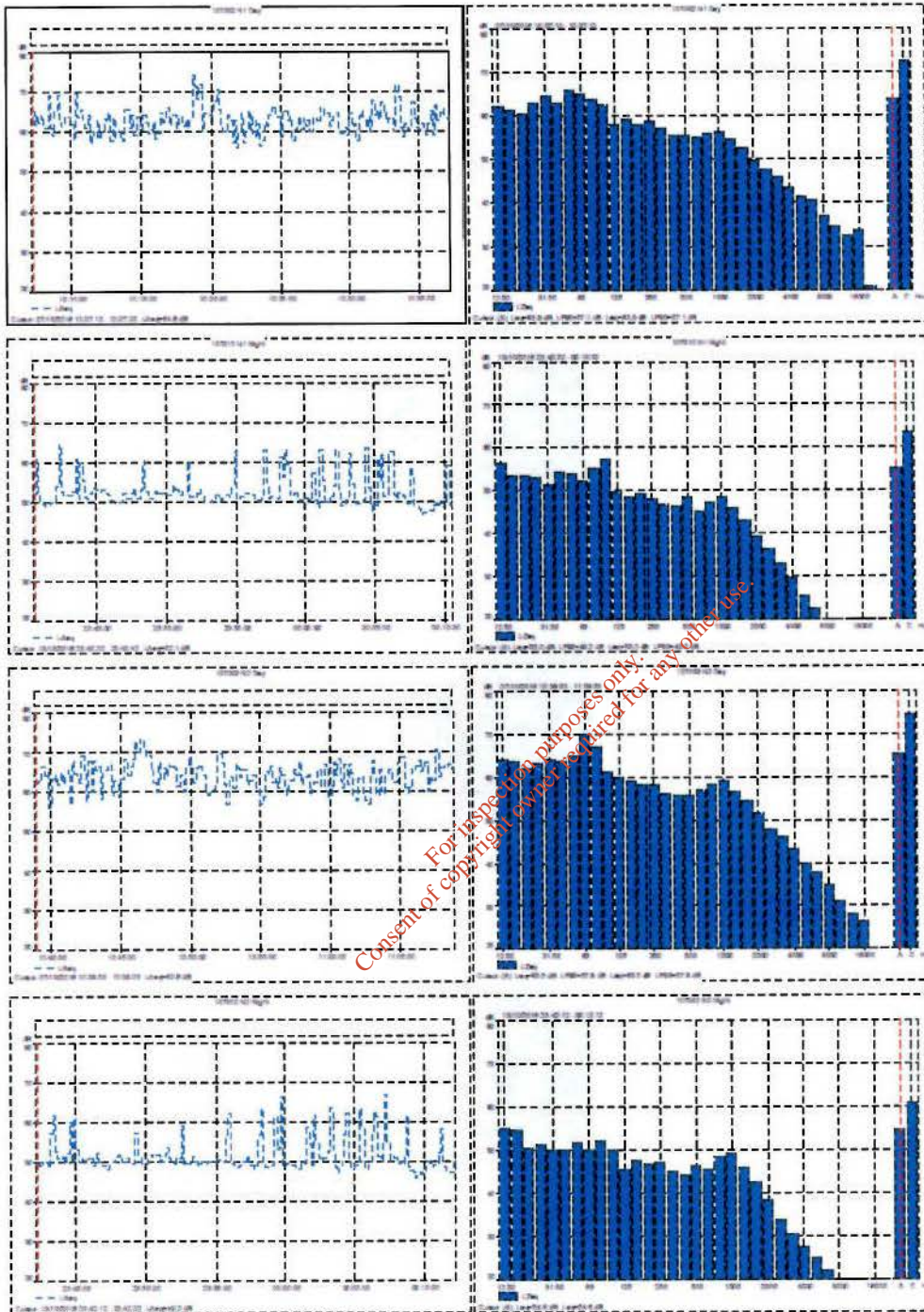
Daytime Night-time

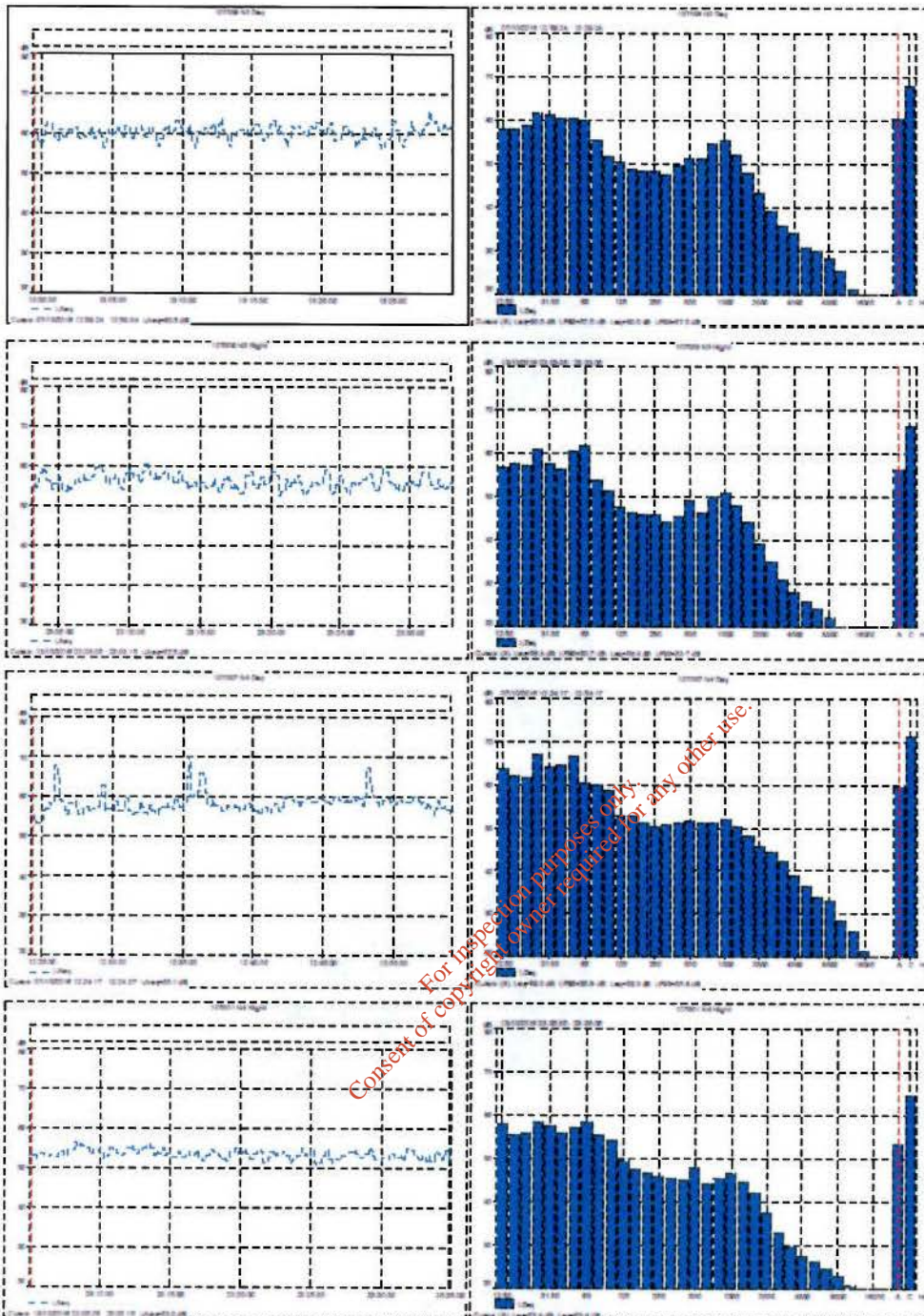
Station	Date	Time	Wind vector	L _{Aeq} 30 min dB	L _{AF10} 30 min dB	L _{AF50} 30 min dB	Specific L _{Aeq} 30 min dB
N4	13.10.16	2305-2335	0	53	55	52	≤44
	<p>Facility: Processing operations in building slightly audible, almost entirely masked by traffic. No yard activity. Extraneous: Road traffic continuously clearly audible in several directions, particularly dominant N27 traffic. No other noise audible apart from continuous Ferrero emissions to SE, clearly audible and distinctive in character. Specific L_{Aeq} T determination: Site emissions almost entirely masked by traffic, estimated at least 8 <L90.</p>						
NSL1	14.10.16	0057-0127	+	61	57	48	≤39
	<p>Facility: No emissions audible. Extraneous: Intermittent Forge Hill traffic dominant when present. Distant traffic in several directions dominating background soundscape. Several vehicle movements in commercial park across road, in addition to truck idling 0116—0117. Ferrero emissions continuously slightly audible. Sporadic dog barking audible 1-200 m N. Sporadic clearly audible impulsive clangs from metal dropping or similar at industrial/commercial premises several hundred metres NE. Specific L_{Aeq} T determination: Inaudible, at least 9 dB <L90.</p>						
NSL2	14.10.16	0022-0052	-	64	68	49	≤40
	<p>Facility: No emissions audible. Extraneous: Emissions from nearby Ferrero facility clearly audible continuously, dominating soundscape, fluctuating slightly up and down at intervals. Intermittent N27 traffic dominant when present. Distant traffic also slightly audible, almost entirely masked by Ferrero emissions. Sporadic clearly audible impulsive clangs from metal dropping or similar at industrial/commercial premises several hundred metres NE. Specific L_{Aeq} T determination: Inaudible, at least 9 dB <L90.</p>						
NSL3	14.10.16	0135-0205	+	46	47	43	≤34
	<p>Facility: No emissions audible. Extraneous: Ferrero emissions continuously quite audible across valley, partially masking distant traffic noise. No other emissions audible apart from several car movements to W within residential estate. Specific L_{Aeq} T determination: Inaudible, at least 9 dB <L90.</p>						

Audibility scale: Inaudible; faintly audible; slightly audible; audible at low level; quite audible; clearly audible; dominant; intrusive; excessive.

