



DAYLIGHT & SUNLIGHT

LIGHT POLLUTION REPORT

New City Court

03 June 2019

GIA No: **8684**

PROJECT DATA:

Client **Great Portland Estates**
Architect **AHMM**
Project Title **New City Court**
Project Number **8684**

REPORT DATA:

Report Title **Light Pollution Report**
GIA Department **Daylight & Sunlight**
Dated **03 June 2019**

Prepared by **GLE**
Checked by
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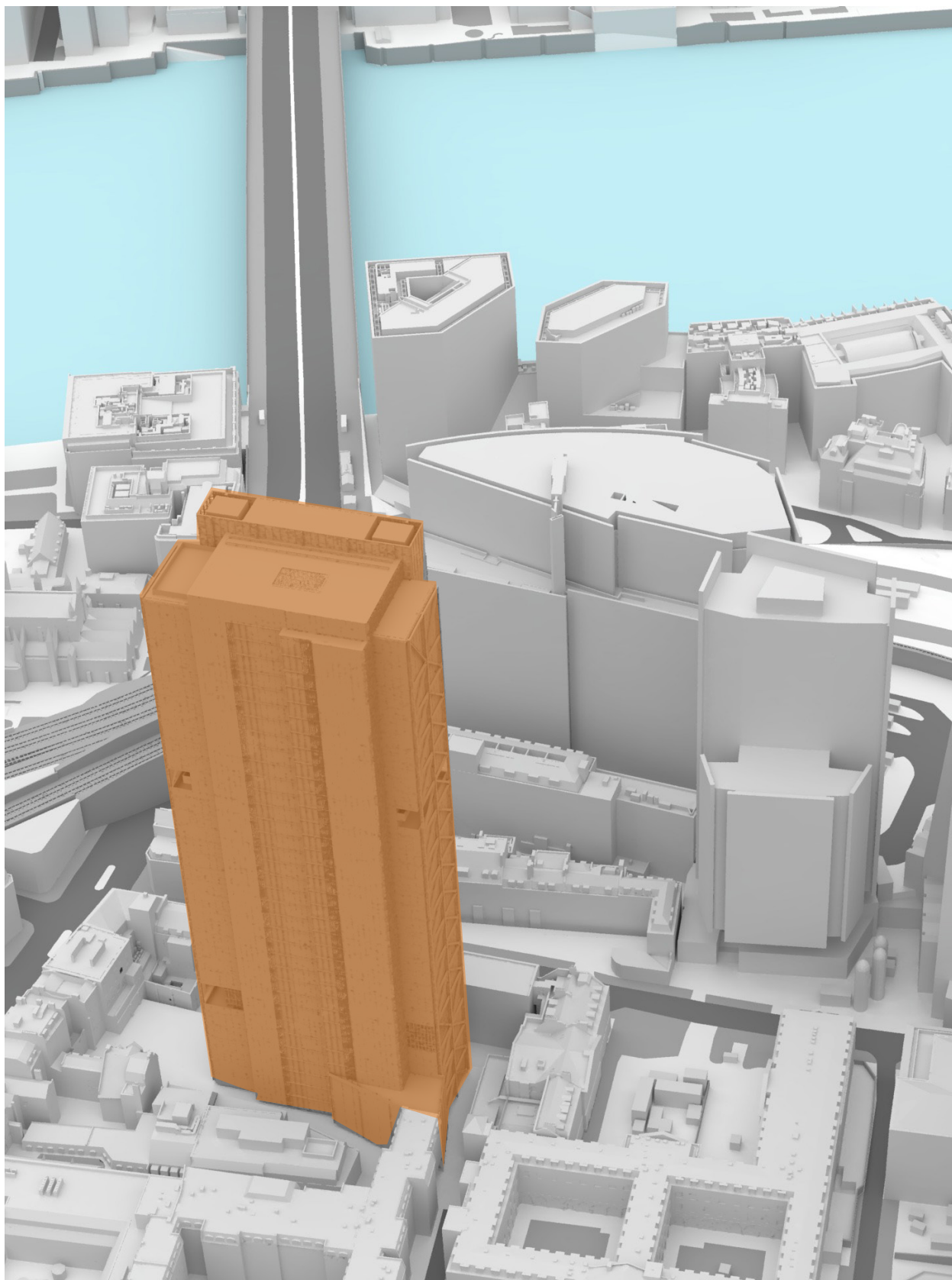


Fig. 01: Site Overview Perspective

1 EXECUTIVE SUMMARY

As requested by the London Borough of Southwark (LBS) we have undertaken a further light pollution assessment for the residential element at 9 St Thomas Street.

The purpose of this assessment is to determine the levels of obtrusive light caused by the interior light fittings of the Proposed Development onto the relevant residential windows within 9 St Thomas Street.

Overall the results show that the levels of light trespass seen on sensitive receptors pre-curfew are acceptable and below those recommended by the ILE.

Post-curfew potential light pollution issues have been identified on some of the tested windows. However, in reality, the proposed lighting system will include occupancy sensors and therefore, as demonstrated by additional assessments with a 300 Lux maximum output, the proposed lighting system is unlikely to cause any significant nuisance upon 9 St Thomas Street.

