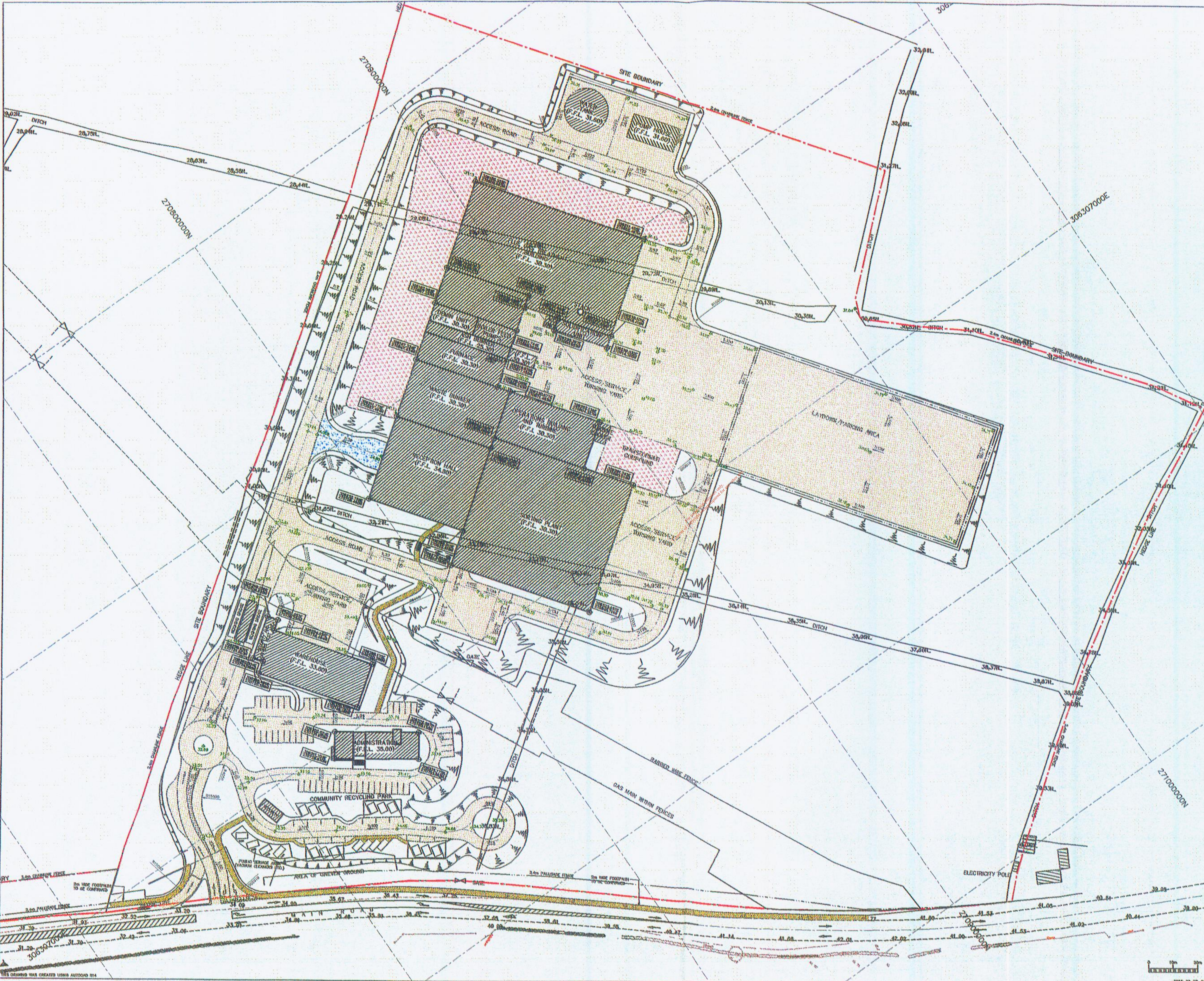


Attachment D2.2

Drawing No. 2666-22-DR-006: Site Layout Plan

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NOTES

- LEVELS ARE GIVEN IN METRES AND RELATE TO O.S. DATUM (MALN HEAD).
- AC UNIT REFERS TO ACTIVATED CARBON / LIME MIXTURE UNIT