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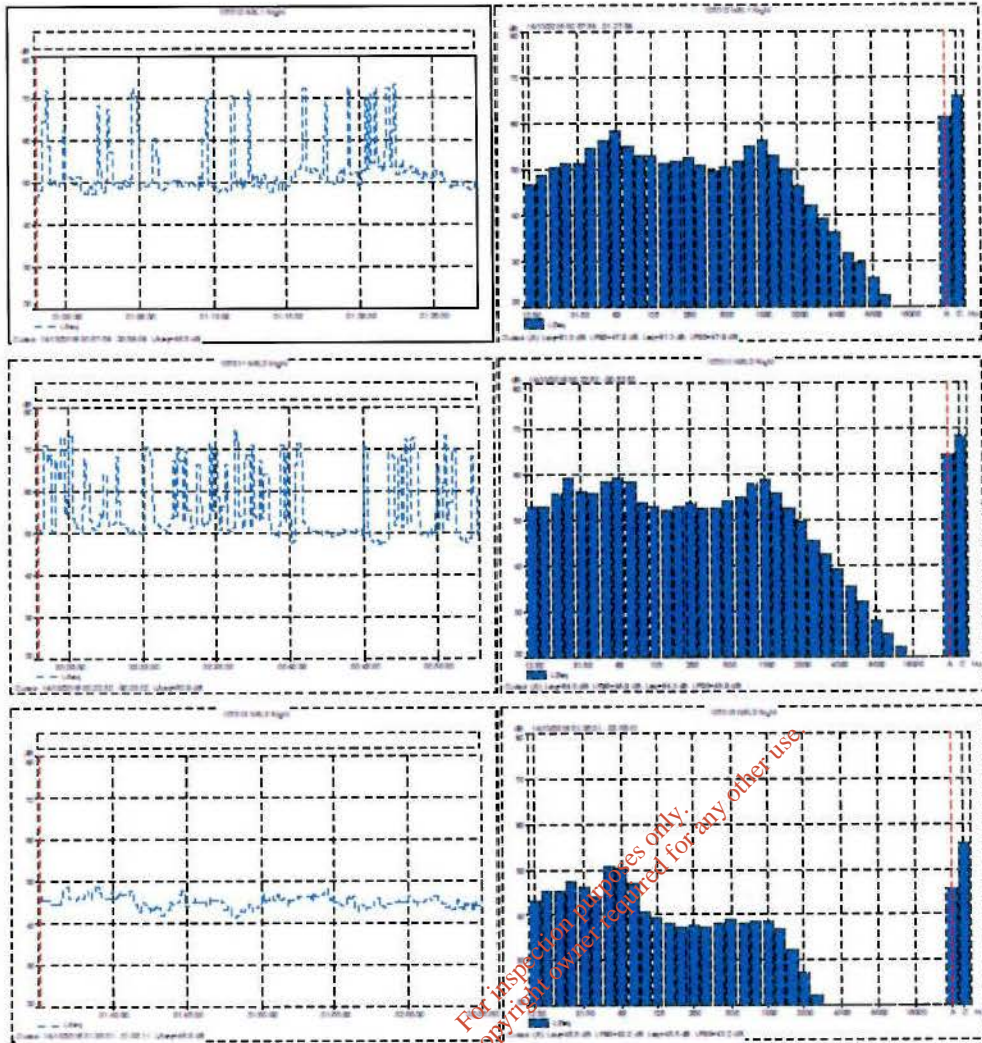
Appendix 5: Profiles & spectra





October 2016 noise compliance survey at Forge Hill Recycling facility, Forge Hill, Cork

DBA report 107.1



Appendix 6: Glossary

Ambient	Total noise environment at a location, including all sounds present.
A-weighting	Weighting or adjustment applied to sound level to approximate non-linear frequency response of human ear. Denoted by suffix A in parameters such as $L_{Aeq T}$, $L_{AF10 T}$, etc.
Background level	A-weighted sound pressure level of residual noise exceeded for 90 % of time interval T. Denoted $L_{AF90 T}$.
Broadband	Noise which contains roughly equal energy across frequency spectrum. Does not contain tones, and is generally less annoying than tonal noise.
Decibel (dB)	Unit of noise measurement scale. Based on logarithmic scale so cannot be simply added or subtracted. 3 dB difference is smallest change perceptible to human ear. 10 dB difference is perceived as doubling or halving of sound level. Examples of decibel levels are as follows: 20 dB: very quiet room; 30-35 dB: night-time rural environment; 55-65 dB: conversation; 80 dB: busy pub; 100 dB: nightclub. Throughout this report noise levels are presented as decibels relative to 20 μPa.
Fast response	0.125 seconds response time of sound level meter to changing noise levels. Denoted by suffix F in parameters such as $L_{AF10 T}$, $L_{AF90 T}$, etc.
Free field	Noise environment away from all surfaces other than ground i.e. outside near field.
Frequency	Number of cycles per second of a sound or vibration wave. Low frequency noise may be perceived as hum, while whine represents higher frequency. Range of human hearing approaches 20-20,000 Hertz.
Hertz (Hz)	Unit of frequency measurement.
Impulse	Noise which is of short duration, typically less than one second, sound pressure level of which is significantly higher than background.
Interval	Time period T over which noise parameters are measured at position. Denoted by T in $L_{Aeq T}$, $L_{AF90 T}$, etc.
$L_{Aeq T}$	Equivalent continuous sound pressure level during interval T, effectively representing average A-weighted noise level of ambient noise environment.
$L_{AF10 T}$	Sound pressure level exceeded for 10% of interval T, usually used to quantify traffic noise.
$L_{AF90 T}$	Sound pressure level exceeded for 90% of interval T, usually used to quantify background noise. May also be used to describe noise level from continuous steady or almost-steady source, particularly where local noise environment fluctuates.
$L_{Req T}$	Rating noise level, derived from $L_{Aeq T}$ plus specified adjustments for tonal and impulsive characteristics. Equivalent to $L_{A T}$ used by EPA.
Masking	The rendering inaudible of one noise source by another noise source(s) which may be louder, or may contain significant acoustic energy in the same part of the frequency spectrum. In the latter case, any tone(s) in the original source emissions may become inaudible.
Near field	Noise levels recorded near walls or other surfaces, artificially increased due to reflections. Levels near walls may be increased by up to 3 dB, and up to 6 dB near corners. Free field conditions may be achieved by maintaining separation distance of at least 3.5 m from walls.
Noise sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.
1/3 octave band	Frequency spectrum may be divided into octave bands. Upper limit of each octave is twice lower limit. Each octave may be subdivided into thirds, allowing greater analysis of tones.
Residual level	Noise level remaining when specific source is absent or does not contribute to ambient.
Specific level	$L_{Aeq T}$ level produced by specific noise source under consideration during interval T, measured directly or by estimation or calculation.

