CLIENT: LONDON UNDERGROUND LIMITED

CONTRACT REF: TLL 7917

NORTHERN LINE EXTENSION

MAIN WORKS CONTRACT

Kennington Green Passive Air Quality Monitoring – Monthly report

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Rev No	**Date**	**Summary of Changes**	**Section Number**

CONTENTS

1 INTRODUCTION

Ferrovial Laing O'Rourke (FLO) is currently undertaking works at the Kennington Green worksite as part of the London Underground Extension of the Northern Line (NLE) running from Kennington to Battersea (Charing Cross branch).

Temple has been appointed to undertake passive air quality monitoring on a fortnightly basis within specific areas located in the surroundings of the Kennington Green worksite.

The objective of this air quality monitoring assessment is to investigate the likelihood of deposition dust soiling effects at sensitive receptor locations surrounding the Kennington Green site. The locations of the monitoring positions are shown in **Appendix I**.

This report presents the details of the assessment method used, the results of the air quality monitoring undertaken and also includes conclusions in light of these results.

2 THE SITE AND ITS SURROUNDINGS

This worksite is located at Kennington Green within the London Borough of Lambeth. The triangular site is bounded on all three sides by Kennington Road, the eastern boundary being the main route of the road. It is overlooked by residential properties to the north, south and west. Commercial units are located to the east of the worksite.

3 RELEVANT GUIDANCE

3.1 GLA and London Councils

In 2014, The Greater London Authority (GLA) and London Councils produced, as part of the London Plan, *The Control of Dust and Emissions during Construction and Demolition* supplementary planning guidance (SPG)[1]. This guidance seeks to reduce emissions of dust from construction and demolition activities in London and identifies mitigation measures for a range of different sites. This guidance is widely referred to in assessments of construction impacts, in and outside London.

Within the SPG, Appendix 7: Air Quality Control states that a site preparation/maintenance mitigation measure for a construction site that has a medium/high risk of producing dust is to:

"*Carry out regular dust soiling checks of buildings within 100 m of site boundary and cleaning to be provided if necessary".*

Visual soiling checks may be appropriate for sites with a small risk of dust effects; however, as visual assessments can be subjective, dust slides may provide a more quantifiable method.

3.2 Environment Agency: Technical Guidance Note M17

This technical guidance note[2], published in July 2013, provides guidance to Environment Agency staff, monitoring contractors, industry and other parties involved with monitoring particulate matter in ambient air. Section 3 of the guidance identifies that the effects of deposited dust (or *dustfall*) can be divided into:

"a) The effects of the bulk property of the dust, irrespective of its composition, to cause nuisance by its sheer prevalence or its capacity to soil surfaces (e.g. a car, window sill, laundry, buildings, etc) …

b) The effects of the deposited dust resulting from the toxic or corrosive nature of the elements (e.g. metals) and compounds from which it is composed. This may lead to impacts on soils and vegetation and also (though ingestion of these) add to people's total exposure to the substances on top of what they receive from inhalation of the PM_{10} fraction."

The level of dustfall can also be indicative of the level of suspended particulates in the air (including inhalable PM_{10}).

Section 4.2.3 of the document states that:

> *"For monitoring dust deposition or dust soiling rates:*
>
> *i. a minimum of two sites (upwind and downwind of the site, in relation to the prevailing wind) should be established;*
>
> *ii. it is useful (where applicable) to co-locate dust deposition gauges with PM analysers;*
>
> *iii. it is useful to establish additional sites around the site to cover other wind directions and along a downwind transect."*

Section 5.4.2 of the guidance note gives a guideline limit for soiling rates of dustfall, sampled by glass slides. The soiling rate is likely to cause complaints if it is greater than approximately 25 soiling units (SU) per week. A soiling unit is defined as a decrease in the reflectance value or 'gloss' of a soiled glass slide when compared with that of a clean glass slide.

[1] Greater London Authority (2014), The Control of Dust and Emissions during Construction and Demolition: Supplementary Planning Guidance.

[2] Environment Agency (2013), Technical Guidance Note (Monitoring) M17: Monitoring Particulate Matter in Ambient Air around Waste Facilities. Version 2.

Dust emissions can arise from a number of sources. Construction activities need to be considered alongside emissions from associated road vehicles and on-site machinery, including that classed as non-road mobile machinery (NRMM).

