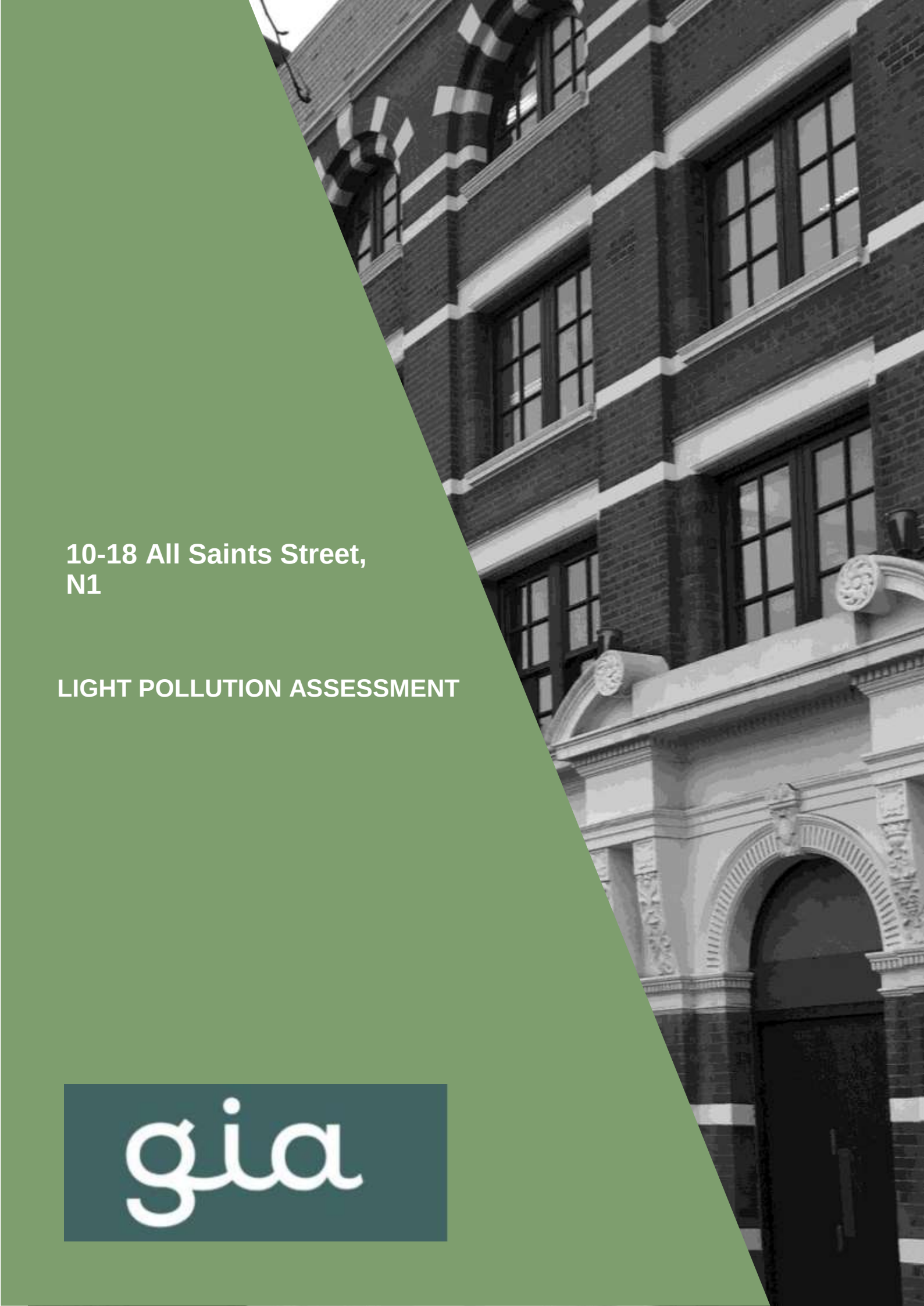


10-18 All Saints Street, N1

LIGHT POLLUTION ASSESSMENT

gia

gia
CHARTERED SURVEYORS

DAYLIGHT & SUNLIGHT

LIGHT POLLUTION ASSESSMENT

10-18 All Saints Street

29 November 2019

GIA No: **9771**

PROJECT DATA:

Client	**Regent's Wharf Property Unit Trust**
Architect	**Hawkins Brown**
Project Title	**10-18 All Saints Street**
Project Number	**9771**

REPORT DATA:

Report Title	**Light Pollution Assessment**
GIA Department	**Daylight & Sunlight**
Dated	**29 November 2019**

Prepared by	**MM/GLE**
Checked by	**MLI**
Type	**Planning**

Revisions	No:	Date:	Notes:	Signed:
A		29/11/2019	Comments included	GLE

SOURCES OF INFORMATION:

Information Received	**IR-102, 103, 105-9771**
Release Number	**Rel_19_9771_DSD**
Issue Number	**05**
Site Photos	**GIA**
3D models	**VERTEX**
OS Data	**FIND Maps**

Map data

CONTENTS

1 EXECUTIVE SUMMARY

Fig. 01: Perspective of the proposed redevelopment

A light pollution assessment has been undertaken to support the planning application for the redevelopment at 10-18 All Saints 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 in close proximity of the site.

The following buildings are within a 30m radius of the proposal and were therefore assessed for potential light pollution:

- Ice Wharf North;
- Ice Wharf South;
- 1-3 All Saints Street;
- 18-19A Lavina Grove;
- 53-66 Treaty Street;
- 67-77 Treaty Street;
- Copenhagen Primary School;
- Regent's Canal.

The results of the assessment show that the levels of artificial light spillage onto the residential neighbouring properties and the school will be within the ILP guidance both pre and post-curfew. Pre-curfew the artificial lighting spillage from the proposed development onto the Regent's Canal will be below the ILP threshold.

Should the proposed office spaces be occupied after 11 pm, levels of light intrusion greater than the maximum recommendation would be seen on some isolated parts of a few windows within 1-3 All Saints Street and in some small portions of the Regent's Canal, adjacent to the proposed redevelopment. Such effects are expected given the proximity of the proposed development to the assessed area within the Regent's Canal.

However, the proposed lighting system will include occupancy sensors, therefore risk of light pollution will be significantly reduced.

In addition to this, the proposal features an office building which is the same use as the current building and therefore, light spillage levels are unlikely to be increased in comparison to the current condition.

When compared to the previous scheme (Ref: P2016/4805/FUL), there are significant improvements on the levels of light spillage owing to the proposed facade alterations.

Overall, the lighting spillage noticed is considered to be minor and acceptable.

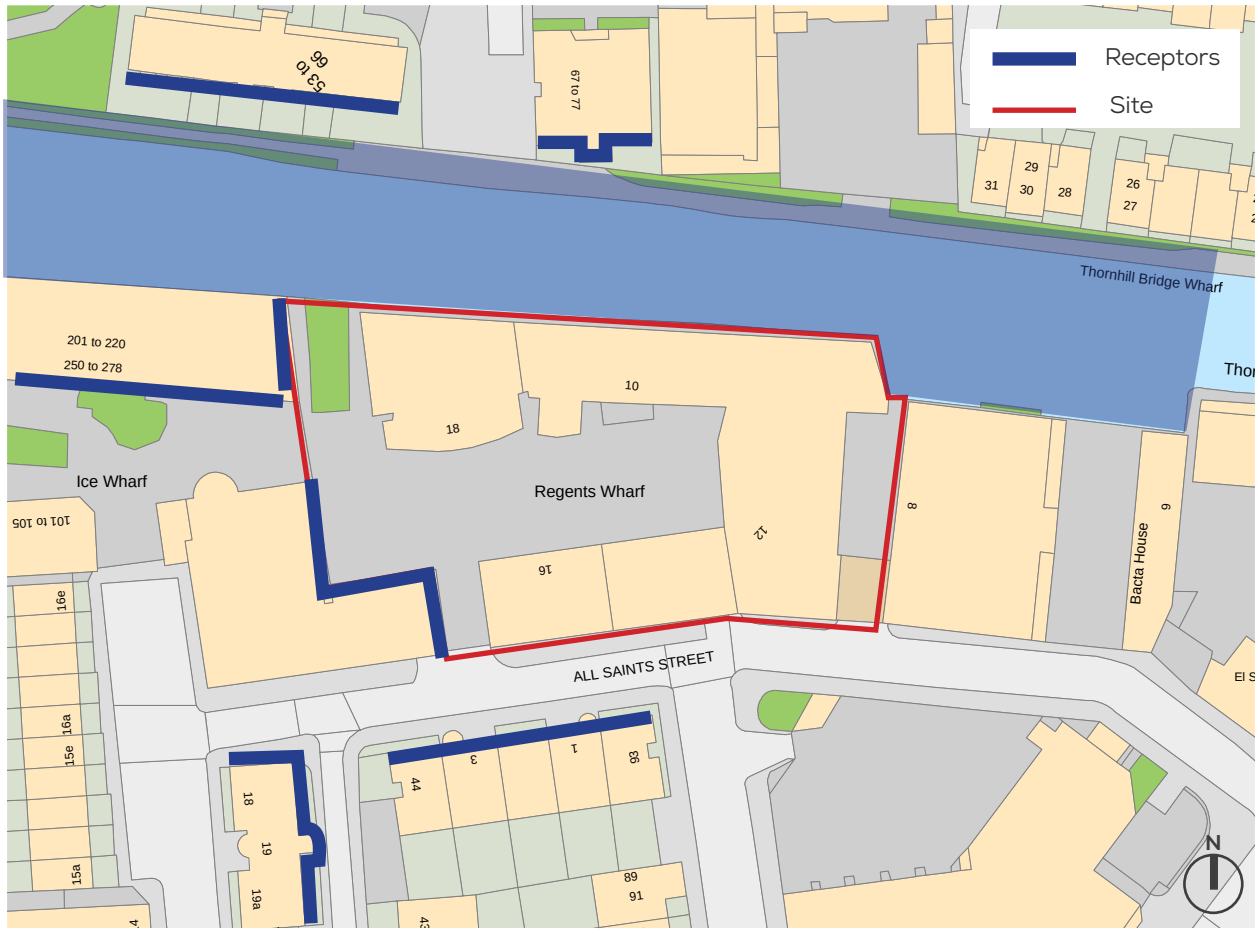


Fig. 02: Site Plan

2 INTRODUCTION AND OBJECTIVE

GIA has been instructed to provide a report upon the potential light intrusion 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 based upon survey.
- Create a 3D model of the Proposed Development suitable for Light intrusion assessments.
- Apply an interior artificial lighting system within the 3D model so the lighting software can accurately simulate the resultant light spillage.
- Carry out a light intrusion assessment to measure the illuminance levels (lux) at sensitive receptors.

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, 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/m^2 (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."

Section 7.61

"Development proposals should begin by understanding their wider context and viewing promotion of nature conservation as integral to the scheme not as an 'add-on'. The indirect impacts of development (eg noise, shading, lighting etc) need to be considered alongside direct impacts (eg habitat loss). New development should improve existing or create new habitats or use design (green roofs, living walls) to enhance biodiversity and provide for its on-going management."

Draft London Plan (2019)

Section 7.6.10

"The night-time economy doesn't only happen inside; many night-time activities make use of outside spaces including the public realm, and enjoying the public spaces of the city at night is an important part of the night-time experience. This requires careful and co-ordinated management between a wide variety of stakeholders, including residents," in order to ensure that the city can be enjoyed at night to its fullest, and that the night-time economy complements rather than conflicts with daytime activities. Impacts such as noise and light pollution on local wildlife and biodiversity should be considered through appropriate location, design and scheduling.

Table 01: Artificial lighting guidance

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/m2]
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, and in accordance with your instructions, 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 Hawkins Brown. 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 where used for the calculation of Light Pollution. These values are shown in table 02.

4.1.1 LIGHT SOURCES

As detailed information about the artificial lighting system were not available, a standard down-lighting system providing an average illuminance level of 500 lux on the working plane has been assumed for the office spaces. For the proposed restaurant facility overlooking the Canal at ground floor we have assumed an illuminance level of 100 lux.

These assumptions are based on a typical Category A office fit-out as per BS EN 12464-1:2002, Table 5.3 -0 Offices. The fittings chosen are circular ceiling-recessed compact fluorescent downlighters.

It is worth noting that occupancy sensors will be installed and therefore, the 500Lux output represents the worst-case condition. Post-curfew levels of potential lighting spillage are likely to reduce significantly.

4.1.2 ENVIRONMENTAL ZONE

The site is located within London's central Zone 1, on the fringe of the Central Activity Zone set out within the London Plan. The Islington Local Plan Policies Map identifies the site as an Employment Growth Area. Furthermore, the site is located in close proximity of King's Cross station and Kings Place, which have a high level of night time activity. The area is therefore considered to be part of Environmental Zone 4 as defined within section 3.1 of this report.

The following limits for obtrusive light are therefore considered.

	pre-	**post-curfew**
sky glow (ULR)	15 %	--
light trespass	25 lux	5 lux
source intensity	25 kcd	2.5 kcd
building luminance	25 cd/m^2	--

Table 02: Typical reflectance, transmittance and maintenance factors

REFLECTANCE VALUES:	
Surrounding	0.2
Pavement	0.2
Grass	0.1
Water	0.1
Yellow brick	0.3
Red brick	0.2
Portland Stone	0.6
Concrete	0.4
Internal walls (light grey)	0.68
Internal ceiling (white paint)	0.85
Internal floor (medium veneer)	0.3
Internal floor (light veneer)	0.4

TRANSMITTANCE VALUES	TV
Triple glazing (Low-E): Pilkington K Glass 4/12/4/12/4 Argon filled 90%	0.63
Double glazing (Low-E): Pilkington K Glass 4/16/4 Argon filled 90%	0.75
Single glazing: Pilkington Optifloat Clear 4mm Annealed	0.90
Translucent glazing (Low-E): Pilkington Optifloat Opal - 4mm K /16/4mm Opal	0.74

MAINTENANCE FACTORS: GLAZING TYPE	TV (Normal)	A.3	A.4	A.5	A.6	TV (Total)
Triple Low-E (frames modelled)	0.63	8	1	1	1	0.58
Triple Low-E (frames not modelled)	0.63	8	1	1	0.8	0.46
Triple Low-E (inclined, frames modelled)	0.63	8	2	1	1	0.53
Triple Low-E (inclined, frames not modelled)	0.63	8	2	1	0.8	0.42
Triple Low-E (horizontal, frames modelled)	0.63	8	3	1	1	0.48
Triple Low-E (horizontal, frames not modelled)	0.63	8	3	1	0.8	0.38
Double Low-E (frames modelled)	0.75	8	1	1	1	0.69
Double Low-E (frames not modelled)	0.75	8	1	1	0.8	0.55
Double Low-E (inclined, frames modelled)	0.75	8	2	1	1	0.63
Double Low-E (inclined, frames not modelled)	0.75	8	2	1	0.8	0.50
Double Low-E (horizontal, frames modelled)	0.75	8	3	1	1	0.57
Double Low-E (horizontal, frames not modelled)	0.75	8	3	1	0.8	0.46
Single (frames modelled)	0.9	8	1	1	1	0.83
Single (frames not modelled)	0.9	8	1	1	0.8	0.66
Single (inclined, frames modelled)	0.9	8	2	1	1	0.76
Single (inclined, frames not modelled)	0.9	8	2	1	0.8	0.60
Single (horizontal, frames modelled)	0.9	8	3	1	1	0.68
Single (horizontal, frames not modelled)	0.9	8	3	1	0.8	0.55
Double Translucent Low-E (frames modelled)	0.74	8	1	1	1	0.68
Double Translucent Low-E (frames not modelled)	0.74	8	1	1	0.8	0.54
Double Translucent Low-E (inclined, frames modelled)	0.74	8	2	1	1	0.62
Double Translucent Low-E (inclined, frames not modelled)	0.74	8	2	1	0.8	0.50
Double Translucent Low-E (horizontal, frames modelled)	0.74	8	3	1	1	0.56
Double Translucent Low-E (horizontal, frames not modelled)	0.74	8	3	1	0.8	0.45

5 CONCLUSION

The purpose of this report is to comment upon the levels of light pollution caused by the commercial elements within the proposed redevelopment at 10-18 All Saints Street. The proposed design has been amended as part of a new planning submission and incorporates façade alterations in order to minimise any light pollution effect as described in the latest assessment undertaken in October 2017.

This assessment aims to determine the levels of obtrusive light caused by the interior light fittings of the Proposed Development onto the relevant residential receptors. These are:

- Ice Wharf North;
- Ice Wharf South;
- 1-3 All Saints Street;
- 18-19A Lavina Grove;
- 53-66 Treaty Street;
- 67-77 Treaty Street;
- Copenhagen Primary School;
- Regent's Canal.

5.1 CONCLUSIONS ON LIGHT INTRUSION

As discussed within the methodology section, this light pollution assessment has been undertaken with a standard down-lighting system providing an illuminance level of 500 lux on the working plane for the office spaces. For the proposed restaurant facility overlooking the Canal at ground floor an illuminance level of 100 lux has assumed. (BS EN 12464-1:2002)

This illustrates a worst-case condition in terms of the potential light intrusion and, in reality, fewer floors would be fully lit post-curfew (after 11pm), as occupancy sensors will be installed.

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

Post-curfew levels of light spillage above those recommended by the Institute of Lighting Professionals (ILP) can be seen on some isolated parts of a few windows within 1-3 All Saints Street and on small portions of the Regent's Canal with the lighting system at its maximum output (500 Lux).

However, the illuminance levels on the northern shore of the canal and on the pathway will be in line with the post-curfew recommendation. The light spillage within the Regent's Canal area is limited to the water surface immediately adjacent to the proposed scheme, where such effects are expected and is considered to be acceptable.

In addition to this, such levels of light spillage are unlikely to occur post-curfew, given the inclusion of occupancy sensors which reduce the lighting output.

Another aspect to be noted is that the proposed building use is the same as the current office building (Figures 3 to 5) and therefore potential lighting spillage along the canal and towards other neighbours is unlikely to increase significantly.

In comparison to the previous scheme, there are significant improvements on the levels of light spillage. This is owing to the facade alterations which sought to minimise any potential light pollution. For easy of reference, the previous assessments have been appended to the end of this report.

Overall, the results show that the proposed lighting system being installed is unlikely to give rise to any significant issue of light pollution whether pre or post curfew on the neighbouring residential receptors.

Fig. 03: Existing light condition on Regent's Canal looking East

Fig. 04: Existing light condition on Regent's Canal looking West

Fig. 05: Existing light condition in central yard

6 LIGHT POLLUTION ASSESSMENTS

LIGHT TRESPASS ASSESSMENT
ICE WHARF: PRE CURFEW

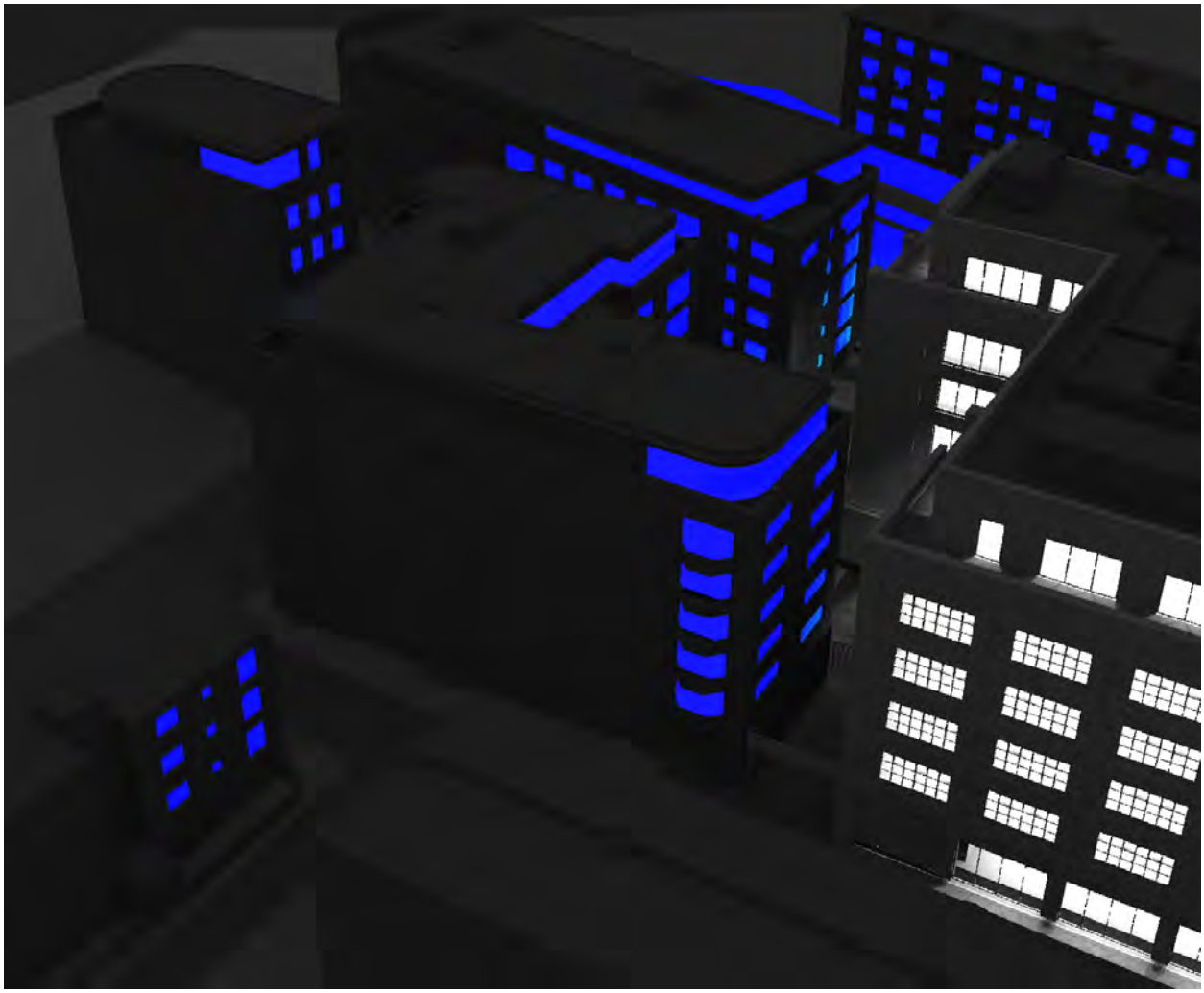
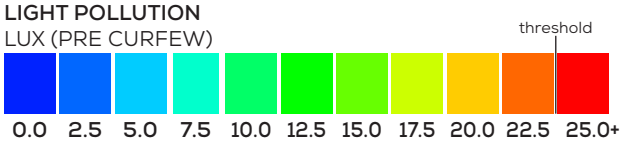


