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RIVERS HOUSE, BRIDGWATER

LIGHTING STRATEGY

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Designs for Lighting (DFL) are a business built on the successfully collaborating with our clients. We have over 20 years proven experience in our industry, listening to the challenges our clients face, developing the best solutions and being innovators in our specialism. Our role is to find the most effective and sustainable outcome to enhance and support your projects. We proudly work with recognised industry bodies to promote and shape the future of the industry and ensure our staff are trained to exceed the required competency levels of our industries. Above all, we ensure each project delivers against our values.

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1. INTRODUCTION

1.1. Executive Summary

1.1.1. This Lighting Strategy has been written by DFL (Designs for Lighting Ltd), a lighting design consultancy specialising in Lighting Impact Assessments, obtrusive light mitigation, and detailed lighting design.

1.1.2. The Lighting Strategy is to be imposed in conjunction with the previously outlined Lighting Strategy DGP/JT/BSET/LIGHTING STRATEGY/22-02-23.

1.1.3. The Proposed Lighting installation is for River House, Bridgewater. The development is a 3-floor office complex, roughly 3600m^2 located in E Quay Bridgwater. The premises is used as the main offices of the Environmental Agency.

1.1.4. The Development comprises of Ground floor, First floor and Second floor offices. All three floors comprise of predominantly open plan office spaces with multiple small private office areas, meeting rooms, stairs, receptions, WC's, storage rooms and , circulation points connecting the areas together. Luminaires area mounted within predominantly 1200 x 600 grid ceilings, a few areas utilising 600 x 600 grid configurations and some open surface ceilings The ceiling Layouts for each floor can be seen in **Figures 1,2** and **3**.

1.1.5. The Proposed lighting installation will comply with relevant British Standards and CIBSE (SLL) guidance.

1.1.6. This report outlines the following:

- The phasing of the installation
- The requirements for luminaires found at the development.
- Controls requirements for the development
- Minimum Warranty requirements
- Potential for energy saving per phase.