3.3 British Standard 6069-2:1994

British Standard (BS) 6069: Part Two[3] describes particulate matter in the size range 1 – 75 µm in diameter. Dust nuisance is the result of the perception of the soiling of surfaces by excessive rates of dust deposition. Under provisions in the Environmental Protection Act 1990, dust nuisance is defined as a statutory nuisance.

There are currently no standards or guidelines for dust nuisance in the UK, nor are formal dust deposition standards specified. This reflects the uncertainties in dust monitoring technology, and the highly subjective relationship between deposition events, surface soiling and the perception of such events as a nuisance. In law, complaints about excessive dust deposition would have to be investigated by the local authority and any complaint upheld for a statutory nuisance to occur.

However, dust deposition is generally managed by suitable on-site practices and mitigation rather than by the determination of statutory nuisance and/or prosecution or enforcement notice(s).

[3] BS 6069-2:1994, ISO 4225:1994. Characterization of air quality. Glossary.

4 AIR QUALITY MONITORING

The objective of the passive air quality monitoring programme carried out in the Kennington Green area is to establish deposition dust soiling during three fortnightly periods between 1st September 2017 and 2nd October 2017.

4.1 Air Quality Programme

4.1.1 Monitoring Method

Temple positioned five glass slides at sensitive receptor locations surrounding the Kennington Green construction site on a fortnightly basis. The receptor locations include residential and commercial properties around the site:

- Kennington Road;
- Montford Place; and
- Pegasus Place.

The passive monitoring locations are shown in **Appendix II**.

4.1.2 Passive Monitoring Techniques

Passive monitoring of pollutants provides a simple method of screening air quality in an area and gives a general indication of air quality conditions (including PM_{10} levels) over a specified period.

Deposition dust is measured using glass slides positioned around the site. These are collected fortnightly and then analysed using a dust deposition meter (reflectometer) to produce a measure of soiling units (SU) per fortnight. A soiling unit is defined as a decrease in the reflectance value or 'gloss' of a soiled glass slide when compared with that of a clean glass slide, where the clean glass slide has a reflectance of 100 per cent. Each percentage loss in reflectance equates to 1 SU.

This method is used to assess the degree of dust soiling from exposure to ambient air, and is designed to replicate the behaviour of dust on outside surfaces which naturally involve dust re-distribution by rainfall and wind. The technical guidance note provided by the Environment Agency[2] was used as guidance for the dust deposition assessment.

4.1.3 Meteorological Data

Table 1 shows the mean wind speed measured by the sonic anemometer operating at the Kennington Green site (KG1W) and rainfall averages during the sampling period measured by the weather station operating at the Battersea site (BN2W).

Figures 1 and 2 show the wind roses from the KG1W sonic anemometer during the relevant period. Data was downloaded via the Sigicom integrated monitoring system.

Table 1 – Weather Conditions During Sampling Period

SAMPLING PERIOD AVERAGE WEATHER CONDTIONS		
Period	**Rainfall / mm / day**	**Mean Daily Wind Speed / mph (ms^{-1})**
01/09/2017 – 15/09/2017	0.66	2.3(1.0)
15/09/2017 – 02/10/2017	1.03	1.5(0.7)

Figure 1. Wind rose from the Kennington Green sonic anemometer KG1W. Period 1.