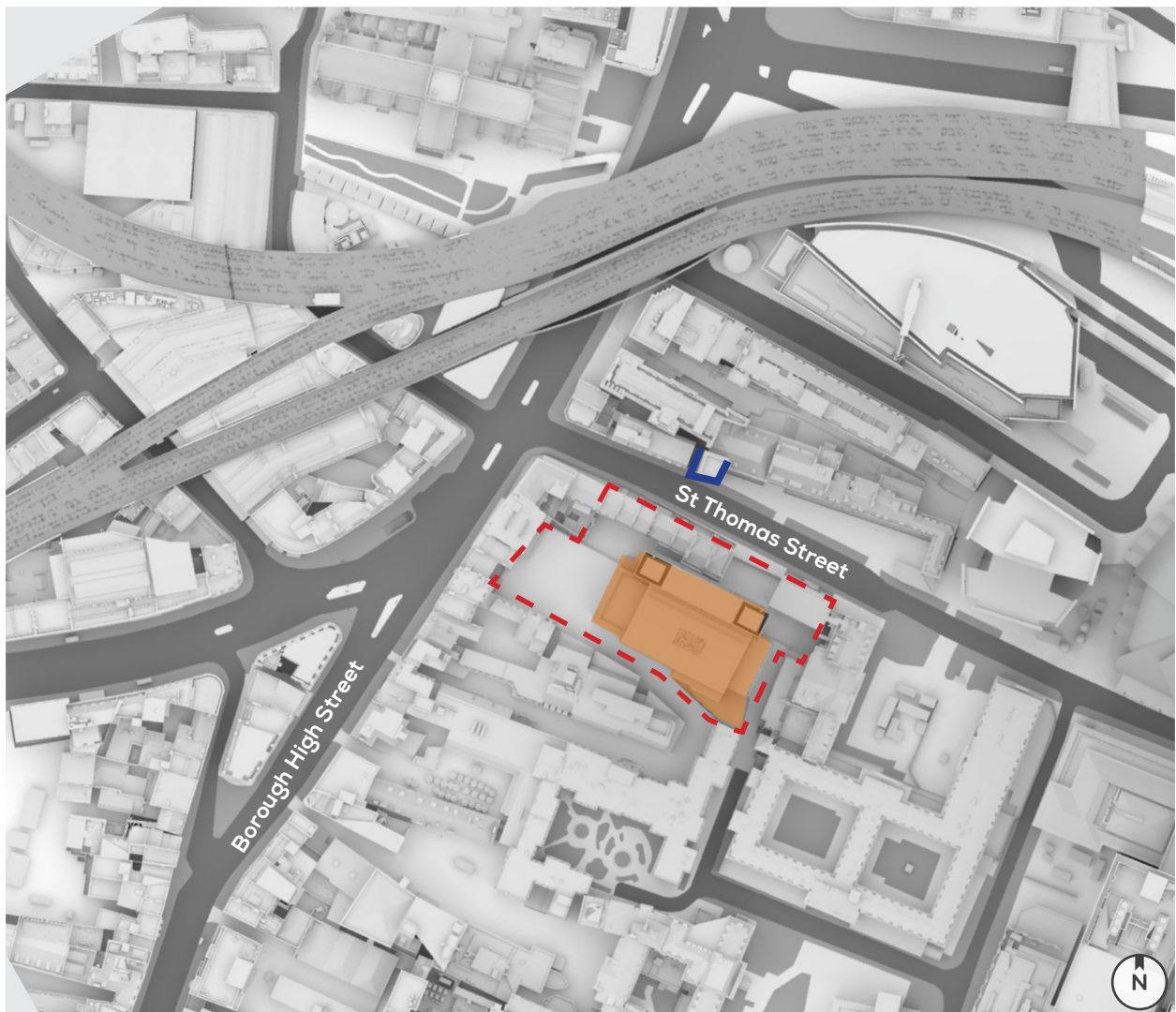


Fig. 02: Site Plan

2 INTRODUCTION AND OBJECTIVE

GIA has been instructed to provide a report upon the potential Light Trespass as a result of the proposed development.

GIA was specifically instructed to carry out the following:

- Create a 3D computer model of the immediate area surrounding the site and the proposed development.
- Apply a standard lighting design within the 3D model so the lighting software can simulate the resultant light spillage.
- Carry out a light trespass assessment to measure the illuminance levels (lux) at sensitive receptors surrounding the site.
- Prepare a report setting out the analysis, findings and recommendations.

3 POLICIES, GUIDANCE, LEGISLATION AND STANDARD

3.1 NATIONAL POLICY AND GUIDANCE

Environmental Protection Act 1990

An amendment contained within the Clean Neighbourhoods and Environment Act 2005 to section 79 of the Environmental Protection Act 1990 states:

"Artificial light emitted from premises so as to be prejudicial to health and nuisance constitutes a 'Statutory Nuisance' and it shall be the duty of every local authority to cause its area to be inspected from time to time to detect any statutory nuisances which ought to be dealt with under section 80 and, where a complaint of a statutory nuisance is made to it by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint".

Guidance notes for the reduction of obtrusive light, Institute of Lighting Professionals ILP (2011)

The ILP guidelines quantify the levels of Sky Glow, Light intrusion, Glare/Source Intensity and Building Luminance seen as acceptable for varying environmental zones:

E0: Dark landscapes (UNESCO Starlight Reserves, IDA Dark Sky Parks, etc.);

E1: Intrinsically dark landscapes (National Parks, Areas of Outstanding Natural Beauty, etc.);

E2: Low district brightness areas (Rural, small village, or relatively dark urban locations);

E3: Medium district brightness areas (Small town centres or urban locations); and

E4: High district brightness areas (Town/city centres with high levels of night time activity)

The limitations below may be supplemented or replaced by the LPA's own planning guidance for exterior lighting installation.

Sky Glow is the brightening of the night sky over our towns, cities and countryside. This can be quantified by measuring the Upward Light Ratio (ULR). This is the maximum permitted percentage of luminaires flux for the total installation that goes directly into the sky. The values suggested in the table opposite are the maximum allowable levels for their respective environmental zones.

Light intrusion is the spilling of light beyond the boundary of the proposed development. This is assessed as vertical illuminance in lux (Ev) measured flat at the centre of the sensitive receptor. The values in the table below are suggested maximum allowable levels, taking into account the existing light intrusion at the point of measurement in each environmental zone (pre and post-curfew).

Glare/Source Intensity is the uncomfortable brightness of a light source when viewed against a dark background. This applies to each source visible from the sensitive receptor and is measured as source intensity (I) (kcd). The values in the table below are the suggested maximum allowable levels in each environmental zone (pre and post curfew).

Building Luminance can cause an increase in the brightness of the general area. This is measured in cd/m² (L) as an average over the building façade caused only by external lighting. The values suggested in the table below are the suggested maximum allowable pre-curfew levels in each environmental zone.

The ILP guidelines suggest that in many cases the levels below may not be obtainable. These specific cases will be dealt with individually and mitigations should be utilised to ensure that the impact is minimised.

Lighting of Work Places – Part 2: Outdoor Work Places, British Standards BS 12464-2:2007 (ref 4)

This document mirrors the recommendations made in the ILP guidelines above. The only variations are higher maximum Upward Lighting Ratio (sky glow) limits. This report will refer to the levels suggested by the ILP guidelines thereby assuring compliance with both documents.

3.2 REGIONAL POLICY AND GUIDANCE

The London Plan (2016)

Section 7.22

“A building should enhance the amenity and vitality of the surrounding streets. It should make a positive contribution to the landscape and relate well to the form, proportion, scale and character of streets, existing open space, waterways and other townscape and topographical features, including the historic environment. New development, especially large and tall buildings, should not have a negative impact on the character or amenity of neighbouring sensitive land uses. Lighting of, and on, buildings should be energy efficient and appropriate for the physical context”

The New London Plan (draft)

Section 3.7.10

“ Any external lighting for tall buildings should be energy efficient, and designed to minimise glare, light trespass, and sky glow, and ensure it does not negatively impact on protected views or the amenity of nearby residents.”

OBTRUSIVE LIGHT LIMITATIONS FOR EXTERIOR LIGHTING INSTALLATIONS

Environmental Zone	Sky Glow ULR [Max %] ⁽¹⁾	Light intrusion (into Windows) Ev [Lux] ⁽²⁾		Source Intensity I [kcd] ⁽³⁾		Building Luminance Pre- curfew ⁽⁴⁾
		Pre- curfew	Post- curfew	Pre- curfew	Post- curfew	Average, L [cd/m ²]
E0	0	0	0	0	0	0
E1	0	2	1*	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5.0	10	2	10	1.0	10
E4	15.0	25	5	25	2.5	25

Curfew The time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by the local planning authority. If not otherwise stated 23.00hrs is suggested.

* From Public road lighting installations only

4 METHODOLOGY

In order to undertake the light pollution assessments set out above, we have prepared a 3D computer model and used specialist lighting simulation software.

The 3D representation of the proposed development is based on models and drawings provided by AHMM. This has been placed in the context of its surrounding buildings which have been modelled from measured survey. This allows for a precise model, which in turn ensures that analysis accurately represents the levels of light spillage.

4.1 SIMULATION ASSUMPTIONS

Where no values for reflectance, transmittance and maintenance factor were specified by the designer the following values from BS 8206-2:2008, Annex A, tables A.1-A.6 were used for the calculation of Light Pollution. These values are shown in the table below (Table 01).

Light Sources

The light fittings used for this lighting simulation are typical recessed office luminaires arranged in a regular array on the proposed office ceilings so that an average illuminance of 500 lux is achieved across the working plane. This represents a typical Category A office fit-out. The fittings chosen are circular ceiling-recessed compact fluorescent downlighters. Any proposed retail use has been considered as office and therefore represents the worst-case condition.

All luminaires were assumed to be switched on. Blinds or any other shading devices were considered to be either not installed or not deployed. This therefore, portrays the worst-case scenario in terms of light trespass.

Additional assessments have been undertaken with a maximum 300 Lux output as a way of illustrating a more realistic condition of the proposed lighting system.