Tone	Character of noise caused by dominance of one or more frequencies which may result in increased noise nuisance.
Wind vector	May be positive (+), negative (-), neutral (0) or crosswind (x). Positive wind vector blows from source to receptor, within angular range of $\pm 45^\circ$, creating conditions more favourable to propagation. During certain conditions, this range may increase to $\pm 60^\circ$ by day and $\pm 90^\circ$ at night. Negative wind vector occurs when receptor is upwind of source. Neutral vector arises during still conditions, or upwind when in close proximity to source. Crosswinds typically result in negative vector.
Z-weighting	Standard weighting applied by sound level meters to represent linear scale. Denoted by suffix Z in parameters such as $L_{Zeq,T}$, $L_{ZF90,T}$, etc. used to describe 1/3 octave band levels in frequency spectra.

In this report units are generally presented using US National Institute Of Standards & Technology guidelines.

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Drawings

New Drawings:

- Drawing C-103 – Layout of Escape Routes & Pre-sort Picking Cabins. (showing equipment layout)
- Drawing C-104 – As Built layout of Materials Recovery Machinery (showing schematic layout of the processing and storage areas)
- Drawing W11 – Floor Plan & Section with levels










Revised Drawings:

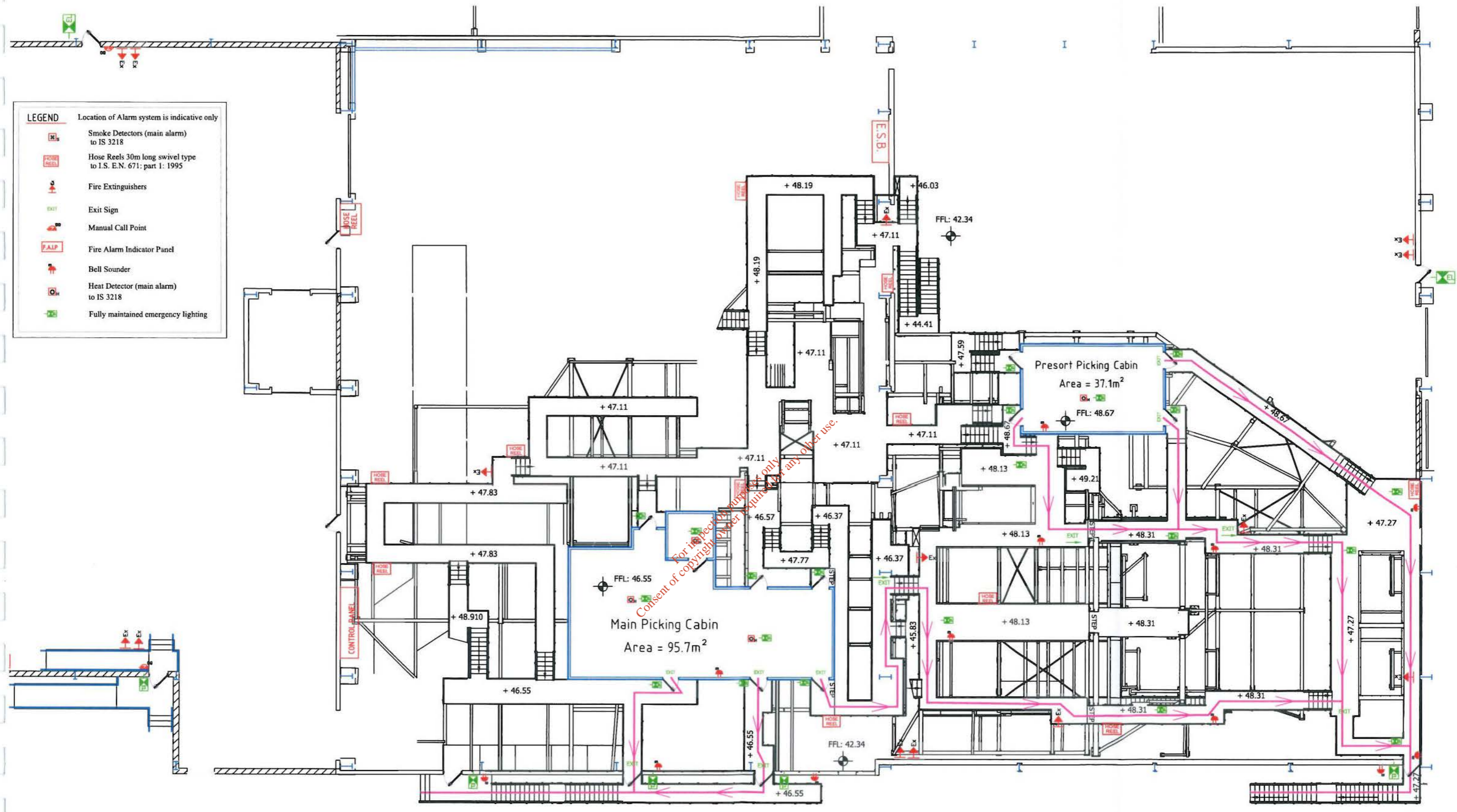
- Drawing WL17 (Rev 2) – Location of Monitoring Points at the site