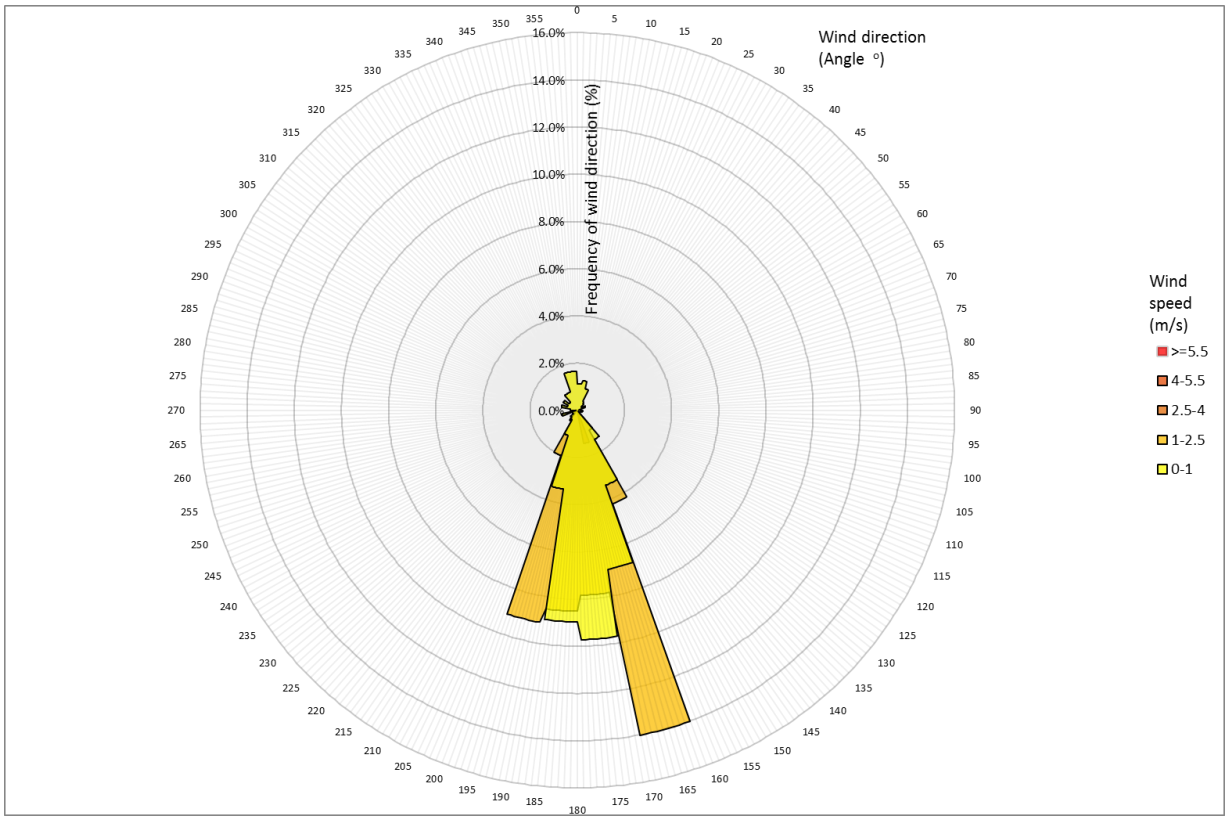
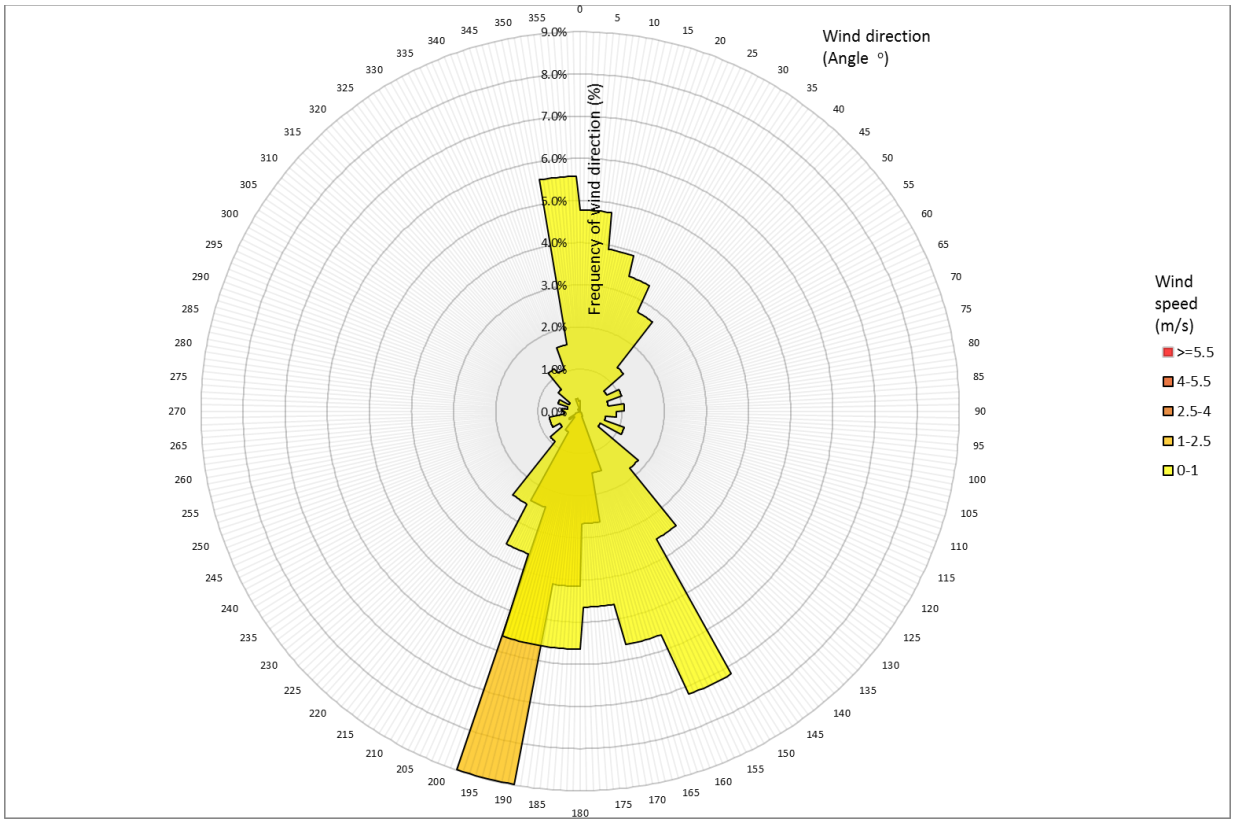


