Greggs Bakery / Twickenham

External Lighting Assessment

Prepared by Desco

05 August 2022

LONDON SQUARE DEVELOPMENTS LTD

FORMER GREGGS BAKERY SITE
TWICKENHAM
TW2 6RT

External Lighting Assessment
Residential-Led Scheme
Supplementary Report:
Minimising the Impact of Lighting on Nocturnal Wildlife

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02	17/05/2019	ISSUE	ACh	JC
03	16/06/2019	COMMENTS FROM ASSAEL ARCHITECTURE INCORPORATED	ACh	JC
04	29/06/2020	UPDATED TO LATEST LANDSCAPE LAYOUTS	ACh	JC
05	13/07/2022	UPDATED TO LATEST COMMENTS	ACh	SB

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1.0 INTRODUCTION

Following input from the Environmental Agency (EA), Friends of the River Crane Environment (FORCE) and Richard Graves Associates in relation to the River 'Dark Corridor' and Bat (and other nocturnal wildlife) activity in this corridor, this supplementary report outlines the mitigation measures employed to minimise environmental impact and provides an assessment of the contribution of the apartment lighting and revised low level lighting design for the riverside car park to the proposed residential development at the former Greggs Bakery site in Twickenham. The project comprises of the Demolition of existing buildings (with retention of a single dwelling) and redevelopment of the site to provide up to 116 residential units and 175 sqm commercial floorspace (Use Class E) with associated hard and soft landscaping, car parking and highways works and other associated works.

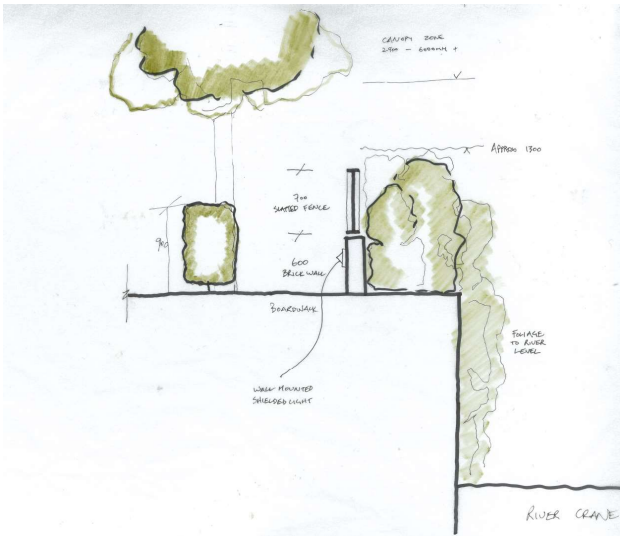
The site is located within the London Borough of Richmond upon Thames and is situated in the centre of an established low-rise residential area mainly comprising townhouses. The development is accessible via both Gould and Crane Road, and Twickenham station sits approximately 900 metres due East of the site.

2.0 LIGHTING DESIGN

Planning objections were raised with regards to the amount of likely illumination the development would cause to the 'Dark Corridor' of the river. We have modelled the external illumination from the apartments based on a 70% occupancy at any one time with 60% of apartments having curtains closed when lighting is on in living rooms and bedrooms. Balcony lights have since been omitted from the model as advised by the Architect.

We have also modelled with the under croft/car park with the garage door open and lighting on.

One of the mitigation measures referred to in the 'Protecting bats in waterside development[1]' document is to restrict the amount of light spill reaching the sensitive area by providing light barriers which can be in the form of walls, bunds or fences. We understand from Assael Architecture Ltd the construction build-up along the river edge will comprise a 600mm brick wall with 700mm slatted fence above. A continuous hedge, circa 1300mm high will also be planted behind the fence on the riverside to try to reduce light spill onto the river from the new development and effectively creating a 2700mm 'bat flight zone'.



SKETCH SHOWING RIVERSIDE WALL BUILD-UP

[1] The Environment and Design Team (2018) WaterSpace Design Guidance Protecting Bats in Waterside Development

REVISED RIVERSIDE EXTERNAL LIGHTING WITH APARTMENT CONTRIBUTION LOOKING WEST

Other mitigation measures referred to in that document are:

i) To use recessed luminaires in the apartments and set these back from the windows.
ii) To use LED lamps.
iii) To use shielded external lights.