Title	Previously Submitted	Revised Now	Changes
Monitoring Locations	4348-WL17 Rev0	4348-WL17 Rev2	Revised Site Boundary noise monitoring locations

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LEGEND Location of Alarm system is indicative only

-  Smoke Detectors (main alarm) to IS 3218
-  Hose Reels 30m long swivel type to I.S. E.N. 671: part 1: 1995
-  Fire Extinguishers
-  Exit Sign
-  Manual Call Point
-  Fire Alarm Indicator Panel
-  Bell Sounder
-  Heat Detector (main alarm) to IS 3218
-  Fully maintained emergency lighting



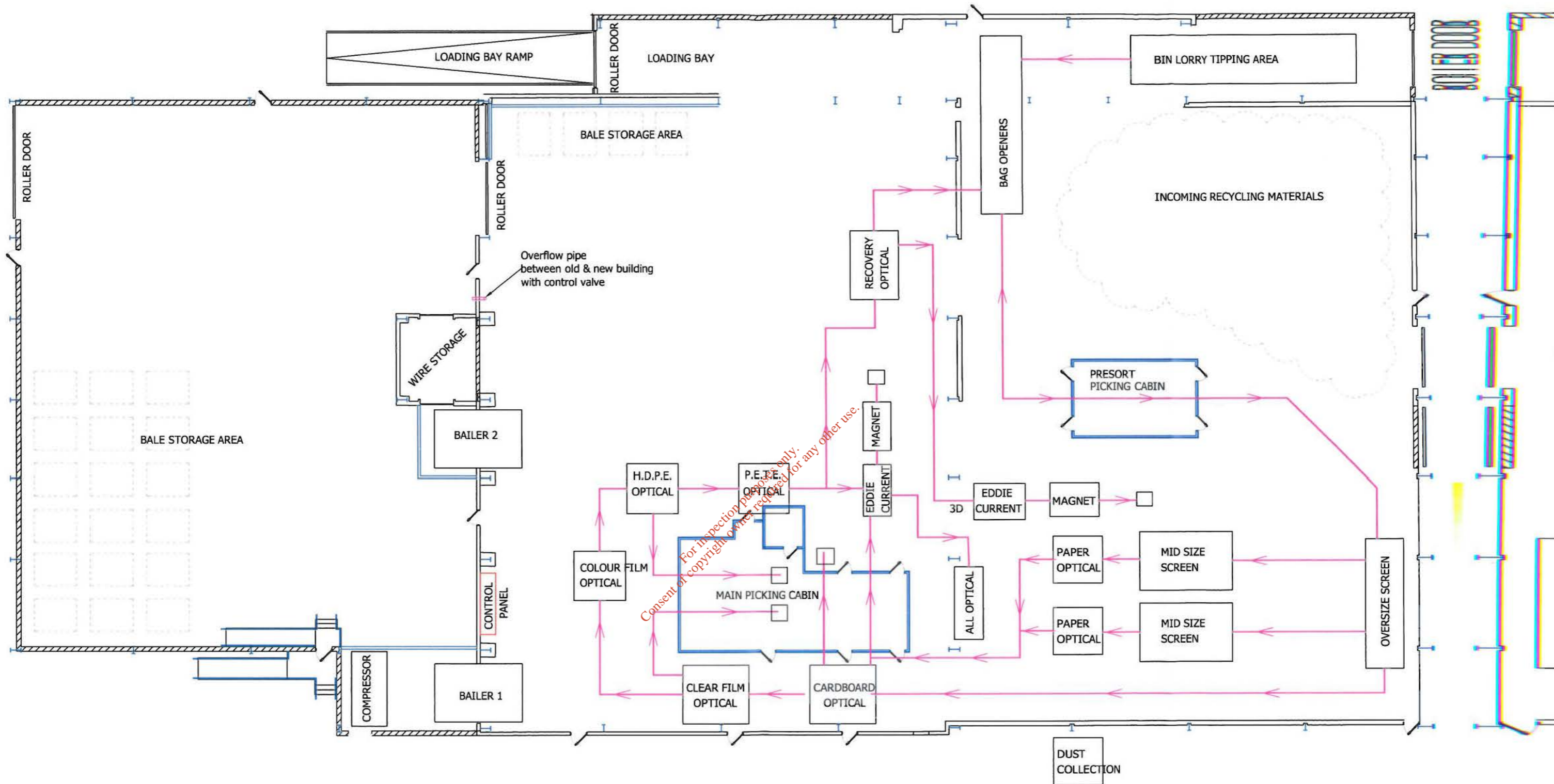
BRIAN O KENNEDY & ASSOCIATES LTD
Consulting Engineers

Client: FORGE HILL RECYCLING LTD		
Drawing Title: LAYOUT OF ESCAPE ROUTES & PRESORT PICKING CABINS		
Scale: 1:200 @A3	Date: Sept. 2016	Revision:
Drawn By: G. Forde	Drawing Number: 4348-C-103	

Shannon House,
Church Road,
Douglas,
Co. Cork

Tel: 021-4899854
Fax: 021-4899464
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Project:
EXTENSIONS TO EXISTING
MATERIALS RECYCLING FACILITY
FORGE HILL, CO. CORK



