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Appendix 9D

Construction Dust Assessment

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Contents

1. Construction Dust Assessment Methodology

1.1.1 The following section sets out the methodology for a construction dust assessment, taken directly from the IAQM Guidance[1].

1.2 Step 1 – Screening the Need for a Detailed Assessment

1.2.1 A construction dust assessment will normally be required where there is:

- A 'human receptor' within:
  - 250m of the boundary of the site; and/or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).
- An 'ecological receptor' within:
  - 50m of the boundary of the site; and/or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s)

1.2.2 Where the need for a construction dust assessment is screened out, it can be concluded that the level of risk is 'negligible'.

1.3 Step 2A – Define the Potential Dust Emission Magnitude

1.3.1 The dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium, or Large.

1.3.2 The following are examples of how the potential dust emission magnitude for different activities can be defined. It should be noted that not all the criteria need to be met for a particular class. Other criteria may be used if justified in the assessment.

[1] Institute of Air Quality Management (2024). Guidance on the assessment of dust from demolition and construction (Online). Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf (Accessed June 2024).

Table 9D 1.1 Definitions of Dust Emissions Magnitudes

Dust Emissions Magnitude	Activity
Demolition	
Large	• Total building volume >75,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities >12m above ground level
Medium	• Total building volume 12,000m^3 – 75,000m^3 • Potentially dusty construction material • Demolition activities 6-12m above ground level
Small	• Total building volume <12,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities <6m above ground • Demolition during wetter months
Earthworks	
Large	• Total site area >110,000m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >6m in height
Medium	• Total site area 18,000m^2 – 110,000m^2 • Moderately dusty soil type (e.g. silt) • 5-10 heavy earth moving vehicles active at any one time • Formation of bunds 3m-6m in height
Small	• Total site area <18,000m^2 • Soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time

Dust Emissions Magnitude	Activity
	• Formation of bunds <3m in height
Construction	
Large	• Total building volume >75,000m^3 • On site concrete batching • Sandblasting
Medium	• Total building volume 12,000m^3 – 75,000m^3 potentially dusty construction material (e.g. concrete) • On site concrete batching
Small	• Total building volume <12,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout	
Large	• >50 HDV (>3.5t) outward movements in any one day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length >100m
Medium	• 20-50 HDV (>3.5t) outward movements in any one day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m – 100m
Small	• <20 HDV (>3.5t) outward movements in any one day • Surface material with low potential for dust release • Unpaved road length <50m

1.4 Step 2B – Define the Sensitivity of the Area

1.4.1 The sensitivity of the area takes account of a number of factors including: the specific sensitivities of receptors in the area; the proximity and number of those receptors; in the case of PM_{10}, the local background concentrations; and site-

specific factors, such as whether there are natural shelters to reduce the risk of wind-blown dust.

Table 1D.1.2 Sensitivities of people to dust soiling effects

Sensitivity	Example
High sensitivity receptor – surrounding land where	• Users can reasonably expect enjoyment of a high level of amenity • The appearance, aesthetics or value of their property would be diminished by soiling • 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 • Examples include dwellings, museums, hospitals and schools
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 • The appearance, aesthetics or value of their property could be diminished by soiling • 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 • Examples include parks and places of work
Low sensitivity receptor – surrounding land where	• The enjoyment of amenity would not reasonably be expected • Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling • 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 • Examples include playing fields, farmland, footpaths and short term car parks

Table 1D.1.3 Sensitivities of receptors to ecological effects

Sensitivity	Example
High sensitivity receptor	• Locations with an international or national designation and the designated features may be affected by dust soiling • Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britian • Examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings
Medium sensitivity receptor	• Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown • Locations with a national designation where the features may be affected by dust deposition • Examples include a Site of Special Scientific Interest (SSSI) with dust sensitive features
Low sensitivity receptor	• Locations with a local designation where the features may be affected by dust deposition • Examples include a local nature reserve with dust sensitive features

1.4.2 The tables below show how the sensitivity of the area may be determined for dust soiling, human health and ecosystem impacts, respectively. These tables take into account a number of factors which may influence the sensitivity of the area.

