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Consulting Engineers

# REPORT

*Global* Engineering Solutions



Client: FOM Properties Ltd.

Project: Light Pollution  
Report, Queens  
Road, Richmond

Light Pollution Report

Rev Final

29<sup>th</sup> April 2010

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FOM Properties Ltd  
Queens Road  
Richmond  
Light Pollution Study  
Rev - Final

Revision	Date	Description	Tender Issue	
Final	29/04/10	Queens Road, Richmond	Prepared By	Checked By
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## 1 Introduction

This study has been undertaken to determine if the proposed development at Queens Road/Stafford Place will have any negative impact on Richmond Park in terms of light pollution.

Richmond Park is a listed Conservation Area and is defined by the Institute of Lighting Engineers as an Intrinsically Dark Area with the most stringent external light intrusion criteria. There are five basic types of light pollution and the possibility of each type having an impact on the Park must be assessed.

The five main types of light pollution are

**Light Trespass:** This unwanted light entering a property

**Over Illumination:** Excessive use of light

**Glare:** Excessive contrast bright and dark areas in the field of vision

**Clutter:** Excessive groupings of luminaires

**Sky Glow:** Illumination of the night sky caused by badly directed light in populated areas.

In order to assess the light pollution and associated implications of the residence at Queens Road/Stafford Place, a simulation has been carried out based on the proposed architectural layouts to evaluate the impact of the proposed development.

Of the above types of light pollution the primary concern is light trespass and this is what will be evaluated in this study.

Over illumination is not a concern given that this is a residential development and the lower levels of illumination are usually desirable in dwellings and their surroundings.

Glare does not need to be considered as the type of activities that will take place external to the development are not glare dependent and assuming lower levels of illumination are desired there will be little contrast between and bright and dark.

Sky glow must be considered but it is unlikely given two key restrictions that will be used in the design.

- No fittings with an uplight component will be used in the external lighting scheme.
- All other luminaires will incorporate a sharp cut off lens diffuser to ensure light is direct to where it is needed and to prevent unnecessary light spillage.

In summary the issue of light trespass from the rear facing windows into Richmond Park is the key item of concern and is the aspect of light pollution which must be considered in this report.

## 2 Planning Policy and Guidelines

The following guidelines and policy documents have been referenced for this study and the recommendations have been adopted where appropriate.

- Richmond upon Thames UDP (March 2005) - POLICIES FOR NATURE CONSERVATION ENV 18 SITES OF SPECIAL SCIENTIFIC INTEREST AND OTHER SITES OF NATURE IMPORTANCE
- Guidance Notes for the Reduction of Light Pollution, Institute of Lighting Engineers (2000)
- Lighting the Environment: A guide to good urban lighting, CIBSE and ILE (1995)

### **3 Site Description**

On examination of the proposed development the key issue in terms of minimising light pollution to minimise the impact of light trespass from the house proposed at the rear of site onto Richmond Park.

The proposed house is a two storey building on Stafford Place with an elevation overlooking Richmond Park. The front Elevation is approximately 12 metres from the boundary of Richmond Park and at first floor level is approximately 18 metres . The simulation and calculations undertaken for this study focus on the light trespass from this facade on to Richmond Park.

Richmond Park is considered to be an area of special historic interest and is a Grade 1 listed conservation area and as such falls within environmental category E1 (Intrinsically Dark Area), referred to in the guidance notes on the reduction of light pollution (Institute of Lighting Engineers)

### **4 Site Proposal**

It is understood from the proposed scheme drawings that the existing car park will be decommissioned and replaced with a new two storey residence. The property will also have a lower ground level. The design of the property will include a high level of glazed facade.

The Ground Floor of the development shall have an open living area/kitchen space and a number of bedrooms whilst the first floor shall encompass the Master Bedroom.

As the proposed internal lighting scheme has yet to be determined for the purposes of this study a scheme has been assumed. In general it has been assumed that internal lighting will be achieved through the use of recessed downlights which is deemed most appropriate to the architectural form of the development.