Fig. 06: Light Trespass Assessment - Pre Curfew



LIGHT TRESPASS ASSESSMENT
ICE WHARF: POST CURFEW

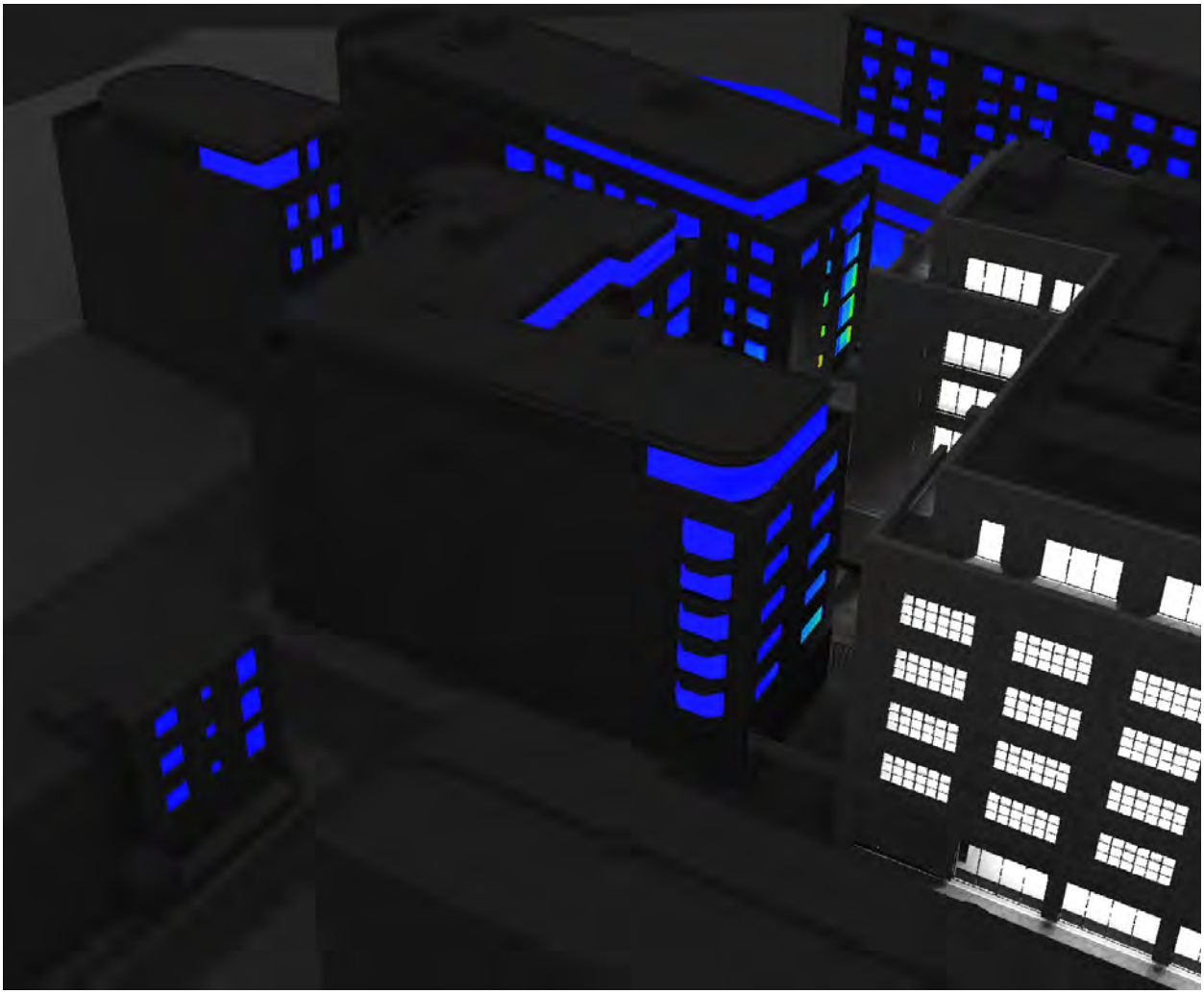
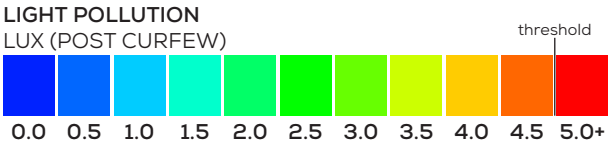
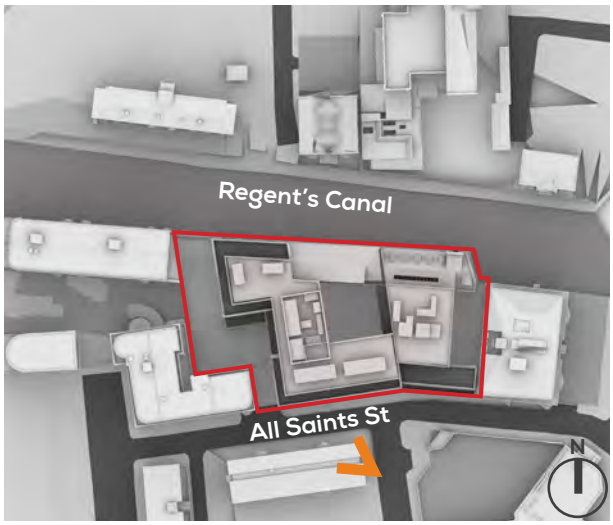


Fig. 07: Light Trespass Assessment - Post Curfew





LIGHT TRESPASS ASSESSMENT
ICE WHARF: PRE CURFEW

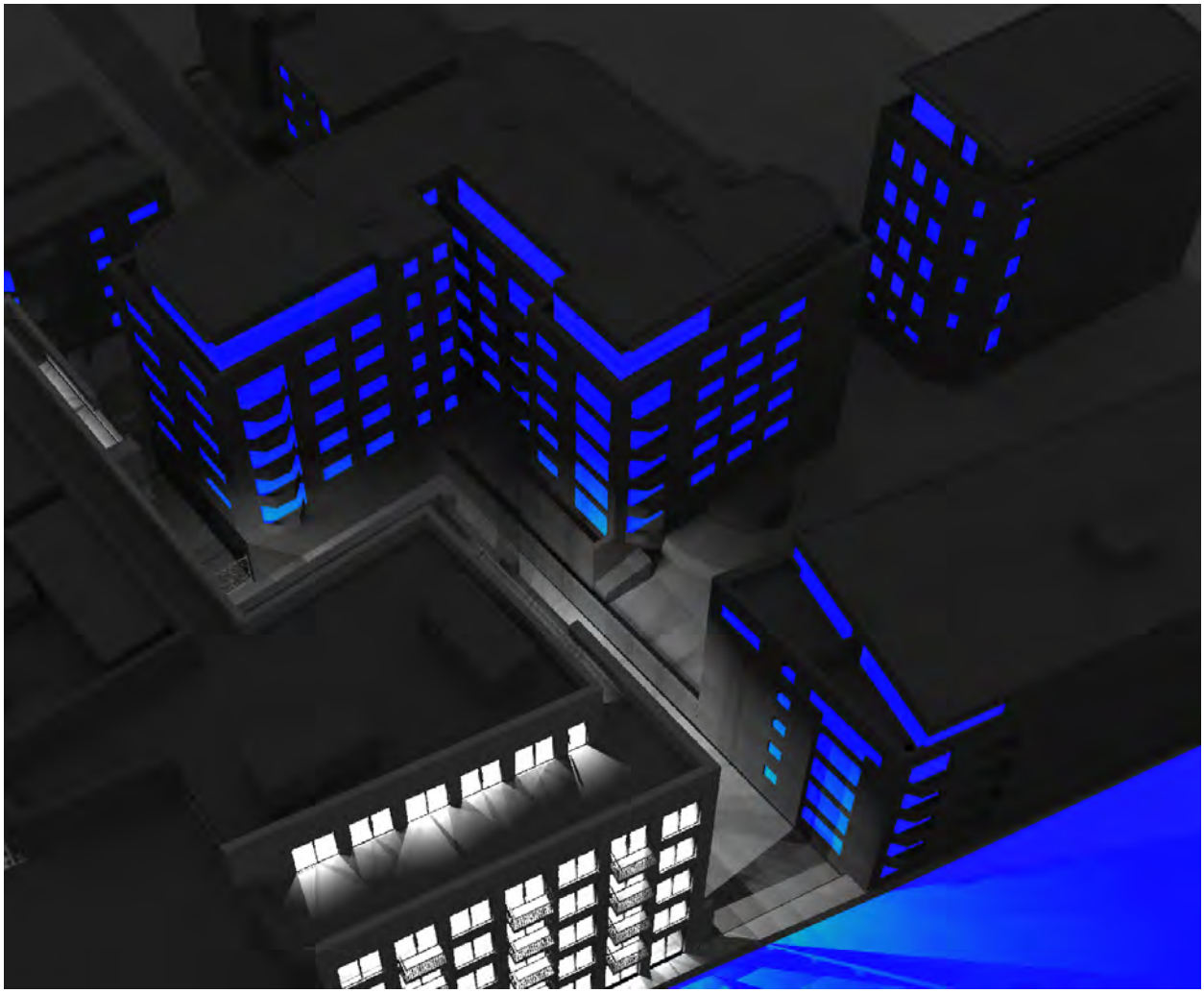
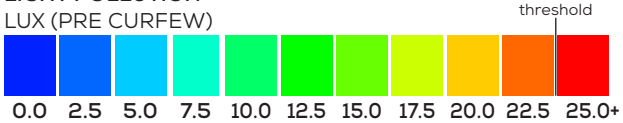


Fig. 08: Light Trespass Assessment - Pre Curfew

LIGHT POLLUTION
LUX (PRE CURFEW)



LIGHT TRESPASS ASSESSMENT
ICE WHARF: POST CURFEW

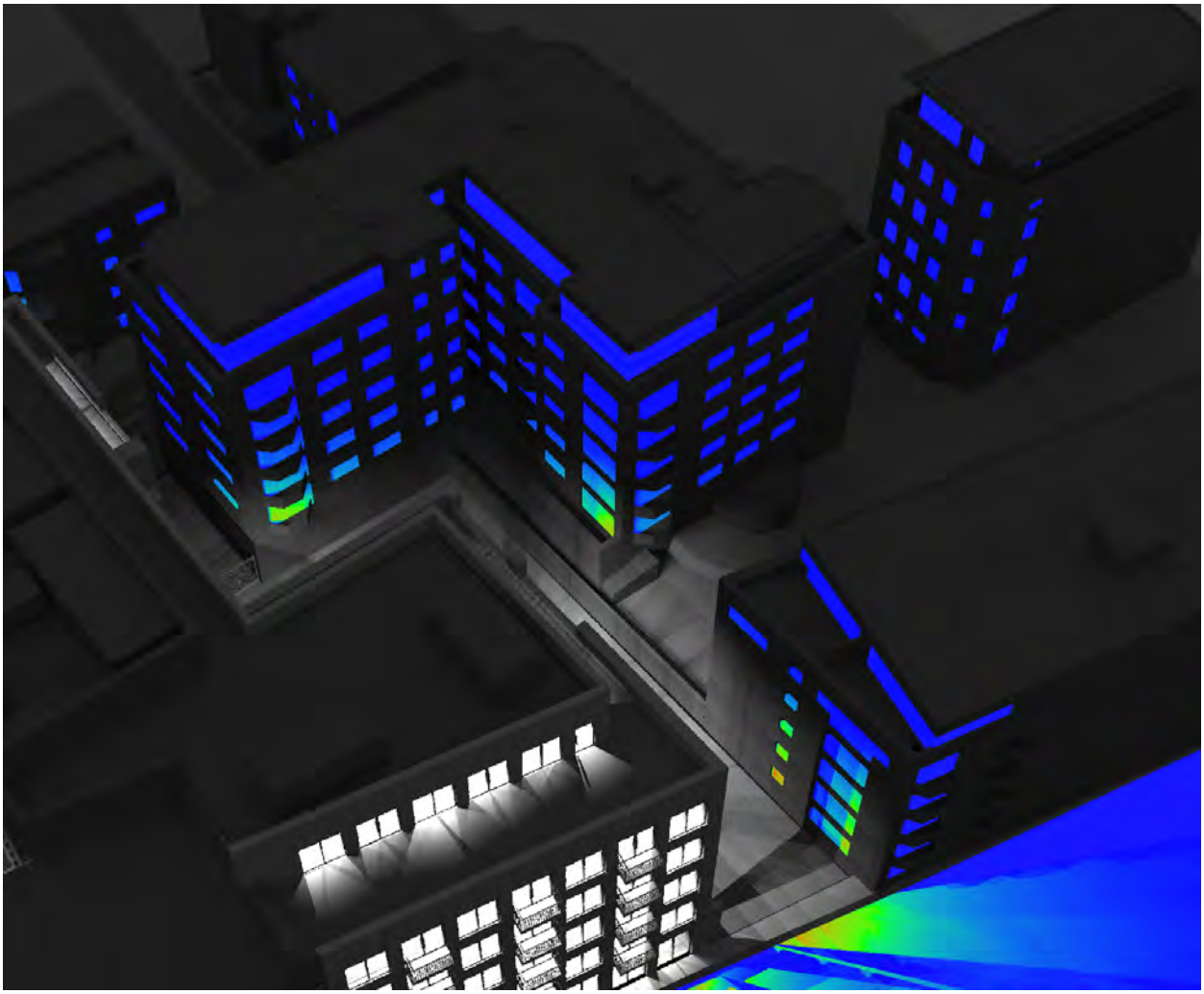
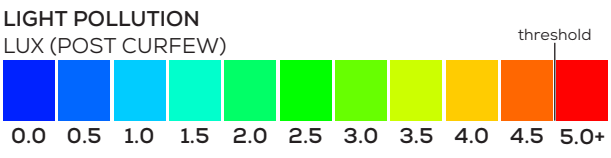
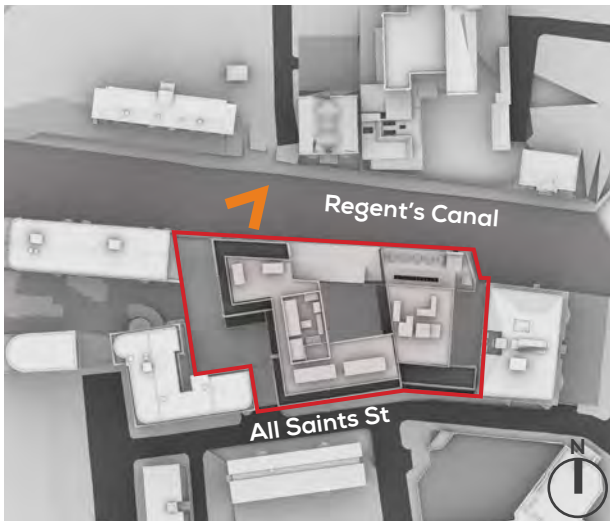


Fig. 09: Light Trespass Assessment - Post Curfew





LIGHT TRESPASS ASSESSMENT
ICE WHARF: PRE CURFEW

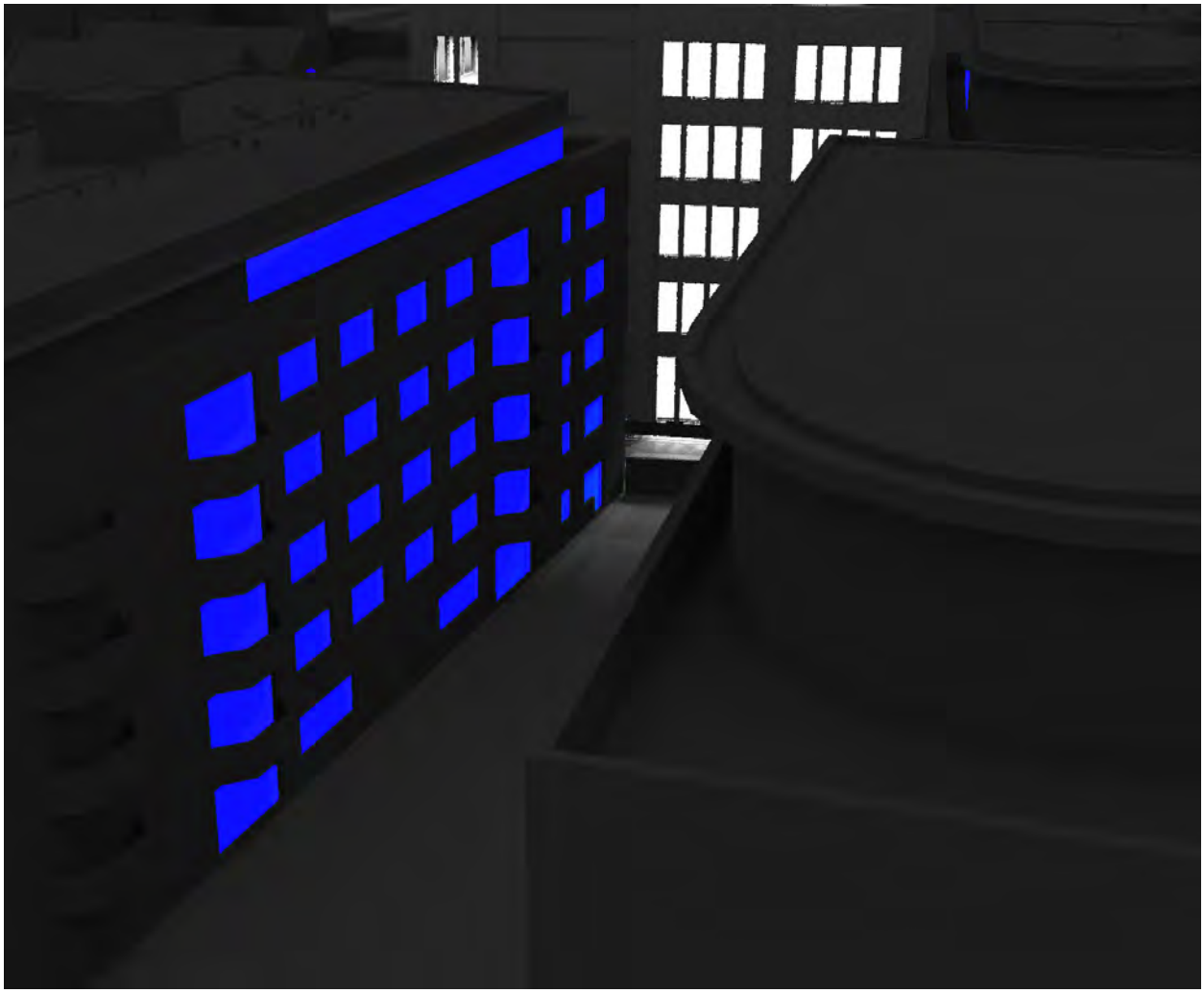
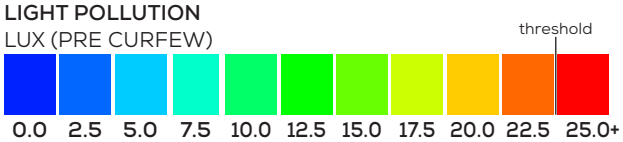


Fig. 10: Light Trespass Assessment - Pre Curfew



LIGHT TRESPASS ASSESSMENT
ICE WHARF: POST CURFEW

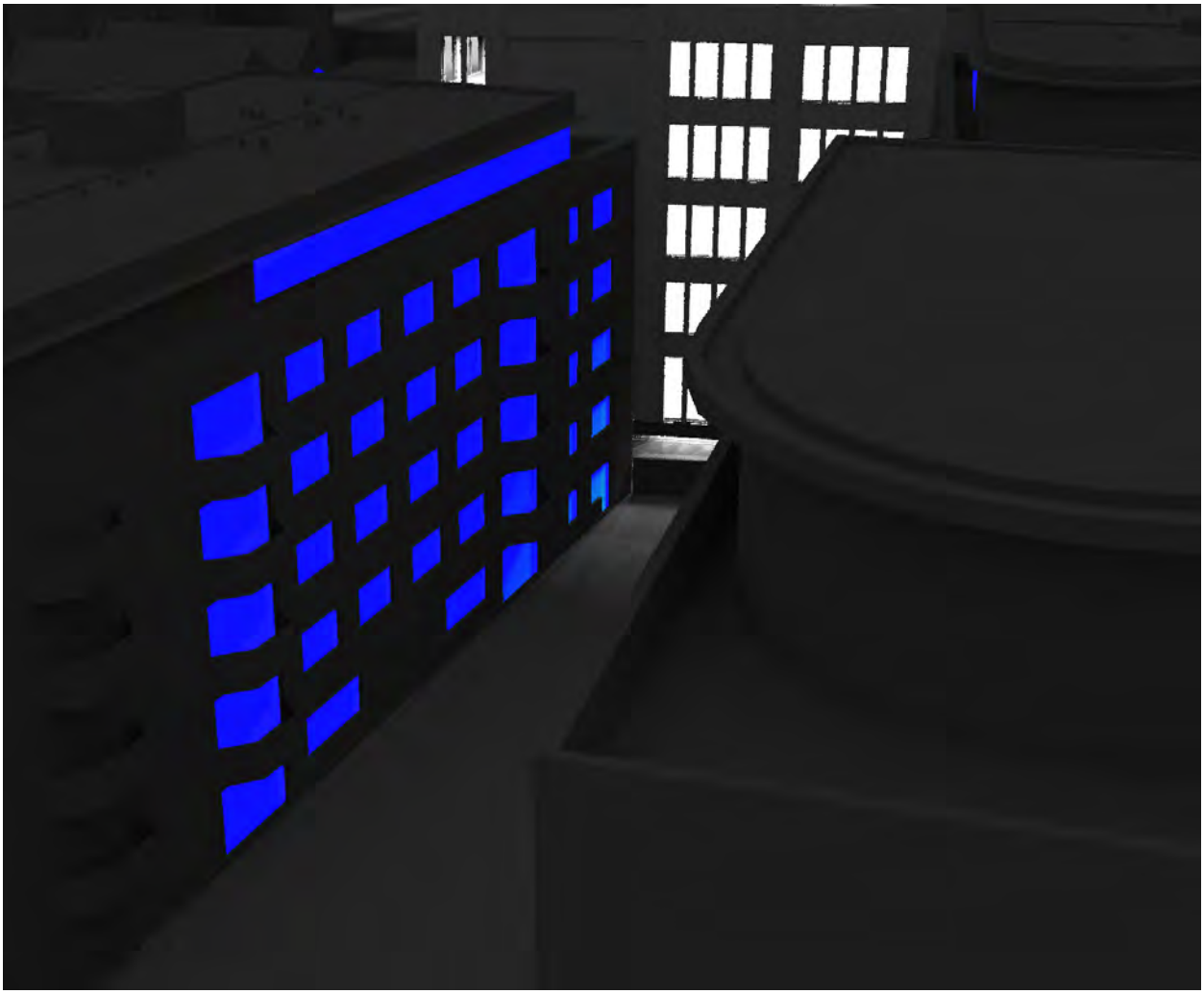
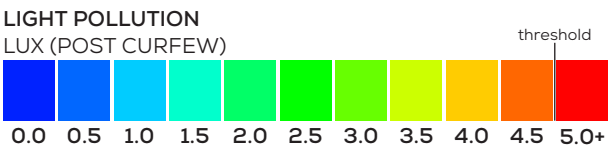
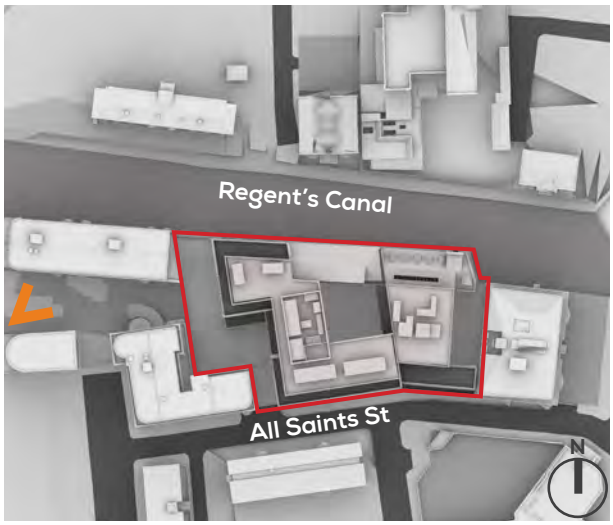


