AVONMOUTH IBA RECYCLING FACILITY

DUST RISK ASSESSMENT

APRIL 2016

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Registered in England and Wales No. 9150373

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1.0 INTRODUCTION

1.1 Background

This dust risk assessment has been undertaken by Isopleth Ltd on behalf of Day Group Ltd. Day Group Ltd. are primary aggregates suppliers and recycled aggregates suppliers for the construction and landscaping industries.

In 2014, Day Group was issued with a Certificate of Lawfulness for operation of a new Incinerator Bottom Ash (IBA) recycling facility at the former CWS Flour Mills, Royal Edward Dock, Bristol BS11 9HF:

> *14/00824/CP. Certificate of Lawful Development to operate and maintain a facility for the processing of inert waste and specifically IBA (Incineration Bottom Ash) imported into Avonmouth Docks and for onwards transit to a variety of end users. Former CWS Flour Mills Royal Edward Dock Bristol BS11 9HF.*

The Certificate of Lawfulness for the Proposed Development was issued on the basis that the details submitted met the criteria to be "Permitted Development", as set out in Schedule 2, Part 17, Class B of the Town and Country Planning (General Permitted Development) Order 1995 (as amended).

The operation of this facility will be regulated by the Environment Agency through an Environmental Permit for the installation.

1.2 Information Request

An Environmental Permit application has been submitted and Environment Agency comments received, including:

> *"We are not clear from your application how you plan to manage emissions of dust. Your risk assessment includes as a control measure 'all ash separation and screening processes shall be carried out inside a building'. But Drawing no. 2703/11 shows only one building for the initial storage of IBA. You appear to be proposing to undertake all processing of IBA outside this building. Neither this plan, nor other supporting documents, explain how dust emissions will be prevented from the conveyors and processing equipment. Additionally, your Drawing no. 2703/11 shows open 'finished product storage bays' and 'additional product storage and ash mixing bays'. We are unclear from your 'Management System and Operating Techniques' how you plan to manage any dust emissions associated with these areas. Your Drawing no. 2703/11 shows 'ventilation and dust extraction'. But we cannot find reference to this in your 'Management System and Operating Techniques'.*
>
> *We therefore need a valid risk assessment and full dust management plan that addresses all activities that are proposed at the facility and how you will prevent dust emissions from them. We will also need more comprehensive proposals for dust monitoring which state where and when you will undertake monitoring and the actions that you will take if you detect emissions of dust beyond your site boundary."*

This dust risk assessment is aimed at providing the Environment Agency with this information.

1.3 Scope

The scope of this dust risk assessment is limited to describing the potential dust sources from the IBA recycling facility, mitigation and proposing monitoring to ensure that the effectiveness of the mitigation may be quantified.

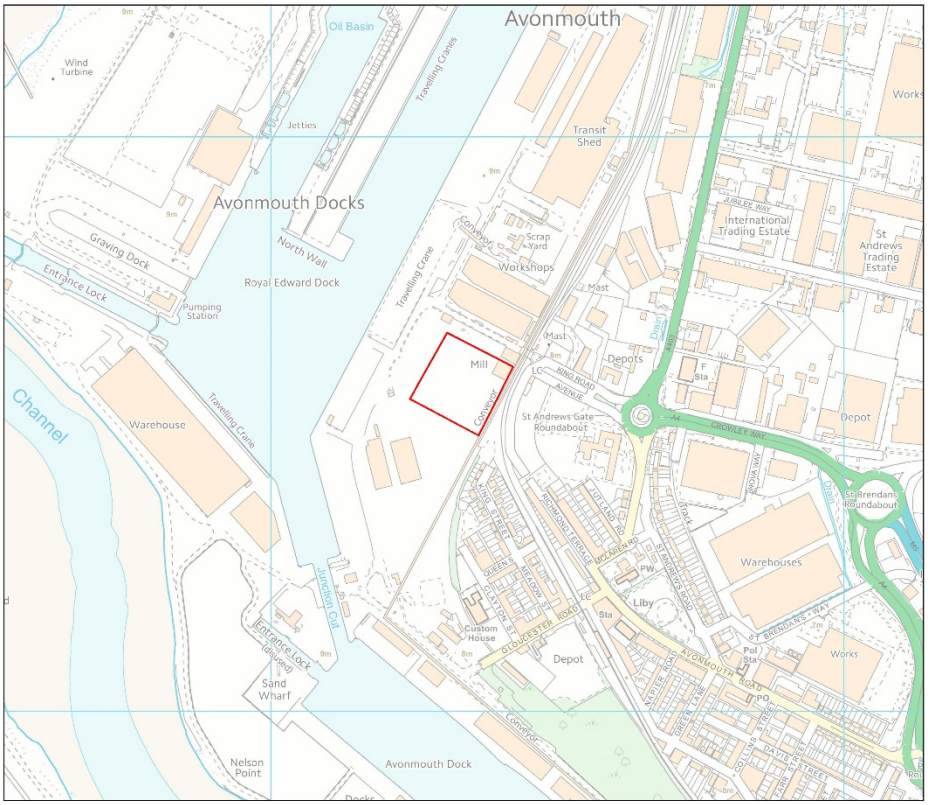
2.0 SITE DESCRIPTION

2.1 Location

The proposed IBA recycling facility is to be located on land at the former CWS Flour Mills, Royal Edward Dock, Bristol BS11 9HF. The site is within the docks area of the port of Avonmouth.

The approximate National Grid Reference for the site is 351350, 178550. A location plan of the site is presented as Figure 1.

Figure 1: Site Location



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The Royal Edward Dock (also known as Avonmouth Dock), is the northernmost and largest of three docks in the area. The present Royal Edward Dock has two arms: Oil Basin and Eastern Arm. Work began on the dock in 1902 and as such it has been a major hub for cargo shipping for over 100 years. The CWS Flour Mill was demolished (aside from the office building and two grain silos) in 1985.