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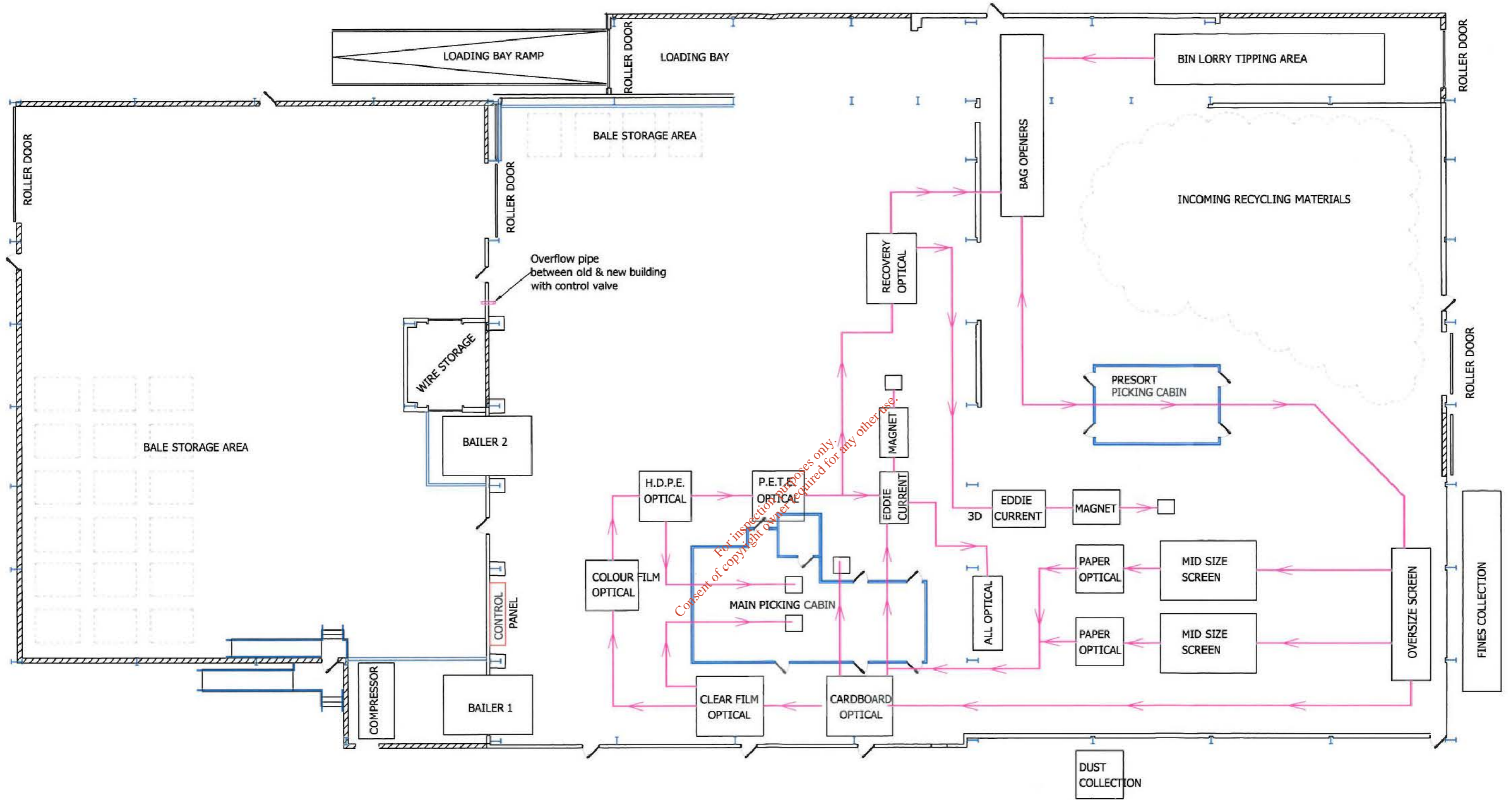
PET (PETE), polyethylene terephthalate.
 HDPE, high-density polyethylene.

Client: FORGE HILL RECYCLING LTD		
Drawing Title: AS-BUILT LAYOUT OF MATERIALS RECOVERY MACHINERY		
Scale: 1:250 @A3	Date: Sept. 2016	Revision:
Drawn By: G. Forde	Drawing Number: 4348-C-104	

BRIAN & ASSOC
 Consultants

Shannon House,
 Church Road,
 Douglas,
 Co Cork

Project:
EXTENSIONS TO MATERIALS RECYCLING FACILITY AT FORGE HILL, CO.



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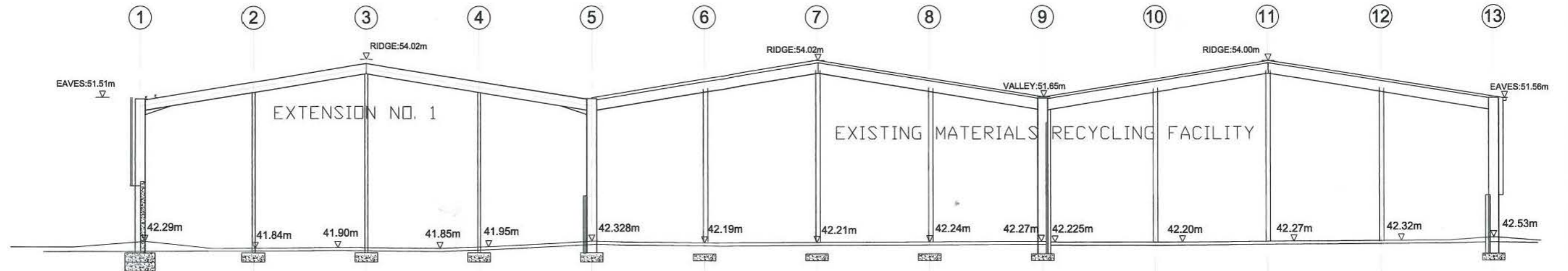
PET (PETE), polyethylene terephthalate.
HDPE, high-density polyethylene.