We have modelled the riverside car park scene to include the wall build-up as discussed above.

The original external lighting design submitted for planning comprised LED street luminaires mounted on 4000mm high columns adjacent to the river have been removed and no lighting will be included in the 5m buffer strip. We have replaced these bollard lighting will use DW Windsor[1] Pharola DS (for dark skies compliant schemes)

Lighting in the apartments will be recessed LED downlights set back approximately 1000mm from windows with the colour temperature being a mixture of 3200k and 4000k, however we cannot fully control the angle of the refracted and emitted light from the apartment windows.

All car park lighting will utilise LED lamps which produce no UV emissions which ensures insects are not attracted away from neighbouring habitats and comprise integral louvres to control light distribution and reduce upward light spill.

The existing site comprises warehouse/factory buildings overlooking the existing riverside wall with windows at high level above the wall which would cause localised illumination pollution to the river 'Dark Corridor'. There is also a property on the opposite bank with windows and doors within about 2m of and overlooking the bank.

[1] Note, DW Windsor Lighting Solutions used for Teddington Lock footbridge for the London Borough of Richmond: https://www.luxreview.com/2019/07/30/car-park-project-cuts-light-spill-and-benefits-bats/[accessed 26/06/20]

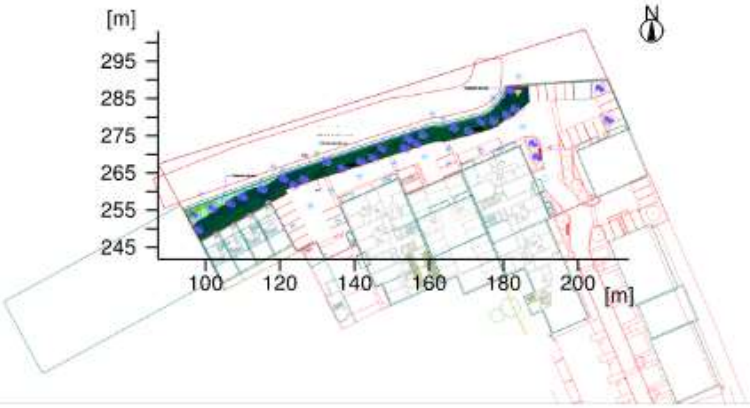
The apartment blocks and houses in the proposed development are set back approximately 11000mm from the edge of the river. There would be an improvement on the current factory situation in relation to maintaining and creating the river 'Dark Corridor'.

The proposed external lighting has been modelled using lighting design software, the calculation outputs of which are shown below. This has enabled lighting levels and spill across the space and the river to be predicted, thus ensuring that light is not provided to areas which do not require illumination and does not impact the 'Dark Corridor'.

There is no proposed uplighting to trees and other landscape features, both new and existing, which will avoid illuminating bat foraging and commuting habitats.

The revised lighting design no longer conforms to Secured by Design (SBD), however having the wall and hedge adjacent the riverside will discourage congregation in the area. The Client, in consultation with local authorities and authorities having jurisdiction (AHJ's), would need to undertake a risk assessment, balancing the risk of nuisance and crime against the environmental issues and the risk of refusal of planning permission.