Significant industries in the area with the potential to generate dust[1] include:

- Sims Metal Management;
- Remix Cement;
- Coal conveyor and stockpiles; and
- Grain and wood pellet sheds

The nearest neighbouring receptors that could be adversely affected by emissions from the IBA facility are:

- Commercial development within 50m of the proposed IBA recycling facility;
- Residential development at King Street, 50m south east of the proposed development;
- Seven Estuary SSSI / SPA / SAC approximately 500m to the south west at its closest point.

These are described in more detail in section 2.3, below.

2.2 Proposed Development

The facility will be used for recycling of Incinerator bottom ash (IBA) to produce a range of high quality secondary aggregates - Incinerator Bottom Ash Aggregate (IBAA)

The facility will contain three main elements:

- IBA storage areas;
- IBA recycling areas; and,
- Facility infrastructure comprising the IBA treatment and handling plant and equipment, access, weighbridge

Up to a maximum of 700 tonnes per day (max. 130,000 tpa) of material will be recycled through the facility to produce a range of high quality graded aggregate products. No difficult or hazardous waste will be handled. In addition, ferrous and non-ferrous metal will be recovered. The maximum holding capacity of the facility 10,000 tonnes IBA.

The facility will operate on a 24-hour basis, though most operations take place between 07.00 to 18.00 hours Monday to Friday; and 07.00 to 13.00 on Saturdays.

A full description of the development is provided in the Day Group Limited 'Management System & Operating Techniques' document (Ref: 629A/MS&OT).

2.3 Sensitive Human Health Receptors

The term 'sensitive receptors' includes any persons, locations or systems that may be susceptible to changes as a consequence of the proposed development. The Institute of Air

[1] As identified by the Environment Agency: 'Study of Ambient Air Quality at Avonmouth'

Quality Management (IAQM) defines a dust receptor as a location that may be affected by dust emissions. Human receptors include locations where people spend time and where property may be impacted by dust. Ecological receptors are habitats that might be sensitive to dust.

The site setting, particularly in relation to surrounding receptors, can be seen in drawing DRA1. The proposed IBA recycling facility lies in the docks area where the surrounding commercial uses would be regarded as 'low' sensitivity receptors. To the south east (within 100m) lie residences along King Street, and close to these are other residential streets such as Richmond Villas and East Street. These would be regarded as 'high' sensitivity receptors, albeit they are located within an area of historically dense industrial / commercial activity (for over 100 years).

IAQM guidance defines the sensitivity of receptors to dust soiling as follows:

2.3.1 High sensitivity receptor

Surrounding land where:

- users can reasonably expect enjoyment of a high level of amenity; or
- the appearance, aesthetics or value of their property would be diminished by soiling; and
- the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.
- indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.

2.3.2 Medium sensitivity receptor

Surrounding land where:

- users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or
- the appearance, aesthetics or value of their property could be diminished by soiling; or
- the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.
- indicative examples include parks and places of work.

2.3.3 Low sensitivity receptor

Surrounding land where:

- the enjoyment of amenity would not reasonably be expected; or

- property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or
- there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.
- indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.

2.4 Baseline Air Quality

2.4.1 Environment Agency Investigations

The Environment Agency, Bristol City Council and Public Health England undertook investigations during 2014 and 2015 to determine whether there are health risks from air quality in Avonmouth[2].

The Environment Agency installed a mobile dust monitor at the location of the proposed IBA recycling facility in August 2014 following community concerns about dust. The mobile dust monitor was in place for 4 months and was used to determine the concentrations of PM_{10}, $PM_{2.5}$ and Total Suspended Particulates.

The Environment Agency report that dust monitoring equipment was used to:

- compare the local air quality with the objectives in the national Air Quality Strategy;
- identify any local sources with a significant impact on air quality;
- identify the impact of industrial sites on local air quality; and
- understand which weather conditions result in poor air quality.

As a result of the monitoring, Public Health England and Bristol City Council's public health representatives confirmed that recorded levels of dust in Avonmouth were below that which would pose a concern to public health and safety.

The Environment Agency also reviewed all the information collected about both airborne and deposited dust in Avonmouth. It concluded that the type and quantity of dust particles is what you would reasonably expect to find in an urban setting. This includes a broad range of human-generated dusts alongside a variety of naturally occurring materials. The range of dust particles found in Avonmouth is not out of the ordinary and is similar to what you would expect to find across the city of Bristol.

2.4.2 Council Review and Assessment of Air Quality

Bristol City Council has not declared an Air Quality Management Area (AQMA) in Avonmouth.

[2] https://www.gov.uk/government/publications/avonmouth-fly-and-dust-issues

Chapter 7 of the 2015 Updating and Screening Assessment for Bristol City Council (July 2015) makes reference to the Environment Agency study of particulate patter in Avonmouth during 2014.

> *'Public concern has been raised in the Avonmouth area of Bristol in relation to fugitive dust emissions. There are a number of processes in the area of the docks that have the potential to be sources of fugitive dust emissions and this increased public concern led to particulate monitoring being put in place in Avonmouth in 2014.*
>
> *….*
>
> *Initial results show that PM10 concentrations are well below the objective for this pollutant. Continued monitoring at the Bristol City Council TEOM site in Avonmouth for a full 12 months will allow for a direct comparison of results to the objectives for PM_{10}.'*

2.4.3 DEFRA Background Maps

Additional information on background concentrations in the vicinity of the development site has been obtained from the DEFRA background pollutant maps. Background concentrations from grid square 351500, 178500 which represents the proposed development site are provided in Table 2-1.

Table 2-1
Estimated background concentrations from DEFRA maps

Pollutant	2016 Concentration (µg/m^3)
PM_{10}	17.56
$PM_{2.5}$	11.37

The data presented in Table 2-1 shows that estimated background concentrations of PM_{10} are 'well below' the annual mean objective of 40 µg/m^3.

3.0 REGULATORY STANDARDS AND GUIDANCE

3.1 Air Quality Strategy for England, Scotland, Wales & Northern Ireland

The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007, pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems.

The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

The air quality objectives are medium-term policy based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

The air quality Standards and Objectives considered within this dust assessment relate to particulates, and are presented within Table 3-1.