Fig. 11: Light Trespass Assessment - Post Curfew





LIGHT TRESPASS ASSESSMENT
ALL SAINTS ROAD: PRE CURFEW

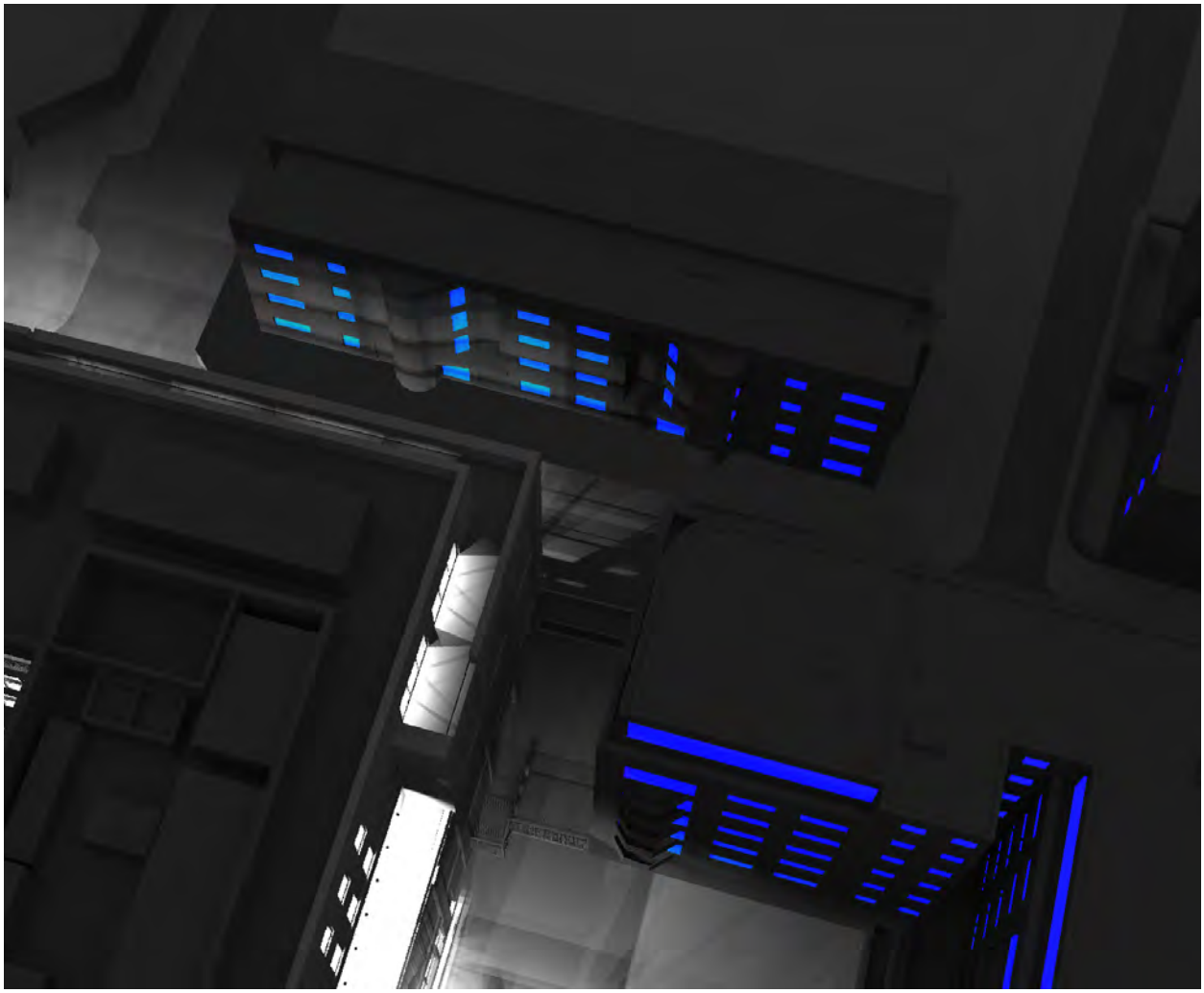
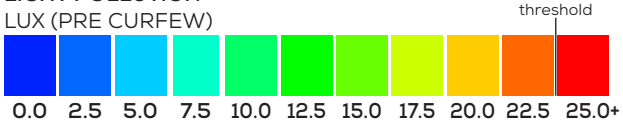


Fig. 12: Light Trespass Assessment - Pre Curfew

LIGHT POLLUTION
LUX (PRE CURFEW)



LIGHT TRESPASS ASSESSMENT
ALL SAINTS ROAD: POST CURFEW

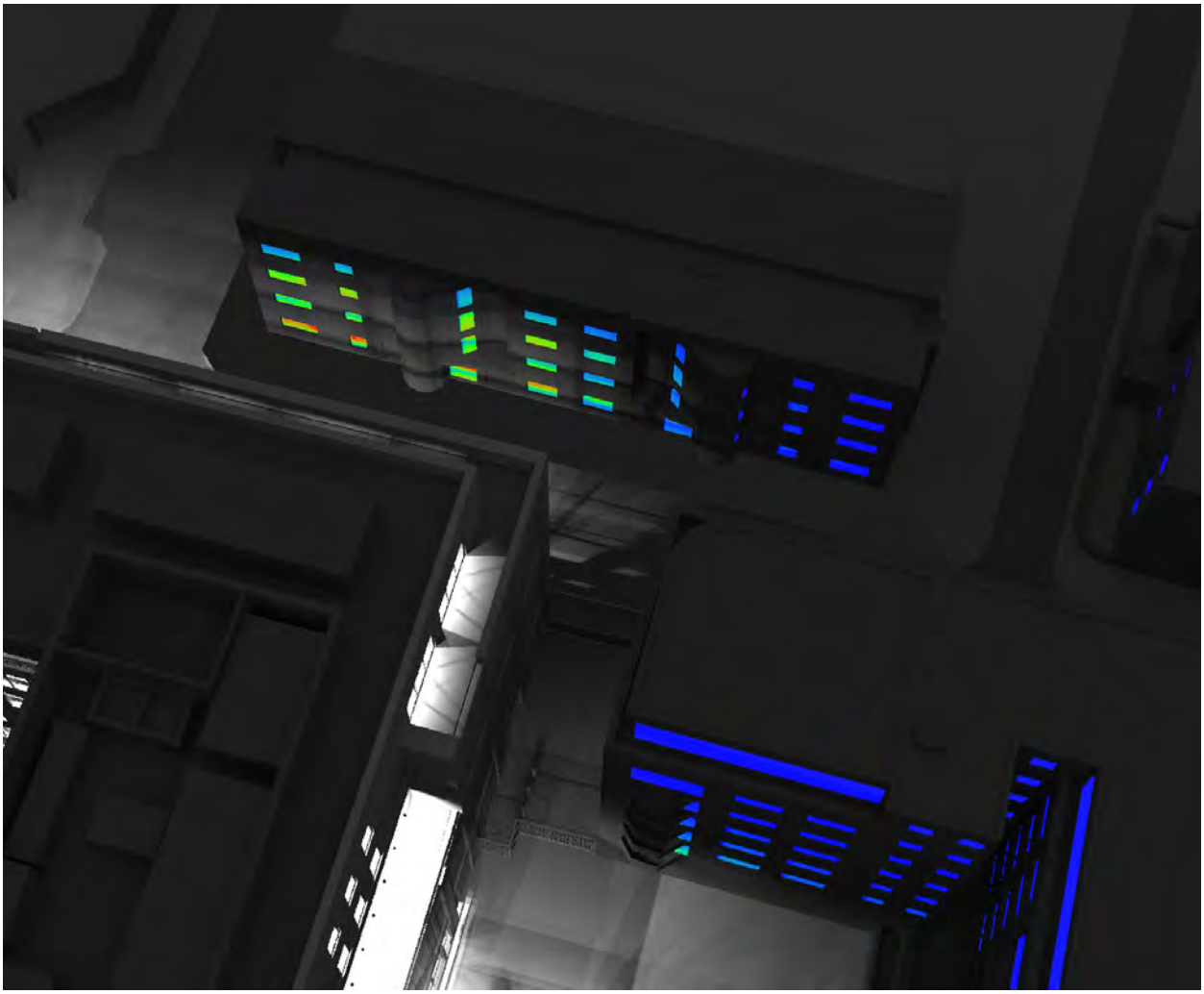
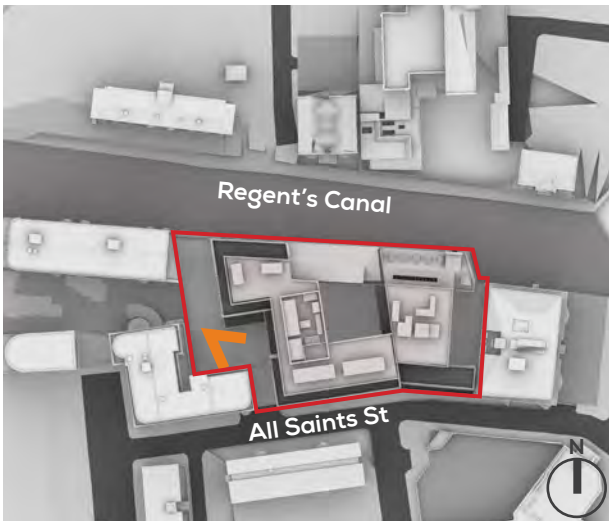
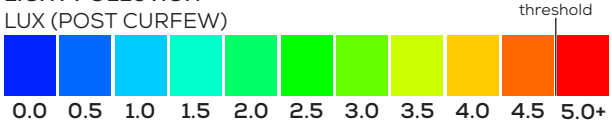


Fig. 13: Light Trespass Assessment - Post Curfew



LIGHT POLLUTION
LUX (POST CURFEW)



LIGHT TRESPASS ASSESSMENT
53-66 TREATY STREET: PRE CURFEW

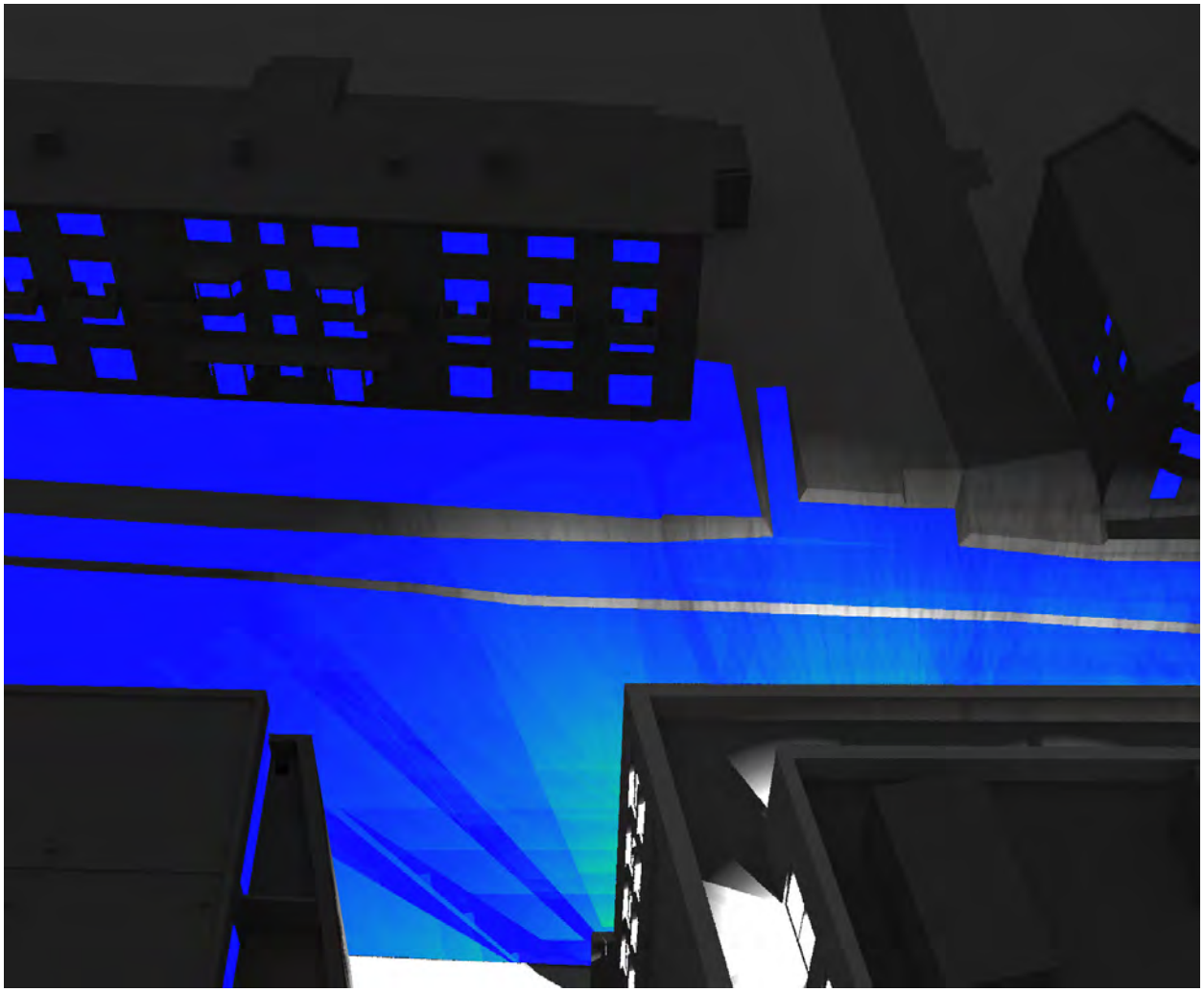
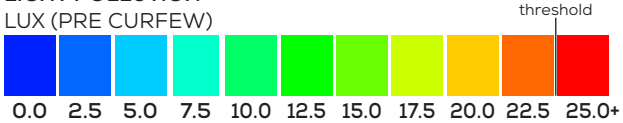


Fig. 14: Light Trespass Assessment - Pre Curfew

LIGHT POLLUTION
LUX (PRE CURFEW)



LIGHT TRESPASS ASSESSMENT
53-66 TREATY STREET: POST CURFEW

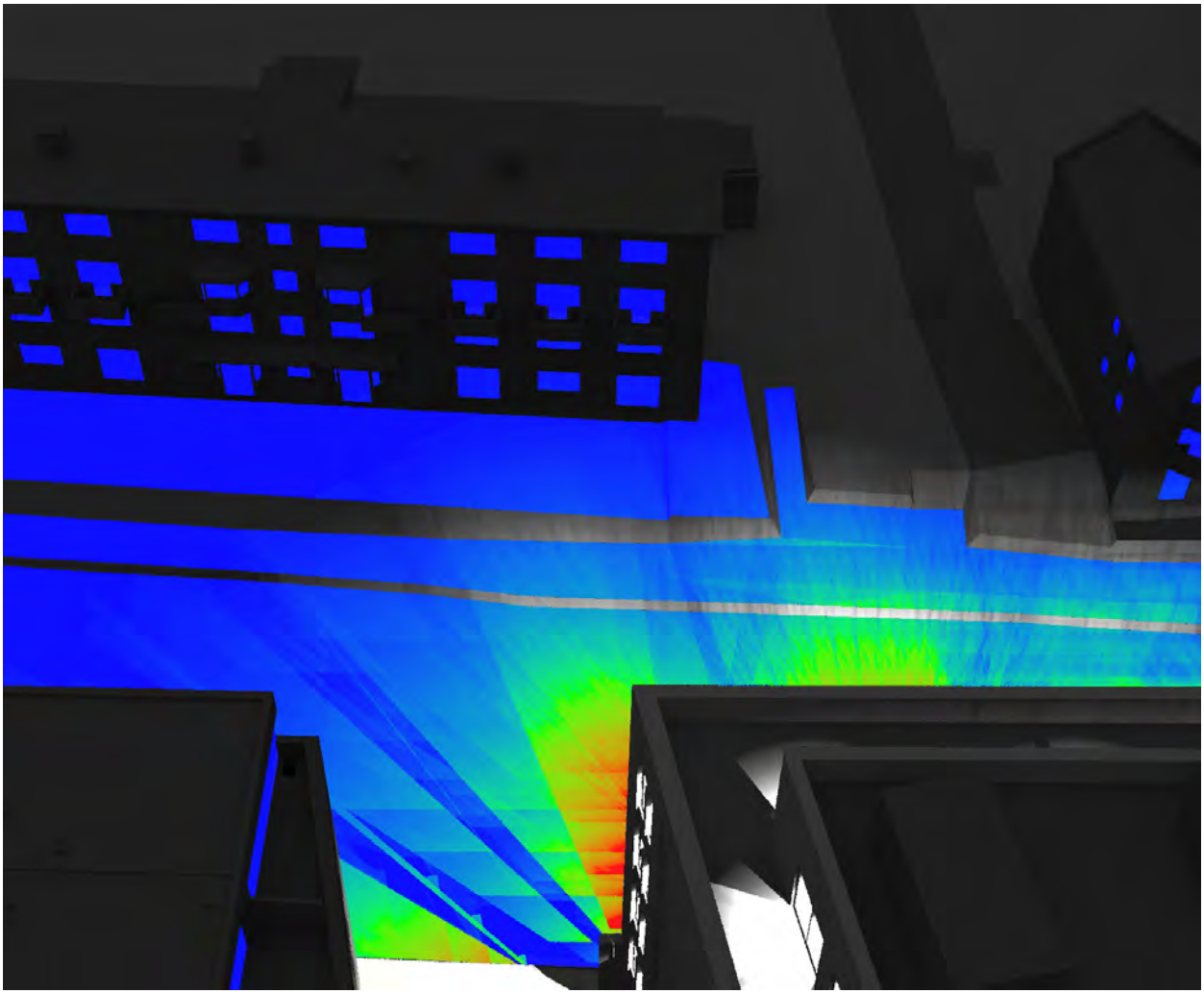
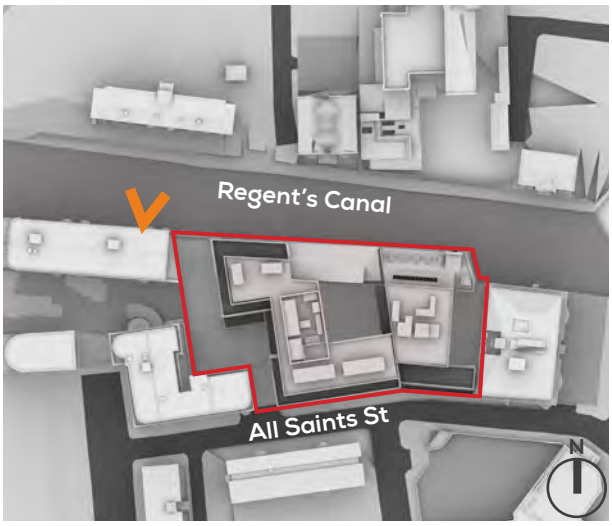
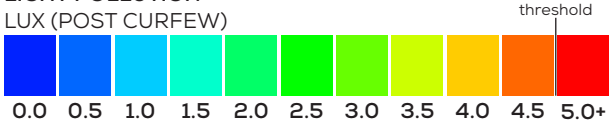


Fig. 15: Light Trespass Assessment - Post Curfew



LIGHT POLLUTION
LUX (POST CURFEW)



