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Planning & Development

Dust & Particulate Management Plan

Towens of Weston Limited

Farrington Park Golf Course, Bristol, BS39 6TS

Document Control

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Towens of Weston Limited

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1 Introduction

1.1 Terms of Reference

Ashfield Solution Limited ("Ashfield") has been commissioned Towens of Weston Limited ("Towens" or "the Client") to prepare a Dust and Particulate Management Plan to support an Environmental Permit application for work to reconfigure and reprofile the golf course at Farrington Park Golf Course, Bristol, BS39 6TS ("the site"). The site location and boundary can be seen in Drawing 01.

1.2 Context

The site broadly comprises approximately 495ha of an irregular parcel of land, currently utilised as a golf club.

This Dust and Particulate Management Plan provides detailed information on the sources, risks and mitigation measures related to the potential emission of dust from the operations proposed to be undertaken on this site.

This document should read in in conjunction with the following:

- Towens of Weston Ltd - Environmental Management System (EMS) Manual - Document reference: SWP019
- Towens of Weston Ltd - Dust Control - Document reference: SWP019

1.3 Report Structure

This Dust Management Plan is structured as follows:

- Section 2 provides a discussion of the potential impacts of dust emissions.
- Section 3 provides a summary of the relevant legislation and guidelines.
- Section 4 provides a description of the operations on the site and the identification of sensitive receptors.
- Section 5 provides a discussion of the risk that dust emissions may pose to sensitive receptors.
- Section 6 provides information on the proposed mitigation measures employed on the site, as well as management and monitoring of the site.

2 Dust Emissions

2.1 Introduction

Dust is the generic term for particulate matter and covers airborne particles in the size range of 1 to 75µm (micrometres) in diameter:

- Particles above 30µm are termed large.
- 10µm to 30µm are termed intermediate.
- Less than 10µm are small.

The Department for Environment Food & Rural Affairs (DEFRA) Daily Air Quality Index (DAQI)[1] refer to Particulate Matter (PM) <10µm as PM10 particulates, one of five factors used to provide details about air pollution levels. The Air Quality Standards Regulations 2010[2] require that concentrations of PM in the UK must not exceed an annual average of 40 µg/m^3 for PM10.

> Large and intermediate dust particles are often referred to as nuisance dust, whilst small particles are associated with effects on human health. Dust generated from the handling of waste, soils and aggregates and the movement of plant and vehicles on a site are commonly of larger particle size. Therefore, it is generally regarded that the operations are likely to emit large particles rather than small particles.

2.2 Potential Impacts

The larger particle fraction of dust can create a potential nuisance in the community or impact on the environment and is normally perceived as an accumulated deposit on surfaces such as window ledges, paintwork, and other horizontal surfaces e.g. car roofs. When the rate of accumulation is sufficiently rapid to cause noticeable fouling, discolouration, or staining (and thus decrease the time between cleaning) then the dust is generally considered to be a nuisance. The visibility of dust clouds themselves may also give rise to such impacts.

A report by the QUARG (Quality of Urban Air Review Group)[3] provides a discussion on the potential health effects of airborne particles by reference to a detailed review of this issue undertaken by the then Department of Health's Committee on the Medical Effects of Air Pollutants (COMEAP). The report concluded that there is little evidence that healthy individuals will be significantly affected by ambient levels of particles occurring in the UK. Furthermore, with regard to the health effects from specific types of particles, the QUARG report states "It is unlikely, however, that coarse, windblown particles have a significant effect upon health".

[1] The Department for Environment Food & Rural Affairs Daily Air Quality Index - https://uk-air.defra.gov.uk/air-pollution/daqi?view=more-info.
[2] The Air Quality Standards Regulations 2010 - No. 1001.
[3] Quality of Urban Air Review Group 1996 - ISBN 0 9520771 3 2.

3 Relevant Legislation

3.1 UK Air Quality Strategy

The Air Quality Strategy (AQS) for England, Scotland, Wales, and Northern Ireland[4] fulfils the requirement under Part IV of the Environment Act 1995 for a national air quality strategy that sets out policies for improving ambient air quality and keeping these under review.