Table 3-1
Air Quality Strategy Objectives

Pollutant	Concentrations	Measured As
Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10}) (gravimetric)	40µg/m^3	Annual mean
	50µg/m^3	24 hour mean

In accordance with DEFRA's technical guidance on Local Air Quality Management (LAQM.TG(09)), the air quality objectives should be assessed at locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective. A summary of relevant exposure for the objectives presented in Table 3-1 are shown below in Table 3-2.

Table 3-2
Air Quality Strategy Objectives

Objective Averaging Period	Relevant Locations	Objectives should apply at:	Objectives should not apply at
Annual mean	Where individuals are exposed for a cumulative period of 6 months in a year;	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	Where individuals may be exposed for eight hours or more in a day	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure if expected to be short term

Fractions of dust greater than 10µm in diameter are not covered within the National Air Quality Strategy and typically relate to nuisance effects as opposed to potential health effects. When the rate of accumulation of this coarser fraction of dust (referred to as deposited dust) is sufficiently rapid to cause fouling or discolouration then it is generally considered to introduce a nuisance. The point at which an individual perceives dust deposition as a nuisance and causes a complaint is highly subjective; there are no statutory numerical limits that define at what level dust becomes a nuisance.

3.2 Local Air Quality Management (LAQM)

Part IV of the Environment Act 1995 also requires local authorities to periodically Review and Assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

Where any of the prescribed air quality objectives are not likely to be achieved the authority concerned must designate that part an Air Quality Management Area (AQMA).

For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

The Department for Environment, Food and Rural Affairs (DEFRA) has published technical guidance for use by local authorities in their Review and Assessment work. This guidance, referred to in this chapter as LAQM.TG(09), has been used where appropriate in the assessment.

3.3 Environmental Permitting

Some facilities could harm the environment or human health unless they are controlled. The environmental permitting (EP) regime requires operators to obtain permits for some facilities, to register others as exempt and provides for ongoing supervision by regulators. The stated aim of the regime is to:

- protect the environment so that statutory and Government policy environmental targets and outcomes are achieved;
- deliver permitting and compliance with permits and certain environmental targets effectively and efficiently in a way that provides increased clarity and minimises the administrative burden on both the regulator and the operators;
- encourage regulators to promote best practice in the operation of facilities; and
- continue to fully implement European legislation.

The proposed IBA Recycling Facility falls within the EP regime and will therefore require a Permit to operate.

The Environment Agency will ensure that the facility is designed and operated in accordance with defined Best Available Techniques (BAT).

3.4 Standards Relating to Dust

There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist – 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred.

Guidance for the control and monitoring of dust from construction sites has been produced by the IAQM:

- *IAQM (2014) 'Guidance on the assessment of dust from demolition and construction'; and*
- *IAQM (2012) 'Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites'.*

This guidance document provides site evaluation guidelines based upon the size in square metres (or number of properties) of a development to rate the application site between a low risk to high risk once local sensitivity has been taken into account.

The Environment Agency Guidance M17 monitoring of particulate matter in ambient air around waste facilities is of more relevance to the IBA recycling process, although it does not include a risk ranking methodology such as that in the IAQM construction guidance, its focus instead being on the available monitoring methods for waste facilities.

These are overarching guidance documents which pull together the available techniques for assessment and monitoring. The IAQM documents underpin the approach taken in this dust risk assessment.

4.0 ASSESSMENT METHODOLOGY

As with any potentially dust generating activity, the risk of dust emissions from an IBA recycling facility causing loss of amenity and/or health or ecological impacts is related to:

- the activities being undertaken (demolition, number of vehicles and plant etc.);
- the duration of these activities;
- the size of the site;
- the meteorological conditions (wind speed, direction and rainfall);
- the proximity of receptors to the activities;
- the adequacy of the mitigation measures applied to reduce or eliminate dust; and
- the sensitivity of the receptors to dust.

Consideration of these issues allows the assessor to determine the Source-Pathway-Receptor risks, and this is a standard approach used in the IAQM construction dust and IAQM minerals dust guidance documents, for example.

The assessment methodology considers three separate dust effects:

- annoyance due to dust soiling;
- harm to ecological receptors; and
- the risk of health effects due to a significant increase in exposure to PM_{10}.

Risks may be described in terms of there being a low, medium or high risk of dust, based largely on professional judgement. Mitigation measures are identified where necessary and significance of dust effects determined following such mitigation.

5.0 IMPACT ASSESSMENT

In accordance with the standard qualitative risk assessment approach in the UK (often referred to as the Source-Pathway-Receptor method), the factors influencing the risk of dust emissions from the IBA recycling facility causing loss of amenity and/or health or ecological impacts are described below.

5.1 Source

5.1.1 Material

IBA is the ash that is left over after waste is burnt in an incinerator. Municipal energy from waste plants that use incineration burn a wide range of municipal wastes and therefore IBA will contain glass, brick, rubble, sand, grit, metal, stone, concrete, ceramics and fused clinker as well as combusted products such as ash and slag.

At the EfW facility the IBA, on removal from the incineration grate, drops into a 'quench' tank then along a conveyor to a storage pit. This means that the fresh IBA will always be damp (typically around 18 % moisture).

The damp, coarse textured IBA has a low potential for dust release (an example of similar material is shown in figure 2, below). The potential will increase when the IBA has been stockpiled as it dries during the maturation process and where the IBA is allowed to desiccate and / or is agitated, when finer dust may be released (if not adequately controlled)

Figure 2: Stockpiled IBA

5.1.2 Materials Handling

On import, raw (damp) IBA will be left to hydrate (also known as 'maturation ') in stockpiles of not more than 8m high for a period of up to three weeks to achieve the appropriate pH

level in accordance with the 'storage and rotation of raw IBA' protocol. The IBA will be housed within the main storage building (of 15.575m to ridge) during this stage, limiting the exposure to winds which may otherwise dry the material and carry it from the surface of the stockpiles.

The following items of mobile plant and equipment will be used as required at the facility:

- Loading shovel;
- Excavator;
- Telehandler; and
- Bobcat.

All conveyors will be covered to prevent dust release.