LIGHT TRESPASS ASSESSMENT

67-77 TREATY STREET AND COPENHAGEN PRIMARY SCHOOL: PRE CURFEW

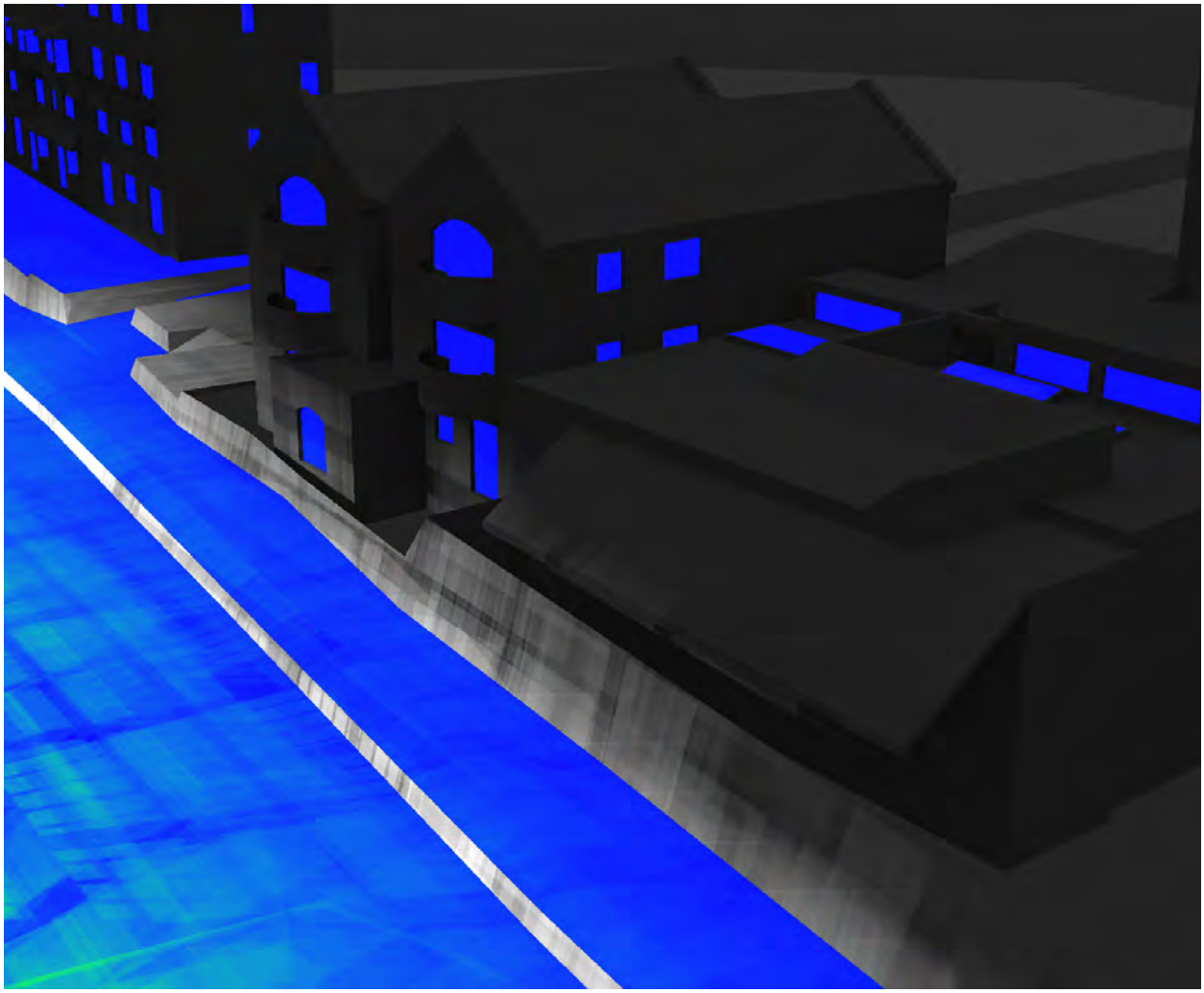
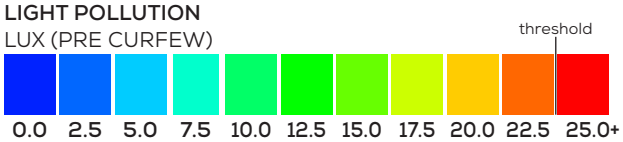


Fig. 16: Light Trespass Assessment - Pre Curfew



LIGHT TRESPASS ASSESSMENT

67-77 TREATY STREET AND COPENHAGEN PRIMARY SCHOOL: POST CURFEW

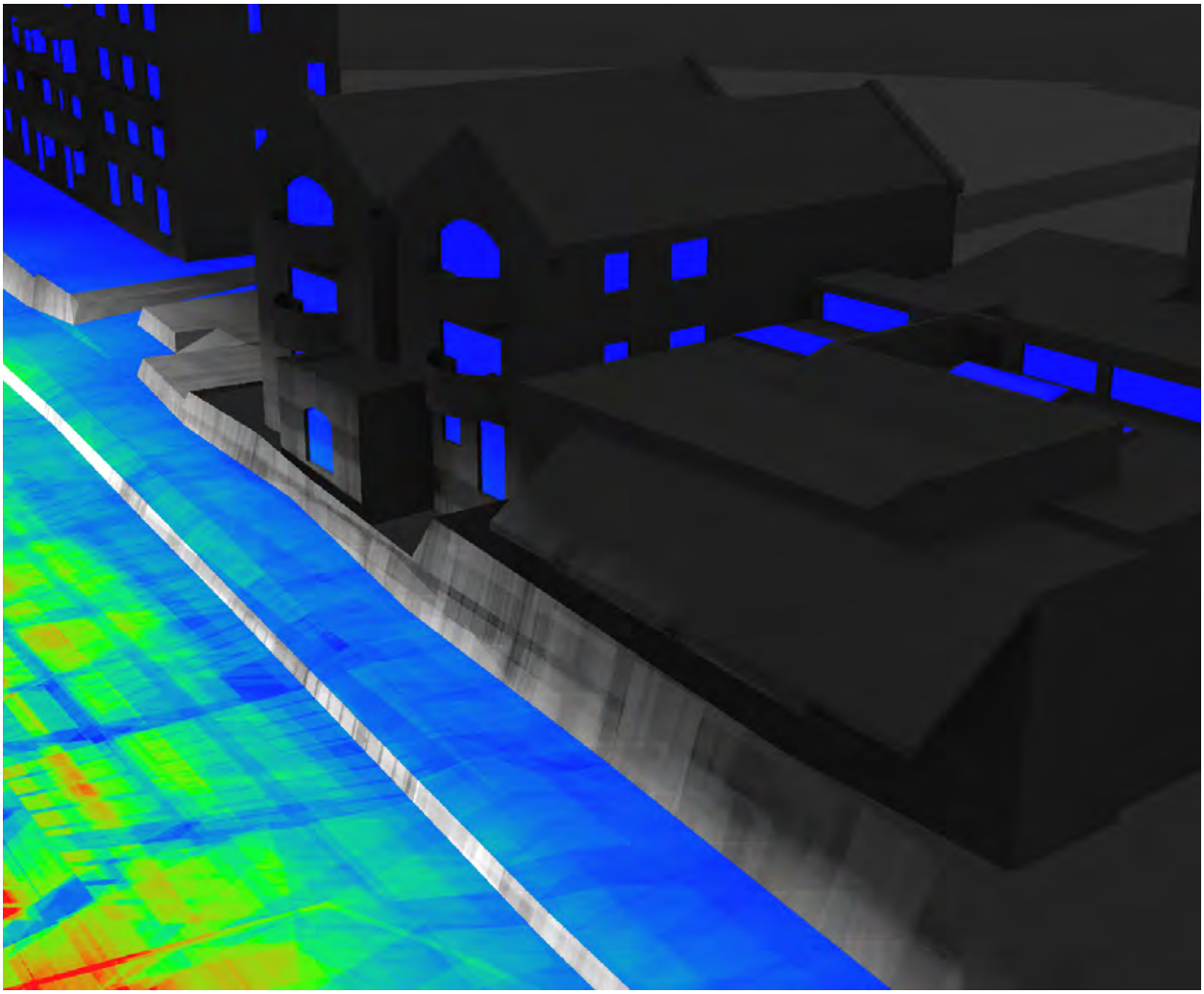
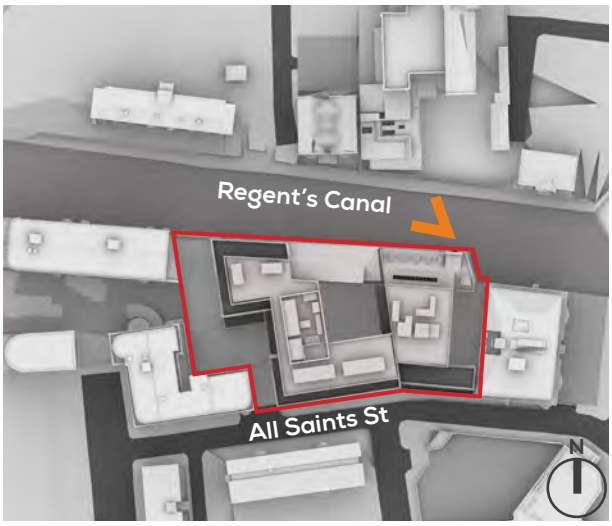
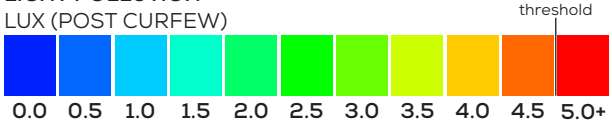


Fig. 17: Light Trespass Assessment - Post Curfew



LIGHT POLLUTION

LUX (POST CURFEW)



LIGHT TRESPASS ASSESSMENT
67-77 TREATY STREET: PRE CURFEW

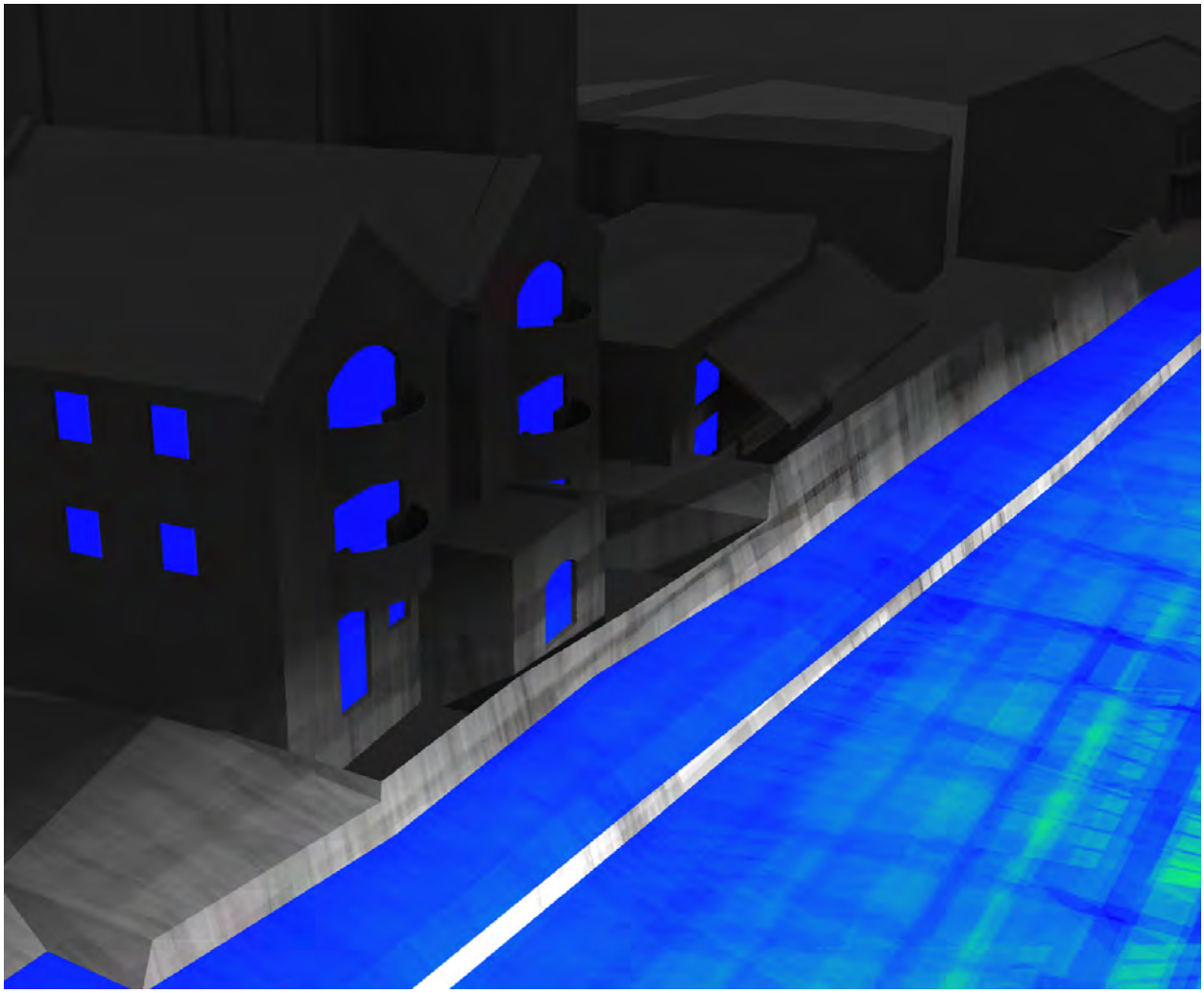
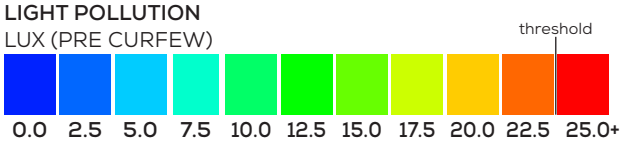


Fig. 18: Light Trespass Assessment - Pre Curfew



LIGHT TRESPASS ASSESSMENT
67-77 TREATY STREET: POST CURFEW

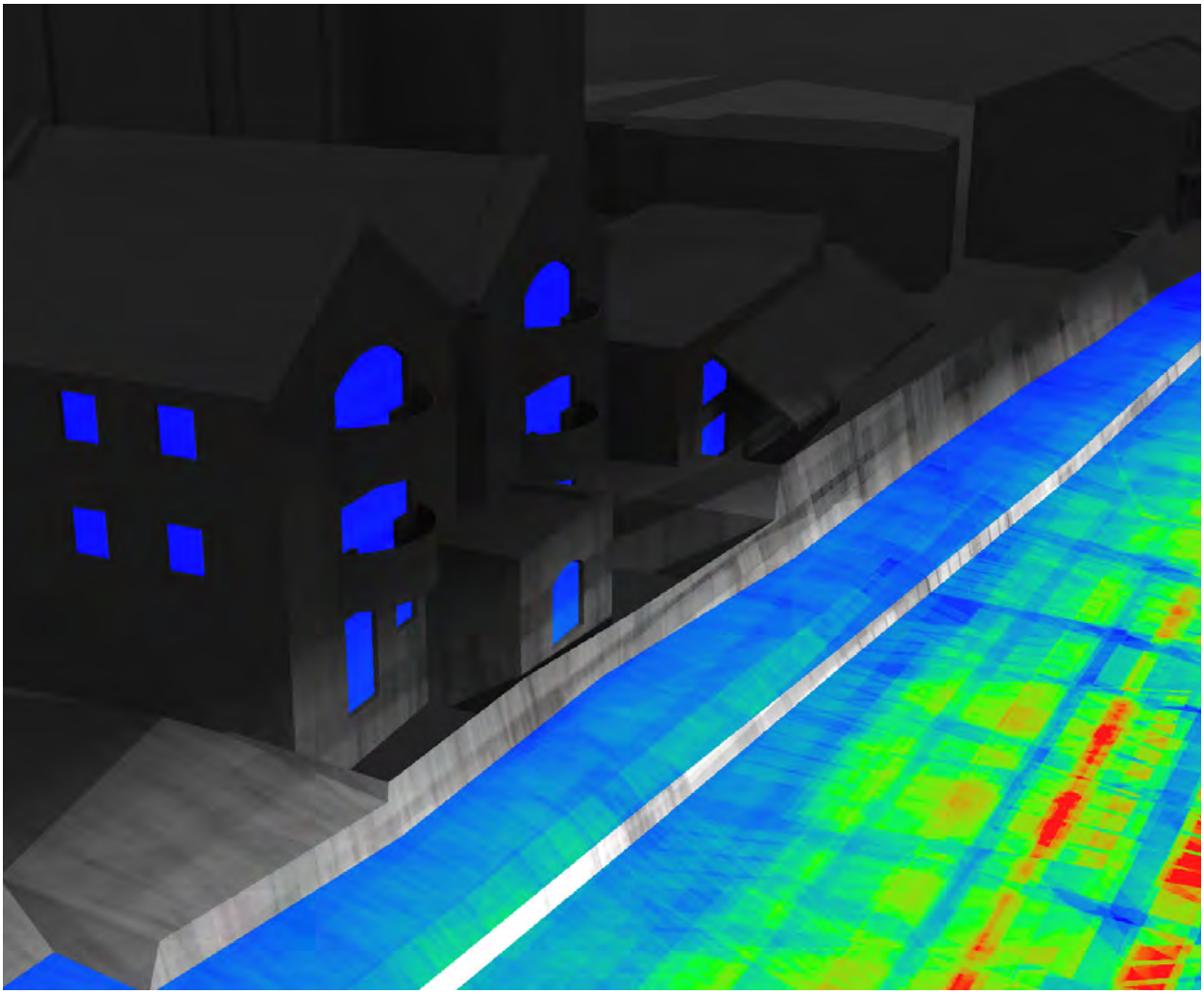
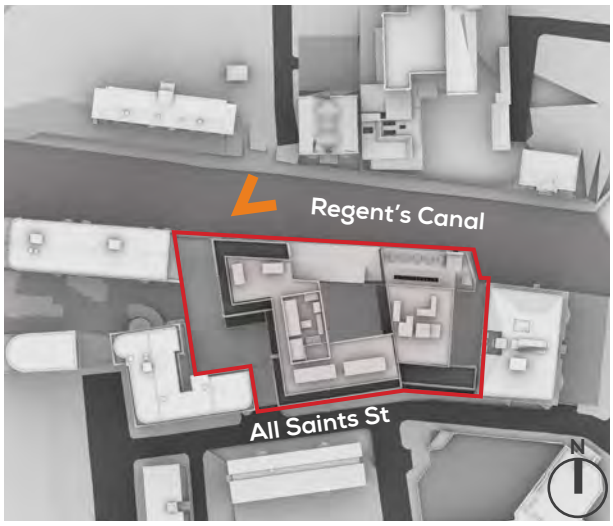
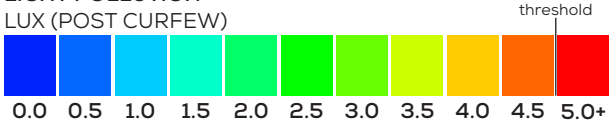


Fig. 19: Light Trespass Assessment - Post Curfew



LIGHT POLLUTION
LUX (POST CURFEW)



LIGHT TRESPASS ASSESSMENT
REGENT'S CANAL: PRE CURFEW

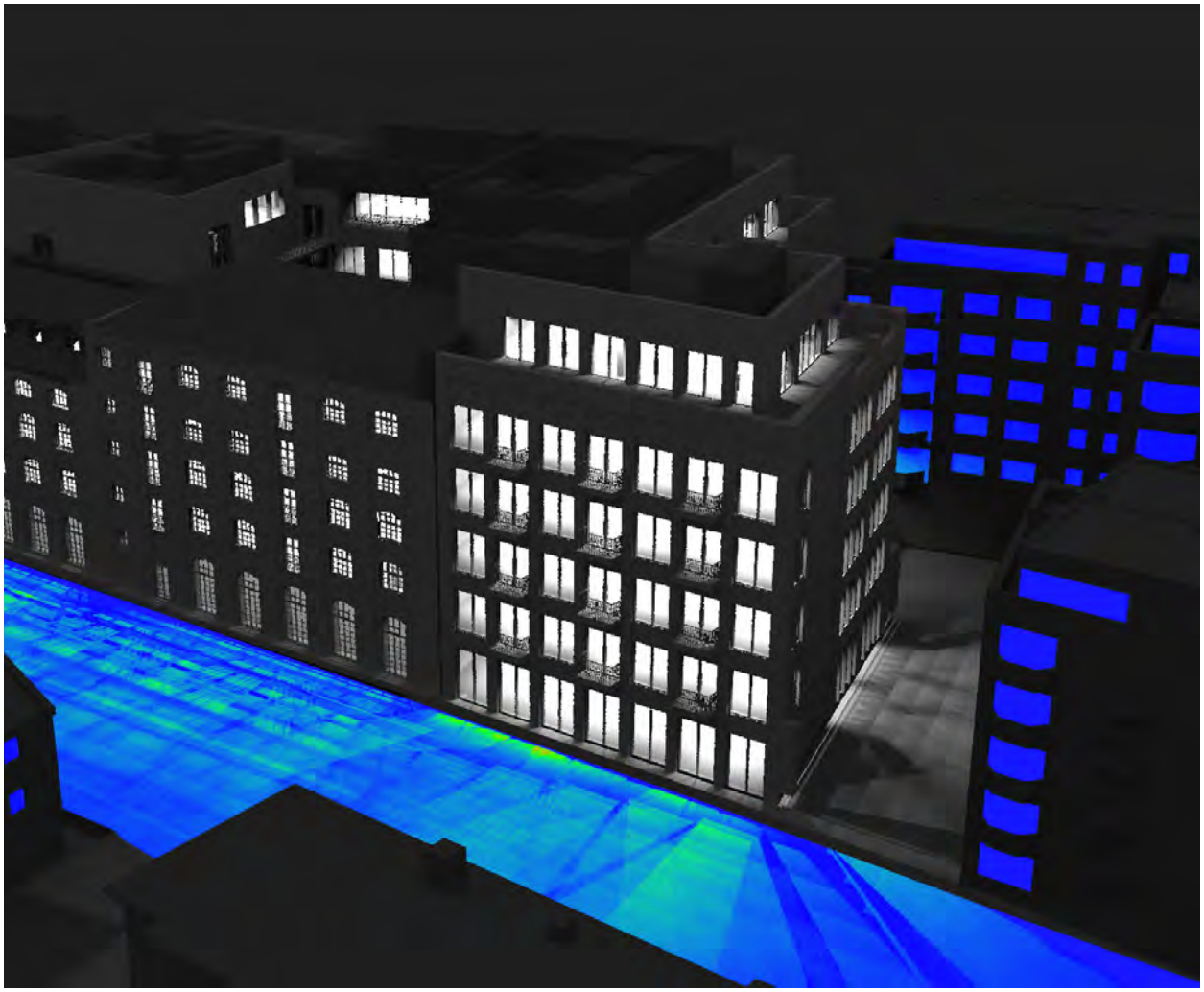
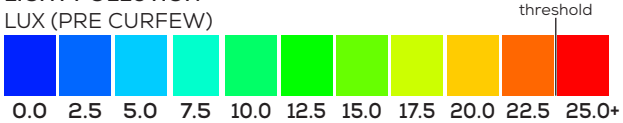


Fig. 20: Light Trespass Assessment - Pre Curfew

LIGHT POLLUTION
LUX (PRE CURFEW)