4.2 LIGHT TRESPASS

In the proposed scenario virtual sensors are placed on the outside of the relevant windows of the aforementioned residential building. The sensors calculate the incident illuminance to this point.

Sky Glow, Source Intensity and Building Luminance were not assessed in this study since they are not relevant to the project. The first two are of interest with external flood lighting installations such as for sports lighting. The latter would need to be considered for a flood lit facade, which is not a feature of the proposal.

Table 01: Typical reflectance, transmittance and maintenance factors

REFLECTANCE VALUES:		MAINTENANCE FACTORS: GLAZING TYPE	TV (Normal)	A.3	A.4	A.5	A.6	TV (Total)
Surrounding	0.2	Triple Low-E (frames modelled)	0.63	8	1	1	1	0.58
Pavement	0.2	Triple Low-E (frames not modelled)	0.63	8	1	1	0.8	0.46
Grass	0.1	Triple Low-E (inclined, frames modelled)	0.63	8	2	1	1	0.53
Water	0.1	Triple Low-E (inclined, frames not modelled)	0.63	8	2	1	0.8	0.42
Yellow brick	0.3	Triple Low-E (horizontal, frames modelled)	0.63	8	3	1	1	0.48
Red brick	0.2	Triple Low-E (horizontal, frames not modelled)	0.63	8	3	1	0.8	0.38
Portland Stone	0.6	Double Low-E (frames modelled)	0.75	8	1	1	1	0.69
Concrete	0.4	Double Low-E (frames not modelled)	0.75	8	1	1	0.8	0.55
Internal walls (light grey)	0.68	Double Low-E (inclined, frames modelled)	0.75	8	2	1	1	0.63
Internal ceiling (white paint)	0.85	Double Low-E (inclined, frames not modelled)	0.75	8	2	1	0.8	0.50
Internal floor (medium veneer)	0.3							
Internal floor (light veneer)	0.4							

5 CONCLUSIONS

As requested by the London Borough of Southwark (LBS) we have undertaken a further light pollution assessment for the residential element at 9 St Thomas Street which is located opposite the Proposed New City Court Development.

This assessment aims to determine the levels of obtrusive light caused by the interior light fittings of the Proposed Development onto the relevant residential windows within 9 St Thomas Street.

Overall, the results show that the proposed lighting system being installed is unlikely to give rise to any issue of light pollution whether pre or post curfew. Therefore, we consider the light pollution effects of the Proposed Development onto 9 St Thomas Street both pre and post curfew to be insignificant.

5.1 CONCLUSIONS ON LIGHT INTRUSION

As discussed within the methodology section, the light pollution assessment is undertaken with an average illuminance of 500 lux which represents a typical Category A office fit-out. This illustrates the worst-case condition in terms of the potential light intrusion, owing to the fact that detailed lighting design is not available at this stage of the project.

In order to represent a more realistic simulation of the proposed lighting fittings at post-curfew, a 300-lux average illuminance assessment has also been undertaken.

The assessment results show that, even with all the light fittings in use at maximum output (500lx), the pre-curfew levels are below the guidance threshold (25 lux).

Post-curfew levels of light spillage above those recommended by the Institute of Lighting Professionals (ILP) can be seen on the windows directly facing the Proposed Development with the lighting system at its maximum output (500 Lux). At post-curfew these windows achieve a maximum level of 10 lux where 5 lux is the ILP's recommendation.

However, in reality, fewer floors would be fully lit post-curfew (after 11pm), as occupancy sensors are being installed. Therefore, the 300 Lux assessment is a more realistic representation of the proposed lighting design system and the results show that post-curfew levels of light spillage would be within the 5 Lux threshold.

6 LIGHT POLLUTION ASSESSMENTS

LIGHT TRESPASS ASSESSMENT: 9 ST THOMAS STREET - 500 LUX PRE CURFEW

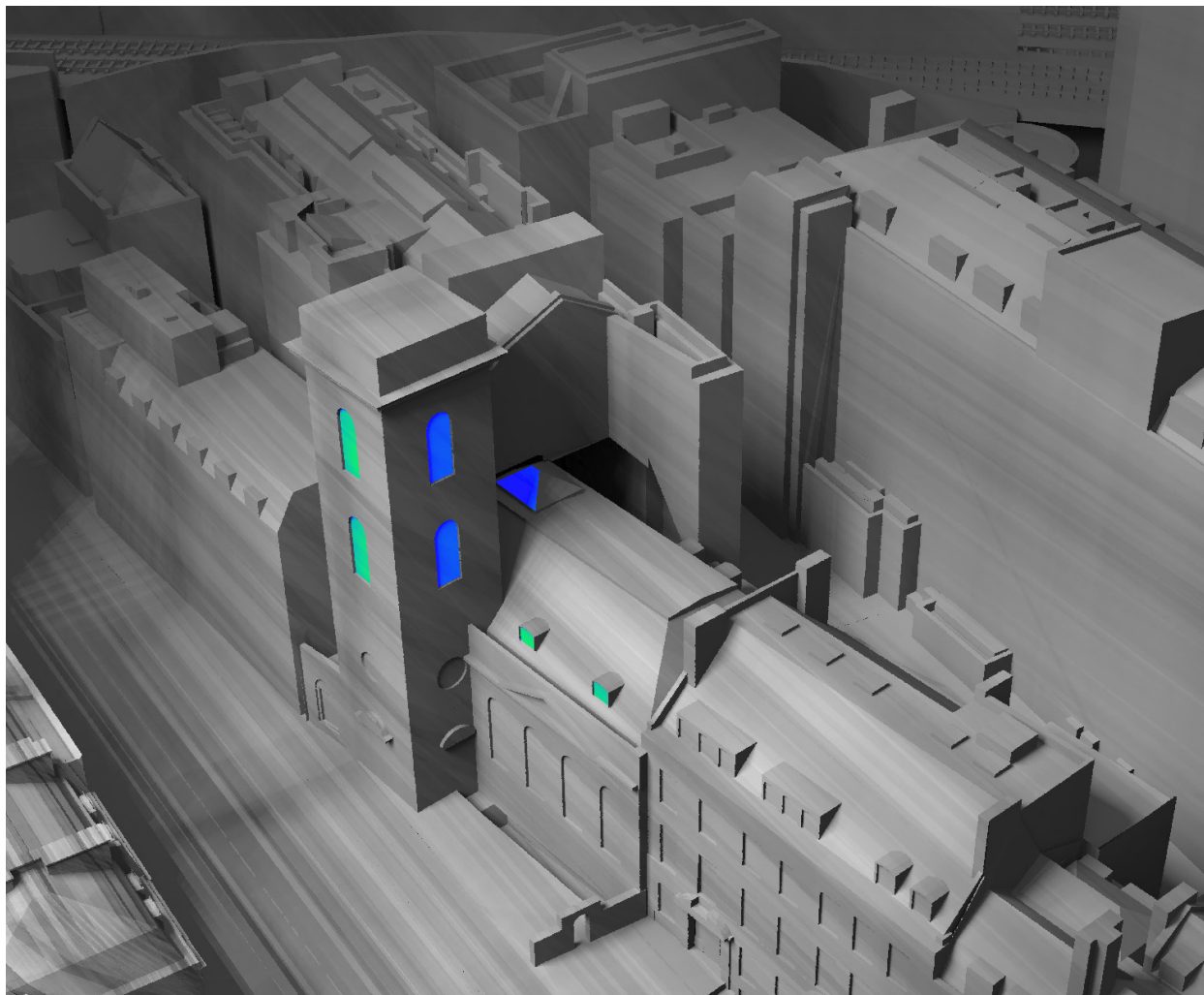
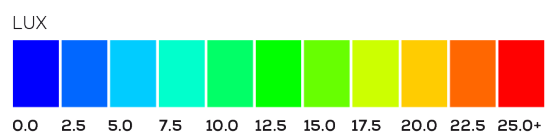