ILLUMINANCE LEVELS WITHIN 5METRE BUFFER ZONE BETWEEN RIVER AND DEVELOPMENT



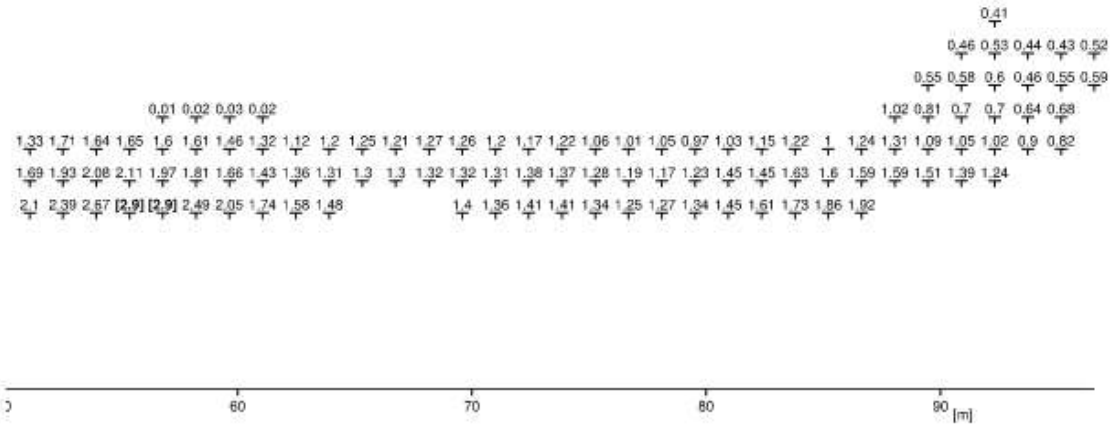
General

Calculation algorithm used	Average indirect fraction with light colours
Height of evaluation surface	0.00 m
Maintenance factor	0.75
Light flux factor (see maintenance plan)	0.90
Total luminous flux of all lamps	56960 lm
Total power	5279.2 W
Total power per area (3399.71 m²)	1.55 W/m²

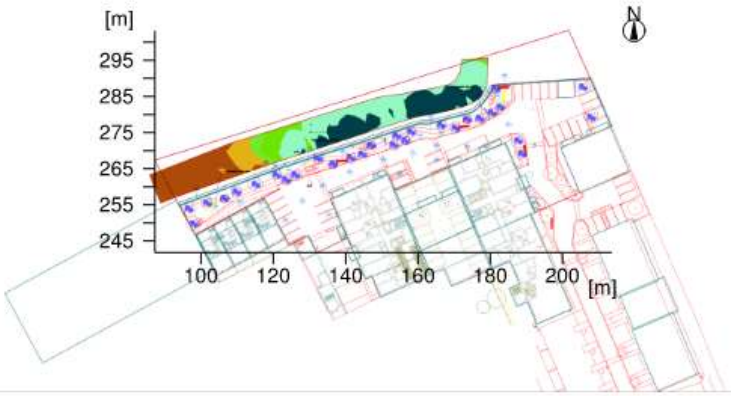
Illuminance

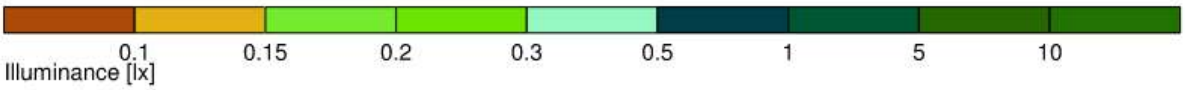
Average illuminance	Eav	1.08 lx
Minimum illuminance	Emin	0 lx
Maximum illuminance	Emax	2.9 lx
Uniformity Uo	Emin/Em	1:--- (---)
Diversity Ud	Emin/Emax	1:--- (---)