LEGEND

- SITE BOUNDARY LINE
- + EXISTING GROUND LEVELS
- o PROPOSED GROUND LEVELS
- ▨ PROPOSED BUILDING
- ▨ PROPOSED ASPHALT PAVEMENT
- ▨ PROPOSED CONCRETE PAVEMENT
- ▨ PROPOSED CONCRETE BLOCK PAVEMENT
- ▨ PROPOSED GRAVEL AREA

C	RE-ISSUED FOR INFORMATION	OK	14/3	14/3	14/3/2008
B	RE-ISSUED FOR INFORMATION	OK	14/3	14/3	14/3/2008
A	FOR INFORMATION	OK	14/3	14/3	14/3/2008
FILE	DESCRIPTION	DRN	ORD	APP	DATE

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PROJECT WASTE MGMT FACILITY - CARRANSTOWN
TITLE SITE LAYOUT PLAN

CLIENT REF. PROJECT No. 2869
CLIENT DRG No. 2868-22-DR-008

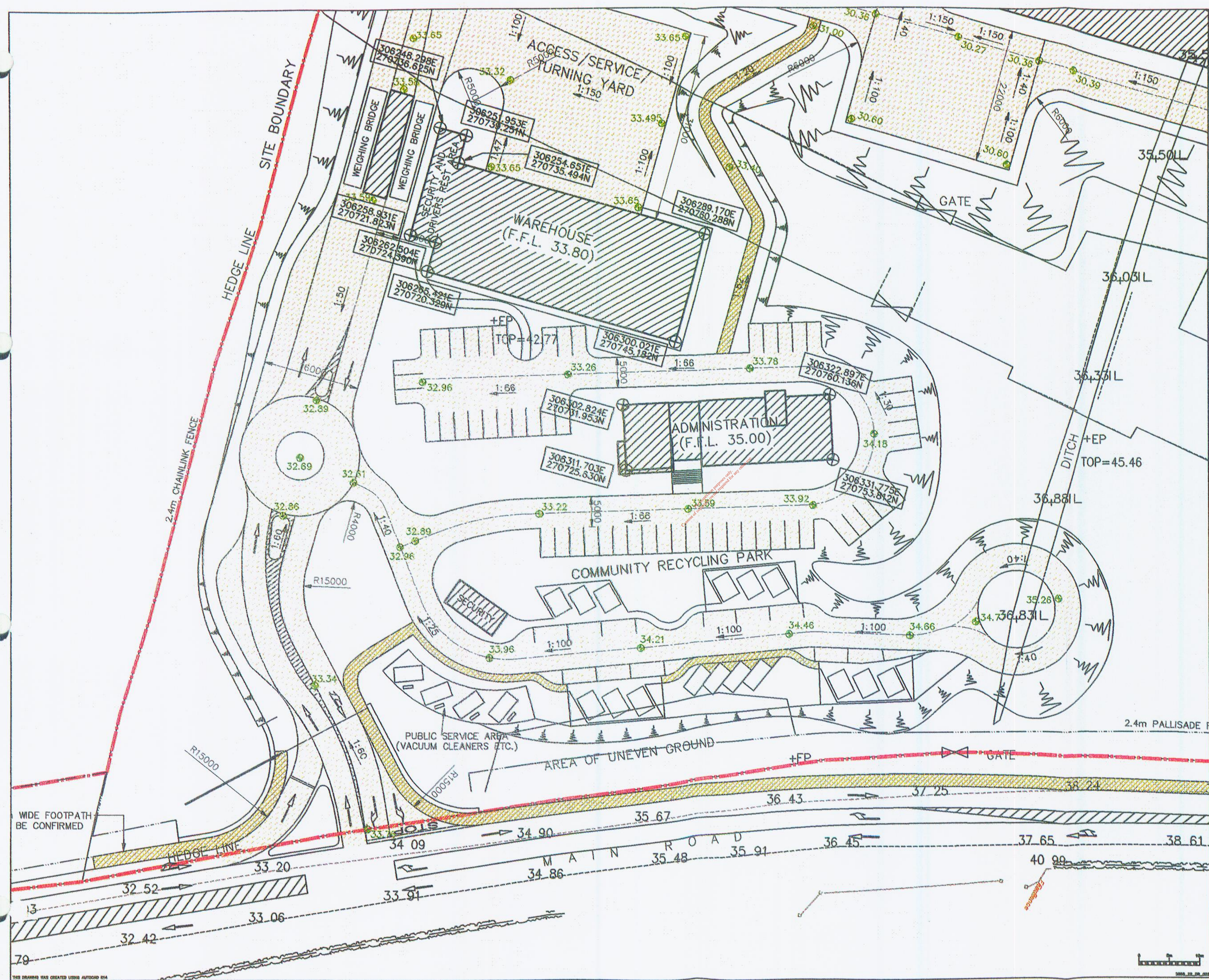
SCALE: NONE

THIS DRAWING HAS BEEN CREATED USING AUTOCAD R14

Attachment D2.3

**Drawing No. 2666-22-DR-002: Layout of
Community Recycling Park**