LIGHT TRESPASS ASSESSMENT
REGENT'S CANAL: POST CURFEW

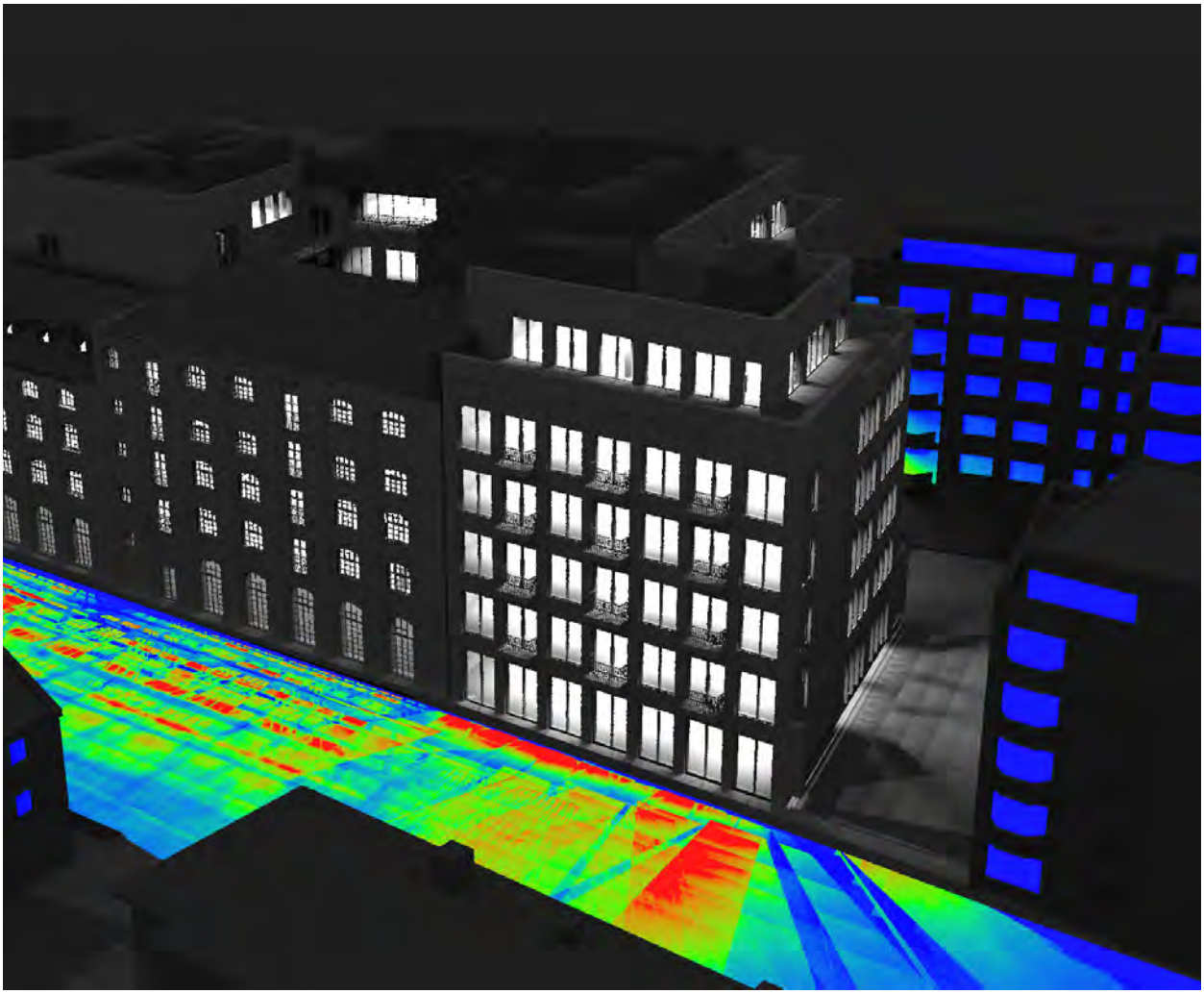
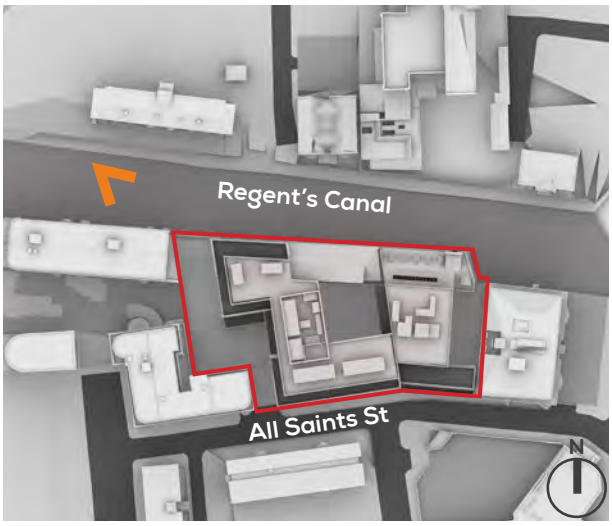
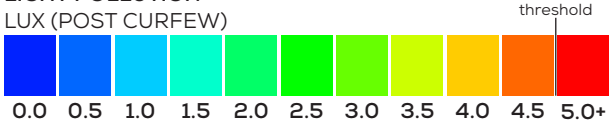


Fig. 21: Light Trespass Assessment - Post Curfew



LIGHT POLLUTION
LUX (POST CURFEW)



LIGHT TRESPASS ASSESSMENT
REGENT'S CANAL: PRE CURFEW

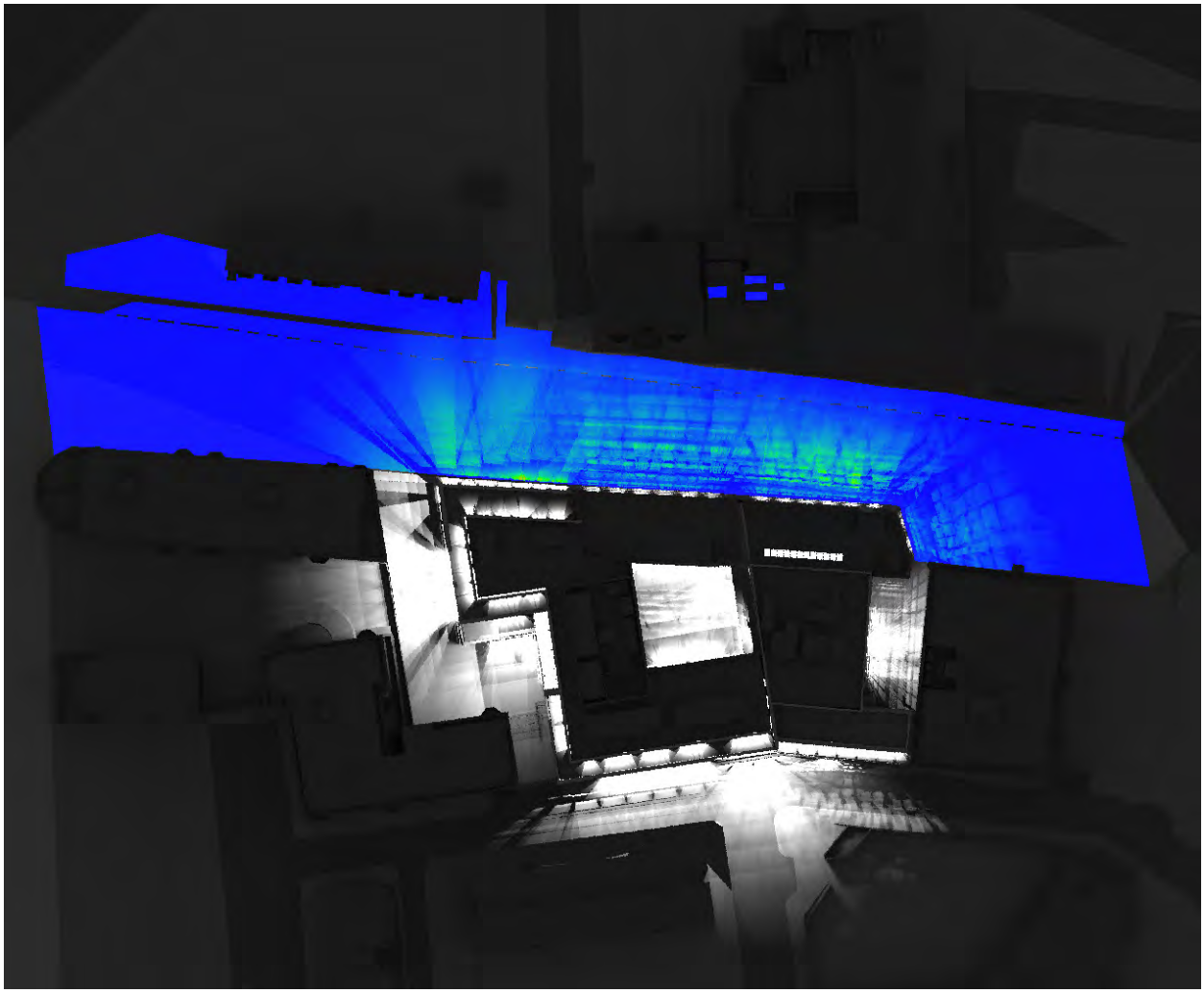
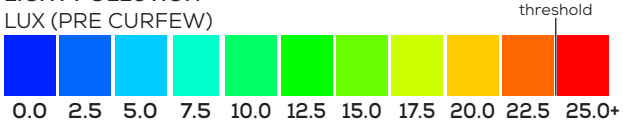


Fig. 22: Light Trespass Assessment - Pre Curfew

LIGHT POLLUTION
LUX (PRE CURFEW)



LIGHT TRESPASS ASSESSMENT
REGENT'S CANAL: POST CURFEW

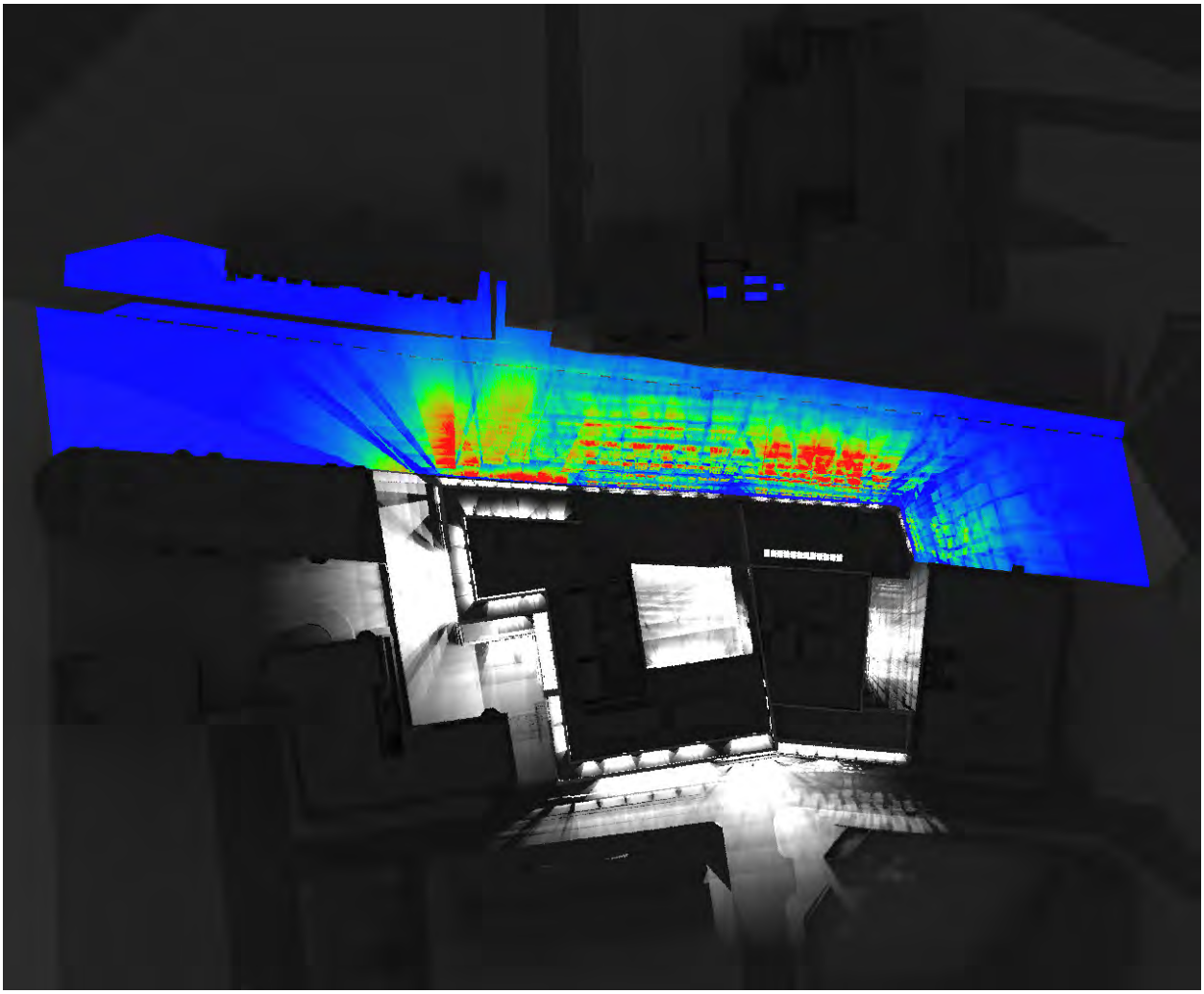
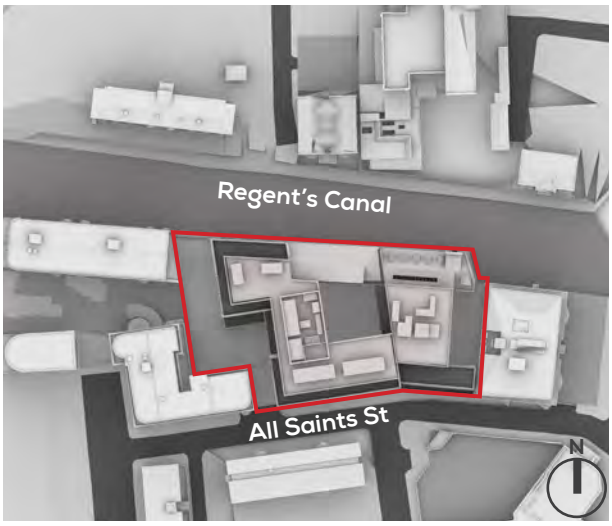
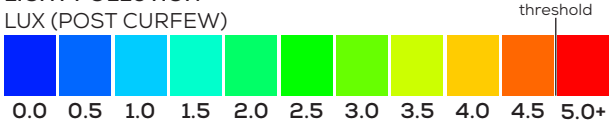


Fig. 23: Light Trespass Assessment - Post Curfew



LIGHT POLLUTION
LUX (POST CURFEW)



For further details please contact us on:

gia

LONDON

T 020 7202 1400
E mail@gia.uk.com

THE WHITEHOUSE
BELVEDERE ROAD
LONDON SE1 8GA

MANCHESTER

T 0161 672 5100
E manchester@gia.uk.com

2 COMMERCIAL STREET
MANCHESTER
M15 4RQ

BELFAST

T 02892 449 674
E belfast@gia.uk.com

RIVER HOUSE
48-60 HIGH STREET
BELFAST BT1 2BE

Regents Wharf, N1
Light Pollution Assessment

26.10.17

gia

Client	Grafton Advisors
Architect	Hawkins Brown
Project Title	Regent's Wharf
Project Number	9771
Report Title	Light Pollution Assessment
Dated	27 October 2017

Prepared by	GL
Checked by	ML
Type	

Revisions		Date:	Notes:	Signed:
	A	26/10/17	Grafton Advisors Comments	ML
	B	27/10/17	Grafton Advisors/DP9 Comments	ML

1. INTRODUCTION AND OBJECTIVE

GIA has been instructed to provide a report upon the potential light intrusion as a result of the proposed Regent's Wharf 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 based upon survey.
- Create a 3D model of the Proposed Development suitable for Light intrusion assessments.
- Apply an interior artificial lighting system within the 3D model so the lighting software can accurately simulate the resultant light spillage.
- Carry out a light intrusion assessment to measure the illuminance levels (lux) at sensitive receptors.

2. POLICIES, GUIDANCE, LEGISLATION AND STANDARD

2.1. NATIONAL POLICY AND GUIDANCE

2.1.1. 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".

2.1.2. GUIDANCE NOTES FOR THE REDUCTION OF OBTRUSIVE LIGHT, ILP (2011)

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

E0: Dark landscapes (UNESCO starlight reserves)

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)

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.

Potential light pollution impacts are typically tested in relation to four specific assessments:

- 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 below 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 (E_v) 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/Luminaire 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 luminaire 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/m^2 (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.

2.1.3. 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.

2.1.4. NATIONAL PLANNING POLICY FRAMEWORK 2012

The National Planning Policy Framework stipulates that:

"By encouraging good design, planning policies and decisions should limit the impact of light pollution from artificial light on local amenity..."

2.2. REGIONAL POLICY AND GUIDANCE

2.2.1. THE LONDON PLAN (2015)

Paragraph 7.19 states:

"The lighting of the public realm also needs careful consideration to ensure places and spaces are appropriately lit, and there is an appropriate balance between issues of safety and security, and reducing light pollution."

Environmental Zone	Sky Glow ULR [Max %][1]	Light Intrusion (into Windows) E_v [lux] [2]		Luminaire Intensity I [candelas] [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	0 (1*)	2,500	0	0
E2	2.5	5	1	7,500	500	5
E3	5.0	10	2	10,000	1,000	10
E4	15	25	5	25,000	2,500	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 23:00 is suggested.

*: From Public road lighting installations only

3. METHODOLOGY

In order to undertake the light pollution assessments set out above, and in accordance with your instructions, we have prepared a 3D computer model based upon the drawings provided to us by the architects. This has been placed in the context of its surrounding buildings which have been modelled from survey. This allows for a precise model, which in turn ensures that the analysis accurately represents the levels of light pollution.

In addition to the windows of the residential properties surrounding the site, the Regent's Canal and the adjacent paths have also been assessed for Light intrusion.

3.1. 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 where used for the calculation of Light Pollution levels:

3.1.1. REFLECTANCE VALUES

Surrounding walls	0.2
Pavement	0.2
Internal walls	0.65
Internal ceiling	0.85
Internal floor	0.3

3.1.2.TRANSMITTANCE VALUES

Double glazing:	0.75
Framing factor:	0.8

3.1.3.LIGHT SOURCES

As detailed information about the artificial lighting system were not available, a standard down-lighting system providing an illuminance level of 400 lux on the working plane has been assumed for the office spaces. For the proposed restaurant facility overlooking the Canal at ground floor we have assumed an illuminance level of 100 lux.

3.1.4.ENVIRONMENTAL ZONE

The site is located within London's central Zone 1, on the fringe of the Central Activity Zone set out within the London Plan. The Islington Local Plan Policies Map identifies the site as an Employment Growth Area. Furthermore, the site is located in close proximity of King's Cross station and Kings Place, which have a high level of night time activity. The area is therefore considered to be part of Environmental Zone 4 as defined within paragraph 2.1.2 of this report.

4. CONCLUSIONS

4.1. DISCUSSION OF RESULTS

The following sensitive receptors have been subject to a Light intrusion assessment:

- Ice Wharf;
- 1-3 All Saints Street;
- 18-19A Lavina Grove;
- 53-66 Treaty Street;
- 67-77 Treaty Street;
- Copenhagen Primary School;
- Regent's Canal.

The results of the assessment show that pre-curfew the artificial lighting spillage from the proposed development will be below the ILP threshold for Environmental Zone 4 on all tested receptors.

Should the proposed office spaces be occupied after 11 pm, levels of light intrusion greater than the maximum recommendation would be seen in the following locations:

- East façade of Ice Wharf South

  A small portion of the façade of Ice Wharf South is parallel and in close proximity to the proposed development. Two windows in this location will receive approximately 15 lux, where the post-curfew maximum recommendation is 5 lux.

- North façade of 1-3 All Saints Street

  Five windows on the ground will be affected by the artificial lighting spillage from the proposed development, receiving between 7.5 and 10 lux.

- Regent's Canal

  The part of the canal immediately to the north of the site will receive up to 15 lux of light intrusion. The illuminance levels on the northern shore of the canal and on the pathway will be in line with the post-curfew recommendation.

4.2. MITIGATIONS

Should the office spaces within the Proposed Development be occupied after 11 pm, some mitigation measures would be recommended in order to reduce the light intrusion to the surrounding residential windows and canal. These could include:

- Roller blinds fitted in the proposed office spaces;
- Lighting strategies that reduce the output of luminaires closer to the façades;
- Light fittings controlled through the use of sensors which switch on and off the light according to office occupancy or on a timer;
- External fins located in specific areas where the levels of light trespass are higher.