ILLUMINANCE VALUES WITHIN 5METRE BUFFER ZONE BETWEEN RIVER AND DEVELOPMENT



ILLUMINANCE LEVELS APPROX 1300mm ABOVE RIVER SURFACE LEVEL BEHIND PERIMETER WALL AND HEDGE PLANTING





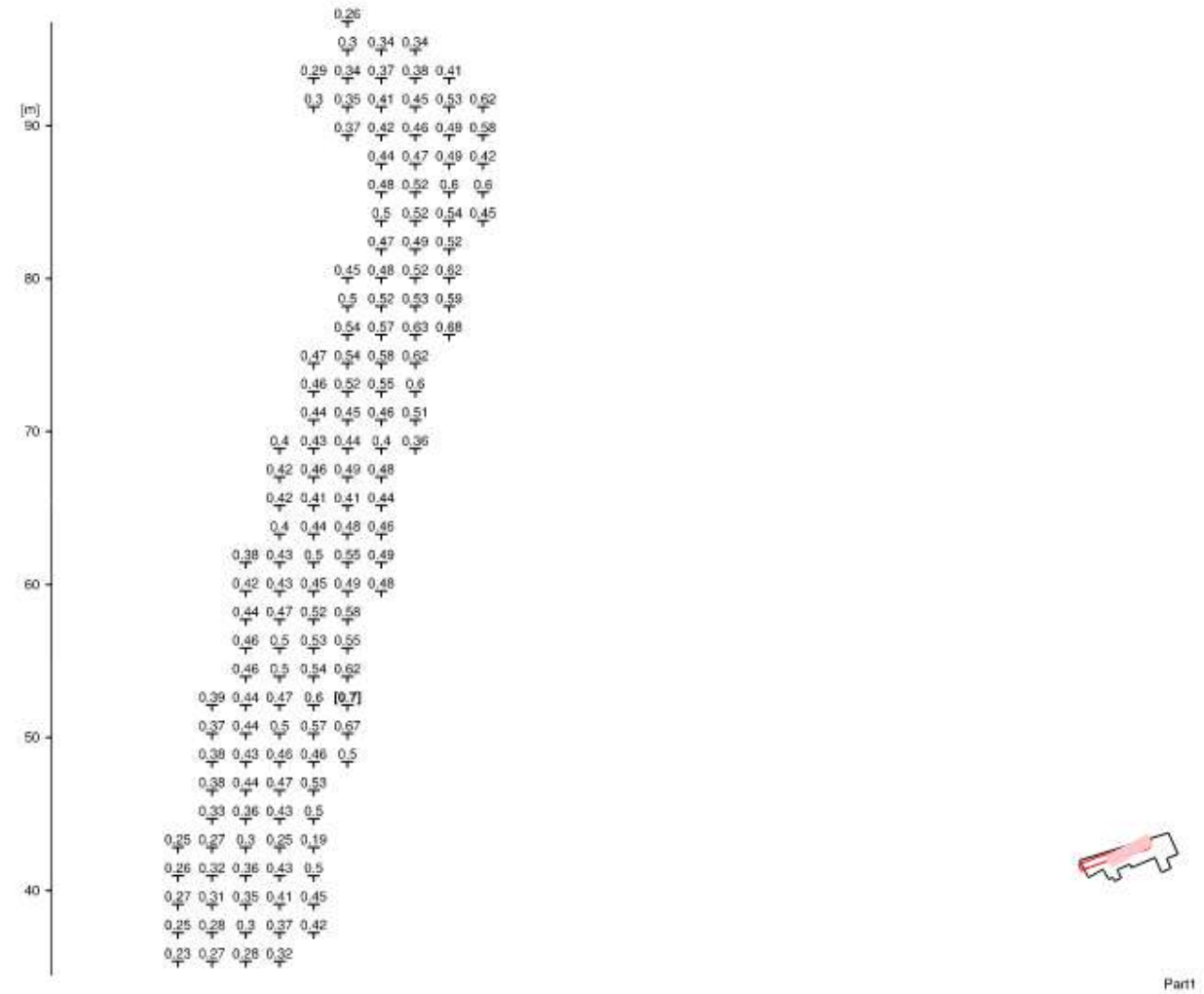
General

Calculation algorithm used	Average indirect fraction with light colours
Height of evaluation surface	1.30 m
Maintenance factor	0.75
Light flux factor (see maintenance plan)	0.90
Total luminous flux of all lamps	56960 lm
Total power	5279.2 W
Total power per area (3399.71 m²)	1.55 W/m²