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NOTES
 1. LEVELS ARE GIVEN IN METRES AND RELATE TO O.S. DATUM (MALIN HEAD).

LEGEND

- SITE BOUNDARY LINE
- + EXISTING GROUND LEVELS
- o PROPOSED GROUND LEVELS
- PROPOSED BUILDING
- PROPOSED ASPHALT PAVEMENT
- PROPOSED CONCRETE BLOCK PAVEMTS

C	RE-ISSUE FOR INFORMATION				
B	FOR PLANNING				
A	FOR PLANNING	AR	OC	FP	DR/1/01
DATE	DESCRIPTION	DRN	CHG	APP	DATE



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Project Management Group
 Dublin, Ireland

WASTE MGMT FACILITY - CARRANSTOWN

LAYOUT OF COMMUNITY RECYCLING PARK

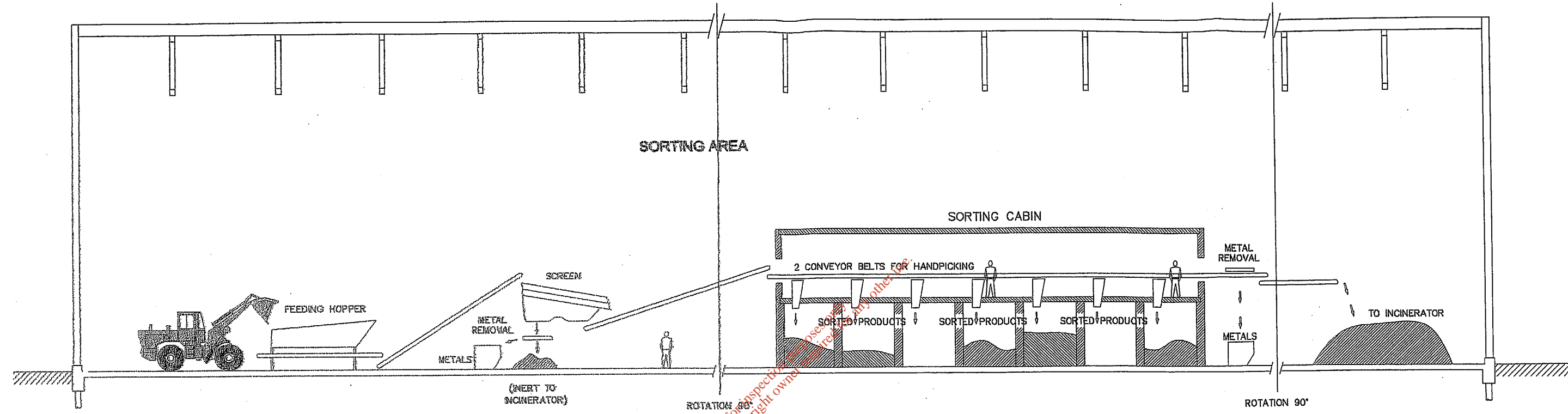
CLIENT REF.	CLIENT DRG No.
PROJECT No.	DATE OF DRG No.
AO SCALE	DATE OF DRG No.
HTS	2008-22-DR-002