Fig. 03: Light Trespass Assessment - Pre Curfew



LIGHT TRESPASS ASSESSMENT: 9 ST THOMAS STREET - 500 LUX
POST CURFEW

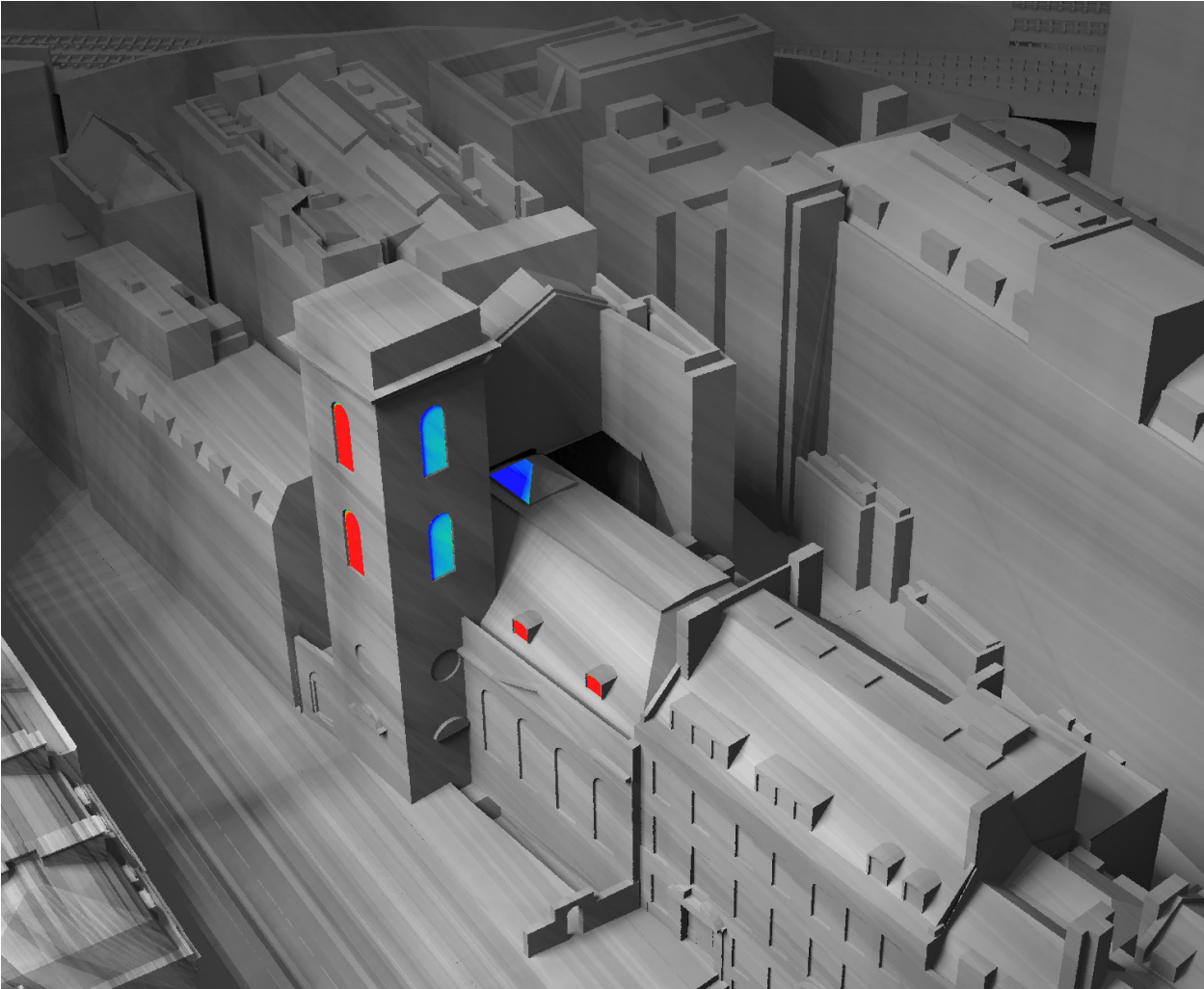
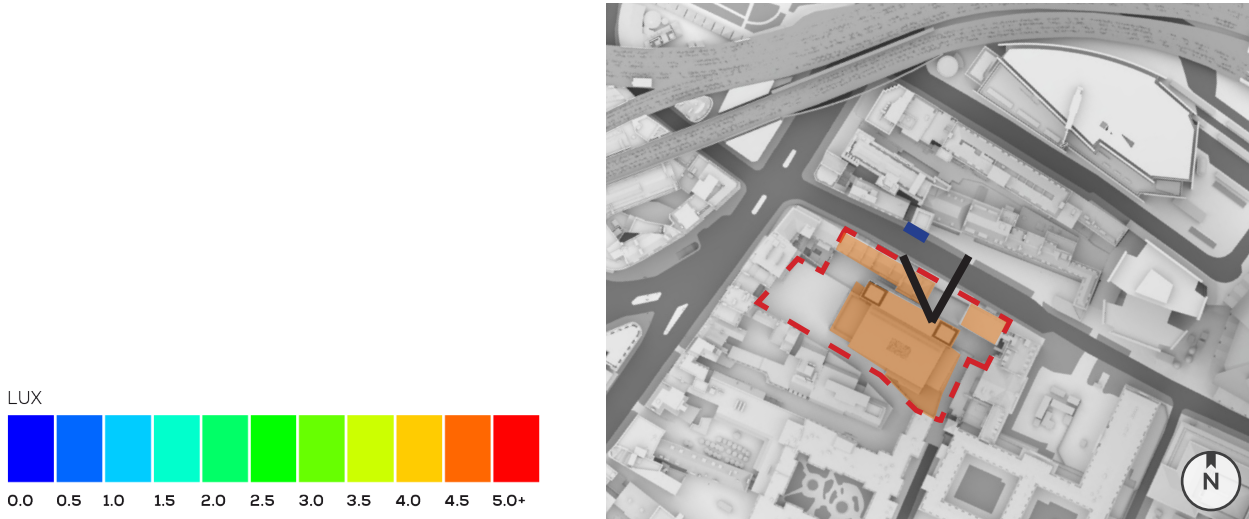