The first strategy, the National Air Quality Strategy (NAQS), was published in March 1997. In January 1999, proposals to amend the strategy were put out for consultation and a consultation document was produced. Following consultation, a revised version of the strategy was published in January 2000. This was further revised in 2007.

The AQS provides a framework for air quality control through air quality management and air quality standards and objectives for different pollutants (including particulate matter). These air quality standards and objectives were transposed into English Law by the Air Quality (Standards) Regulations 2010.

3.2 Local Authority Review & Assessment

Local Authority Review and Assessment Air Quality Management Area (AQMA)

The system of local air quality management (LAQM) was introduced under the Environment Act 1995. LAQM[5] requires local authorities to periodically review and assess the current and future quality of air in their areas. Where it is determined that an air quality objective is not likely to be met within the relevant time period, the authority must designate an AQMA. The site is not located within an AQMA.

Low Emission Zone (LEZ)

A LEZ is an area that has restrictions on the type and age of vehicles permitted in it, therefore, vehicles emitting high levels of pollution can be prevented from entering and operating within the zone. The site is not located within an LEZ.

[4] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland - Volume 1 Ref: PB12654
[5] Part IV of the Environment Act 1995 Local Air Quality Management Policy Guidance (PG09)

4 Proposed Activity & Locality

4.1 Proposed Operations

The proposed works are designed to allow Farrington Golf Club to re-profile and re-configure the site in accordance with the granted planning permission. This shall improve the golf club's offering via improved facilities, providing:

- Phase 1 – The creation of two new holes to produce a full 18-hole championship golf course that is playable in all weather conditions;
- Phase 2 – Creation of a new driving range and practice area; and
- Phase 3 – Creation of a five-hole Academy course.

4.2 Baseline Environment.

Suitable material is to be sourced from local development sites and imported to site. This would avoid the unnecessary use of virgin materials, reduce the carbon footprint, and prevent suitable waste soil materials from otherwise being disposed. Table 1 provides material volumes requires for each phase outlined in the Work Recovery Plan (WRP).

Table 1.

PHASE 1:	58,595
PHASE 2:	51,200
Total volumes	109,795
Range of material densities for imported material	1.8t/m3
Estimated mass of imported material	197,631 tonnes

In addition to the above, the proposed Phase 3 element of works (to be completed after Phase 1 and Phase 2) equates to 26,153m^3 of material (or an additional 47,076 tonnes). It is anticipated that the WRP and permit application shall be amended, upon completion of Phases 1 and 2, to allow for completing the proposals using imported waste soil materials (subject to agreement with the EA).

Only inert and chemically suitable material excavated from residential and commercial development sites will be used for the purpose of this proposed recovery activity. Towens proposes to further restrict the description of waste accepted under these codes to materials originating from greenfield excavations only. As such, the waste types proposed for this activity will be 17 05 04 - Soil and stones other than those mentioned in 17 05 03.

4.3 Meteorology

Unlike many other atmospheric pollutants, the generation of dust is particularly dependent upon weather conditions. The prevailing meteorological conditions at any site will be dependent upon many factors, including its location in relation to macroclimatic conditions as well as more site-specific, microclimatic conditions.

Clearly, the most significant meteorological factor is the predominant wind direction and wind speeds, and consequently, this report includes data for the predominant wind speeds and directions appropriate to the site.