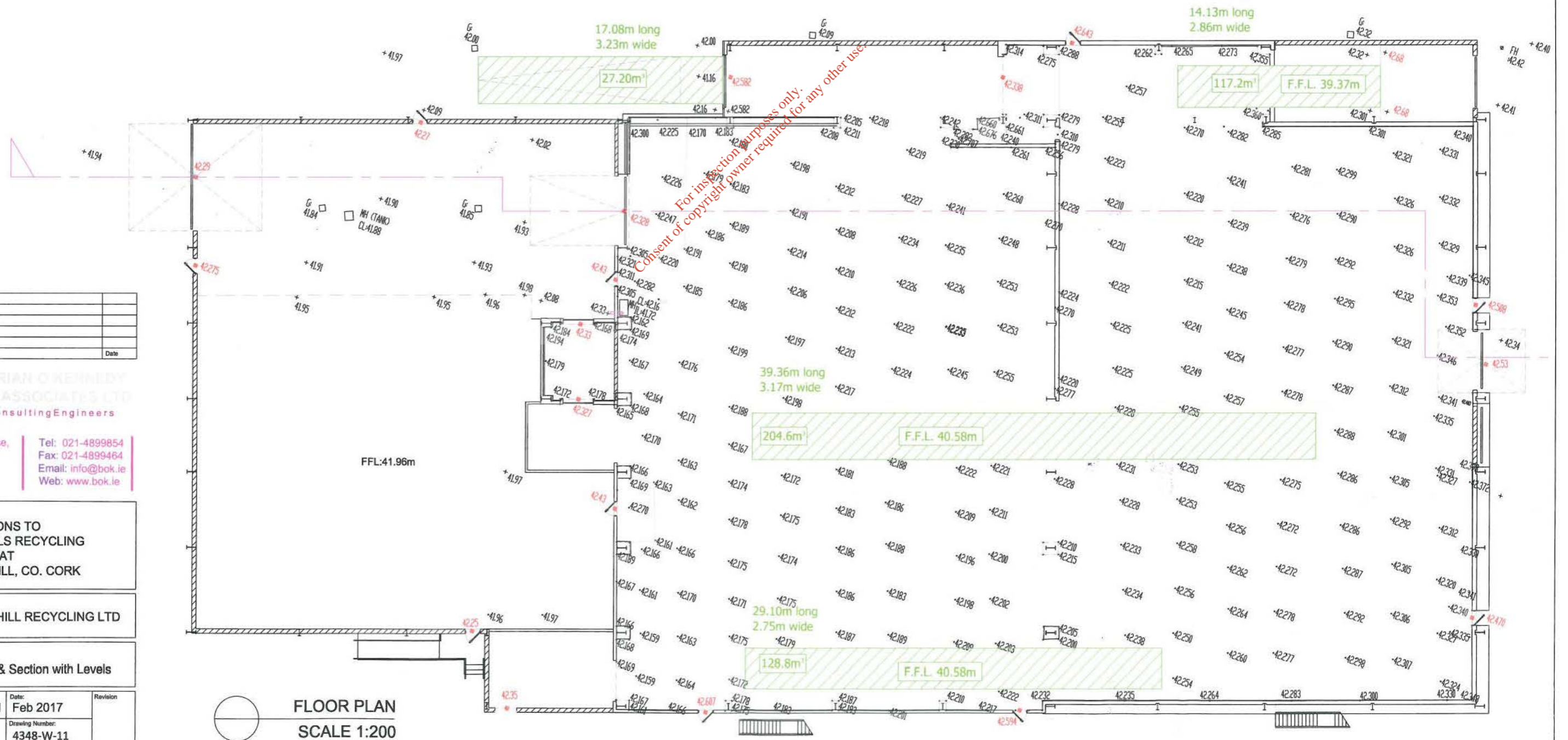
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Web: www.bok.ie

Client: FORGE HILL RECYCLING LTD		
Drawing Title: AS-BUILT LAYOUT OF MATERIALS RECOVERY MACHINERY		
Scale: 1:250 @A3	Date: Sept. 2016	Revision:
Drawn By: G. Forde	Drawing Number: 4348-C-104	