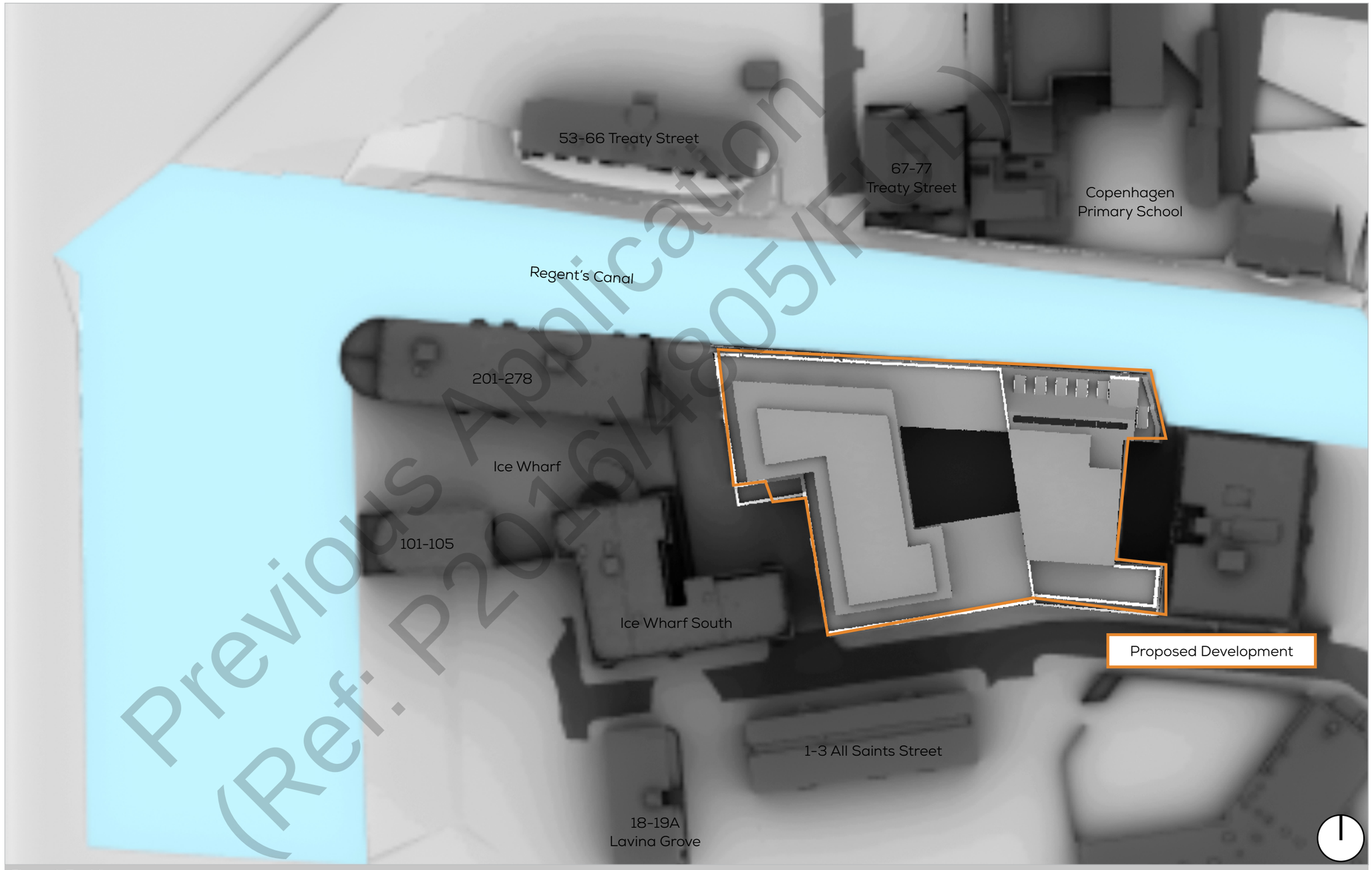


Figure 1: Top View

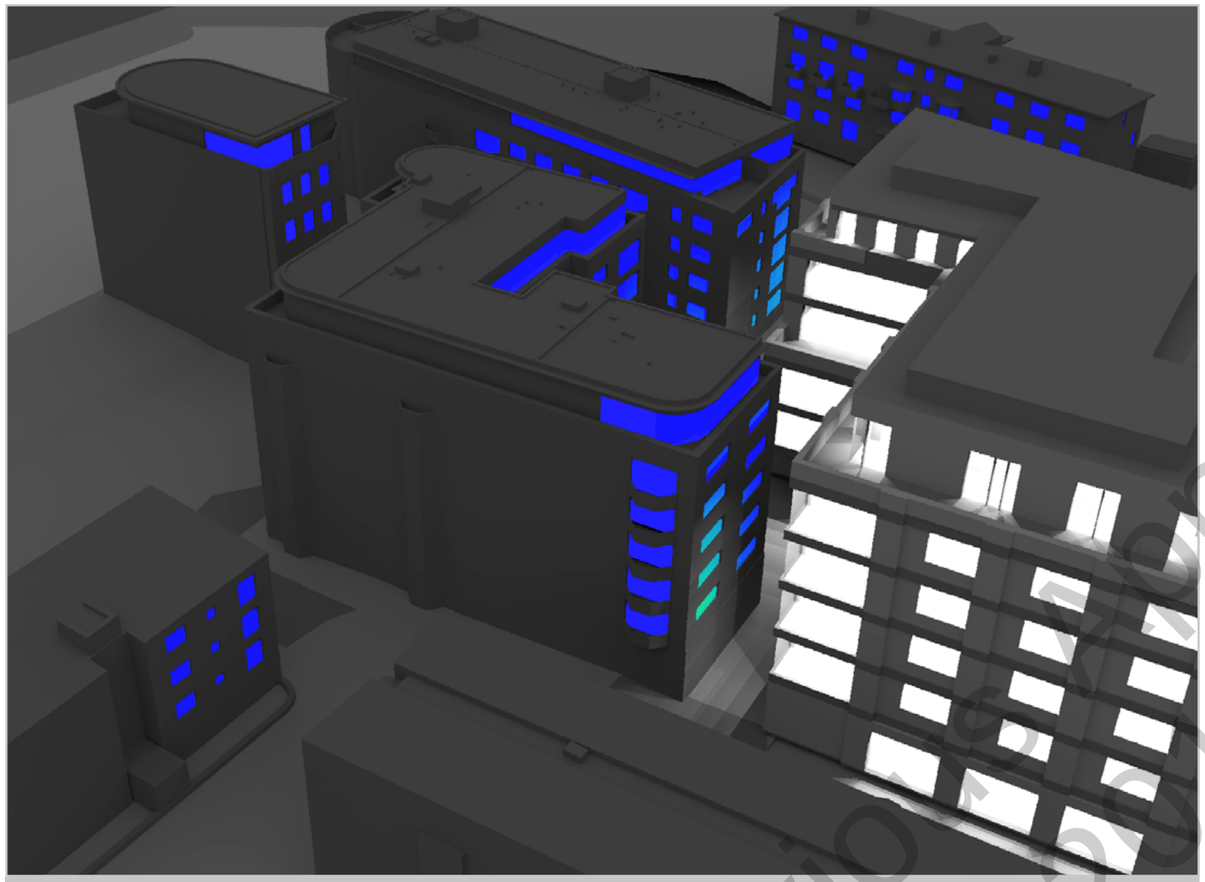


Figure 2: Pre-curfew

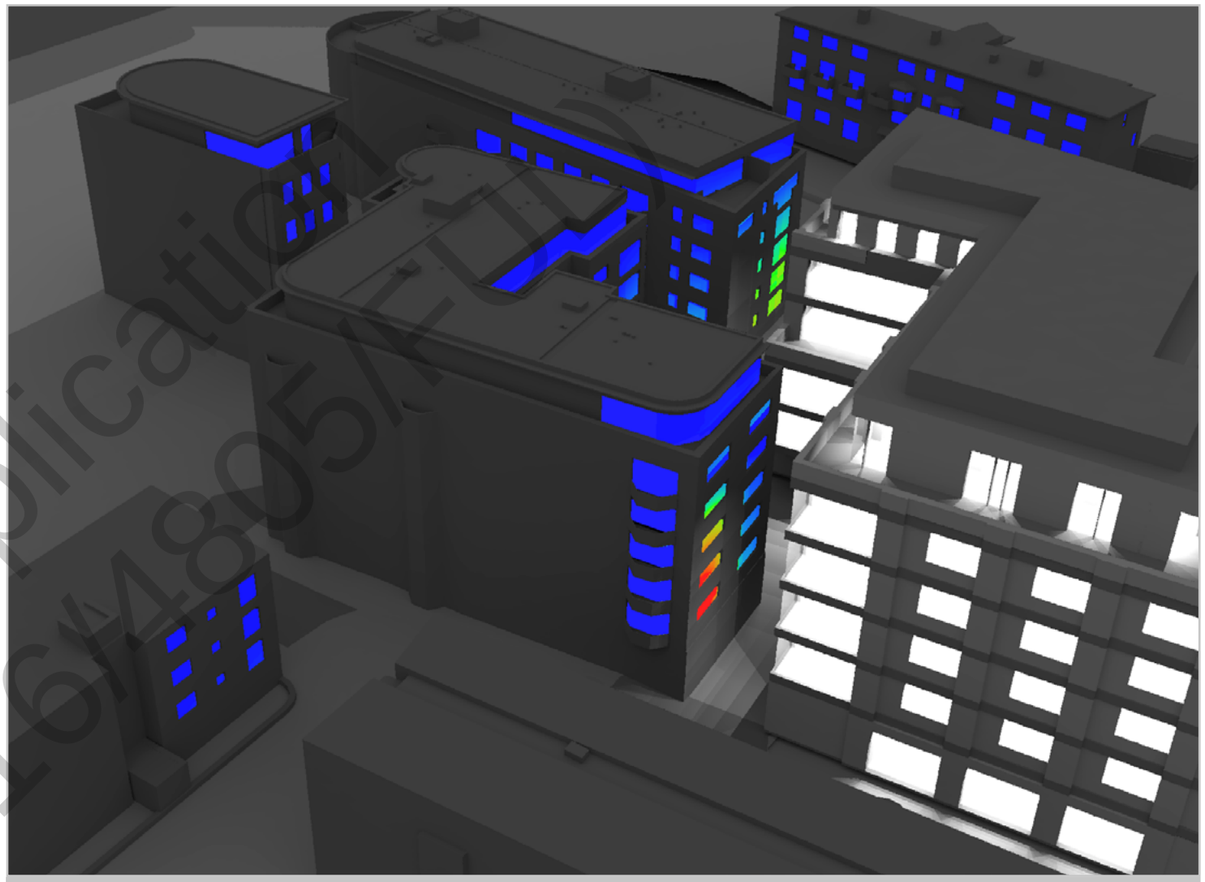
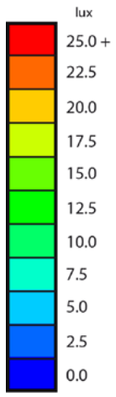
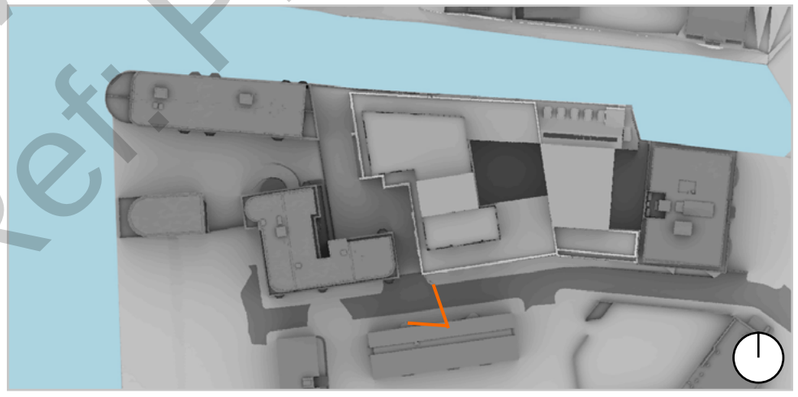
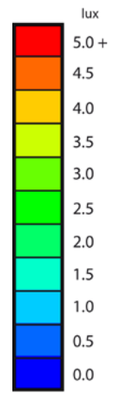


Figure 3: Post-curfew







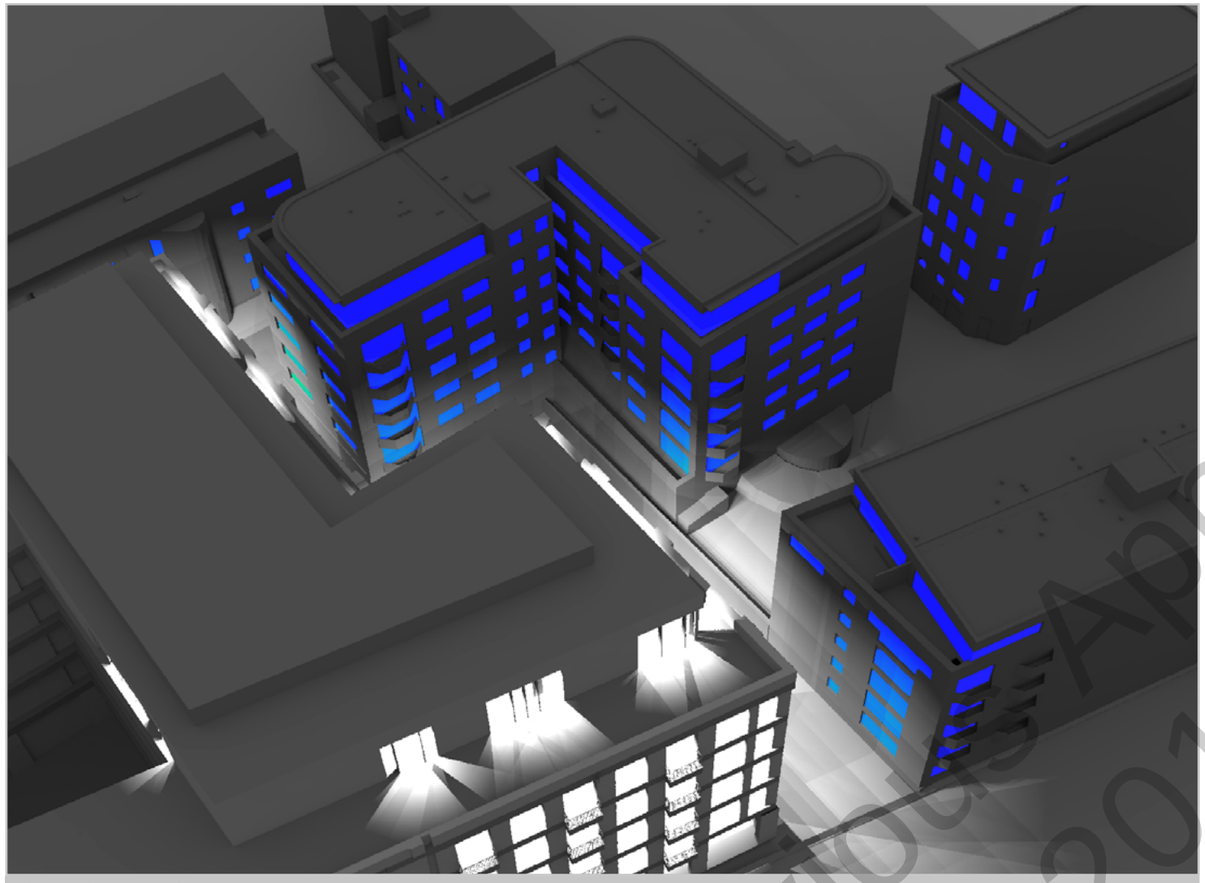


Figure 4: Pre-curfew

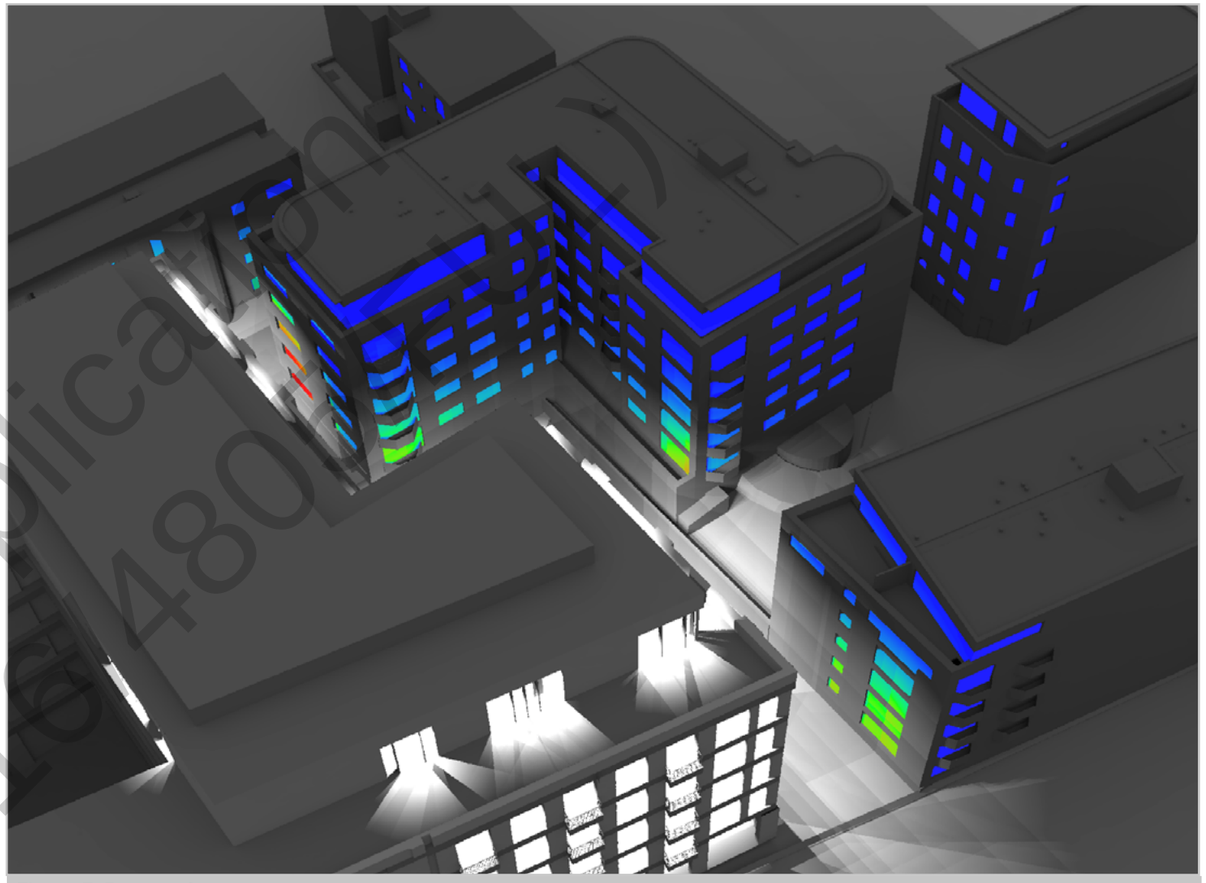
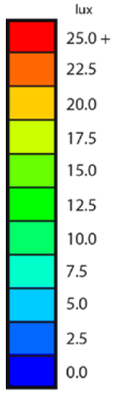
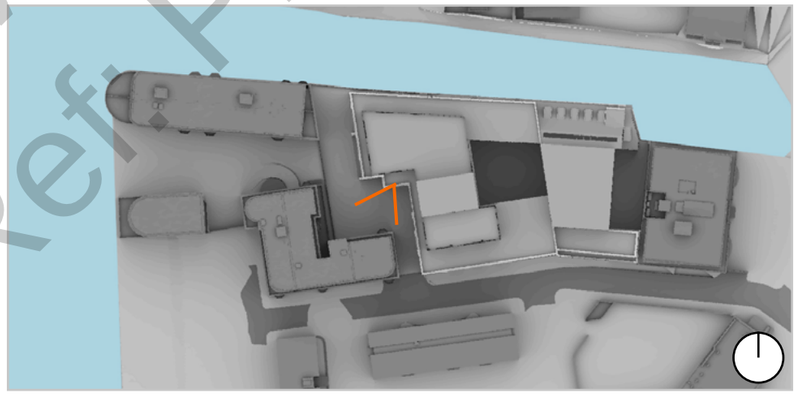
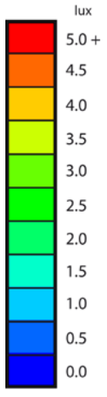