4.4 Local Wind Speeds & Directions

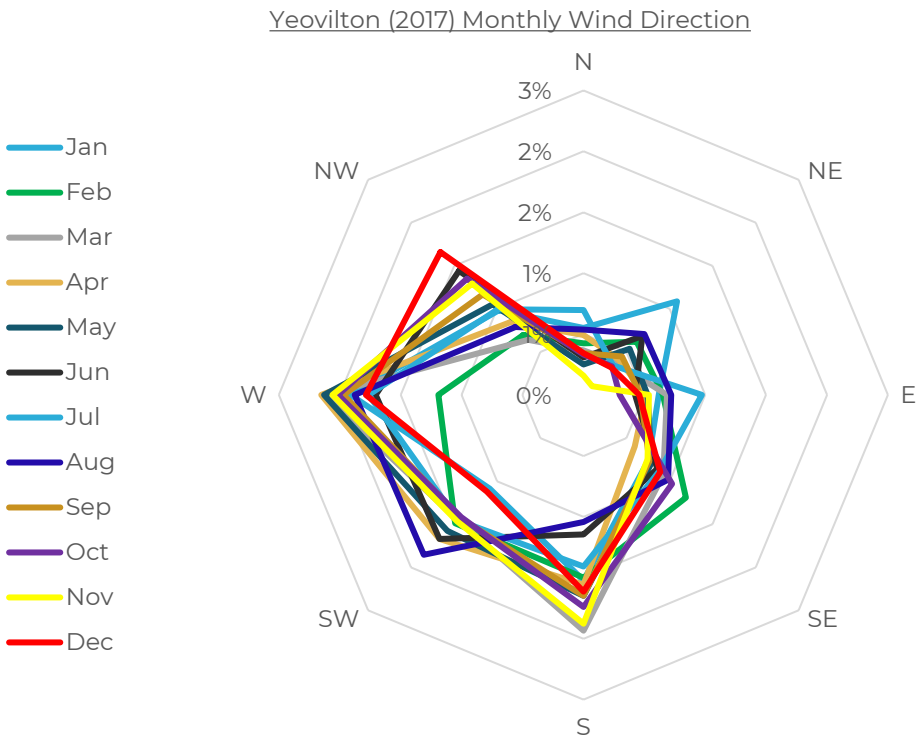
Information on local wind speeds and directions has been acquired from The Centre for Environmental Data Analysis (CEDA[6]) part of The Natural Environment Research Council (NERC's) Environmental Data Service (EDS)[7], responsible for looking after data from atmospheric and earth observation research. Data has been collected from weather monitoring stations.

Data has been collected from the weather monitoring station located at Yeovilton, Somerset, 20km from the site for the year 2017. The information provided on CEDA for Yeovilton was the most comprehensive dataset available with 2017 being the most recent data available. The Yeovilton observation station has wind speed and direction data appropriate for the characterisation of the wind conditions at the site.

Wind data acquired for Yeovilton has been categorised by cardinal and intercardinal direction converted from mean true degrees from north. The percentage of cardinal direction has then been used to calculate wind direction for each month of the year 2017. Figure 01. Shows a Wind rose diagram for the monthly wind direction at Yeovilton in 2017.

Figure 1. Wind rose diagram for monthly wind direction observation at Yeovilton monitoring station during 2017. The diagram shows the percentage of winds blowing from a cardinal direction for each month.

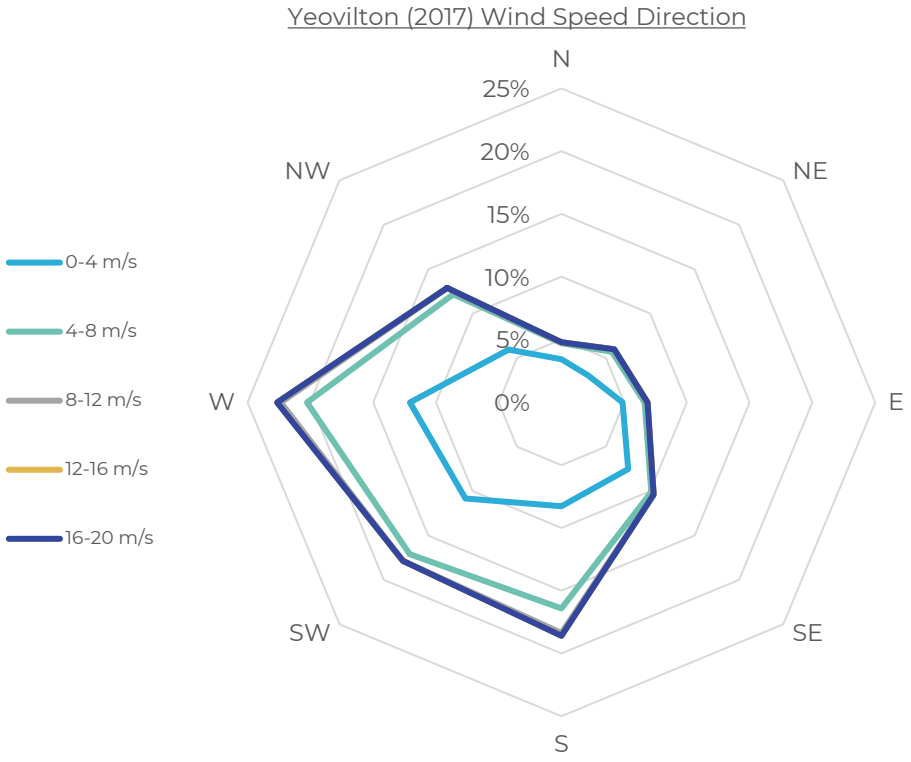
Direction (wind blowing from)	Yearly percentage of records (%)
N	7%
NE	5%
E	6%
SE	13%
S	19%
SW	18%
W	23%
NW	7%