On commencement of processing, IBA will be loaded into the processing plant feed conveyor which will be fitted with a 200mm 'grizzly' (Recycling Vibrating screen) to remove oversize material. It will then pass through a magnetic separator to remove ferrous metal from where it will pass through a trommel screen to separate the -32mm and +32mm fractions.

The +32mm fraction will then pass through a second magnetic separator to remove additional ferrous metal followed by an eddy current separator (ECS) for the removal of non-ferrous metal. The +32mm inert fraction will be stored separately prior to being sold as +32mm IBAA.

The -32mm material will be fed into a 'flip flow' screen deck which will provide a 3 way split of the material. -4mm will pass through the screen and will be conveyed to an eddy current separator for further metal recovery and then conveyed to the stocking area as a finished product. The +4mm to -12mm and the +12mm to -32mm fractions will be subjected to further separate processing through additional Eddy Current Separators and further magnetic processing to remove the remaining ferrous and non-ferrous metals. The resultant products will then be conveyed to stock.

5.1.3 Designed-in mitigation

In addition to operational mitigation, the stockpile building and covered conveyors will act as effective barriers to prevent wind-blow of the fines IBA fraction.

The Environment Agency has requested clarification on this point. Only the IBA maturation will take place within a building. Processing areas are enclosed and conveyors are covered, however not housed within a building. The stored product (aggregate) is stored in open bays.

5.1.4 Summary

Although the IBA recycling facility will handle a significant volume of raw material, the IBA itself has a relatively low potential for dust release due to the moisture content and particle size. Furthermore, designed-in mitigation will ensure that the potential dust emission magnitude is 'medium'.

5.2 Receptor(s)

As described above, the proposed IBA recycling facility lies in the docks area where the surrounding commercial uses would be regarded as 'low' sensitivity receptors. To the south east (within 100m) lie residences along King Street, and close to these are other residential streets such as Richmond Villas and East Street. These would be regarded as 'high' sensitivity receptors, albeit they are located within an area of historically dense industrial / commercial activity (for over 100 years).

In terms of smaller particulates (PM_{10}), this is not a high risk site. DEFRA Backgrounds show a PM_{10} concentration at 351500, 178500 of 17.6 µg/m^3. The classification is consistent with Table 3 of the IAQM Guidance.

5.3 Pathway

5.3.1 Distance

The distance from the source to the sensitive receptor is crucial. The vast majority of particles responsible for annoyance are deposited within 100m of the source, and hence it is in this zone that the risk of problems from dust is greatest. Drawing DRA1 shows the proximity of residences to the proposed IBA recycling facility.

Table 2 of the IAQM guidance (*IAQM 2014 Guidance on the Assessment of dust from demolition and construction*) may be used to determine the sensitivity based on receptor numbers and distance from source.

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Drawing DRA1 shows that there are no residences within 50m of the site boundary, and 11 residences within 100m. On this basis the sensitivity of the area to dust soiling effects on people and property would be regarded as 'Low'. As the vehicles using the IBA recycling facility would exit the site onto Kings Road, the properties on Kings Street will not be influenced by HGV trackout.

The Severn Estuary is over 500m from the site. There is no potential for dust impact from the proposed IBA recycling facility at this ecological site.

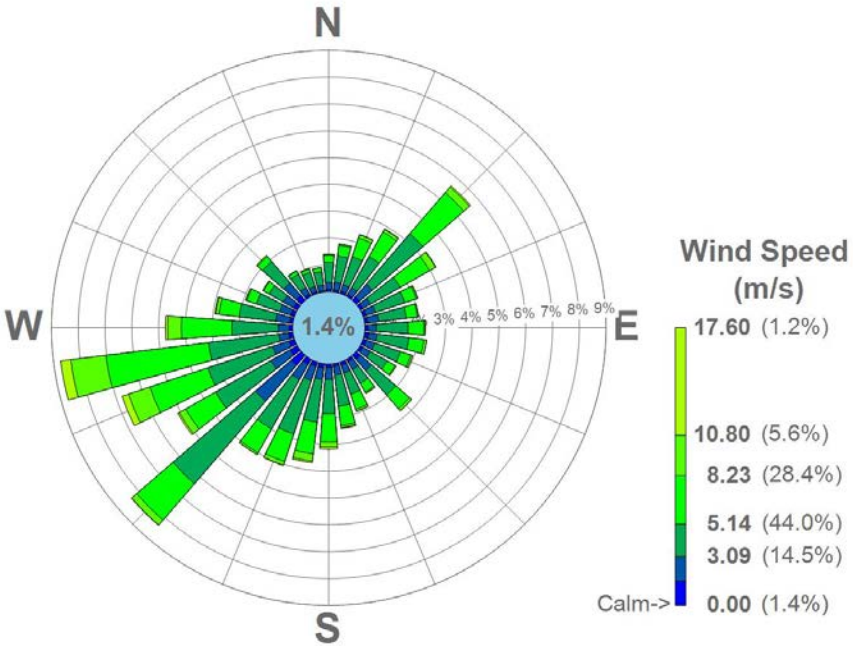
5.3.2 Local Meteorological Data

The generation of dust will be directly influenced by rainfall as moisture is the most effective suppressant to dust release. In dry conditions, the wind speed will then determine the potential for any dust to be blown and the wind direction will determine where it is carried.

The closest weather station with sufficient records of wind direction and wind speed considered representative of conditions experienced at the site is Bristol Airport (Lulsgate) Meteorological Station.

The wind speed and direction data for this site over the period 2009 – 2013 is presented below in Figure 3.

Figure 3: Windrose – Lulsgate (2009 – 2013)



A breakdown of winds by speed and direction is shown below.