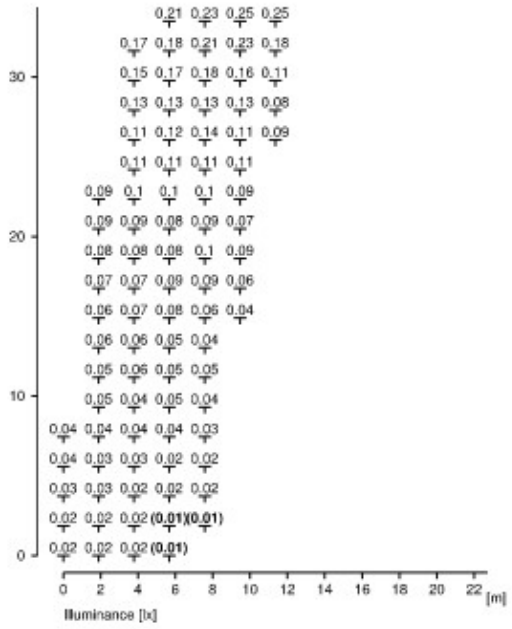
Illuminance

Average illuminance	Eav	0.31 lx
Minimum illuminance	Emin	0.01 lx
Maximum illuminance	Emax	0.7 lx
Uniformity Uo	Emin/Em	1:51.9 (0.02)
Diversity Ud	Emin/Emax	1:118 (0.01)

ILLUMINANCE VALUES APPROX 1300mm ABOVE RIVER SURFACE LEVEL BEHIND HEDGE PLANTING



Light flux factor (see maintenance plan)		: 0.90
Height of the reference plane		: 1.30 m
Average illuminance	Eav	: 0.31 lx
Minimum illuminance	Emin	: 0.01 lx
Maximum illuminance	Emax	: 0.7 lx
Uniformity Uo	Emin/Eav	: 1 : 51.87 (0.02)
Diversity Ud	Emin/Emax	: 1 : 117.99 (0.01)


0.21 0.23 0.25 0.25
0.17 0.18 0.21 0.23 0.18
0.15 0.17 0.18 0.16 0.11
0.13 0.13 0.13 0.13 0.08
0.11 0.12 0.14 0.11 0.09
0.11 0.11 0.11 0.11
0.09 0.1 0.1 0.1 0.09
0.09 0.09 0.08 0.09 0.07
0.08 0.08 0.08 0.1 0.09
0.07 0.07 0.09 0.09 0.06
0.06 0.07 0.08 0.06 0.04
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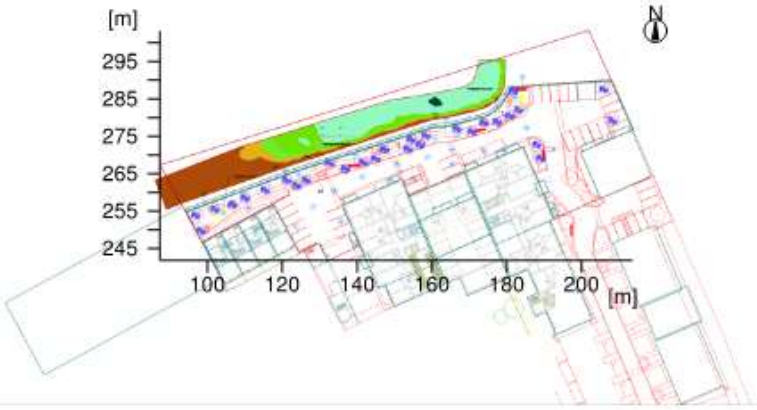
0.02 0.02 0.02 (0.01)
30
20
10
0
0 2 4 6 8 10 12 14 16 18 20 22 [m]
Illuminance [lx]