[6] The Centre for Environmental Data Analysis (CEDA) 2022
[7] The Natural Environment Research Council (NERC's) Environmental Data Service (EDS) 2022

The data shows the yearly predominant wind direction is from the West accounting for 23% of all yearly winds. A component blowing from the south is the secondary predominate wind accounting for 19% of all winds. Wind speed data shown in Figure 02 indicates that the wind blowing from west to east is the strongest followed by winds from the south.

Figure 2. Wind rose diagram for wind speed and direction observation at Yeovilton monitoring station during 2017.



Examination of the seasonal variations in wind speeds from Yeovilton show that wind speeds generally averaged 3.9 meters per/second (m/s) throughout the year with the months of February and March seeing the highest average winds of 4.8m/s

4.5 Existing Air Quality – Dust

No existing records/reports for air quality with regards to dust are available for the locations of the site.

4.6 Other Sources of Dust

The site is surrounded by agricultural land. Work on the agricultural land can result in the emissions of dust and PM from working the ground (ploughing) and harvesting crops during dry and windy conditions.

4.7 Sensitive Receptors

This dust and PM plan identify all types of receptors that may be sensitive to dust emissions. Locations with a high sensitivity to dust include hospitals and clinics, hi-tech industries, painting, furnishing and

food processing[8]. Locations classed as being moderately sensitive include schools, residential areas, and food retailers.

The distance from the site boundary to the sensitive receptor plays an important role in the potential impact experienced from airborne dust. Concentrations of airborne dust reduce significantly further away from the source. Table 2 contains details and distances of receptors; the locations of sensitive receptors are shown in Drawing 02.

Table 2. Sensitive Receptors

Ref	Receptor	Description	Direction from the site boundary	Distance (m)
1	Groundwater	Bedrock aquifer designated as Secondary A, high groundwater vulnerability	On-site	0
2	Wellow Brook	Surface water	North	0
3	Wellow Brook	Surface water	South	0
4	Terrace Wood	Deciduous, Ancient and Semi-Natural Woodland	South	0
5	Rush Hill Wood	Deciduous, Ancient and Semi-Natural Woodland	North-West	0
6	Ston Easton Park	Country house hotel	South	30
7	Residential Housing	Marsh Lane BS39 6TT	North	162
8	Farrington Gurney Village	Residential village	North	390
9	Farrington Gurney Primary School	Village Primary School	North	560
10	Clapton Village	Residential and commercial properties	South-East	1000
11	Paulton Village	Large residential village	North-East	1350
12	Chewton Woods	Deciduous, Ancient and Semi-Natural Woodland	West	1300
13	Solar farm	Solar panels	South	1700
14	Midsomer Norton	Residential town including schools and food retailers.	East	2000
15	Paulton Memorial Hospital	Hospital	East	2150
16	Hollow Marsh Meadows Nature Reserve	Nature Reserve and Sites of Special Scientific Interest (England) including surface water features.	West	2900

[8] Ireland M. (1992) "Dust: Does the EPA go far enough?", Quarry Management, pp23-24

4.8 Potential Impact of Dust Emissions on Sensitive Receptors

The wind direction is predominantly blows towards receptors in the east with a component blowing towards receptors in the north. Receptors in these directions from the site include Paulton Village and Paulton Memorial Hospital to the east and Residential Housing along Marsh Lane, Farrington Gurney Village and Farrington Gurney Primary School in the village to the north.