Figure 2. Wind rose from the Kennington Green sonic anemometer KG1W. Period 2.



5 RESULTS

5.1 Dust Deposition (Glass Slides)

Table 2 lists the measured soiling units (SU) during the first fortnightly monitoring period for each monitoring location.

Table 2 – Results of Glass Slide Analysis.

GLASS SLIDE RESULTS			
Slide Number	**Fortnightly Soiling Unit (SU) Objective**	**Soiling Units (SU) measured during period 01/09/17 – 15/09/17**	**Nuisance (Y/N)**
GS1	<50	20.0	N
GS2	<50	16.1	N
GS3	<50	20.8	N
GS4	<50	-*	n/a
GS5	<50	-*	n/a

* - slide was missing upon collection

Table 3 lists the measured soiling units (SU) during the second fortnightly monitoring period for each monitoring location.

Table 3 – Results of Glass Slide Analysis.

GLASS SLIDE RESULTS			
Slide Number	**Fortnightly Soiling Unit (SU) Objective**	**Soiling Units (SU) measured during period 15/09/17 – 02/10/17**	**Nuisance (Y/N)**
GS1	<50	28.5	N
GS2	<50	35.4	N
GS3	<50	22.5	N
GS4	<50	16.9	N
GS5	<50	37.2	N

6 CONCLUSION

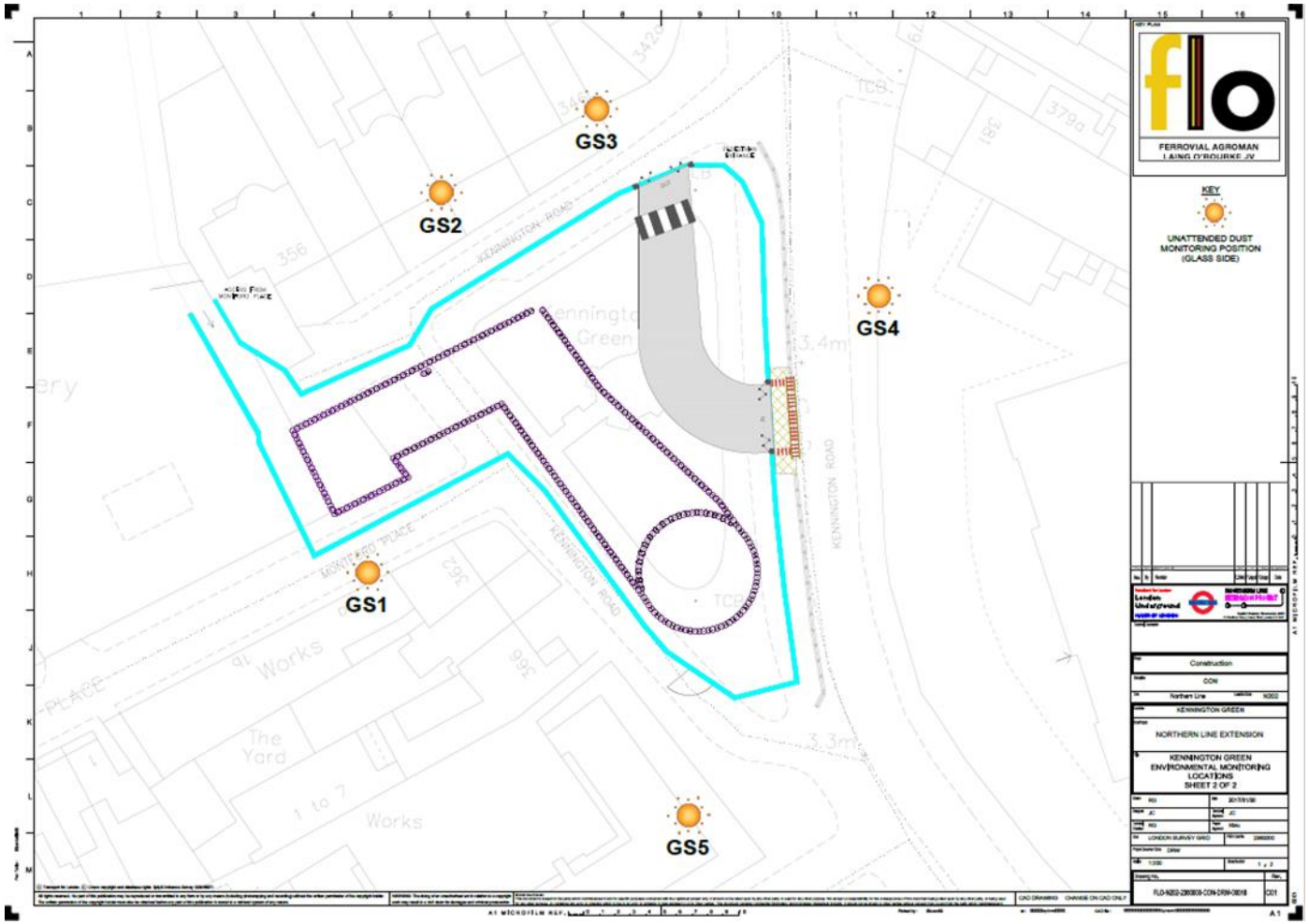
Ferrovial Laing O'Rourke (FLO) is currently undertaking works in the Kennington Green area as part of the London Underground Extension of the Northern Line (NLE) running from Kennington to Battersea (Charing Cross branch).