The CIBSE code for lighting gives no direct guidance for lighting residential spaces:

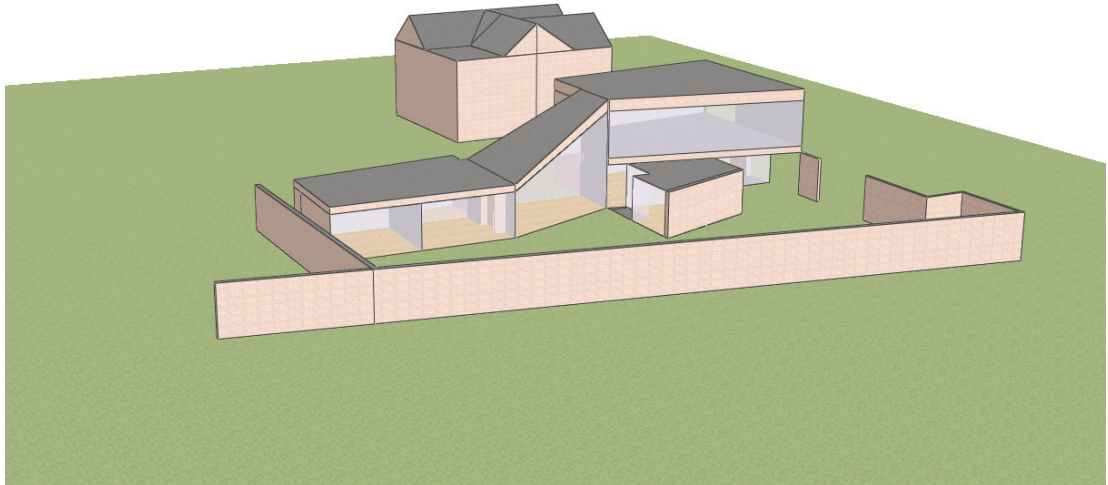
“The recommendations...refer to institutional accommodation, it is not the intention of the Code for Lighting to give guidance for private dwellings.”

However, we have used the recommendations for institutional accommodation as a guidance for this property. Using the pendant light fittings, a working plane illuminance of 150 – 250 Lux was achieved within a 3D model of the building created for this purpose using IES simulation and Dialux lighting software software.

It has been assumed that there are no blinds or curtains on any of the windows and double glazing with a transmission of 70% has been assumed. It is likely however that due to energy efficiency considerations as well as privacy that the building will provide a more enhanced light shield than has been assumed.