The western extent of Paulton Village (closest to the site) is over 1km from the eastern site boundary. Paulton Memorial Hospital is in the centre of the village and is over 2km from the site boundary. Given the distances from the site to these receptors they are unlikely to be affected by dust and PM emissions from the site.

Farrington Gurney Village and Farrington Gurney Primary School to the north of the site are 390m and 560m from the site respectively, with the properties along Marsh Lane being 162m north. The distances from the site mean that there will be potential for dust and PM to impacted them during periods of winds blowing to the north. As the site is tree lined along the northern boundary it will aid in mitigating dust and PM from leaving the constraints of the site.

Rush Hill Wood classified as deciduous, ancient and semi-natural woodland borders the north-east corner of the site. Due to its proximity to the site there is a potential for PM to affect the woodland. However, providing the mitigating measures outlined in Section 5 are followed, we consider the woodland will remain unaffected.

> Only inert and chemically suitable material excavated from household and commercial development sites will be used for the purpose of this proposed recovery activity, as a result, no adverse effects to human health should arise from contact with PM emissions from the materials.

5 Migration, Management and Monitoring

5.1 Mitigation Measures

There are several mitigation measures (recognised as good practice within the industry) outlined in the Dust Control document that will be implemented on-site to reduce the emission of dust and mitigate the effects of emissions should these be released. Table 3 provides details of mitigation measures that will be employed at the site.

Table 3. Details of mitigation measures

Mitigation Measures	Description	Use on-site
Water sprays	Physical breaking of the pathway between source and receptors	Water sprays will be employed at the site to dampen surfaces and stockpiles of material to minimise particulate matter becoming airborne and remove dust from the air.
Minimising drop heights	Minimising the height from which material is dropped will reduce the distance dust could be released and dispersed by the wind.	Drop heights will be minimised where possible.
Sheeting of vehicles	Reduces the escape of material, dust and particulates from vehicles.	All vehicles containing material will be required to be sheeted.
Minimising material movement	Minimising movement of materials should reduce the amount of dust blown and dispersed by winds	The material movement will be minimised.
Ceasing operation during high winds and/or exceptionally dry conditions.	Emissions of dust are likely to be greater during times of strong winds or exceptionally dry conditions. Therefore, ceasing or reducing those activities that may give rise to dust emissions on these events may reduce any nuisance caused by wind blow dust.	The site manager will monitor wind direction, if wind speeds and direction are likely to increase the risk of nuisance to neighbouring receptors the movement operations may be temporarily halted when reasonably practicable. If excessive dust emissions can be seen leaving the site boundary operations will be temporarily ceased.
Site speed limit and minimisation of vehicle movements on site.	Reducing vehicle movement will reduce vehicle emissions. Enforcement of a speed limit and limiting movements will reduce the chance and amount of re-suspension of dust particles by vehicle wheels.	HGV movements will be limited to only necessary movements and a speed limit will be enforced upon all vehicles.
Road sweeper	Control the mud on the access road and reduce the potential	A road sweeper will operate on the local roads.

	for dust emissions from vehicles movements in this area.	

5.2 Site Management

An existing Environmental Management System (EMS) to cover good environmental practice. Based on this and the requirements outlined herein, the following site management activities. The overarching aim of the management system is to ensure that the business fulfil its purpose, stay legally compliant, and maintain social responsibility by way of meeting the objectives set by the Environmental Policy.