Project:
EXTENSIONS TO EXISTING MATERIALS RECYCLING FACILITY FORGE HILL, CO. CORK



BUILDING CROSS-SECTION
SCALE 1:200



FLOOR PLAN
SCALE 1:200

Revision	Comments	Date

BRIAN O'KENNEDY & ASSOCIATES LTD
Consulting Engineers

Shannon House,
Church Road,
Douglas,
Co. Cork

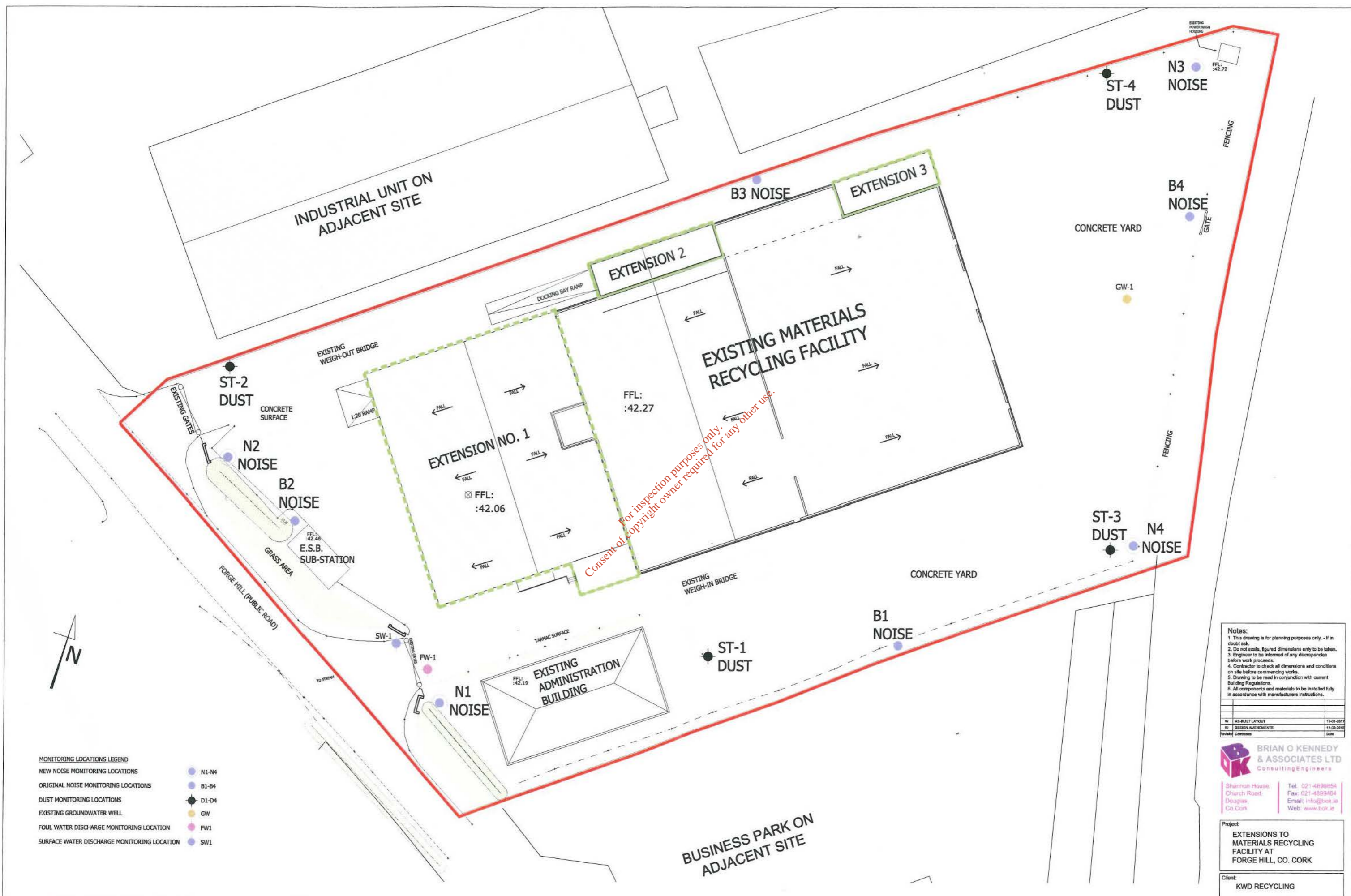
Tel: 021-4899854
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Web: www.bok.ie

Project:
EXTENSIONS TO
MATERIALS RECYCLING
FACILITY AT
FORGE HILL, CO. CORK

Client:
FORGE HILL RECYCLING LTD

Drawing Title:
Floor Plan & Section with Levels

Scale: 1:200 @ A1	Date: Feb 2017	Revision
Drawn By: G. Forde	Drawing Number: 4348-W-11	



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- MONITORING LOCATIONS LEGEND**
- NEW NOISE MONITORING LOCATIONS ● N1-N4
 - ORIGINAL NOISE MONITORING LOCATIONS ● B1-B4
 - DUST MONITORING LOCATIONS ● D1-D4
 - EXISTING GROUNDWATER WELL ● GW
 - FOWL WATER DISCHARGE MONITORING LOCATION ● FW1
 - SURFACE WATER DISCHARGE MONITORING LOCATION ● SW1

SITE BOUNDARY IN RED
NEW EXTENSIONS IN GREEN

○ SITE LAYOUT PLAN - MONITORING LOCATIONS
SCALE 1:250

- Notes:**
1. This drawing is for planning purposes only. - If in doubt ask.
 2. Do not scale, figured dimensions only to be taken.
 3. Engineer to be informed of any discrepancies before work proceeds.
 4. Contractor to check all dimensions and conditions on site before commencing works.
 5. Drawing to be read in conjunction with current Building Regulations.
 6. All components and materials to be installed fully in accordance with manufacturers instructions.

Rev	Description	Date
01	AS-BUILT LAYOUT	17-01-2017
02	DESIGN AMENDMENTS	11-03-2018

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Project:
EXTENSIONS TO MATERIALS RECYCLING FACILITY AT FORGE HILL, CO. CORK

Client:
KWD RECYCLING

Drawing Title:
SITE LAYOUT PLAN
Monitoring points

Scale	Date	Revision
1:250 @A1	SEPT 2015	R2
Drawn By: JB	Drawing Number: 4348-WL17	