Table 1D.1.4 Sensitivity of the area to dust soiling effects on people and property

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		<20	<50	<100	<250
High	**>100**	High	High	Medium	Low
High	**10-100**	High	Medium	Low	Low
High	**1-10**	Medium	Low	Low	Low
Medium	**>1**	Medium	Low	Low	Low

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		<20	<50	<100	<250
Low	**>1**	Low	Low	Low	Low

Table 1D.1.5 Sensitivity of the area to human health impacts

Receptor sensitivity	Annual mean PM_{10} concentration	Number of receptors	Distance from the source (m)			
			<20	<50	<100	<250
High	**>32 µg/m^3**	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
High	**>28-32 µg/m^3**	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
High	**>24-28 µg/m^3**	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
High	**<24 µg/m^3**	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	**>32 µg/m^3**	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
Medium	**>24-32 µg/m^3**	>10	Medium	Low	Low	Low

Receptor sensitivity	Annual mean PM_{10} concentration	Number of receptors	Distance from the source (m) <20	<50	<100	<250
		1-10	Low	Low	Low	Low
Medium	**<24 µg/m^3**	>1	Low	Low	Low	Low
Low	**-**	>1	Low	Low	Low	Low

Table 1D.1.6 Sensitivity of the area to ecological impacts

Receptor sensitivity	Distance from the source (m)	
	<20	**<50**
High	High	Medium
Medium	Medium	Low
Low	Low	Low

1.5 Stem 2C – Define the Risk of Impacts

1.5.1 The dust emissions magnitude determined at Step 2A should be combined with the sensitivity of the area determined at Step 2B to determine the risk of impacts with no mitigation applied. The matrices in the tables below provide a method of assigning the level of risk for each activity. This should be used to determine the level of mitigation that must be applied. Mitigation is discussed in Step 3. For those cases where the risk category is 'negligible', no mitigation measures beyond those required by legislation will be required.

Table 1D.1.7 Risk of dust impacts – demolition

Sensitivity of area	Dust emission magnitude		
	Large	**Medium**	**Small**
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
Low	Medium risk	Low risk	Negligible

Table 1D.1.8 Risk of dust impacts – earthworks, construction and trackout

Sensitivity of area	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

1.6 Step 3 – Site Specific Mitigation

1.6.1 Having determined the risk categories for each of the four activities, it is possible to determine the site-specific measures to be adopted. These measures will be related to whether the site is considered to be a low, medium or high risk site.

1.6.2 The IAQM guidance details the mitigation measures required for high, medium and low risk sites as determined in Step 2C.

1.7 Step 4 – Determine Significant Effects

1.7.1 Once the risk of dust impacts has been determined in Step 2C and the appropriate dust mitigation measures identified in Step 3, the final step is to determine whether there are significant effects arising from the construction stage. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effect will normally be negligible.

2. Activity Specific Construction Dust Assessment

2.1 Hydrogen Above Ground Installation

2.1.1 A total of nine HAGIs are proposed as follows:

- Hydrogen Production Plant (HPP) (Stanlow);
- Rocksavage;
- Runcorn;
- Central Hub;
- Hydrogen Storage Facility (HSF);
- Warburton;
- Partington (options PH1 and PH2);
- Higher Walton (options HWH2 and HWH8); and
- Clock Face.

2.1.2 The potential dust emission magnitude is considered to be the same for all proposed HAGIs, while the sensitivity of the surrounding environment will vary.

Assessment of potential dust emission magnitude

Demolition

2.1.3 No demolition activities are proposed for the Project. Therefore, consideration of the impact of this source on dust soiling and ambient PM_{10} is not required and has not been included in this assessment.

Earthworks

2.1.4 With an estimated site area between 18,000m^2 and 110,000m^2 and fewer than 10 earth moving vehicles predicted to be active at any one time during the construction of each HAGI, the dust emission magnitude for earthworks is **medium**.

Construction

2.1.5 Dusty construction materials, such as concrete, will be used. All HAGIs are estimated to have a total building volume of more than 12,000m^3, but less than 75,000m^3, with the Central Hub HAGI being the largest. Therefore, the dust emission magnitude for construction activities is **medium**.

Trackout

2.1.6 Construction traffic data indicates that there will be up to 264 HGV movements per day during the peak construction period (**Figure 11.4: HGV Matrices**). It should be noted that it is not currently known how many HGV movements will be solely associated with the HAGI construction and therefore to provide a conservative assessment, it has been assumed 100% of the HGV movements is relevant. Therefore, the dust emission magnitude for trackout is **large**. Further detail will be provided in the Final ES.

Summary

2.1.7 Table 9D.2.1 provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 9D.2.1Potential dust emission magnitude

Activity	Dust emission magnitude
Demolition	N/A
Earthworks	Medium
Construction activities	Medium
Trackout	Large

Assessment of the sensitivity of the Study Area

2.1.8 Under low wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. The proposed HAGI construction sites are primarily in rural areas.

