Appendix 5.1: Visible Plume Assessment Methodology

Recycling, Recovery and Renewable Energy Facility

Wealden Brickworks Site, Langhurstwood Road, Horsham, West Sussex

Britaniacrest Recycling Ltd

Environmental Statement Addendum
Chapter 5
Landscape and Visual Resources
Appendix 5.1: Visible Plume Assessment Methodology

Quality Management

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Appendix 5.1: Landscape and Visual Impact Assessment

Visible Plume Assessment Methodology

5.1.1 Due to the dry flue gas clean-up process proposed to be deployed in the development and the temperature and moisture content of the flue gas, there will be no visible plume for the majority of the majority of the year. The flue gases will be treated using dry lime powder and there is little water added to the process other than that which is inherent within the waste fuel in the first place. On days where conditions do give rise to the creation of a visible plume, the plume would extend the visibility of the proposed development for visual receptors with close range views. The visible plume could increase the visual effects of the proposed development by giving the local area a more industrial appearance to visual receptors who witness it. The visible nature of any plume is very variable due to a number of factors including, time of year, cloud cover, temperature, wind speed and direction, and the degree of saturation of the surrounding air. This makes it difficult to be specific about the visual effect of the plume due to the number of variables.

5.1.2 Plumes are generally more likely to be produced in the winter period when temperatures are lower and the atmosphere more likely to be saturated by water vapour. Plumes in the summer period - when outdoor recreational activity is perhaps greatest - tend to be far more infrequent. Similarly, plumes are more likely to occur at night and have a low frequency of occurrence during hours of daylight. As such, the likelihood that visual receptors would witness the visible plume is significantly reduced by the requirement for them to have views towards the proposed site during the time period that the conditions are right for the plume to occur. Furthermore, a number of climatic conditions such as mist or fog where visibility is low would obscure the plume from view. Since the proposed development has committed to a lighting plan that minimizes illumination, these plumes would not be visible at night unless illuminated by off-site sources.

5.1.3 For the purpose of this assessment, an average visible plume has been established from the worst annual met office data recorded over the last five years. The average length of plume determined from the worst year has then been shown on the photomontages that are used to assess the change to views and the significance of effect upon visual receptors at representative viewpoints. The length of plume shown in the photomontages has been used alongside professional judgement and the Zone of Theoretical Visibility to establish the likely change to views and significance of effects that visual receptors across the study area are likely to experience. For the purpose of this assessment, an average length of plume has been used rather than a maximum length or minimum length.

5.1.4 The proposed development would appear as a more noticeable element in wider views from more elevated locations and the visible plume would cause views to be drawn to the development by appearing from the top of the stack due to the plume emphasising the location of the 3Rs facility. Where the proposed development is not visible, the visible plume would, on occasion, alert visual receptors of its presence despite being entirely screened from view.

5.1.5 On the days when visible plume is evident, the largest plumes would increase the levels of visual change for the short duration that the plume is visible. As the plume would cause such a temporary change to the visibility of the proposed development and would only occur on such a small percentage (less than 5%) of daylight hours over the year, it is not considered that the presence of the visible plume would lead to an increase in any of the visual effects identified during the visual assessment.

Plume Visibility

5.1.6 Table 5.1.1 provides a summary of the results of plume visibility modelling based on five years of hourly sequential meteorological data.

Table 5.1.1 Summary of Plume Visibility Results

Year of Met Data	Number of visible plumes	Percentage of year that a visible plume is predicted	Maximum plume length (m)	Average plume length (m)	Number of hours plume visible outside site boundary during daylight hours	Percentage of year visible plumes are outside site boundary during daylight hours
2011	197	2.2	155	1	14	0.4
2012	368	4.2	177	1	15	0.4
2013	533	6.1	376	4	72	1.9
2014	174	2.0	151	1	15	0.4
2015	152	1.7	222	1	12	0.3

Worst case average visible plume

5.1.7 The methodology chosen for visualising the plume on the photomontages is to show the worst case average plume in the direction of the prevailing wind.