ILLUMINANCE LEVELS APPROX 50mm ABOVE RIVER SURFACE LEVEL BEHIND PERIMETER WALL AND HEDGE PLANTING



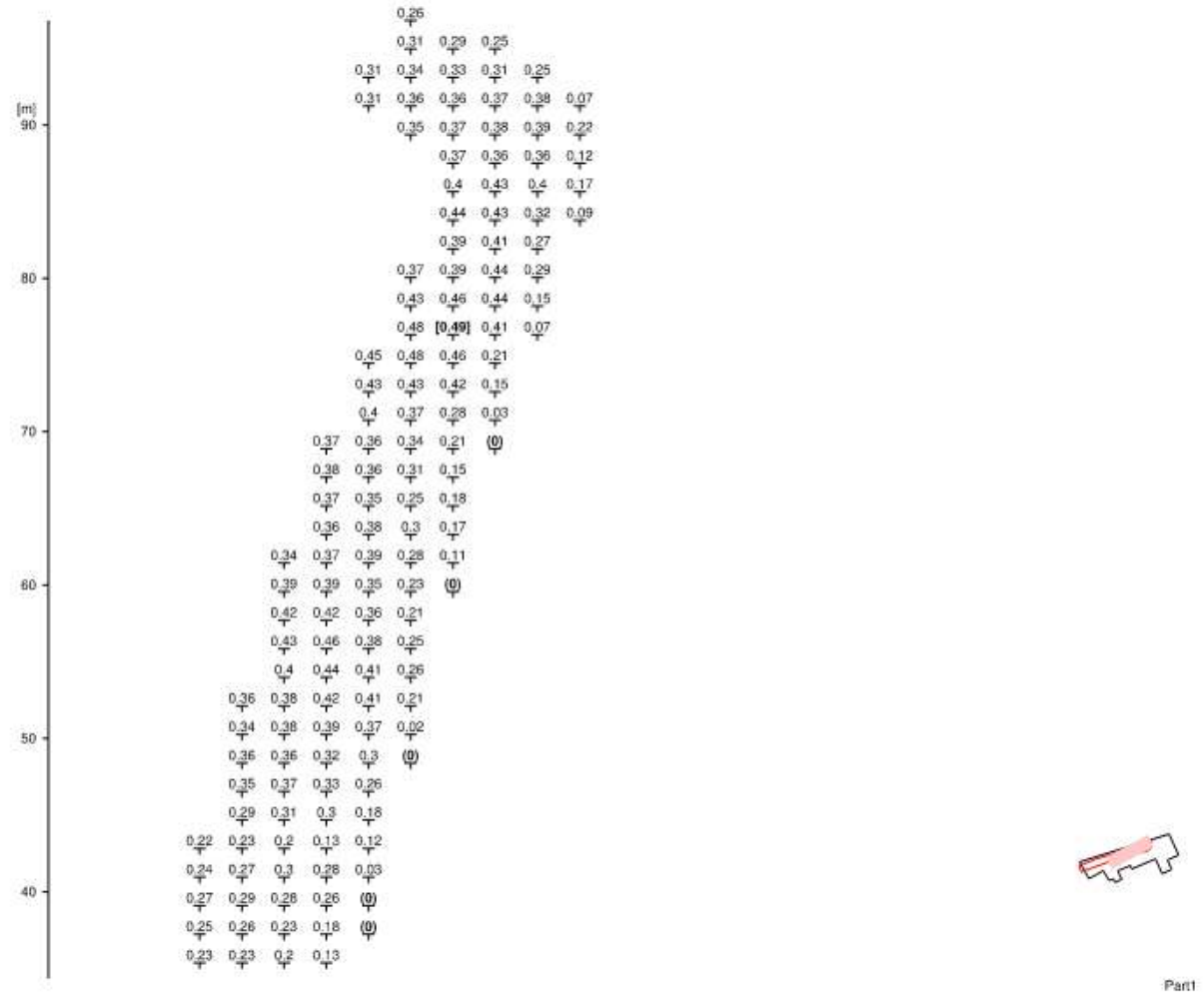
General

Calculation algorithm used	Average indirect fraction with light colours
Height of evaluation surface	0.05 m
Maintenance factor	0.75
Light flux factor (see maintenance plan)	0.90
Total luminous flux of all lamps	56960 lm
Total power	5279.2 W
Total power per area (3399.71 m²)	1.55 W/m²