2.1.9 The worst case location for human health is Warburton HAGI, where there are between 1 and 10 residential dwellings within 20m of the HAGI boundary (based on the Limits of Deviation). The worst case location for ecological receptors is Rocksavage HAGI which is located within the East Clifton Tip Local Wildlife Site. As shown in **Table 1D.1.3**. Local Wildlife Sites are of low sensitivity.

2.1.10 Background annual mean PM_{10} concentration in the vicinity of the Project were mapped by Defra as no higher than 24µg/m^3 across the Project boundary.

2.1.11 Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM_{10} has been derived for each of the construction activities for each proposed HAGI with the outcomes presented in Table 9D.2.2.

Table 9D.2.2 Sensitivity of the Study Area

Potential Impact	Demolition	Earthworks	Construction	Trackout
HPP				
Dust soiling	N/A	Low	Low	Medium
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A
Rocksavage				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	Low	Low	Low
Runcorn				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	Low	Low	Low
Central Hub				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A
HSF				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low

Potential Impact	Demolition	Earthworks	Construction	Trackout
Ecological	N/A	N/A	N/A	N/A
Warburton				
Dust soiling	N/A	Medium	Medium	Medium
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A
Partington PH1				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A
Partington PH2				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A
Higher Walton HWH2				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	Low	Low	Low
Higher Walton HWH8				
Dust soiling	N/A	Low	Low	Low

Potential Impact	Demolition	Earthworks	Construction	Trackout
Human health	N/A	Low	Low	Low
Ecological	N/A	Low	Low	Low
Clock Face				
Dust soiling	N/A	Low	Low	Medium
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A

Risk of impacts

2.1.12 The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction stage, prior to mitigation. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 9D.2.3 Summary dust risk table to define site specific mitigation

Potential Impact	Demolition	Earthworks	Construction	Trackout
HPP				
Dust soiling	N/A	Low	Low	Medium
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A
Rocksavage				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	Low	Low	Low

Potential Impact	Demolition	Earthworks	Construction	Trackout
Runcorn				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	Low	Low	Low
Central Hub				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A
HSF				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A
Warburton				
Dust soiling	N/A	Medium	Medium	Medium
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A
Partington PH1				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low

Potential Impact	Demolition	Earthworks	Construction	Trackout
Ecological	N/A	N/A	N/A	N/A
Partington PH2				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A
Higher Walton HWH2				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	Low	Low	Low
Higher Walton HWH8				
Dust soiling	N/A	Low	Low	Low
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A
Clock Face				
Dust soiling	N/A	Low	Low	Medium
Human health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A

2.2 Open Trench Pipeline Construction

2.2.1 The assessment of the sensitivity of the area includes the results for the worst case location. This allows for a conservative approach when assessing the risk of impacts.

Assessment of potential dust emission magnitude

Demolition

2.2.2 No demolition activities are proposed for the Project. Therefore, consideration of the impact of this source on dust soiling and ambient PM_{10} is not required and has not been included in this assessment.

Earthworks

2.2.3 Earthwork activities associated with the Project is expected to comprise of an area larger than 110,000m^2 in total. However, due to the nature of the works and each pipeline being constructed in a methodical way, each earthwork activity area is expected to be less than 110,000m^2 based on the assumption that each open working area is 1km or less. It is expected that there will be no more than 10 heavy earth moving vehicles active at any one time. Therefore, the dust emission magnitude for earthworks is **medium**.

Construction

2.2.4 The total pipeline for the Project is likely to be more than 75,000m^3. Sections of the pipeline will be prefabricated off-site and welded together before being placed in the ground. There will be no on-site concrete batching or sandblasting. Using professional judgement, the dust emission magnitude for construction is **medium**.

Trackout

2.2.5 Construction traffic data indicates that there will be up to 264 HGV movements per day during the peak construction period (**Figure 11.4: HGV Matrices)**. It should be noted that it is not currently known how many HGV movements will be solely associated with the HAGI construction and therefore to provide a conservative assessment, it has been assumed 100% of the HGV movements is relevant. Therefore, the dust emission magnitude for trackout is **large**. Further detail will be added to the Final ES.

Summary

2.2.6 **Table 9D.2.4** provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 9D.2.4Potential dust emission magnitude

Activity	Dust emission magnitude
Demolition	N/A
Earthworks	Medium
Construction activities	Medium

Activity	Dust emission magnitude
Trackout	Large

Assessment of the sensitivity of the Study Area

2.2.7 Under low wind conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. For each of the pipeline corridors, there are more than 10 but less than 100 residential dwellings within 20m of the pipelines limit of deviation boundary.