Table 5-1
Wind Speed and Direction

Dir \ Spd	<= 1.54	<= 3.09	<= 5.14	<= 8.23	<= 10.80	> 10.80	Total
0.0	0.09	0.26	0.74	0.28	0.03	0.00	1.39
11.3	0.07	0.30	0.98	0.40	0.05	0.00	1.80
22.5	0.08	0.27	1.10	0.74	0.12	0.01	2.32
33.8	0.08	0.30	1.33	1.05	0.11	0.02	2.89
45.0	0.17	0.63	2.48	2.02	0.28	0.05	5.64
56.3	0.11	0.34	1.27	1.26	0.26	0.02	3.25
67.5	0.12	0.37	1.15	0.45	0.05	0.01	2.15
78.8	0.11	0.42	1.03	0.41	0.05	0.00	2.03
90.0	0.12	0.31	1.18	0.59	0.05	0.01	2.26

Dir \ Spd	<= 1.54	<= 3.09	<= 5.14	<= 8.23	<= 10.80	> 10.80	Total
101.3	0.15	0.32	1.19	0.56	0.10	0.00	2.33
112.5	0.13	0.32	1.02	0.41	0.07	0.00	1.95
123.8	0.11	0.32	0.72	0.34	0.04	0.00	1.54
135.0	0.21	0.55	1.20	0.68	0.10	0.01	2.74
146.3	0.10	0.33	0.59	0.38	0.05	0.01	1.46
157.5	0.12	0.30	0.82	0.60	0.07	0.01	1.93
168.8	0.10	0.33	1.17	0.72	0.08	0.03	2.43
180.0	0.13	0.45	1.27	1.06	0.18	0.08	3.17
191.3	0.16	0.44	1.60	1.19	0.28	0.06	3.72
202.5	0.17	0.55	2.10	1.08	0.15	0.01	4.06
213.8	0.21	0.66	2.11	1.02	0.07	0.01	4.08
225.0	0.49	1.77	4.07	1.80	0.24	0.02	8.38
236.3	0.31	0.83	2.38	1.28	0.27	0.07	5.13
247.5	0.21	0.65	2.54	2.28	0.84	0.25	6.77
258.8	0.15	0.38	2.64	3.85	1.32	0.38	8.73
270.0	0.13	0.40	1.73	1.89	0.50	0.09	4.75
281.3	0.12	0.53	1.37	0.76	0.12	0.03	2.93
292.5	0.14	0.44	0.92	0.37	0.05	0.01	1.92
303.8	0.17	0.44	0.60	0.24	0.03	0.00	1.48
315.0	0.25	0.62	1.05	0.25	0.05	0.00	2.21
326.3	0.10	0.28	0.57	0.13	0.02	0.00	1.10
337.5	0.07	0.21	0.55	0.14	0.01	0.00	0.98
348.8	0.05	0.21	0.50	0.15	0.01	0.00	0.92
Total	**4.75%**	**14.52%**	**43.98%**	**28.36%**	**5.65%**	**1.21%**	**98.46%**

It can be seen that the wind speed is above 5.14 m/s (i.e. Beaufort Force 4, a moderate breeze, sufficient to result in wind-blown dust) for 79% of the year in total. The largest proportion of these stronger winds is when the wind is blowing from the WSW, potentially impacting on receptors to the ENE.

The wind speed and direction data must only be considered alongside the rainfall information, as it is only on dry days when the site would have the potential to release dust.

Relevant rainfall data applicable to the review site has been obtained from the Meteorological Office website for Filton Airport (1981 – 2010) and presented in Table 5.2. The annual average number of days with rainfall greater than 1mm is 126 days per year (35% days/year).

On average therefore, of the 79% of days when the wind speed is above 5.14 m/s, approximately a third of these may also be when it is rainy. Clearly the likelihood is that the proportion will be higher, with the higher winds and rain often occurring together in the UK.

Table 5-2
Rainfall

Month	Rainfall (mm)	Days of rainfall >= 1 mm (days)
Jan	82.3	12.5
Feb	53.8	9.7
Mar	58.6	10.8
Apr	49.3	9.4
May	62.3	10.1
Jun	55.2	8.6
Jul	54.6	9.1
Aug	64.2	9.6
Sep	68	8.9
Oct	85.4	12.1
Nov	82.6	12.8
Dec	85.9	12.4
Annual	**802.1**	**125.9**

In relation to the residential receptors to the south and south east of the site, wind blowing from 315° to 025° has the potential to blow IBA dusts towards these residences. Winds above 5.14 m/s blow from this sector for 7.87% of the year, of which a proportion (approximately a third) may be wet days.

5.4 Potential Impacts: No operational mitigation

In summary:

- Residential receptors are close to the site (at approximately 50m – 100m) and of high sensitivity;
- The recycling facility will accept and process a high volume of IBA at a maximum of 700 tonnes per day (max. 130,000 tpa); however
- The source has a low potential for dust release due to the moisture content of the material and tendency to 'crust'; and
- Winds of sufficient strength blow towards receptors for less than 5% of the year;
- The facility incorporates designed-in mitigation (a stockpile building and covered conveyors) to mitigate against wind-blow; and
- The routing of HGVs will mean that the risk of trackout and re-suspension is low.

On the basis of the above it is considered that, before considering operational mitigation, the risk of dust impact is low – medium at residential receptors.

The risk of impact at ecological receptors is negligible due to distance. The risk of impact at other industrial / commercial receptors is negligible due to their low sensitivity.

5.5 Operational Mitigation

In addition to designed-in mitigation, the site will utilise operational mitigation to ensure that the risk of dust impact remains low even during the driest and windiest meteorological conditions.

A dust suppression water spray system will be installed for the control of dust within the yard areas (including finished product aggregate). The processing plant will also be fitted with dust suppression systems as necessary.

The control of dust and particulate emissions from the facility will be the overall responsibility of the facility manager. Any activities causing excessive emissions from the facility will be immediately suspended until the appropriate dust suppression systems have been implemented. Such measures will include the operation of the water spray system, and/or damping the operational area. The system will be controlled by site operatives with remote controls that operate individual sprays.

Sprays will be located around the site, with a cluster around the feed hopper. Additional placement spray will be fitted to the excavator bucket.

Should significant volumes of fugitive dust and particulates escape into the surrounding environment as a result of a particular activity, control measures detailed above would then be applied until the dust levels return to normal and the activity will be reviewed in order to prevent re-occurrence.

5.6 Residual Impacts: Operational Mitigation Applied

Before considering operational mitigation, the risk of dust impact is medium - low. When operational mitigation measures are applied (such as dust suppression sprays), the risk of impacts is low – negligible.