Temple has been appointed to undertake passive air quality monitoring within a specific residential area located in the surroundings of the Kennington Green works site. Passive air quality monitoring was undertaken over two consecutive fortnightly periods in order to investigate the potential for dust nuisance at sensitive receptor locations.

The guidance criterion of 25 SU per week (i.e. 50 SU per fortnight) set out by the Environment Agency was not exceeded at any measurement location during the two fortnightly periods in the surroundings of the Kennington Green site. The soiling units recorded suggest that dust nuisance would have been unlikely at sensitive receptors during the monitoring period.

APPENDIX I – SITE MAP

Figure 3 – Passive monitoring locations



APPENDIX II – MONITORING LOCATIONS

Glass Slide 1 – GS1

Location: front window of 3 Montford Place

Receptor: residents of Montford Place

Figure 4 – Glass Slide 1

Glass Slide 2 – GS2

Location: front window of 350 Kennington Road

Receptor: residents of Kennington Road (North NLE worksite)

Figure 5 – Glass Slide 2

Glass Slide 3 – GS3

Location: front window of Toni's Café (344 Kennington Road)

Receptor: residents of Kennington Road (North-East NLE worksite)

Figure 6 – Glass Slide 3

Glass Slide 4 – GS4

Location: car park fence of 1 Stannary St

Receptor: residents of Kennington Road (East NLE worksite)

Figure 7 – Glass Slide 4

Glass Slide 5 – GS5

Location: street fence of Sherwin House

Receptor: residents of Sherwin House

Figure 8 – Glass Slide 5