Attachment D2.4

**Drawing No. 2666-22-DR-019: Materials
Recycling Facility Schematic**

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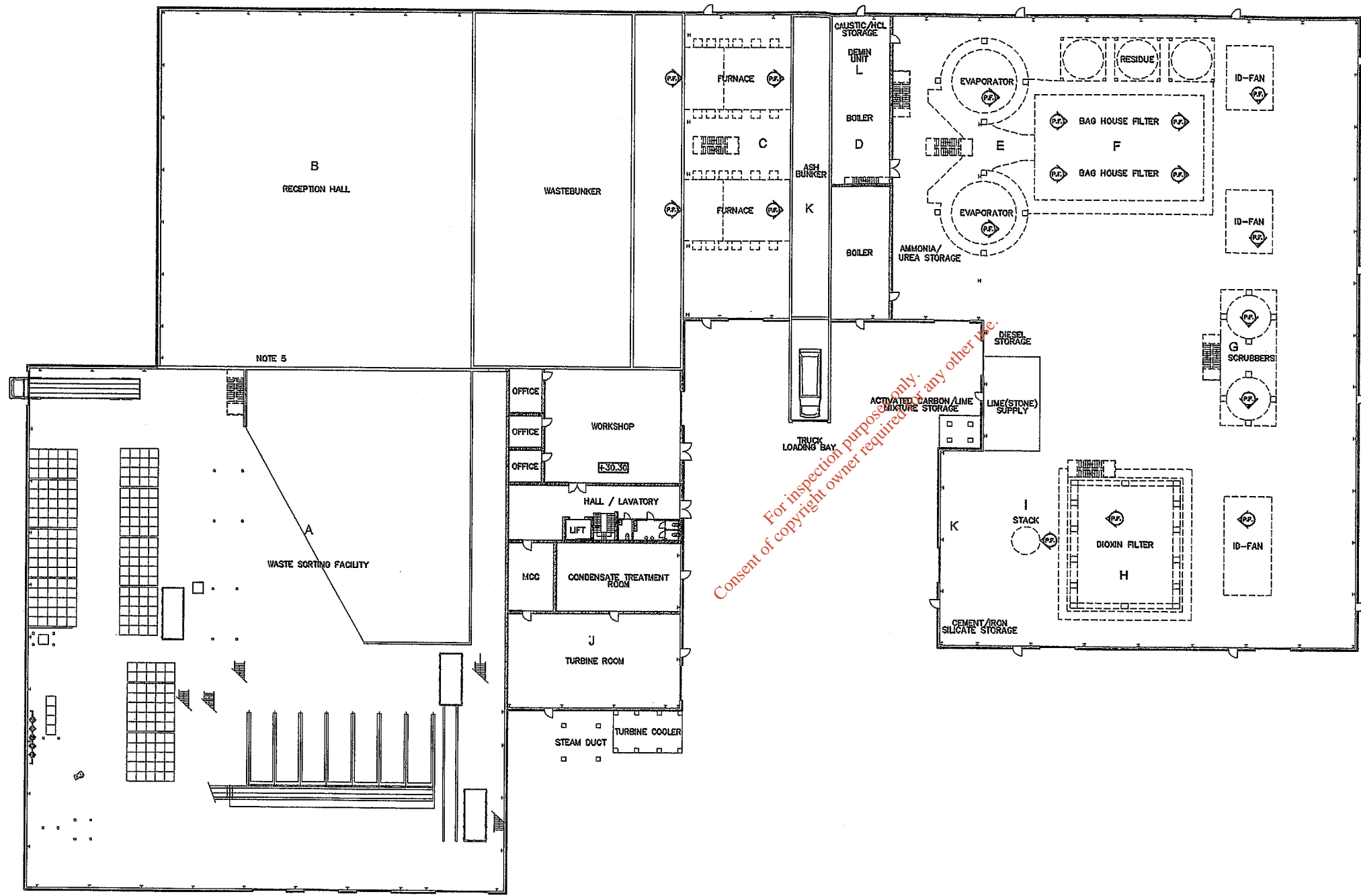
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FOR INFORMATION		DRN	ORIG	AUTH	APP	DATE
ISSUE	DESCRIPTION			CHK		
		INDAVER IRELAND 4 HADDINGTON TCE DUN LAGHAIRE CO. DUBLIN TEL: +353 1 2148830 FAX: +353 1 2807889				
Project Management Group Cork - Dublin		WILSON ASSOCIATES [architects]				
PROJECT WASTE MGMT FACILITY - CARRANSTOWN						
TITLE MATERIALS RECYCLING FACILITY SCHEMATIC						
CLIENT REF.		CLIENT DRG No.				
PROJECT No. 2068		CONTR DRG No. 2666-22-DR-019				
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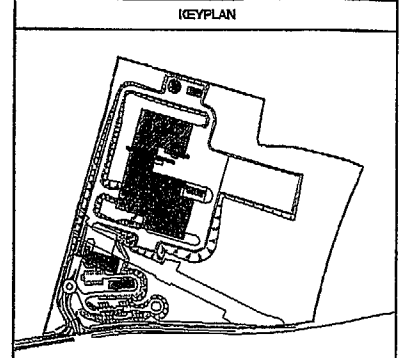
Attachment D2.5