6.0 MONITORING

The monitoring of dust will be undertaken in accordance with best practice as described in relevant guidance such as:

- Environment Agency. *Technical Guidance Note (Monitoring) M17: Monitoring Particulate Matter in Ambient Air around Waste Facilities*. Version 2; and
- *IAQM (2012) 'Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites'.*

Monitoring will be carried out to ensure that the facility is not generating unacceptable concentrations of dust, fibres and particulates due to its operation.

Monitoring will consist of:

- Visual inspections of all loads upon discharge and on-going inspection of the facility area by staff during normal operations. The results of visual dust monitoring will be recorded in the Daily Environmental Log and events will be reported to the Environment Agency, if requested.
- Meteorological monitoring using a site weather station and a windsock to allow prediction of adverse weather and review of meteorological conditions in the event of any dust complaint.

Additional quantitative monitoring will only be carried out should problems be reported by the EA and where it is considered necessary in order to be able to investigate such problems.

6.1 Visual Inspections

It is the duty of all site staff to remain constantly vigilant to dust releases and raise awareness of this issue should it arise. Notwithstanding this, discrete visual dust inspections will be completed at least twice daily:

i. On arrival at the site and before IBA processing and / or agitation occurs; and

ii. After the designated lunch break, before afternoon IBA processing and / or agitation occurs.

At least 4 inspection points, representing the 4 sides of the site boundary, will be selected. Inspections will primarily record general cleanliness of the recycling facility as well as the potential for dust release as determined by the dampness of the IBA and the weather conditions (i.e. dry and windy being the highest risk).

Visual inspection would be carried out in accordance with Environment Agency M17 Section 6.2 'Visual Assessment of Dust Emissions'.

6.2 Meteorological Monitoring

An on-site weather station will record temperature, wind speeds, direction, rainfall and humidity.

A wind-sock will be secured at high level as a visual indicator to the site staff of the potential for wind-blow.

6.3 Quantitative Monitoring

Additional quantitative monitoring will only be carried out should problems be reported by the EA and where it is considered necessary in order to be able to investigate such problems. This may take the form of monitoring for deposited dust (i.e. dust deposition flux) and / or suspended particulate ('TSP'). Given the particle size of the IBA recycled at the facility, it is considered that dust flux would be more relevant than TSP.

7.0 CONCLUSIONS

An assessment has been carried out to determine the potential dust impacts associated with a proposed IBA Recycling Facility within the King Edward Dock, Avonmouth.

A source-pathway-receptor approach has been undertaken to assess the risk of dust release, potential for wind-blow to receptors and subsequent dust impact. This assessment has been undertaken in accordance with guidance released by the IAQM.

In summary:

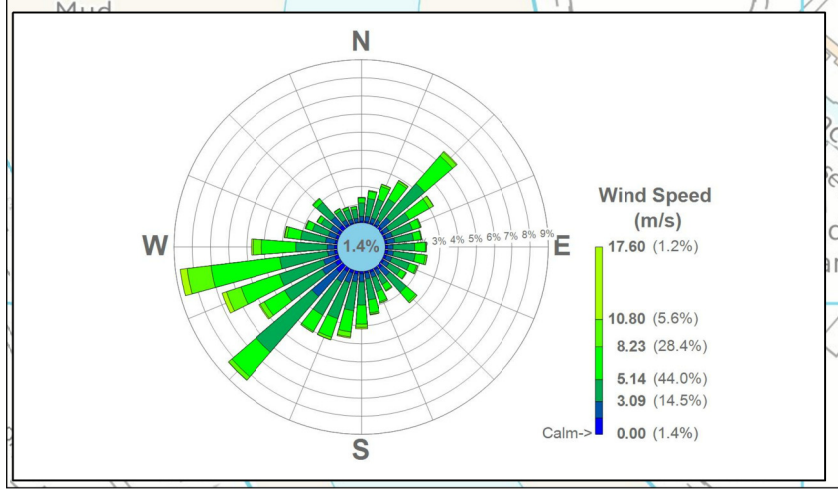
- Residential receptors are close to the site (at approximately 50m – 100m) and of high sensitivity;
- The recycling facility will accept and process a high volume of IBA at a maximum of 700 tonnes per day (max. 130,000 tpa); however
- The source has a low potential for dust release due to the coarse particle size and moisture content of the material; and
- Winds of sufficient strength blow towards receptors for less than 5% of the year;
- The facility incorporates designed-in mitigation (a stockpile building, enclosed processing areas and covered conveyors) to mitigate against wind-blow; and
- The routing of HGVs will mean that the risk of trackout and re-suspension is low.

On the basis of the above it is considered that, before considering operational mitigation, the risk of dust impact is low - medium. Operational mitigation will ensure that this potential impact is reduced still further.

Visual monitoring of the potential for dust release, in addition to monitoring of meteorological parameters essential for fugitive dust release will ensure that the operational mitigation remains effective and measures can be taken rapidly in the event of failure of any of the measures adopted.

APPENDIX A: SITE LOCATION

Avonmouth
Eastern Arm
Oil Basin
Travelling Cranes
Wind Turbine
Jetties
Transit Shed
Avonmouth Docks
9m
Graving Dock
Entrance Lock
North Wall
Royal Edward Dock
Pumping Station
Conveyor
Scrap Yard
200m
Workshops
Travelling Crane
100m
50m
Mast
Mill
8m
Depots
Drain
A403
KING ROAD
AVENUE
St Andrews Gate Roundabout
A4
CROWLEY WAY
Depot
JUBILEE WAY
International Trading Estate
7m
ST
NOVA WAY
Warehouses
Warehouse
Travelling Crane
Channel
Junction Cut
RESIDENTIAL AREA
KING STREET
QUEEN S
CLAYTON ST
MEADOW ST
RICHMOND TERRACE
JUTLAND RD
MCLAREN RD
ST ANDREWS ROAD
PW
Liby
Sta
Custom House
GLOUCESTER ROAD
Depot
Pol Sta
ST BRENDAN'S WAY
Works
NAPIER ROAD
AVONMOUTH ROAD
GREEN LANE
COLLINS STREET
DAVIS STREET
PO
Avonmouth Dock
Conveyor



