

# **Green Hill Solar Farm**

## **Preliminary Environmental Information Report**

### **Volume 3**

### **Air Quality Appendix 16.1**

Prepared by: Arcadis  
Date: November 2024

PINS reference: EN010170

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### **Appendix 16.1 Construction Dust Methodology and Assessment**

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## Appendix 16.1 Construction Dust Methodology and Assessment

### Assessment Methodology

The dust risk assessment has been carried out in accordance with the Institute of Air Quality Management (IAQM) construction dust guidance (Ref.20).

The steps for assessing dust emissions in accordance with the IAQM construction dust guidance (Ref.20) are detailed in the following sections.

#### Step 1

Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 250m of the boundary or 50m from the construction vehicle route up to 250m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or 50m from the construction vehicle route up to 250m from the site entrance, then the assessment also proceeds to Step 2.

Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

#### Step 2

Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on two factors:

- The scale and nature of the works, which determines the potential dust emission magnitude as: small, medium or large (Step 2A); and,
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in **Table 1**.

**Table 1: Construction Dust - Magnitude of Emission**

Magnitude	Activity	Criteria
Large	Demolition	Total building volume greater than 75,000m <sup>3</sup> Potentially dusty construction material (e.g. concrete) On-site crushing and screening Demolition activities greater than 12m above ground level
	Earthworks	Total site area greater than 110,000m <sup>2</sup> Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) More than 10 heavy earth moving vehicles active at any one time Formation of bunds greater than 6m in height
	Construction	Total building volume greater than 75,000m <sup>3</sup> On site concrete batching Sandblasting
	Trackout	More than 50 HDV outward trips per day



Magnitude	Activity	Criteria
		Potentially dusty surface material (e.g. high clay content) Unpaved road length greater than 100m
Medium	Demolition	Total building volume 12,000m <sup>3</sup> to 75,000m <sup>3</sup> Potentially dusty construction material Demolition activities 6m to 12m above ground level
	Earthworks	Total site area 18,000m <sup>2</sup> to 110,000m <sup>2</sup> Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time Formation of bunds 3m to 6m in height
	Construction	Total building volume 12,000m <sup>3</sup> to 75,000m <sup>3</sup> Potentially dusty construction material (e.g. concrete) On site concrete batching
	Trackout	20 to 50 HDV outward trips per day Moderately dusty surface material (e.g. high clay content) Unpaved road length 50m to 100m
Small	Demolition	Total building volume under 12,000m <sup>3</sup> Construction material with low potential for dust release (e.g. metal cladding or timber) Demolition activities less than 6m above ground level Demolition during wetter months
	Earthworks	Total site area less than 18,000m <sup>2</sup> Soil type with large grain size (e.g. sand) Less than 5 heavy earth moving vehicles active at any one time Formation of bunds less than 3m in height
	Construction	Total building volume less than 12,000m <sup>3</sup> Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	Less than 20 HDV outward trips per day Surface material with low potential for dust release Unpaved road length less than 50m

Step 2B defines the sensitivity of the area around the proposed Scheme to potential dust impacts. The influencing factors are shown in **Table 2**.

**Table 2: Construction Dust - Examples of Factors Defining Sensitivity of an Area**



Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	<p>Users expect high levels of amenity.</p> <p>High aesthetic or value property.</p> <p>People expected to be present continuously for extended periods of time.</p> <p>Locations where members of the public are exposed over a time period relevant to the air quality objective for PM<sub>10</sub> e.g. residential properties, hospitals, schools and residential care homes.</p>	<p>Internationally or nationally designated site e.g. Special Area of Conservation, and the designated features may be affected by dust soiling.</p> <p>Locations where there is a community of a particular dust sensitive species such as vascular species included in the Red Data List for Great Britain.</p>
Medium	<p>Users would expect to enjoy a reasonable level of amenity.</p> <p>Aesthetics or value of their property could be diminished by soiling.</p> <p>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 e.g. parks and places of work.</p>	<p>Nationally designated site e.g. SSSI with dust sensitive features.</p> <p>Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown.</p>
Low	<p>Enjoyment of amenity would not reasonably be expected.</p> <p>Property would not be expected to be diminished in appearance.</p> <p>Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, playing fields, farmland, footpaths, short term car park and roads.</p>	<p>Locally designated site e.g. Local Nature Reserve (LNR) where the features may be affected by dust deposition.</p>

The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;



- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and,
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

These factors were considered during the undertaking of the assessment.

The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in **Table 3**.