Fig. 04: Light Trespass Assessment - Post Curfew



LIGHT TRESPASS ASSESSMENT: 9 ST THOMAS STREET - 500 LUX
PRE CURFEW

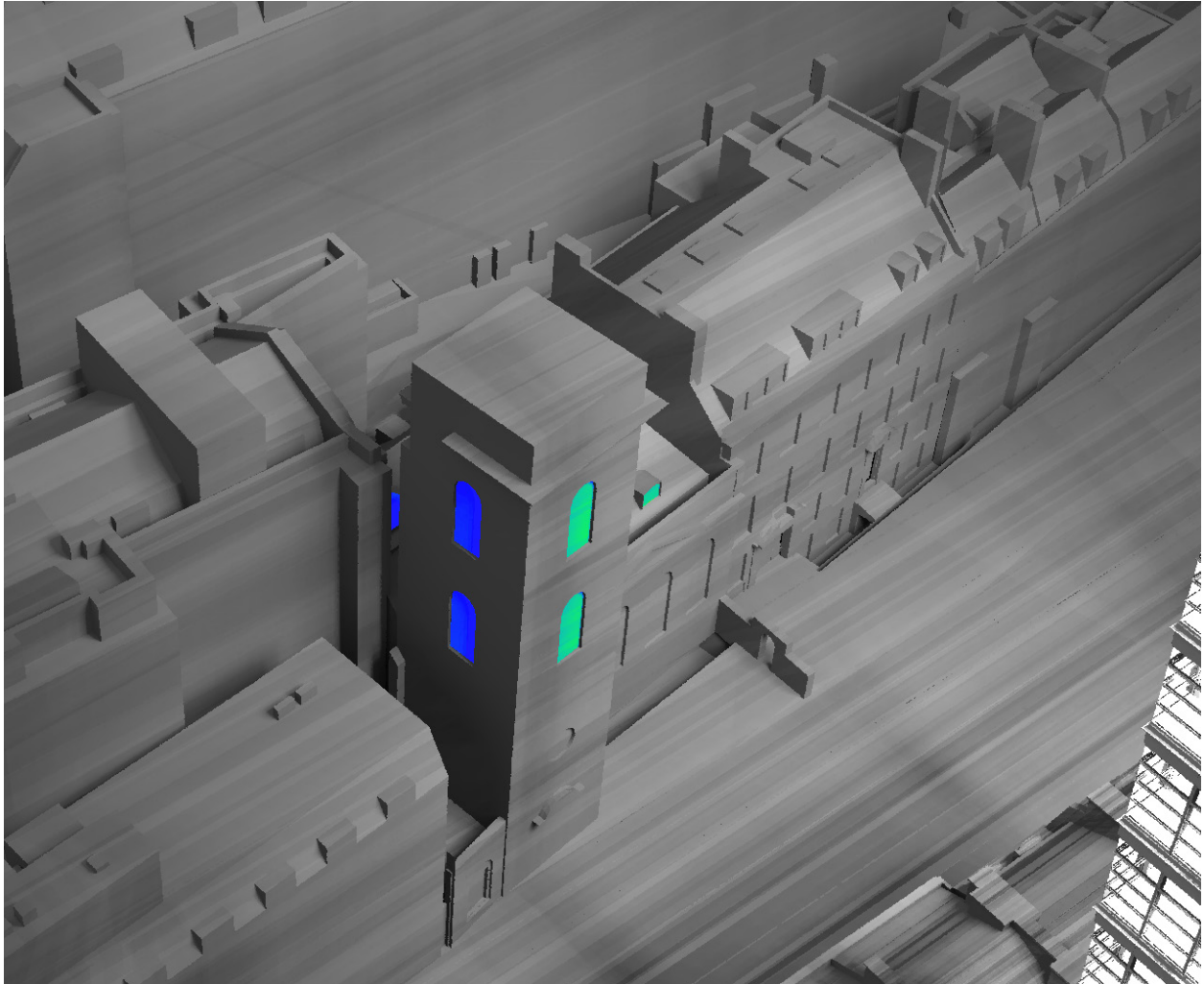
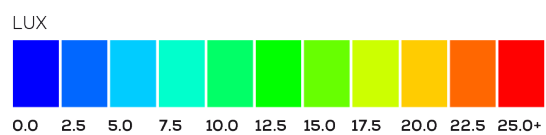


Fig. 05: Light Trespass Assessment - Pre Curfew



LIGHT TRESPASS ASSESSMENT: 9 ST THOMAS STREET - 500 LUX
POST CURFEW

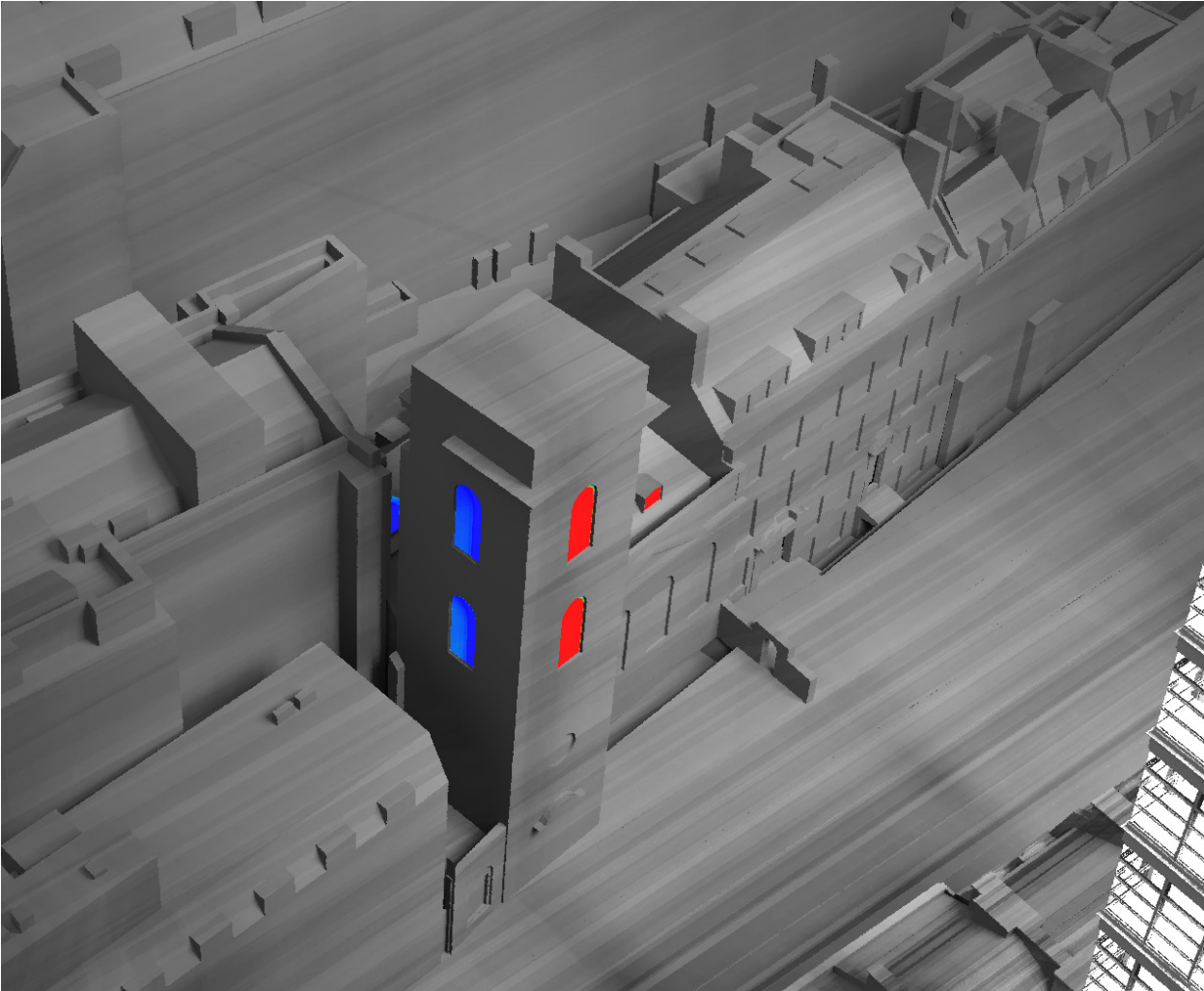
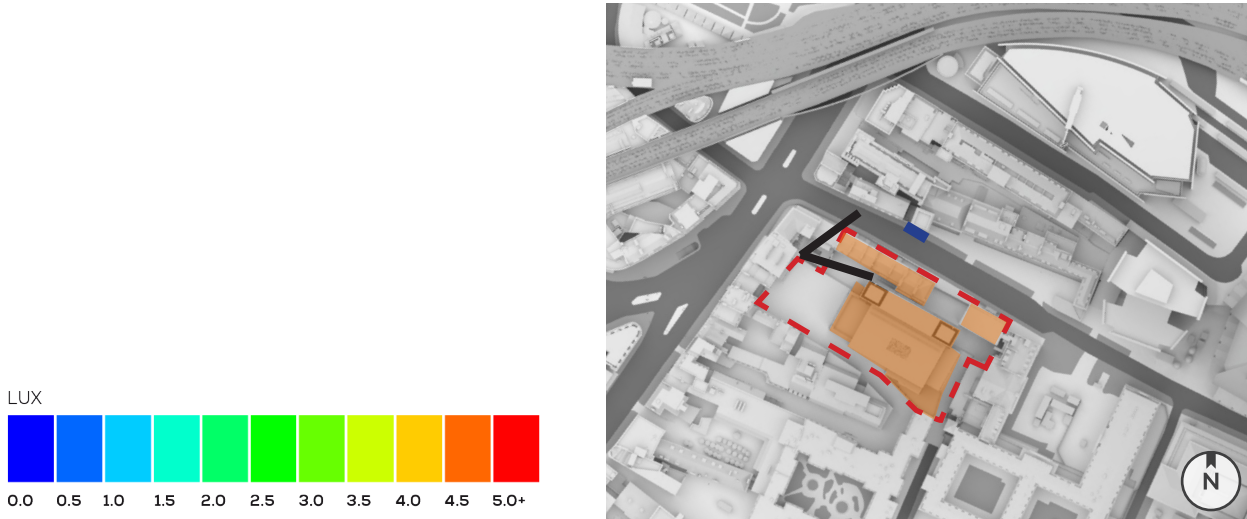