NOTES

LEGEND

SITE BOUNDARY

STAND OFF

N
W E
S

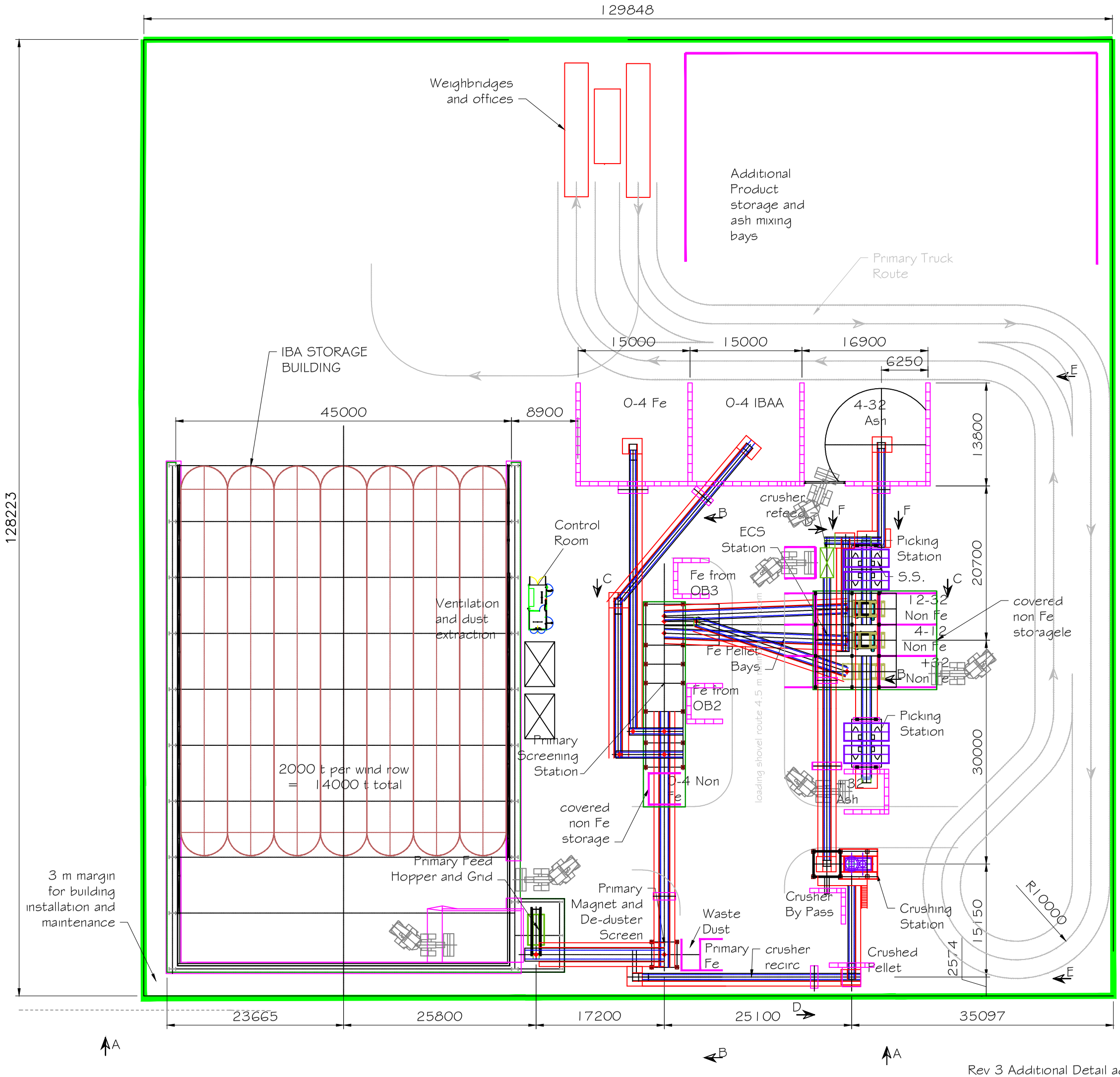
DAY GROUP LTD

SITE: **Avonmouth IBA Processing Plant**	
PROJECT: **Dust Risk Assessment 01.0006.002**	
DRAWING TITLE: **Dust Risk Assessment**	
DRAWING NUMBER: DRA1	REVISION: 0
SCALE: 1:5000 @ A3	DATE: 16.03.2016