- The site staff are responsible for dust management issues and detecting/reporting dust emissions. All members of staff are given training on the EMS for the site, which includes the general dust control. The general dust control document outlines the dust procedure concerning mitigation measures and monitoring/recording visual inspections, see Table 3. for the details of mitigation measures. Site Procedures are communicated between staff via EMS training and weekly toolbox talks. Staff are trained on how to identify adverse levels of dust emissions (i.e. by observing dust emissions that have the potential to cause nuisance, such as dust emissions leaving the site boundary). The training given to staff on the EMS should lead to any adverse dust levels being quickly identified and mitigation measures being employed as soon as the adverse dust levels are identified (if not already in place).
- Daily Inspection Checklists will be completed by site operatives as part of the implementation of the EMS. Checklists include a visual assessment of dust emissions and weather conditions. Monitoring of the weather conditions daily may lead to changes in the site operations on certain days i.e. on particularly dry or very windy days operations may be reduced or cease as these conditions can lead to increased dust emissions.
- The operator will ensure high standards of housekeeping are maintained to minimise mud on roadways and wind-blown dust. Housekeeping activities will include regular inspection and maintenance of all machinery and vehicles used on the site, in accordance with the Maintenance Procedure and associated Inspection Checklists. All of the plant and equipment used on the site, and service intervals and maintenance requirements, will be recorded on the Plant and Equipment Plan. Housekeeping activities such as the removal of mud and debris on the local roads and picking of litter on the site boundary are examples of what is checked using the Daily Inspection Checklists. Actions will be taken to carry out any housekeeping activities that are identified to be required from the Daily Inspection Checklists.
- All activities with the potential to cause dust emissions will be visually assessed to ensure that excessive dust emissions are not caused. If dust is emitted beyond the site boundary, the source(s) of the dust will be identified, and the necessary corrective action will be taken as soon as practicable. Identification of dust emissions beyond the site boundary will trigger remedial actions to be taken or the cessation of the activities giving rise to the emissions.
- In the case of any incidents on site that cause significant dust emissions, the staff will report the incident and record the steps taken to minimise the impacts following the relevant EMS Procedures. The incident, along with steps taken to minimise the impacts, will be recorded on the Accidents / Incidents Form in the EMS.
- The EMS contains Implementation Procedures which require all relevant staff on site to receive training on procedures and for this training to be recorded. EMS training forms part of the Induction Training for new staff and refresher training on EMS procedures takes place at least annually.
- Should a complaint regarding dust be received by the site, the complaint will be recorded on the Complaints Form in the EMS and investigated following the Complaints Procedure within

the EMS implemented on the site. The Complaints Form records who made the complaint, what the complaint was about and what has been done to resolve the issue and make sure this does not happen again. The site Manager must identify what caused the excessive dust emission to be generated. This generation may have been caused by failure of site machinery or dust procedures. If the excessive dust emission has been caused by a procedure not being carried out properly, then staff will receive repeat EMS training on the dust procedures and site management.

- A site Notice Board shall be located at the entrance of the site providing contact details for complainants.

5.3 Dust Monitoring

- Dust emissions for the site and activities undertaken on the site are assessed by visual observation. Assessments are recorded daily on the Daily Inspection Checklists. Adverse dust emissions will be considered to be those that have the potential to cause a nuisance.
- The prevailing weather conditions at the site will be considered and recorded at the start of each working day so that the day's work may be planned as appropriate regarding potential dust emissions. The prevailing conditions will be recorded on the Daily Inspection Checklists. Information on the Daily Inspection Checklists will contain an overall description of the weather conditions including, but not limited to, wind strength (e.g. windy, not windy), wind direction (e.g. towards northern boundary) and rain. Should the weather conditions change during the day, the site Manager may decide to cease operations (if weather conditions deteriorate) or to continue operations (if weather conditions improve).
- During exceptionally dry and/or windy conditions, if any operations/site movements cause or are likely to cause visible dust emissions beyond the Site boundary, or if abnormal dust emissions are observed within the site, site operations may be suspended to avoid further dust emissions. This is decided by the site Manager.

Drawings