Fig. 06: Light Trespass Assessment – Post Curfew



LIGHT TRESPASS ASSESSMENT: 9 ST THOMAS STREET - 300 LUX
PRE CURFEW

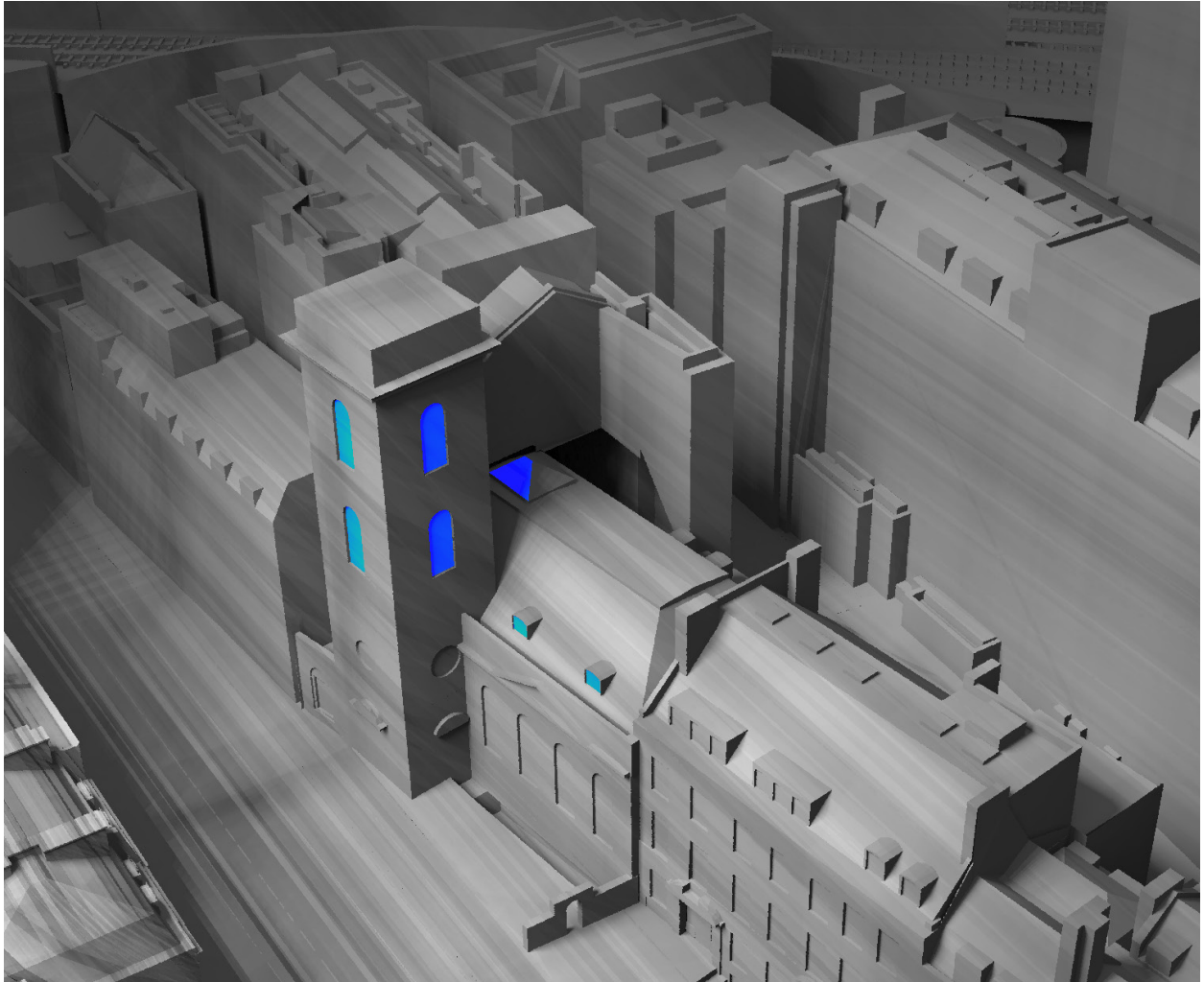
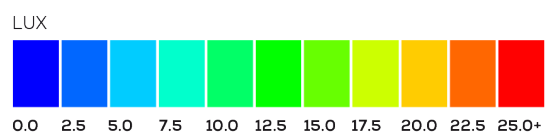