ISOPLETH

APPENDIX B: SITE LAYOUT

SCHEMATIC LAYOUT
FOR DISCUSSION PURPOSES ONLY
ALL DIMENSIONS ARE UNCONFIRMED

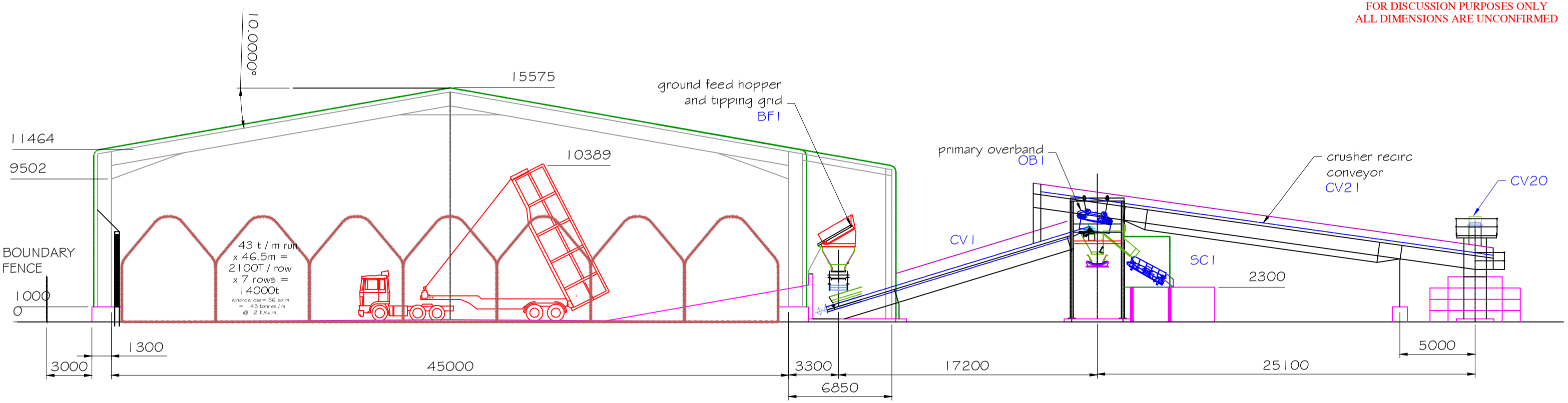


DAY AGGREGATES
IBA PROCESSING PLANT
AVONMOUTH
PROPOSED PLANT OVER SITE PLAN
DRG AV001-09 rev 3
SCALE 1:500 AT A3
19.01.16 SNF

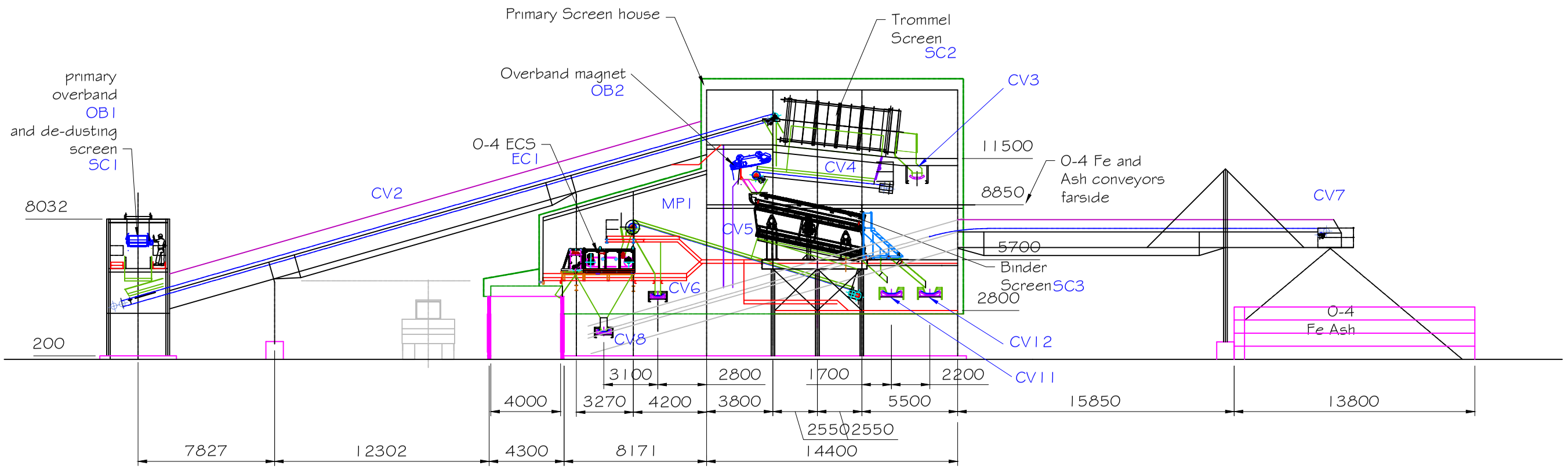
Rev 3 Additional Detail added 08.02.16

APPENDIX C: PLANT ELEVATIONS

SCHEMATIC LAYOUT
FOR DISCUSSION PURPOSES ONLY
ALL DIMENSIONS ARE UNCONFIRMED



SECTION THRO A-A



SECTION THRO B-B

Rev 2 Additional Detail added 08.02.16

To be read with drawing AV001-09

DAY AGGREGATES
IBA PROCESSING PLANT
AVONMOUTH
ELEVATIONS VIEWS ON ARROWS A,&B
DRG AV001-10 rev 2
SCALE 1:500 AT A3
19.01.16 SNF

SCHEMATIC LAYOUT
FOR DISCUSSION PURPOSES ONLY
ALL DIMENSIONS ARE UNCONFIRMED

14300 13900 7050 4200 4200 4200 4300 30000 15150

5950 16300 7700 5500

12-32 Picking Station
12-32 Non Fe
4-12 Non Fe
+32 Non Fe
+32 Picking Station
+32 Ash
Crushing Station
Crusher By Pass
crusher refeed
12-32 Fe
4-12 Fe
+32 Fe
S.S.

12000 24500 2300

Overband magnet 800 mm OB3
Primary Screen house
CV13
CV9 ø10
0-4 Ash
0-4 Fe
CV7
5771
4000 4000
1700 2500 1550
2800
7700 8550 4150
7000 X 4.5M clear
600 5000
7200

SECTION THRO C-C

MP2 MP4 EC2 MP3 13642 EC3 EC4 30000
ECS Station
+32 Picking Station
CV19
Crusher surge bin and feeder
Crusher recirc conveyor
VF1
CR1
CV20
Crusher By Pass
7000
crusher refeed
BF2
4000
12-32 Fe
4-12 Fe
+32 Fe
2950 6200 4200 4200 6400 6400 13000 3250 4200 15150

SECTION THRO D-D

30000 20200 13642 12441
10353
+32 Picking Station PB2
12-32 Picking Station PB1
CV18
CV16
CV14
CV15
+32 Non Fe
4-12 Non Fe
12-32 Non Fe
S.S.
S.S.
4-32 Ash
0
2100
15150 13000 6400 4300 4200 4200 2100 6400 7500 14300

SECTION THRO E-E

CV14 CV17 CV15
CV16
2000 2500 2800

SECTION THRO F-F

DAY AGGREGATES
IBA PROCESSING PLANT
AVONMOUTH
ELEVATIONS VIEWS ON ARROWS C,D,E&F
DRG AV001-11 rev 2
SCALE 1:500 AT A3
19.01.16 SNF

To be read with drawing AV001-09

Rev 2 Additional Detail added 08.02.16

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