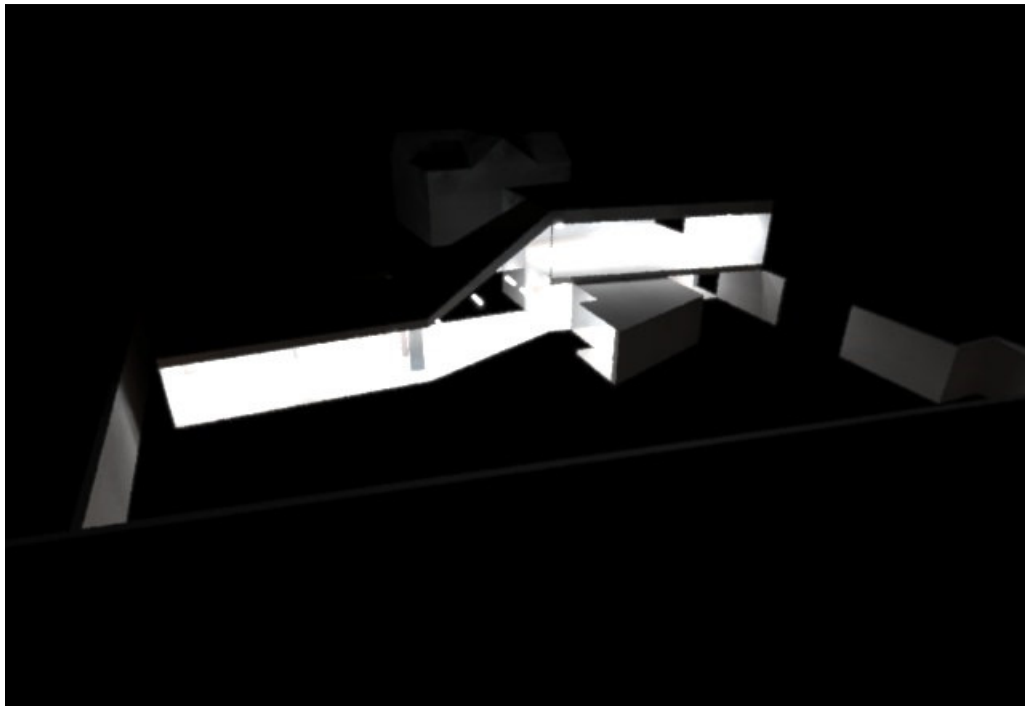
### **5 Analysis and Results**

The simulation also assumed a element of external lighting between the property and the boundary. This has been chosen to prevent any light trespass or sky glow onto Richmond Park.



**Figure 5.1 3D Model**

The image in Figure 5.1 above shows a graphic of the IES model used to simulate the property.

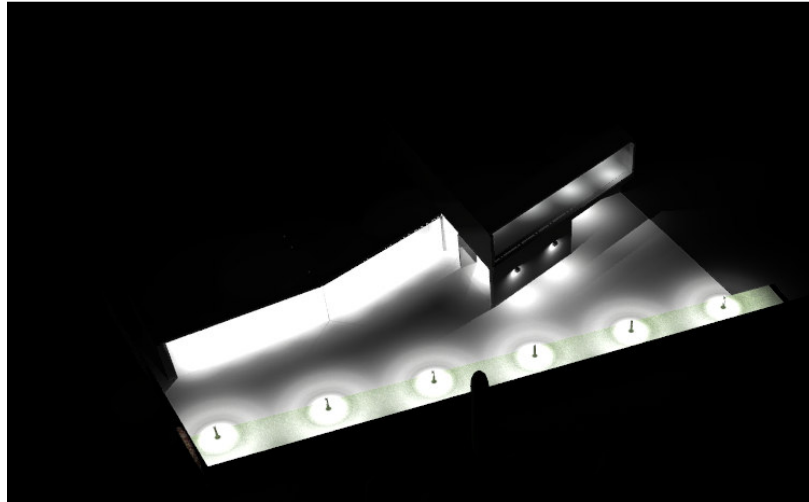


**Figure 5.2 View of Property from Richmond Park**

Figure 5.2 above shows how the property would be viewed from Richmond Park, without the trees being taken into account.

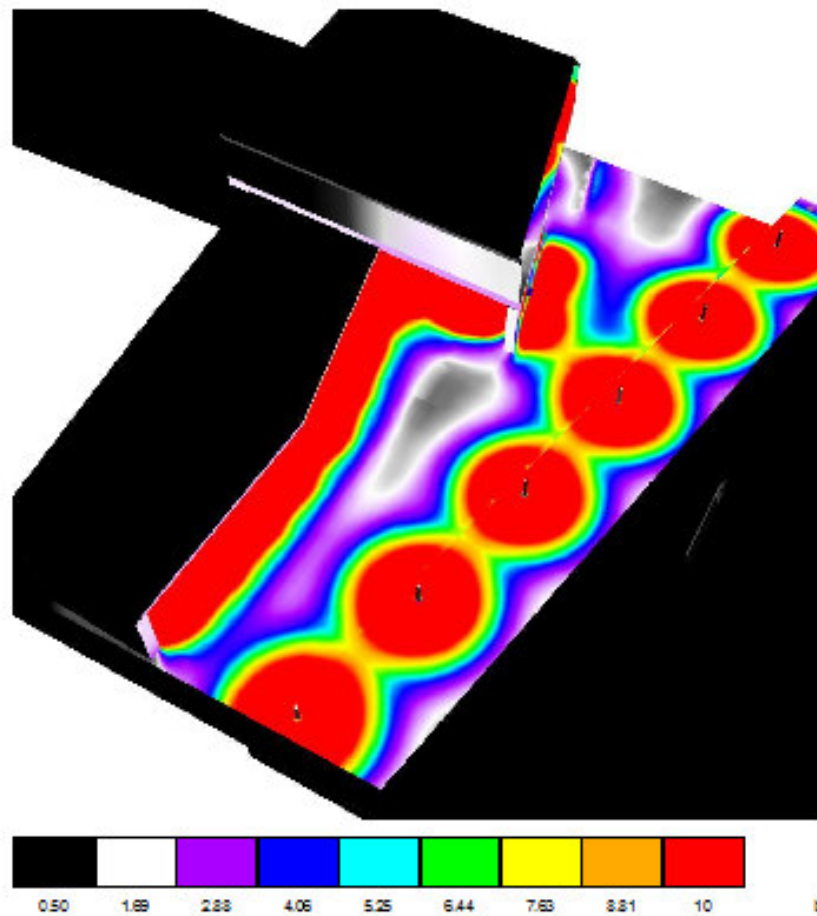
A further calculation was undertaken using Dialux to determine the actual light level within Richmond Park due to the proposed scheme. Four separate calculation points were used,