Drawing No. 2666-22-DR-008: Layout of Main Plant

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LEVEL +30.30
SCALE 1:200



- NOTES**
- THIS DRAWING TO BE READ IN CONNECTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
 - DO NOT SCALE - USE DIMENSIONS ONLY.
 - ALL DIMENSIONS ARE GIVEN IN METRES.
 - LEVELS ARE GIVEN IN METRES AND RELATE TO O.S. DATUM (DUBLIN HEAD).
 - STEEL STRUCTURE FURNACE BUILDING = IP600
 - STEEL STRUCTURE RECEPTION HALL = IP400
 - STEEL STRUCTURE FLUE GAS CLEANING BUILDING = IP600
 - P.F. = PROCESS / PRODUCT FLOW

- LEGEND**
- A - WASTE SORTING FACILITY
 - B - WASTE STORAGE AND HANDLING
 - C - FURNACE
 - D - BOILER
 - E - FLUE GAS COOLING
 - F - ACTIVATED CARBON INJECTION AND BAGHOUSE FILTER
 - G - WET FLUE GAS CLEANING
 - H - TAIL END FLUE GAS CLEANING
 - I - PLUME ABATEMENT AND DISCHARGE
 - J - ENERGY RECOVERY
 - K - ASH HANDLING
 - L - WATER SUPPLY AND TREATMENT (FLOOR LEVEL)

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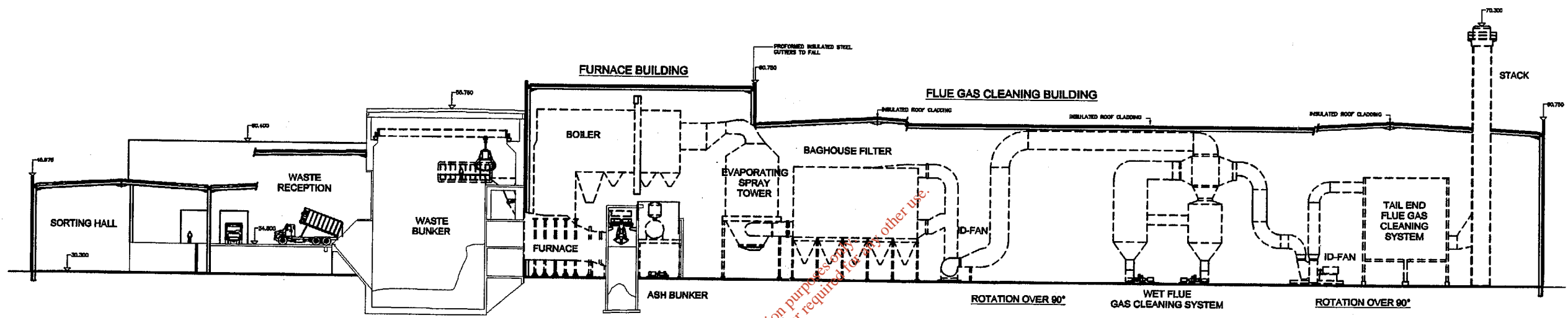
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A	FOR INFORMATION	DA	MG	NG	19/05/01
ISSUE	DESCRIPTION	DRN	DRN	APP	DATE
		HAZARDOVER IRELAND 4 HAZARDOVER TOWER DUBLIN LADYSMOUNT CO. DUBLIN TEL: +353 1 2140000 FAX: +353 1 2807000			
		WILSON ASSOCIATES PROJECT MANAGERS			
PROJECT: WASTE MGMT FACILITY - CARRANSTOWN					
TITLE: LAYOUT OF MAIN PLANT					
CLIENT REF.	CLIENT DRG No.				
PROJECT No.	PROJECT No.				
SCALE	SCALE	CONTR. DRG No.	2888-22-DR-008		