Figure 5: Post-curfew







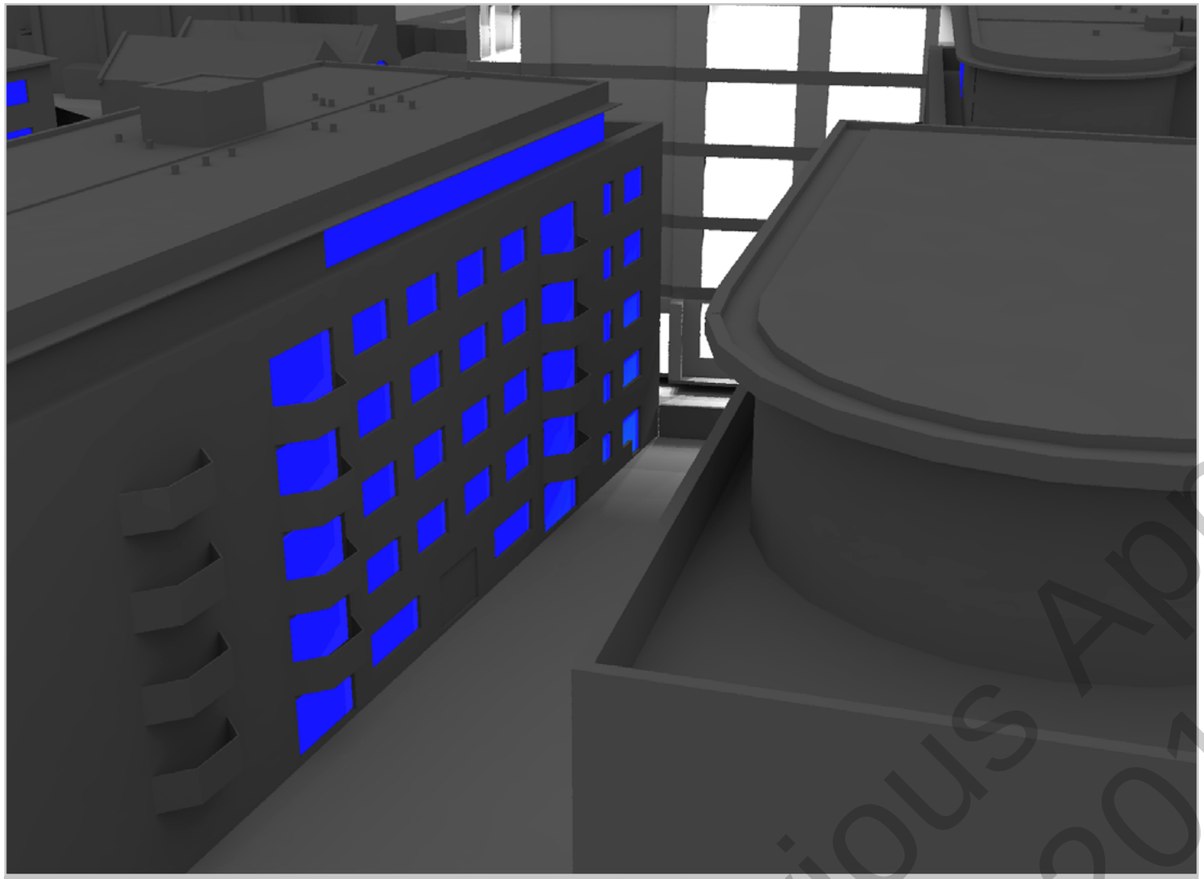


Figure 6: Pre-curfew

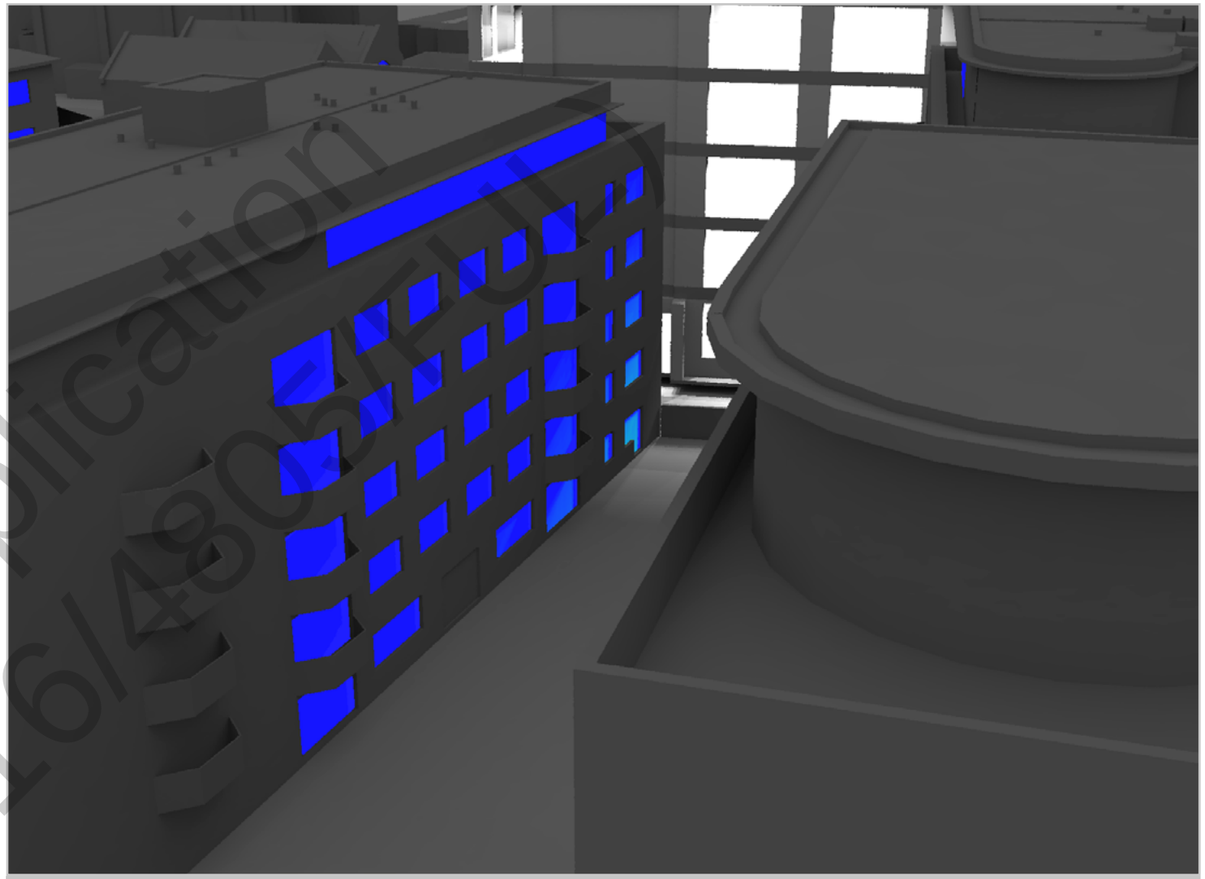
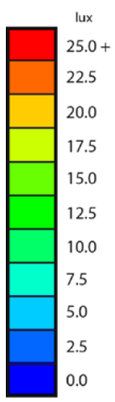
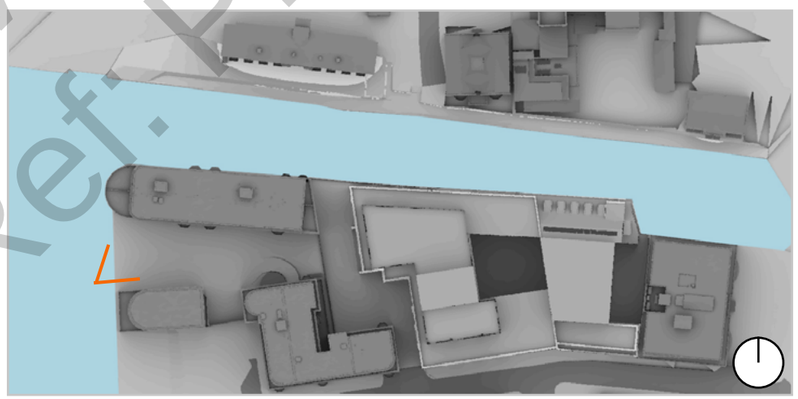
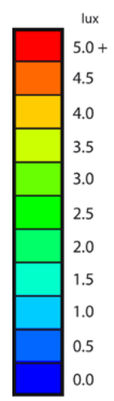


Figure 7: Post-curfew







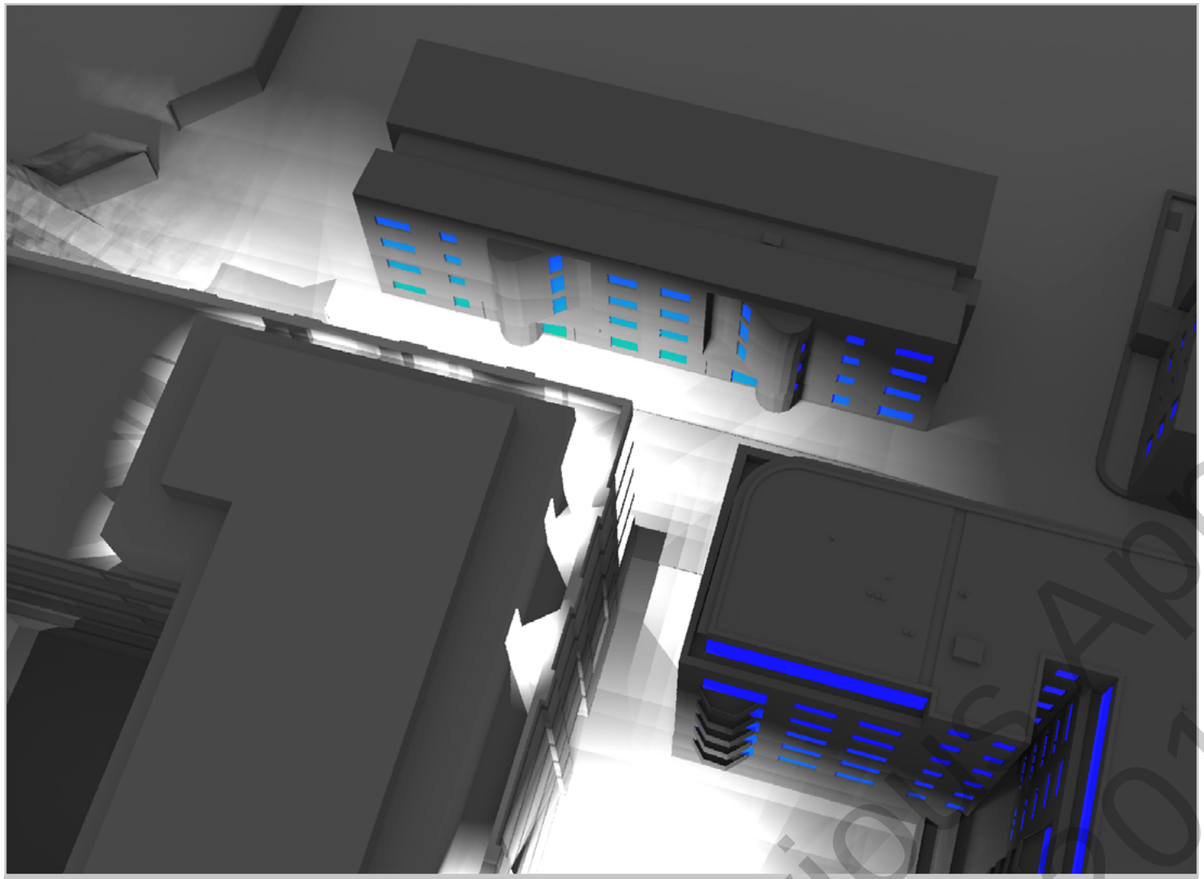


Figure 8: Pre-curfew

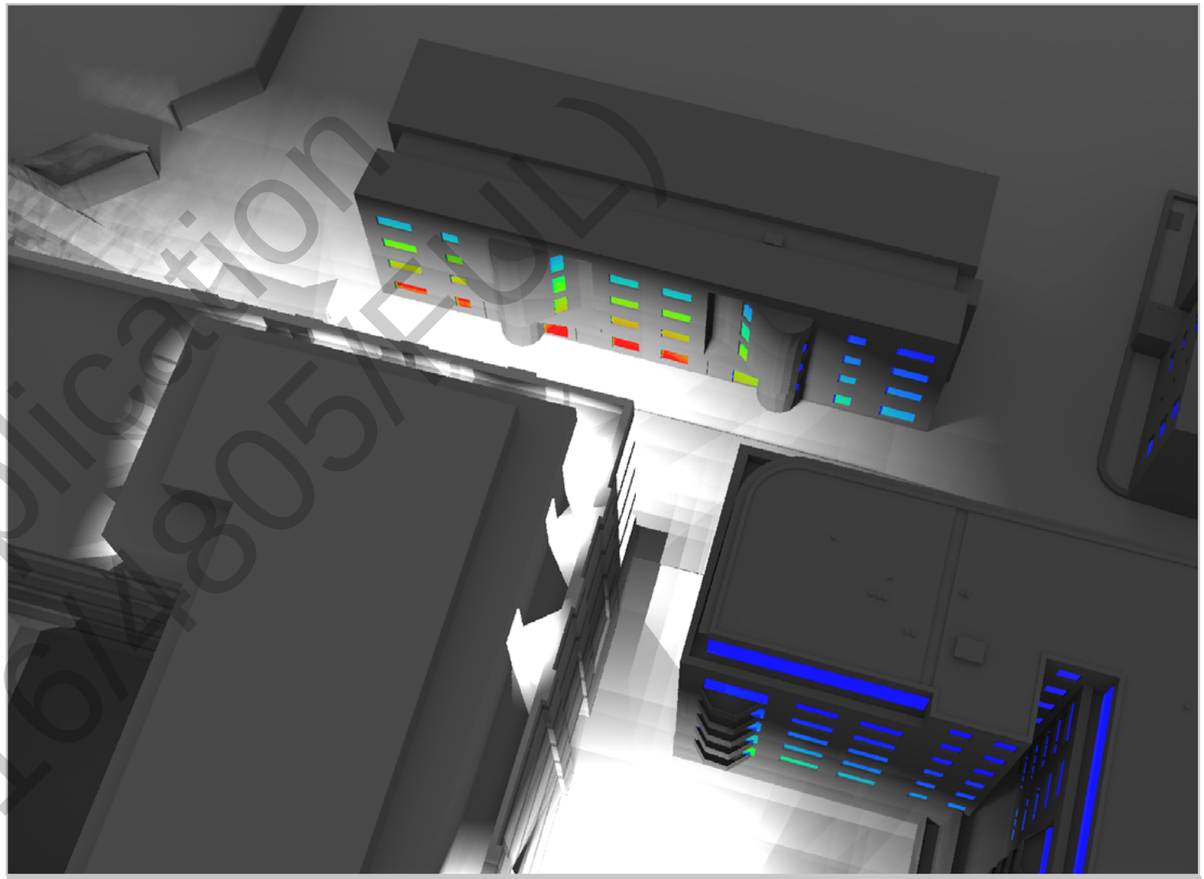
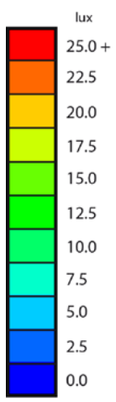
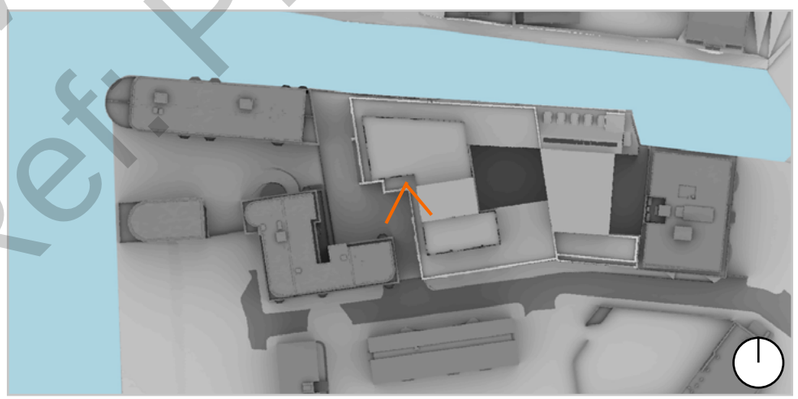
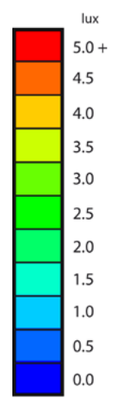


Figure 9: Post-curfew







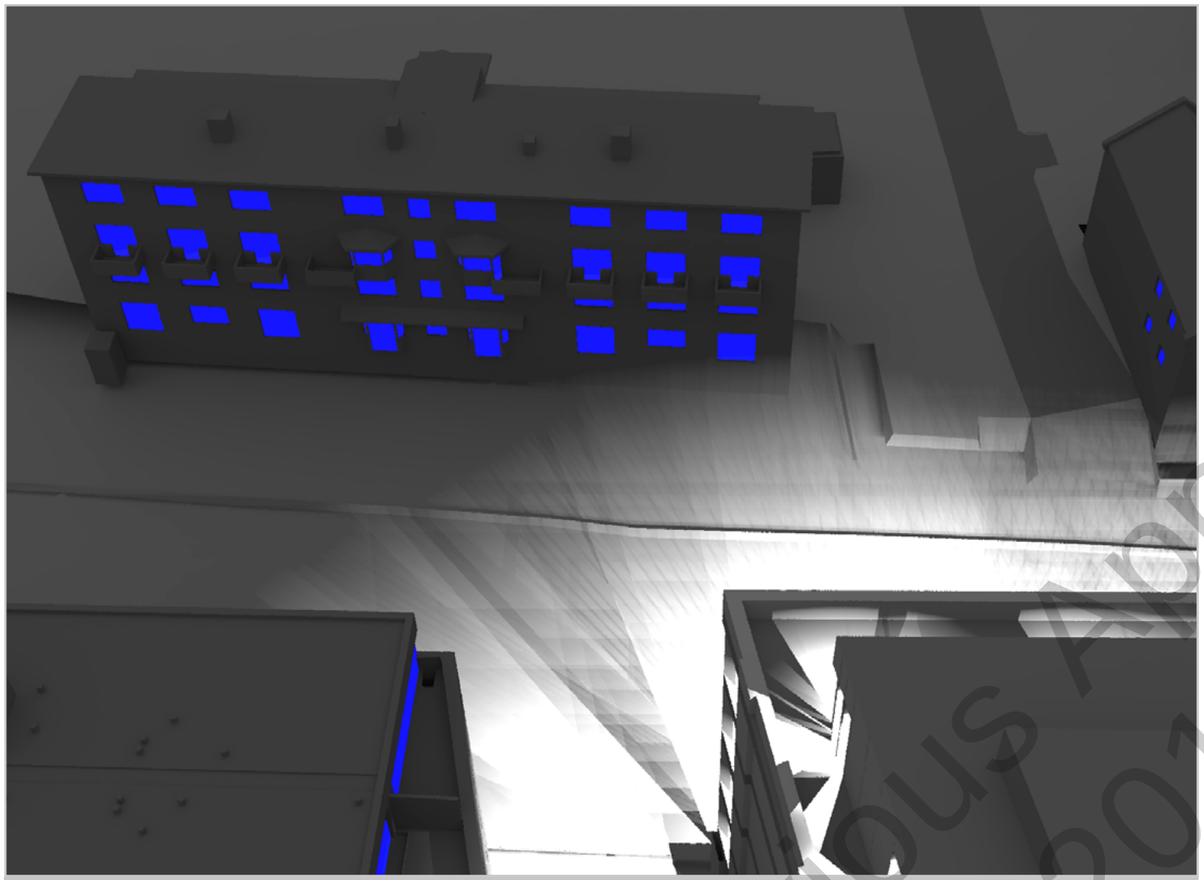


Figure 10: Pre-curfew

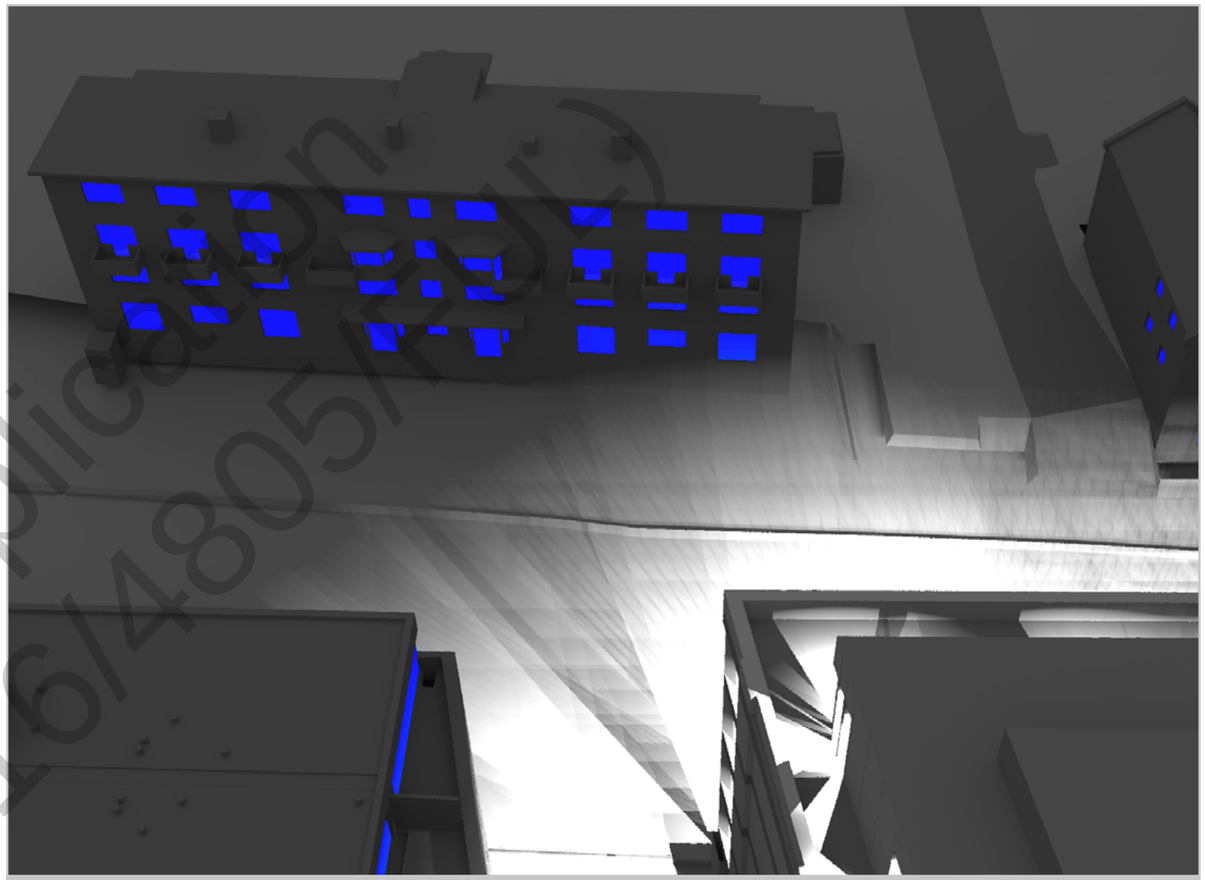
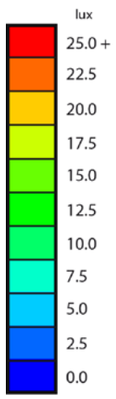
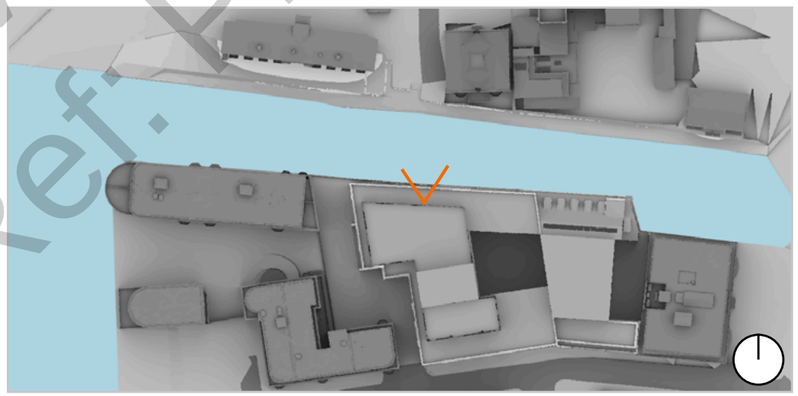
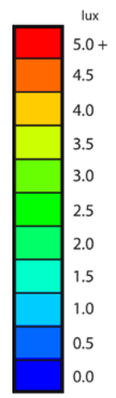