5.1.8 The worst case visible plumes would have occurred in 2013 according to meteorological data.

5.1.9 In 2013 the plume would have been visible 6.1% of the time. The average plume lengths in the summary table include all the zero readings thus resulting in an average length of 4m. If all the zero plume length readings are ignored we can calculate the average plume length when it is visible. This results in an average length of 55.3m

5.1.10 The meteorological data gives a distance when first visible and last visible as well as a plume height where last visible. Averages for these values are as follows:

5.1.11 First visible distance from stack – 11.9m;

5.1.12 Last visible distance from stack – 67.2m; and

5.1.13 Plume height where last visible – 113.7m

Plume direction

5.1.14 Figure 5.1.1 shows the wind-rose for Charlwood.

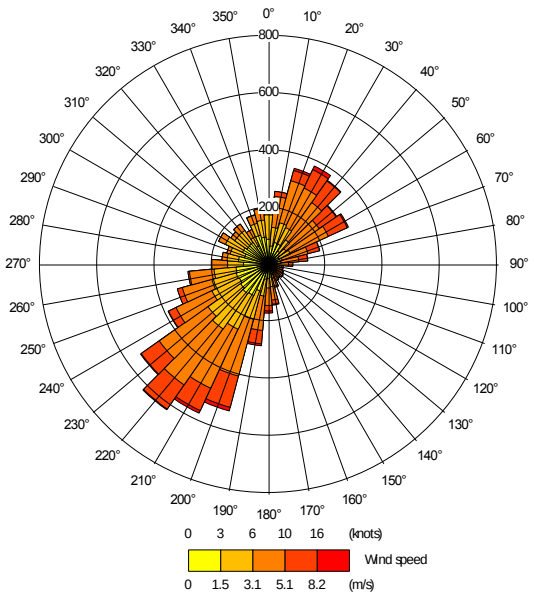

Figure 5.1.1 Wind-rose for Charlwood 2013

5.1.15 Prevailing wind is from the southwest, 220° thus resulting a in an average north-easterly (40°) plume direction.

Modelled dimensions

5.1.16 Figure 5.1.2 shows the dimensions as modelled on the photomontages.

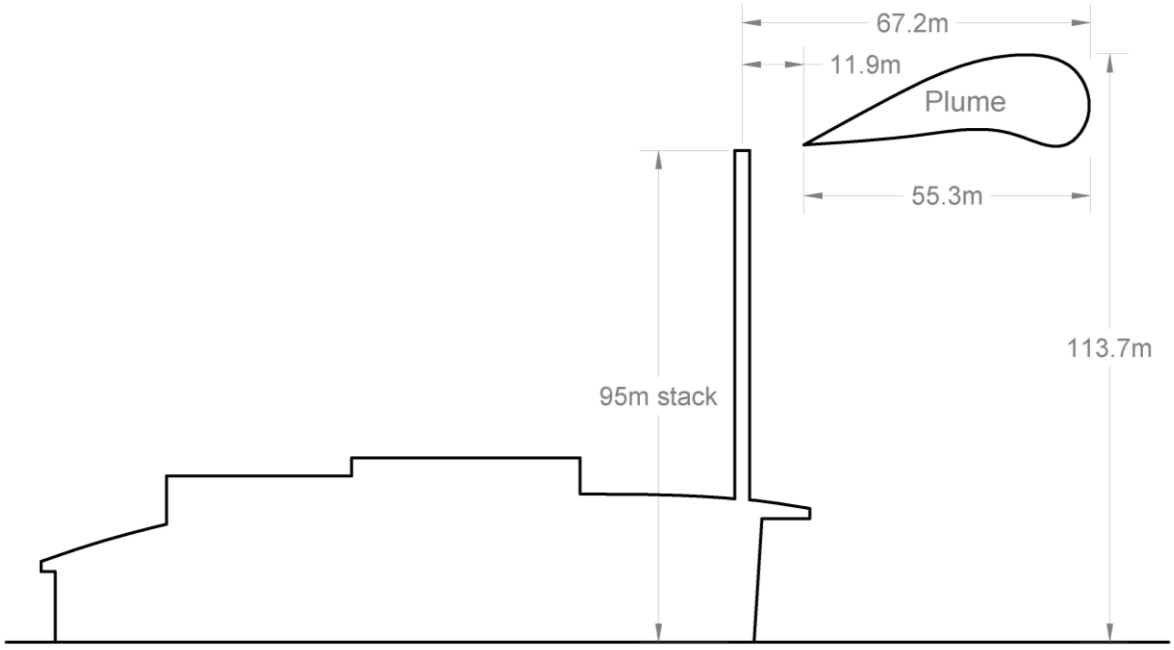

Figure 5.1.2 Modelled Plume