Fig. 07: Light Trespass Assessment - Pre Curfew



LIGHT TRESPASS ASSESSMENT: 9 ST THOMAS STREET - 300 LUX
POST CURFEW

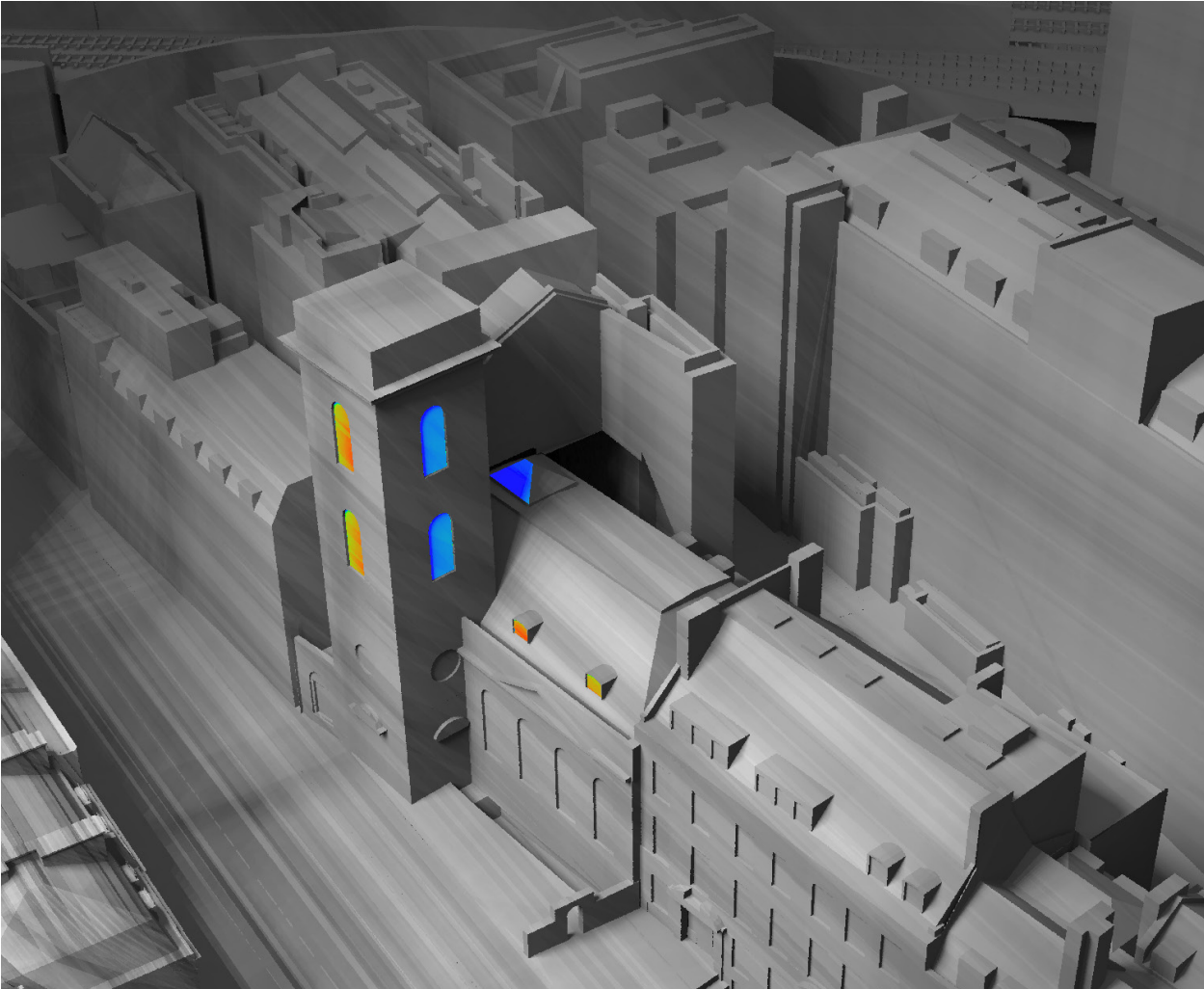
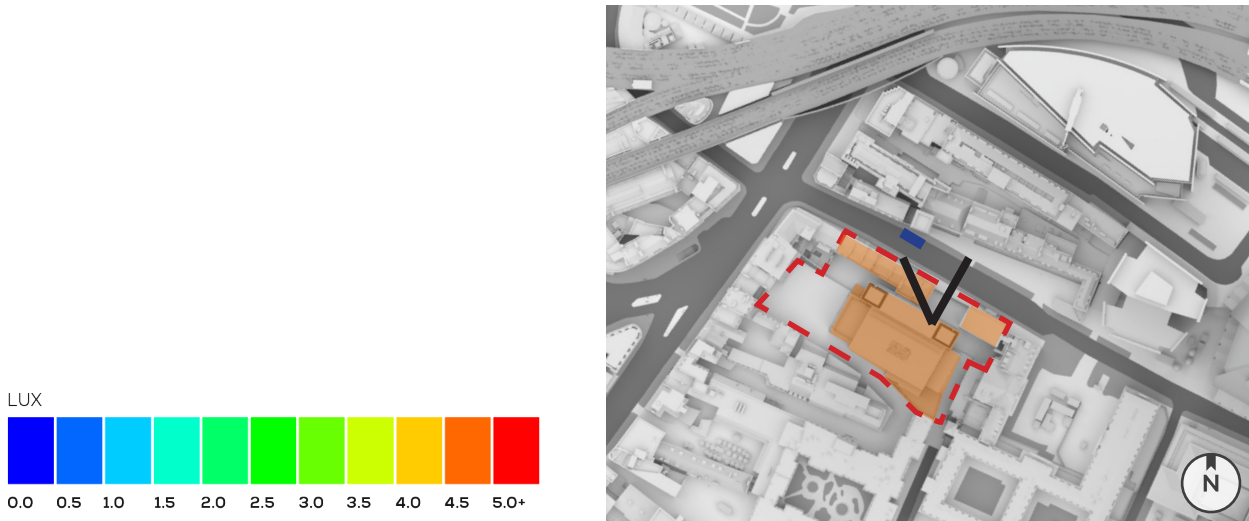


Fig. 08: Light Trespass Assessment - Post Curfew



LIGHT TRESPASS ASSESSMENT: 9 ST THOMAS STREET - 300 LUX
PRE CURFEW

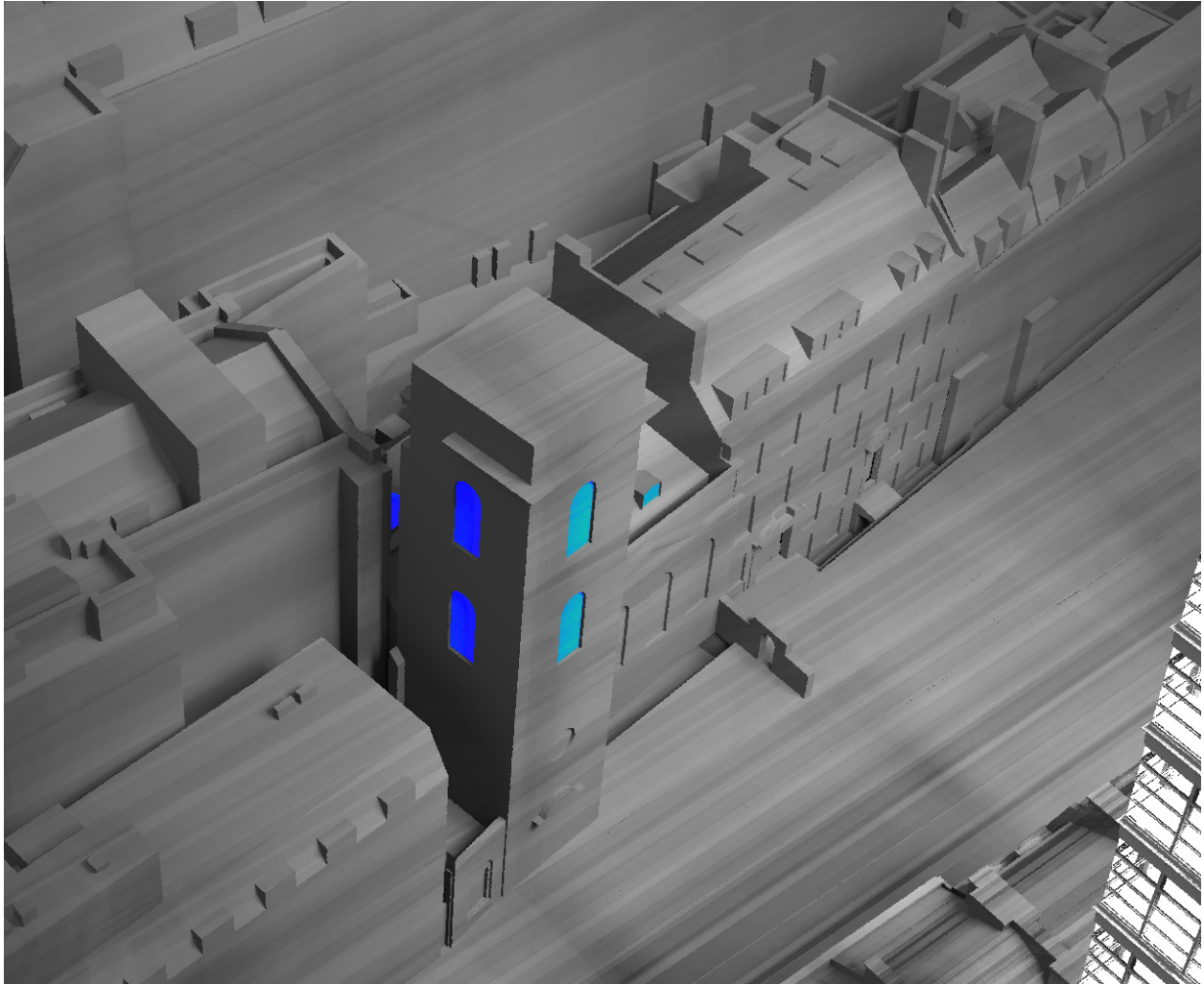
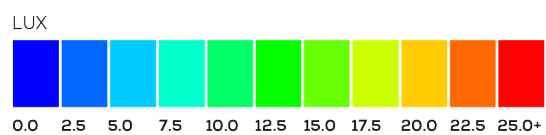