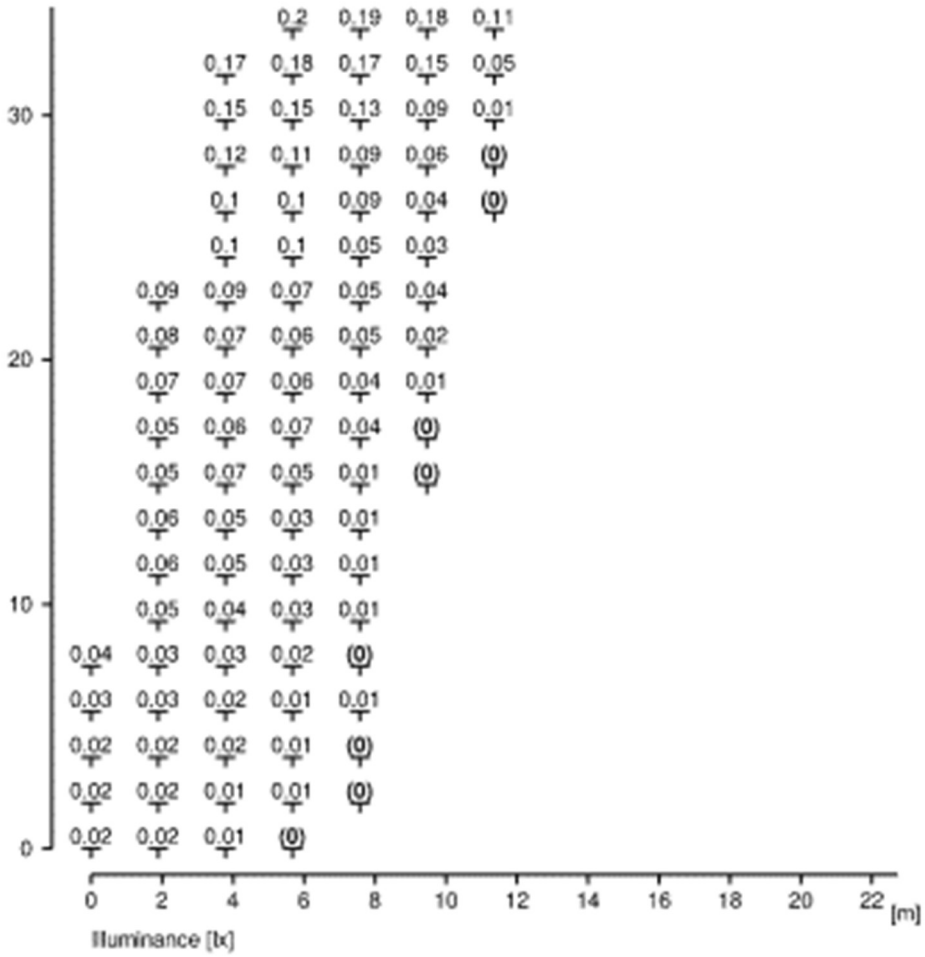
Illuminance

Average illuminance	Eav	0.21 lx
Minimum illuminance	Emin	0 lx
Maximum illuminance	Emax	0.49 lx
Uniformity Uo	Emin/Em	1:--- (---)
Diversity Ud	Emin/Emax	1:--- (---)

ILLUMINANCE VALUES APPROX 50mm ABOVE RIVER SURFACE LEVEL BEHIND HEDGE PLANTING



Light flux factor (see maintenance plan)		: 0.90
Height of the reference plane		: 0.05 m
Average illuminance	Eav	: 0.21 lx
Minimum illuminance	Emin	: 0 lx
Maximum illuminance	Emax	: 0.49 lx
Uniformity Uo	Emin/Eav	: ---
Diversity Ud	Emin/Emax	: ---