Attachment D2.6

**Drawing No. 2666-22-DR-018: Waste to Energy
Plant Schematic**

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2666_22_DR_018

A	FOR INFORMATION	WACAG	NG 2211			
ISSUE	DESCRIPTION	DRN	ORIG	AUTH CHK	APP	DATE
INDAVER		INDAVER IRELAND 4 HADDINGTON TCE DUN LADGHARE CO. DUBLIN TEL: +353 1 2145830 FAX: +353 1 2807885				
AM Project Management Group Conc - Debitis		WILSON ASSOCIATES Architects				
PROJECT	WASTE MGMT FACILITY - CARRANSTOWN					
TITLE	WASTE TO ENERGY PLANT SCHEMATIC WET FLUE GAS CLEANING SYSTEM OPTION 1					
CLIENT REF.	CLIENT DRG No.					
PROJECT No.	2666		CONTR DRG No. 2666-22-DR-018			
A1	SCALE	NONE				

ATTACHMENT NUMBER D3

Materials Management

Contents

Attachment D3.1

Materials Management

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D3.1 MATERIALS MANAGEMENT

1. INTRODUCTION

The major process streams for the three elements (community recycling park, materials recycling facility and waste to energy plant) are described in detail in Attachment D2.1. Tables 1.1 and 1.2 detail the total throughputs for the community recycling park and the materials recycling facility. Tables 1.3 to 1.6 detail the total throughputs for the Waste to Energy Plant for both a nominal capacity of 150,000 tonnes of waste and for a maximum design capacity of 180,000 tonnes of waste.

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Table 1.1 Inputs and Outputs to Community Recycling Park

The classification and descriptions of the wastes as described below are obtained from the European Waste Catalogue,

Section 20 refers to “Municipal wastes (Household waste and similar commercial, industrial and institutional wastes) including separately collected fractions”

Section 20 01 refers to “Separately collected fractions”

Section 20 02 refers to “Garden and park wastes (including cemetery waste)”

Inputs	Annual Usage	Outputs	European Waste Code ¹	Annual Production	
Recyclable Household Waste	2,000 tonnes	Paper	20 01 01	1,990 tonnes	
		Cardboard	20 01 01		
		Newspaper	20 01 01		
		Glass	20 01 02		
		Clothing/Textiles	20 01 10/20 01 11		
		Footwear	20 01 11		
		Plastic	20 01 39		
		Aluminium Cans	20 01 40		
		Wood	20 01 38		
		Kitchen Oil	20 01 25		
		Garden Waste	20 02 01		
		Waste Oil	13 02 05/13 02 06		2 tonnes
		Batteries	20 01 33		3 tonnes
		Fluorescent Tubes	20 01 21		2 tonnes
		Paints, Inks, Resins	20 01 27		2 tonnes
		Detergents	20 01 29		0.5 tonne
Medicines	20 01 32	0.5 tonne			

Notes:

- These European Waste Codes are as detailed in the EU Directive, 2001/118/EC, List of Wastes, effective from 1/1/02.

Table 1.2 Inputs and Outputs to Materials Recycling Facility

The classification and descriptions of the wastes as described below are obtained from the European Waste Catalogue, Section 20 refers to “Municipal wastes (Household waste and similar commercial, industrial and institutional wastes) including separately collected fractions”

Section 20 01 refers to “Separately collected fractions”

Section 20 03 refers to “Other Municipal Wastes”

Inputs	Annual Usage	Outputs	European Waste Code	Annual Production
Dry Recyclable Fraction of Industrial and Commercial Waste	20,000 tonnes	Paper	20 01 01	20,000 tonnes
		Cardboard	20 01 01	
		Plastics	20 01 39	
		Wood	20 01 38	
		Metals	20 01 40	
		Mixed Municipal/Residual Waste	20 03 01	
		Residual Waste from Materials Recycling Facility	19 12 12	

Table 1.3 Inputs to Waste to Energy Plant (based on nominal capacity of 150,000 tonnes/annum)

Inputs	Annual Usage (tonnes)
Waste	150,000 (375,000 – 500,000m ³) ¹
Water ²	110,000 m ³
Ammonia (25% solution) ³	600
Urea ³	400
Activated Carbon/Lime Mixture	225
Lime ⁴	900
Limestone ⁴	1,600
Activated Carbon/Lime Mixture ⁵	225
Lignite Cokes ⁵	100
Cement ⁶	1,600
Iron Silicate ⁶	600
Natural Gas	202,400 Nm ³

Notes:

1. Density of municipal solid waste varies from 0.3 to 0.4 tonnes/m³
2. This will be supplied from stored rainwater and groundwater. Depending on rainfall patterns about 36,000m³ of rainwater will be used with the balance being supplied from groundwater.
3. Either ammonia solution or urea can be used in the Furnace.
4. Either lime or limestone can be used in the Wet Flue Gas Cleaning System.
5. Either activated carbon/lime mixture or lignite cokes will be used in the Tail End Flue Gas Cleaning System.
6. If a solidification plant is installed at the site, either cement or iron silicate can be used.