**Table 3: Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property**

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 250
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

**Table 4** outlines the criteria for determining the sensitivity of the area to human health impacts.

**Table 4: Construction Dust - Sensitivity of the Area to Human Health Impacts**

Receptor Sensitivity	Annual Mean PM <sub>10</sub> Concentration	Number of Receptors	Distance from the Source (m)			
			Less than 20	Less than 50	Less than 100	Less than 250
High	Greater than 32µg/m <sup>3</sup>	More than 100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28-32µg/m <sup>3</sup>	More than 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24-28µg/m <sup>3</sup>	More than 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	Less than 24µg/m <sup>3</sup>	More than 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low



Receptor Sensitivity	Annual Mean PM <sub>10</sub> Concentration	Number of Receptors	Distance from the Source (m)			
			Less than 20	Less than 50	Less than 100	Less than 250
		1 - 10	Low	Low	Low	Low
Medium	Greater than 32µg/m <sup>3</sup>	More than 10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28-32µg/m <sup>3</sup>	More than 10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	24-28µg/m <sup>3</sup>	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	Less than 24µg/m <sup>3</sup>	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	More than 1	Low	Low	Low	Low

Table 5 outlines the criteria for determining the sensitivity of the area to ecological impacts.

**Table 5: Construction Dust - Sensitivity of the Area to Ecological Impacts**

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

Table 6 outlines the risk category from demolition activities.

**Table 6: Construction Dust - Dust Risk Category from Demolition Activities**

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 7 outlines the risk category from earthworks and construction activities.

**Table 7 Construction Dust - Dust Risk Category from Earthworks and Construction Activities**

Receptor Sensitivity	Dust Emission Magnitude
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	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

**Table 8** outlines the risk category from trackout activities.

**Table 8 Construction Dust - Dust Risk Category from Trackout Activities**

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

### Step 3

Step 3 requires the identification of site-specific mitigation measures within the guidance to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with negligible risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

### Step 4

Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects using effective mitigation. Experience shows that this is normally possible, hence the residual effect will normally be not significant.

### Assessment

#### Step 1

The undertaking of activities such as demolition, excavation, ground works, cutting, construction and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from highway surfaces.

The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

A desk-study identified many sensitive human receptors within 250m of the Scheme boundary, mostly residential properties and farms in the area, which are displayed in **Figure 16.1 Air Quality Construction Dust Study Area**.

There are several ecological sites identified within 50m of the Scheme boundary, which are outlined in **Table 9** and in **Figure 16.1 Air Quality Construction Dust Study Area**.

**Table 9 Ecological Designated Sites within 50m of the Scheme Boundary**





Site Name	Designation
Hardwick Lodge Meadow	SSSI
Bozeat Meadow	SSSI
Hardwick Wood	Ancient Woodland (AW)
Nun Wood	AW
Sywell Wood	AW
Three Shire Wood	AW
Horn Wood	AW
Barslay Spinney	AW
Broadlane Spinney	AW
Upper Nene Valley Gravel Pits	Special Protection Area (SPA)
Upper Nene Valley Gravel Pits	RAMSAR

## Step 2A

### Demolition

The Scheme does not include any proposed demolition activity, as such impacts from demolition have not been considered further in the assessment.

### Earthworks

The total site area is greater than 110,000 m<sup>2</sup> and the soil type mostly consist of clay. At this stage there is no information available on the number of heavy earth moving vehicles and height of bunds. However, on the basis of the total site area and soil type, the potential dust emission magnitude for construction is considered to be **large**.

### Construction

The total building volume to be constructed is greater than 75,000m<sup>3</sup>, with construction materials consisting of concrete feet on a number of structures. Concrete batching shall be carried out on site by means of a mobile truck. As such the potential dust emission magnitude for construction is considered to be **large**.

### Trackout

During the construction phase of the project, the maximum outward HDV movements per day from any of the proposed sites is 17. However, there are multiple sites and the access tracks for construction HDVs will be unpaved and may be greater than 100m in length. As such the magnitude of potential dust emissions from trackout is considered to be **large** as a worst case.

The dust emission magnitude for each dust generating activity for the project is summarised in **Table 10**.

**Table 10 Construction Dust – Dust Emission Magnitude Summary**

Activity	Dust emission magnitude
Demolition	Not Applicable
Earthworks	Large
Construction	Large



Activity	Dust emission magnitude
Trackout	Large

**Step 2B**

Receptors sensitive to potential dust impacts during earthworks and construction activities were approximated from a desktop study of the area up to 250m from the site boundary for human receptors and up to 50m for ecological receptors. These are summarised in **Table 11**.

**Table 11 Construction Dust – Earthworks and Construction Dust Sensitive Receptors**

Distance from Sites (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	>100 with high sensitivity	10-100 with high sensitivity
Less than 50	>100 with high sensitivity	10-100 with high sensitivity
Less than 100	>100 with high sensitivity	-
Less than 250	>100 with high sensitivity	-

Receptors sensitive to potential dust impacts from trackout were approximated from a desktop study of the area up to 50m from the road network within 250m of the site accesses. These are summarised in **Table 12**.

**Table 12 Construction Dust – Trackout Dust Sensitive Receptors**

Distance from Sites (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	>100 with high sensitivity	0
Less than 50	>100 with high sensitivity	0

In accordance with the IAQM construction dust guidance (Ref.20), the highest level of sensitivity should be recorded from the criteria outlined in the guidance.