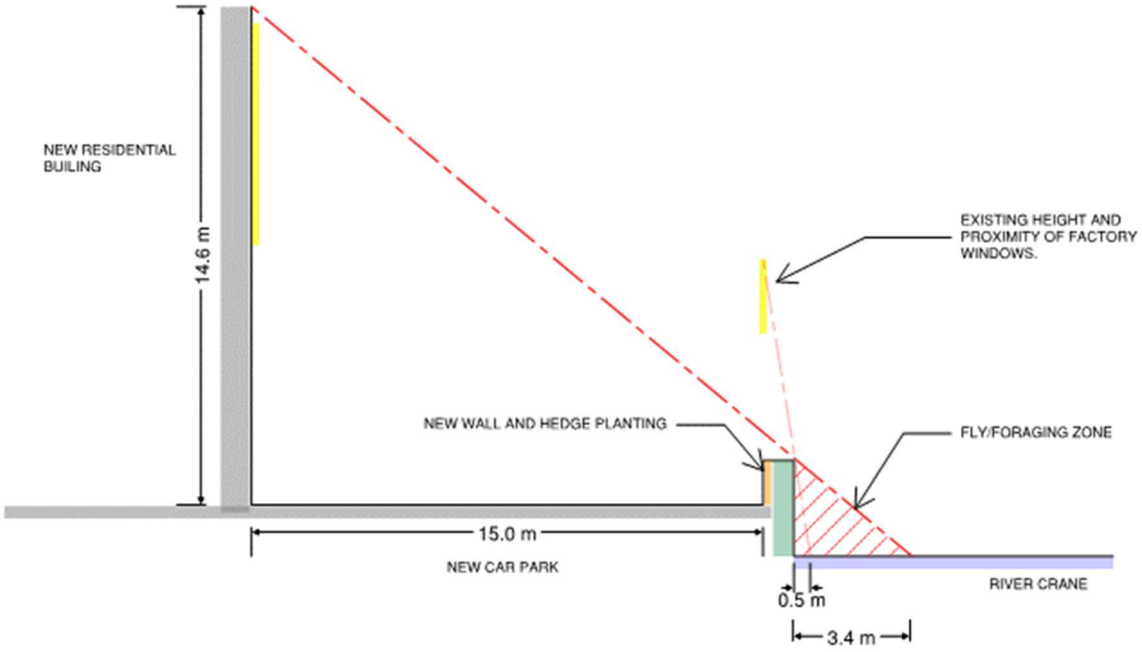

0.2 0.19 0.18 0.11
0.17 0.18 0.17 0.15 0.05
0.15 0.15 0.13 0.09 0.01
0.12 0.11 0.09 0.06 (0)
0.1 0.1 0.09 0.04 (0)
0.1 0.1 0.05 0.03
0.09 0.09 0.07 0.05 0.04
0.08 0.07 0.06 0.05 0.02
0.07 0.07 0.06 0.04 0.01
0.05 0.06 0.07 0.04 (0)
0.05 0.07 0.05 0.01 (0)
0.06 0.05 0.03 0.01
0.06 0.05 0.03 0.01
0.05 0.04 0.03 0.01
0.04 0.03 0.03 0.02 (0)
0.03 0.03 0.02 0.01 0.01
0.02 0.02 0.02 0.01 (0)
0.02 0.02 0.01 0.01 (0)
0.02 0.02 0.01 (0)
30
20
10
0
0 2 4 6 8 10 12 14 16 18 20 22 [m]
Illuminance [lx]

3.0 CONCLUSION

The results obtained from the lighting calculations indicate that the illuminance from the apartments, houses and the riverside car park revised lighting do not significantly impact the river 'Dark Corridor' and improve upon the existing conditions. Overall, there would be a considerable improvement on the current factory situation in relation to maintaining and creating the river at this section as a dark corridor. The proposed changes will provide a darker, deeper and wider fly / foraging zone than currently exists. With all of the above mitigation applied, the residual light spill on the river corridor will be of the average 0.21lux, which is similar to that experienced on a clear full moon (0.25- <1 lux) and with average lux levels within the buffer zone at 1.09 lux, down to 0.1 lux in certain areas.

With the development set back approximately 11000mm from the river's edge, the introduction of a 600mm brick wall complete with 700mm slatted fence above and substantial hedge planting along the river frontage, combined with the river surface being approximately 1200 – 1500mm below ground level, the proposal provides for a darker, deeper and wider fly/foraging zone than currently exists. This is demonstrated in the diagram below which shows a new 3400mm dark foraging zone across on the river's surface. This is far greater than the estimated 500mm wide zone that exists with the boundary wall and factory building high level windows.

DIAGRAM OF LIGHT SPILL/DARK CORRIDOR



PHOTOGRAPH OF EXISTING RIVER CORRIDOR SHOWING FACTORY WINDOWS AT HIGH LEVEL AND PROPERTY ON OPPOSITE BANK