Figure 11: Post-curfew







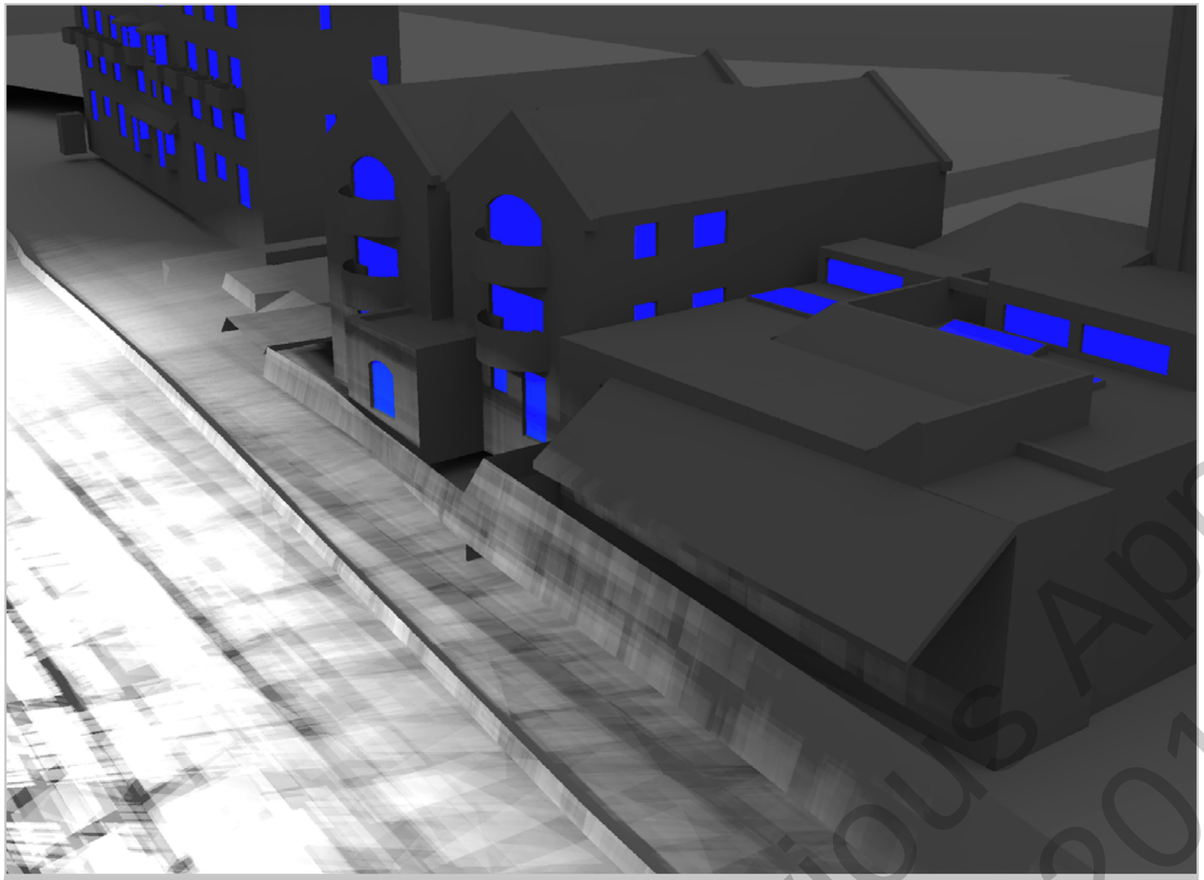


Figure 12: Pre-curfew

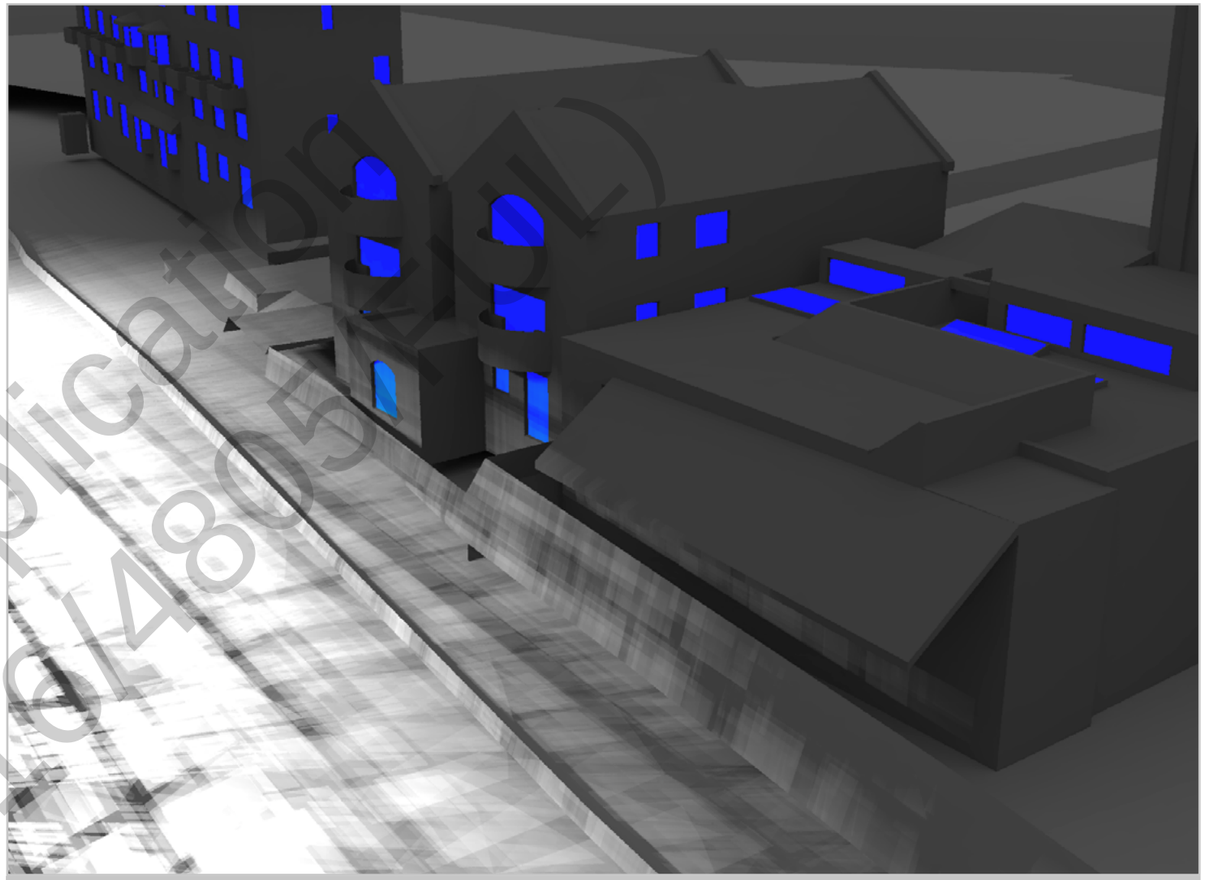
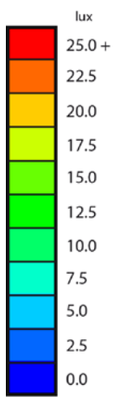
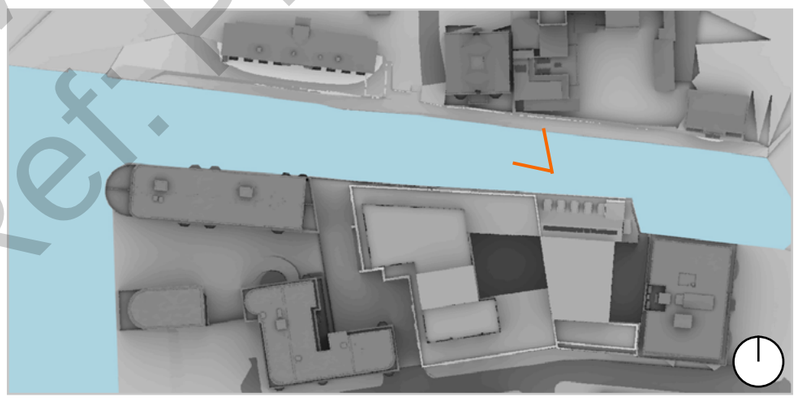
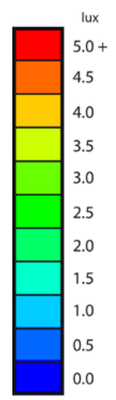


Figure 13: Post-curfew







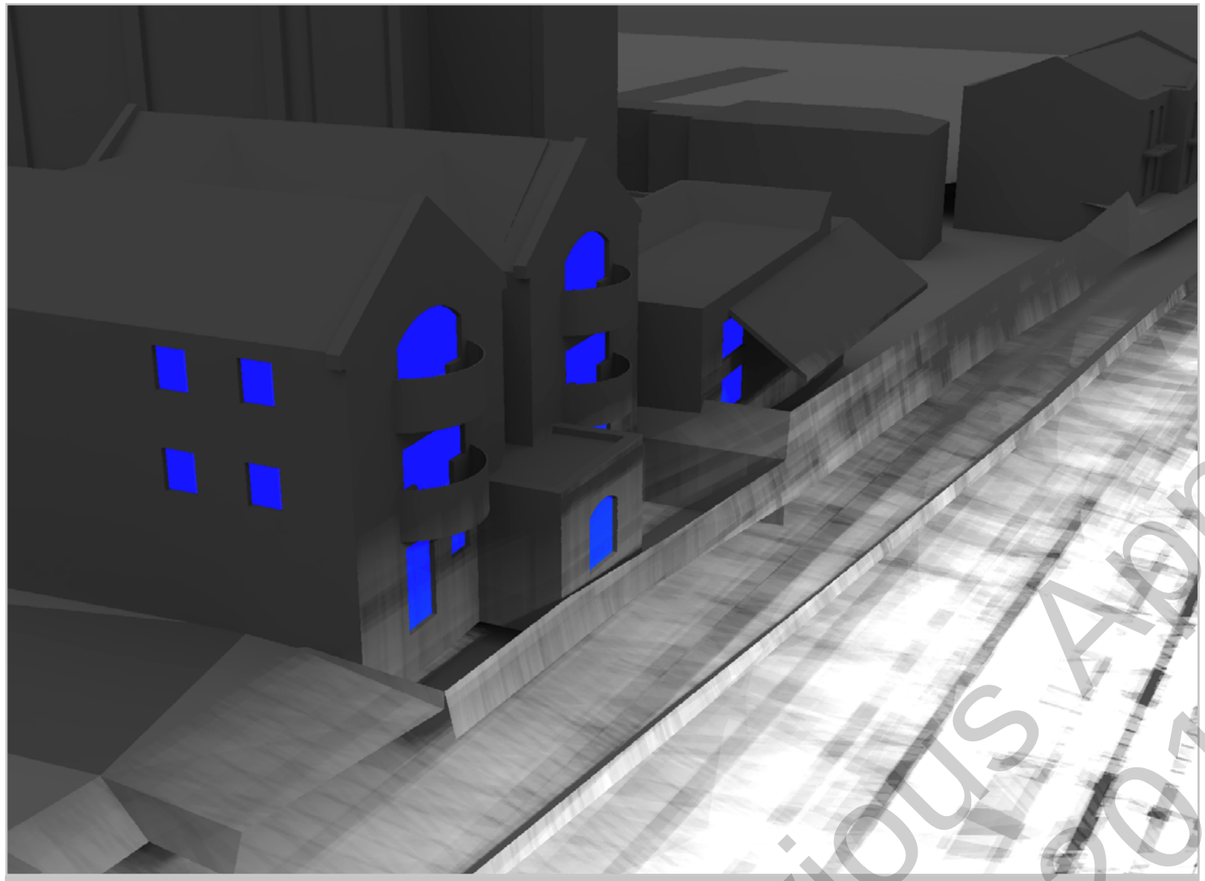


Figure 14: Pre-curfew

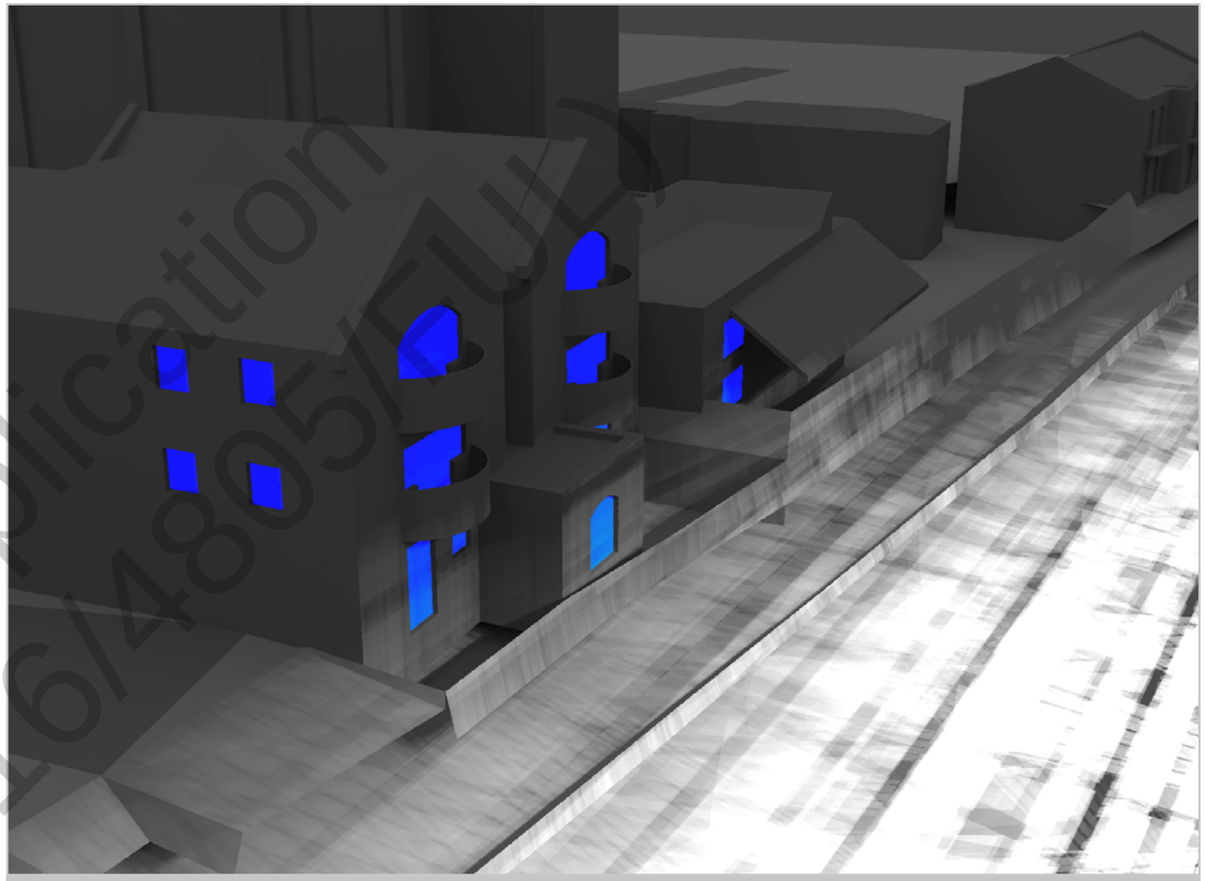
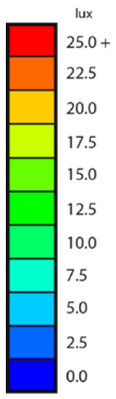
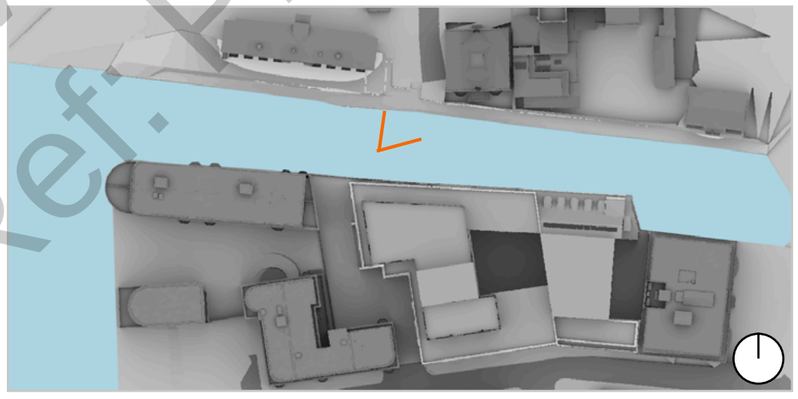
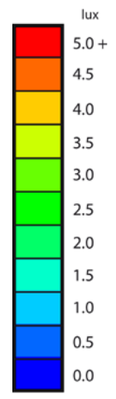


Figure 15: Post-curfew







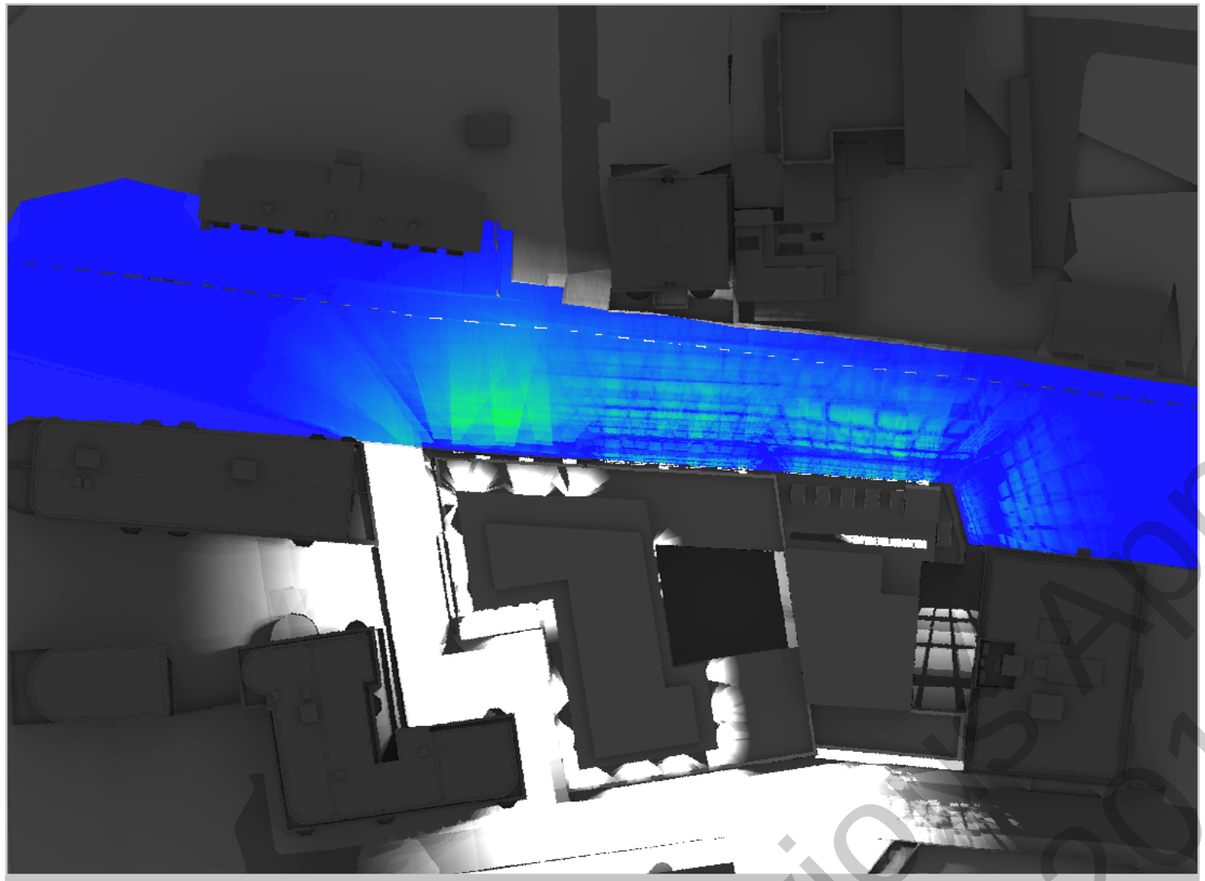


Figure 16: Pre-curfew

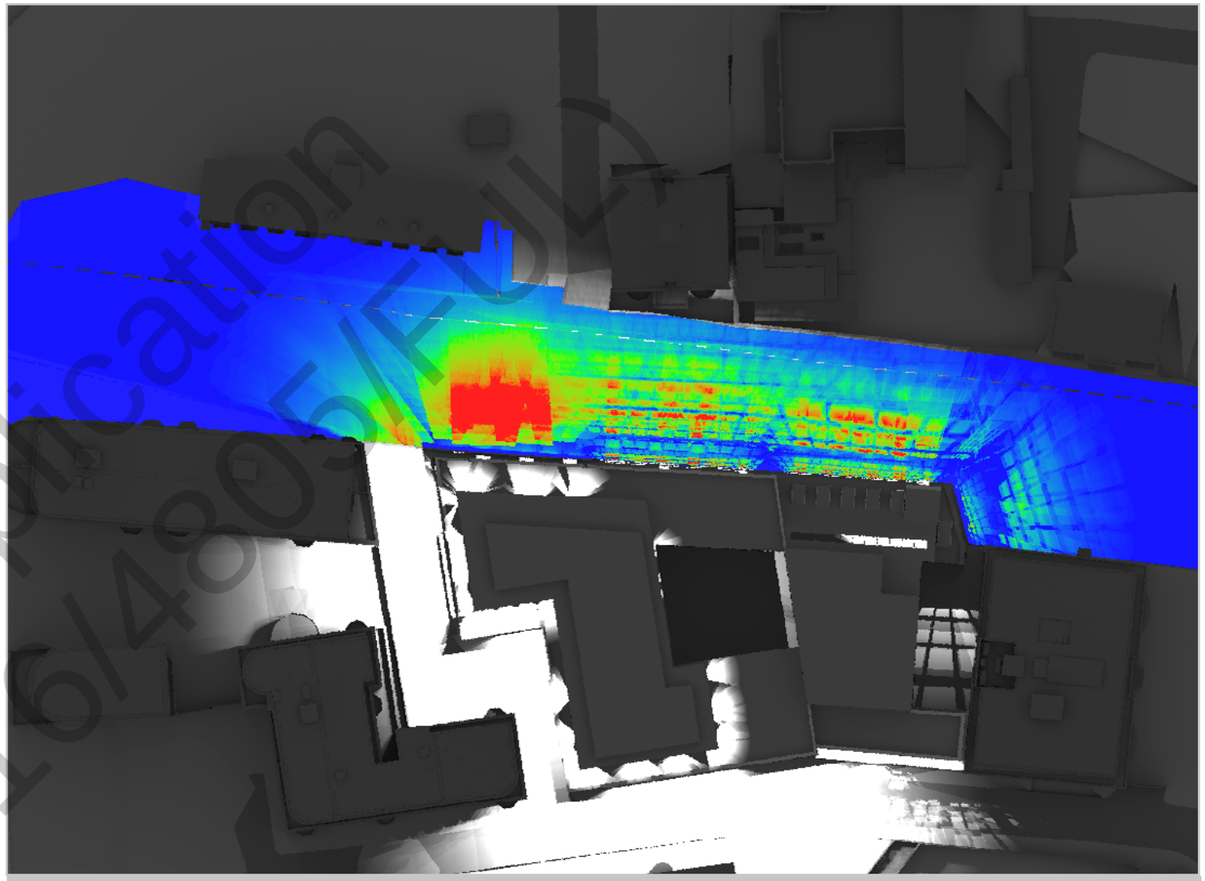


Figure 17: Post-curfew