The IAQM construction dust guidance (Ref.20) defines residential properties as being high sensitivity receptors to dust soiling impacts and therefore the sensitivity of the surrounding area for dust soiling impacts has been determined based on the number of high sensitivity receptors and the distance of the receptor from the source (refer to **Table 3**).

To determine the sensitivity of the receiving environment for human health effects, the maximum 2024 PM<sub>10</sub> background concentration across the Scheme boundary was obtained from the Defra website (Ref.26) and identified as being 14.8µg/m<sup>3</sup> (see **Table 16.6**). Therefore, in accordance with the IAQM construction dust guidance (Ref.20), health impacts should be determined based on the criteria within the less than 24µg/m<sup>3</sup> category (refer to **Table 4**). As the human receptors include residential properties, the sensitivity of the receptor is considered to be high and therefore the sensitivity of the surrounding area for human health impacts has been determined based on the number of high sensitivity receptors within the less than 24µg/m<sup>3</sup> background PM<sub>10</sub> category and the distance of the receptors from the source (Refer to **Table 4**).

In accordance with the IAQM construction dust guidance (Ref.20) internationally and nationally designated sites such as SPA, RAMSAR and SSSIs are defined as high sensitivity for ecological impacts, therefore the



sensitivity of the area to ecological impacts has been determined based on the high receptor sensitivity category and the distance of the receptor from the source (**Table 5**).

The sensitivity of the receiving environment to specific dust impacts is summarised in **Table 13**.

**Table 13 Construction Dust – Summary of the Sensitivity of the Area**

Potential Impact	Sensitivity of the surrounding area		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High
Human Health	Medium	Medium	Medium
Ecology	High	High	Negligible

**Step 2C**

The risk of effects in the absence of environmental measures was then defined based upon the interaction between the magnitude of emission and the highest level of area sensitivity (determined in Steps 2A and 2B, respectively) for each dust generating activity. The risk of dust effects was determined, as presented in **Table 14**.

**Table 14 Construction Dust – Summary of the Risk of Dust Effects**

Potential Impact	Risk		
	Eathworks	Construction	Trackout
Dust Soiling	High Risk	High Risk	High Risk
Human Health	Medium Risk	Medium Risk	Medium Risk
Ecology	High Risk	High Risk	Negligible

As indicated in **Table 14**, the potential risk of dust soiling is high for earthworks, construction and trackout. The potential risk of human health impacts is medium for earthworks, construction and trackout. The potential risk of dust impacts on ecological sites is high for earthworks and construction and negligible for trackout.

It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the edge of the site boundary. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase.

**Step 3**

The IAQM construction dust guidance (Ref.20) provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the project based on the risk of dust effects (**Table 14**) and are summarised in **Table 15**.

**Table 15 Construction Dust – Proposed Dust Mitigation Measures based on IAQM Guidance (Ref.20)**

Mitigation Measure	High Risk Measures. H=Highly Recommended. D=Desirable
Communications	



Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	H
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H
Display the head or regional office contact information.	H
<b>Dust Management</b>	
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority.	H
<b>Site Management</b>	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	H
Make the complaints log available to the local authority when asked.	H
Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.	H
Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	H
<b>Monitoring</b>	
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.	H
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	H
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H
Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible, commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase	H



commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	
<b>Preparing and maintaining the site</b>	
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H
Erect solid screens or barriers around dusty activities or the site boundary so that are at least as high as any stockpiles on site.	H
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	H
Avoid site runoff of water or mud.	H
Keep site fencing, barriers and scaffolding clean using wet methods.	H
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site, cover as described below.	H
Cover, seed or fence stockpiles to prevent wind whipping.	H
<b>Operating vehicle/machinery and sustainable travel</b>	
Ensure all off-road vehicles comply with the requirements of the NRMM standards, where applicable	H
Ensure all vehicles switch off engines when stationary - no idling vehicles.	H
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H
Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required, these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the Local Authority, where appropriate).	H
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	H
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	H
<b>Operations</b>	
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	H
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H



Use enclosed chutes and conveyors and covered skips.	H
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	H
<b>Waste Management</b>	
Avoid bonfires and burning of waste materials.	H
<b>Earthworks</b>	
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	H
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	H
Only remove the cover in small areas during work and not all at once.	H
<b>Construction</b>	
Avoid scabbling (roughening of concrete surfaces) if possible.	H
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	H
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	H
For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.	D
<b>Trackout</b>	
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	H
Avoid dry sweeping of large areas.	H
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	H
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	H
Record all inspections of haul routes and any subsequent action in a site logbook.	H
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	H



Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	H
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	H
Access gates to be located at least 10 m from receptors where possible.	H

**Step 4**

Assuming the relevant mitigation measures outlined in **Table 15** are implemented, the residual effect from all dust generating activities is predicted to be not significant.