2.2.8 Background annual mean PM_{10} concentration in the vicinity of the Project were mapped by Defra as no higher than 24µg/m^3 across the Project boundary.

2.2.9 The open trench excavation could also occur within or close proximity to a number of sensitive ecological sites including Woolston Eyes SSSI and a number of Local Wildlife Sites which could be sensitive to emissions of dust and PM_{10}.

2.2.10 For trackout, there are between 10 and 100 residential receptors within 20m of trackout routes from construction compounds. There are multiple Local Wildlife Sites within 20m of trackout routes across the Project as well as Woolston Eyes SSSI which is located within 20m of the trackout routes.

2.2.11 Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM_{10} has been derived for each of the construction activities with the outcomes presented in **Table 9D.2.5** Sensitivity of the Study Area.

Table 9D.2.5 Sensitivity of the Study Area

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust soiling	N/A	High	High	High
Human health	N/A	Low	Low	Low
Ecological	N/A	Medium	Medium	Medium

Risk of impacts

2.2.12 The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction stage, prior to mitigation. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 9D.2.6 Summary dust risk table to define site specific mitigation

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust soiling	N/A	Medium	Medium	High
Human health	N/A	Low	Low	Low
Ecological	N/A	Medium	Medium	Medium

2.3 Trenchless Crossing Pipeline Construction

2.3.1 The assessment of potential dust emission magnitude for the trenchless crossing pipelines shown below includes the results of the worst case location with the largest trenchless crossing. Due to the size and location of the trenchless crossing pipeline under River Weaver, this was assessed as a worst case location.

2.3.2 The assessment of the sensitivity of the area includes the results for the worst case location. This allows for a conservative approach when assessing the risk of impacts.

Assessment of potential dust emission magnitude

Demolition

2.3.3 No demolition activities are proposed for the Project. Therefore, consideration of the impact of this source on dust soiling and ambient PM_{10} is not required and has not been included in this assessment.

Earthworks

2.3.4 Earthwork activities associated with each pipeline corridor is estimated to comprise of an area less than 18,000m^2. Due to the nature of the works with the trenchless crossings being constructed in a methodical way, it is expected that there will be no more than 5 heavy earth moving vehicles active at any one time. Therefore, the dust emission magnitude for earthworks is **small**.

Construction

2.3.5 The total trenchless crossing pipeline for the project is likely to be less than 12,000m^3. Sections of the pipeline will be prefabricated off-site and welded together before being placed in the ground. The dust emission magnitude for construction of trenchless crossing pipeline is **small**.

Trackout

2.3.6 Construction traffic data indicates that there will be up to 264 HGV movements per day during the peak construction period (**Figure 11.4: HGV Matrices)**. It should be noted that it is not currently known how many HGV movements will be solely associated with the HAGI construction and therefore to provide a conservative assessment, it has been assumed 100% of the HGV movements is relevant. Therefore, the dust emission magnitude for trackout is **large**. Further detail will be provided in the Final ES.

Summary

2.3.7 Table 9D.2.7 provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 9D.2.7 Potential dust emission magnitude

Activity	Dust emission magnitude
Demolition	N/A
Earthworks	Small
Construction activities	Small
Trackout	Large

Assessment of the sensitivity of the Study Area

2.3.8 Under low wind conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. The majority of the trenchless crossings are in rural locations but at some of the trenchless crossings, there are up to 10 residential dwellings within 20m of the pipelines Limit of Deviation boundary.

2.3.9 Background annual mean PM_{10} concentration in the vicinity of the Project were mapped by Defra as no higher than 24µg/m^3 across the Project boundary.

2.3.10 For trackout, there are more than 100 high sensitivity human receptors within 20m of trackout routes from construction compounds for the trenchless crossings. There are multiple Local Wildlife Sites within 20m of trackout routes across the Project.

2.3.11 Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM_{10} has been derived for each of the construction activities with the outcomes presented in **Table 9D.2.8**.

Table 9D.2.8 Sensitivity of the Study Area

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust soiling	N/A	Medium	Medium	High
Human health	N/A	Low	Low	Medium
Ecological	N/A	Low	Low	Low

Risk of impacts

2.3.12 The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction stage, prior to mitigation. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 9D.2.9 Summary dust risk table to define site specific mitigation

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust soiling	N/A	Low	Low	High
Human health	N/A	Negligible	Negligible	Medium
Ecological	N/A	Negligible	Negligible	Low