two of which measured horizontal illumination 0.75m aboveground level while the remaining two measured vertical illumination at height of 2.7mm meters.



**Figure 5.3 3D Rendering**

Figure 5.3 shows a 3-D image of the proposed lighting scheme as simulated in Dialux.



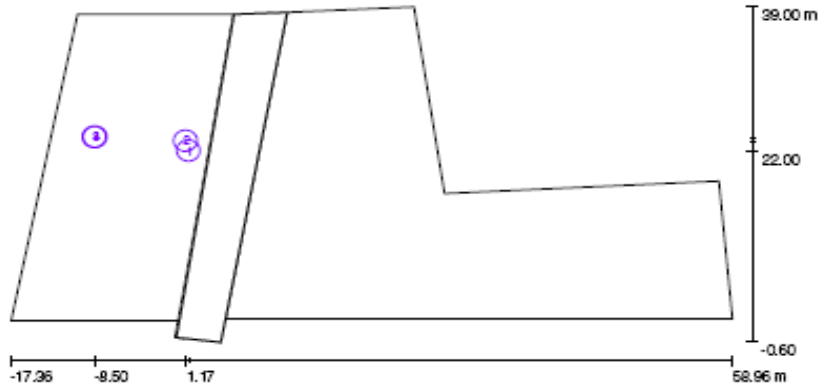
**Figure 5.4 False Colour Rendering**



Figure 5.4 shows a false colour rendering showing illumination levels.

The results show that whilst some light of less than 1 lux will reach the boundary of the garden and the park, some spillage may reach beyond the boundary wall.

While most of the light emitted by the property will rebound off the boundary wall back into the garden, a small amount may escape into the park. These levels of light received within the park will be barely discernible as outlined in the table below and will fall into line with the most stringent criteria set out by the Institute of Lighting Engineers on Reduction of Light Pollution and therefore in line with the UDP produced by the London Royal Borough of Richmond Upon Thames.



Scale 1 : 546

**Calculation Points List**

No.	Designation	Type	Position [m]			Rotation [°]			Value [lx]
			X	Y	Z	X	Y	Z	
1	Vertical Calculation Point 1	vertical, normal	1.470	22.000	2.743	0.0	0.0	0.0	0.04
2	Horizontal Calculation Point 1	horizontal, normal	1.167	23.150	0.750	0.0	0.0	0.0	0.00
3	Horizontal Calculation Point 2	horizontal, normal	-8.500	23.600	0.750	0.0	0.0	0.0	0.00
4	Vertical Calculation Point 2	vertical, normal	-8.400	23.600	2.743	0.0	0.0	0.0	0.03

**Summary of Results**

Calculation Point Types	Quantity	Average [lx]	Min [lx]	Max [lx]	u0	$E_{min} / E_{max}$
Horizontal, normal	2	0.00	0.00	0.00	0.94	0.88
Vertical, normal	2	0.04	0.03	0.04	0.80	0.67

The above results show the negligible levels of illumination occurring in Richmond Park due to the proposed development particularly when one takes into account that moonlight is generally accepted to be in the region of 1 lux on a clear night.

**6 Conclusion**

The proposed building will produce no discernable light spillage into the park and is in line with the Guidelines set out by the Institute of Lighting Engineers



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