Fig. 09: Light Trespass Assessment - Pre Curfew



LIGHT TRESPASS ASSESSMENT: 9 ST THOMAS STREET - 300 LUX
POST CURFEW

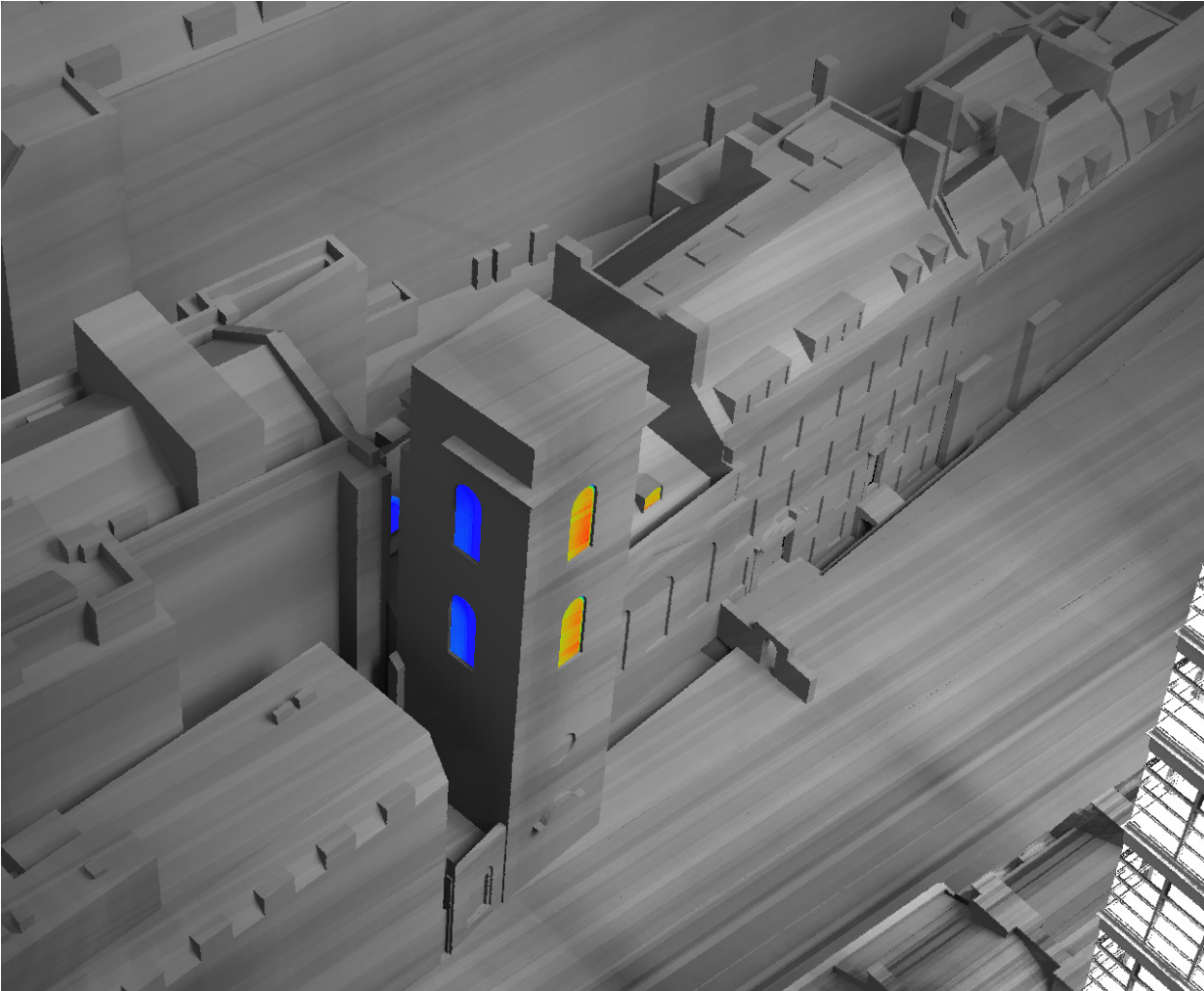
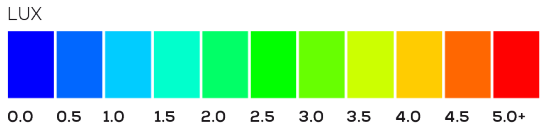
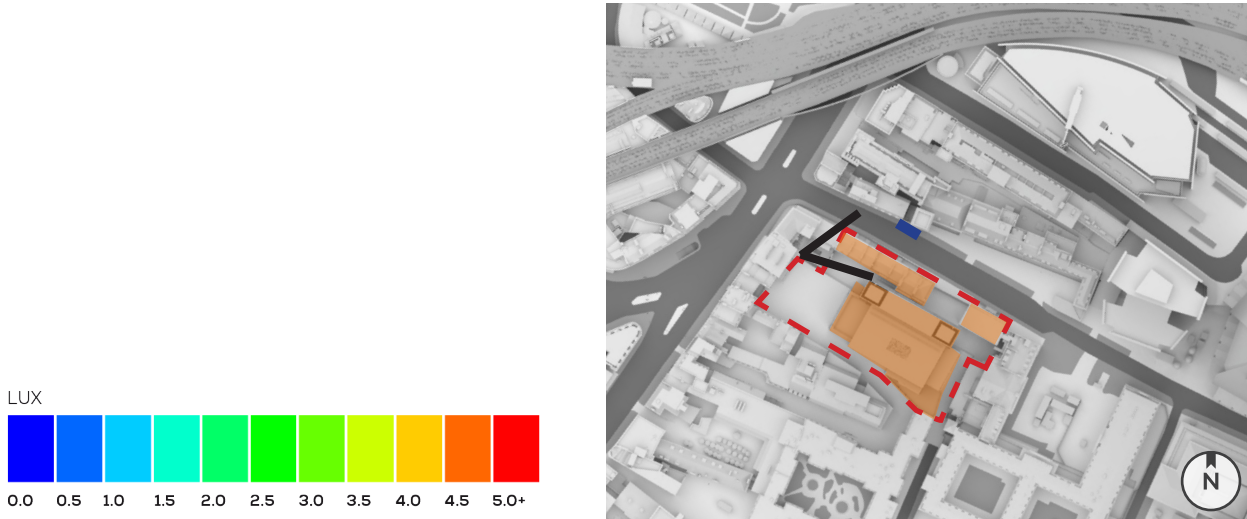


Fig. 10: Light Trespass Assessment - Post Curfew



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