Table 1.4 Outputs from Waste to Energy Plant (based on nominal capacity of 150,000 tonnes/annum)

The classification and descriptions of the wastes as described below are obtained from the European Waste Catalogue, Section 19 refers to “Wastes from waste treatment facilities, off-site waste water treatment plants and the water industry”
Section 19 01 refers to “Wastes from incineration or pyrolysis of waste”

Outputs	European Waste Code	Annual Production (tonnes)	Annual Production (m ³)
Electricity	-	105 GWhours	-
Bottom Ash	19 01 12	30,000	18,750 ¹
Boiler Ash	19 01 15/19 01 16 ²	1,500 – 3,000	1,875 – 10,000 ³
Flue Gas Cleaning Residues	19 01 13/ 19 01 10 ⁴	3,500 – 5,000	4,375 – 16,667 ⁵
Gypsum	19 01 99	1,000	1,000 – 1,429 ⁶
Metals	19 01 02	2,100	272

Notes:

1. Density of bottom ash is approximately 0.625 tonnes/m³
2. Boiler ash is expected to be non-hazardous. However, this is dependent on analysis.
3. Density of boiler ash varies from 0.3 to 0.8 tonnes/m³
4. Flue gas cleaning residues will include a small amount of spent activated carbon/lime mixture
5. Density of flue gas cleaning residues varies from 0.3 to 0.8 tonnes/m³
6. Density of gypsum varies from 0.7 to 1.0 tonnes/m³

Table 1.5 Inputs to Waste to Energy Plant (based on maximum design capacity of 180,000 tonnes/annum)

Inputs	Annual Usage (tonnes)
Waste	180,000 (450,000 – 600,000m ³) ¹
Water ²	112,500 m ³
Ammonia (25% solution) ³	1,320
Urea ³	900
Activated Carbon/Lime Mixture	270
Lime ⁴	3,960
Limestone ⁴	7,200
Activated Carbon/Lime Mixture ⁵	270
Lignite Cokes ⁵	240
Cement ⁶	3,600
Iron Silicate ⁶	1,200
Natural Gas	202,400 Nm ³

Notes:

1. Density of municipal solid waste varies from 0.3 to 0.4 tonnes/m³
2. This will be supplied from stored rainwater and groundwater. Depending on rainfall patterns about 36,000m³ of rainwater will be used with the balance being supplied from groundwater.
3. Either ammonia solution or urea can be used in the Furnace.
4. Either lime or limestone can be used in the Wet Flue Gas Cleaning System.
5. Either activated carbon/lime mixture or lignite cokes will be used in the Tail End Flue Gas Cleaning System.
6. If a solidification plant is installed at the site, either cement or iron silicate can be used.

Table 1.4 Inputs and Outputs to Waste to Energy Plant (based on maximum design capacity of 180,000 tonnes/annum)

The classification and descriptions of the wastes as described below are obtained from the European Waste Catalogue, Section 19 refers to "Wastes from waste treatment facilities, off-site waste water treatment plants and the water industry"
Section 19 01 refers to "Wastes from incineration or pyrolysis of waste"

Outputs	European Waste Code	Annual Production (tonnes)	Annual Production (m ³)
Electricity	-	105 GWhours	-
Bottom Ash	19 01 12	36,000	22,500 ¹
Boiler Ash	19 01 15/19 01 16 ²	1,800 – 3,600	2,250 – 12,000 ³
Flue Gas Cleaning Residues	19 01 13/ 19 01 10 ⁴	4,200 – 6,000	5,250 – 20,000 ⁵
Gypsum	19 01 99	1,200	1,200 – 1,714 ⁶
Metals	19 01 02	2,520	326

Notes:

1. Density of bottom ash is approximately 0.625 tonnes/m³
2. Boiler ash is expected to be non-hazardous. However, this is dependent on analysis.
3. Density of boiler ash varies from 0.3 to 0.8 tonnes/m³
4. Flue gas cleaning residues will include a small amount of spent activated carbon/lime mixture
5. Density of flue gas cleaning residues varies from 0.3 to 0.8 tonnes/m³
6. Density of gypsum varies from 0.7 to 1.0 tonnes/m³