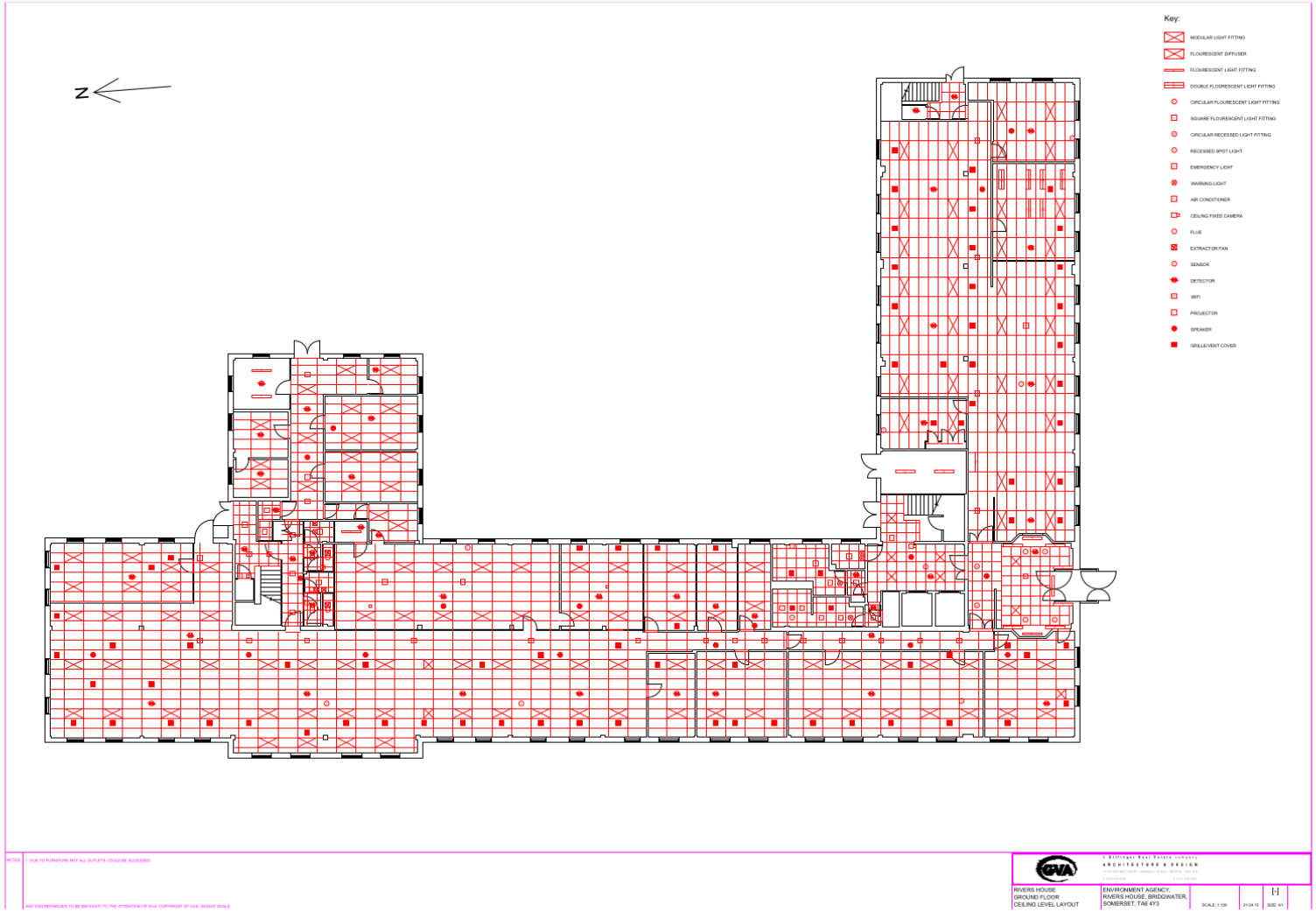


Figure 3: The Ground floor layout

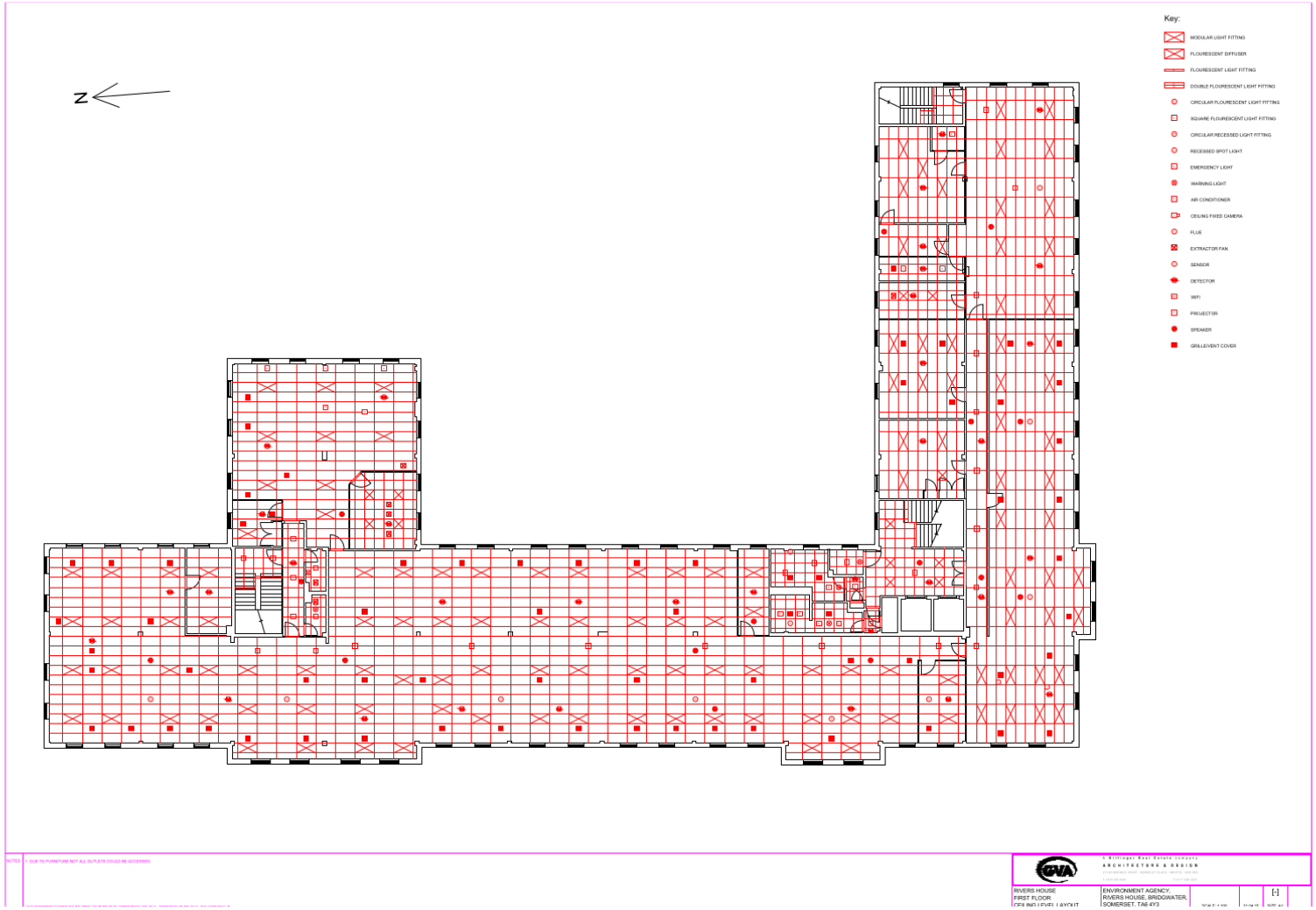


Figure 4: The First floor layout

Figure 3: The Second floor layout

2. BRITISH STANDARDS AND GUIDANCE

2.1. British Standards

2.1.1. The most applicable British Standards for lighting that relate to the development are:

BS EN 12464-1:2021 - Light and Lighting – Lighting of workplaces Part : Indoor work places

BS EN 5266-1:2016 – Emergency Lighting – Part 1: Code of practise for emergency lighting of premises. This may include and require the assistance of other relevant British standards including but not limited to BS EN 1838:2013.

2.2. Additional Industry guidance

2.2.1. CIBSE SLL Industry standard guidance can be used to guide in the implementation of the relevant British standards and best practise based on the research at the time, the relevant documents to the site are,

LG7 – SLL Lighting Guide 7: Offices (2023)

LG12 – SLL Lighting Guide 12: Emergency lighting (2022)

3. LIGHTING STRATEGY

3.1. Brief

3.1.1. The Proposed lighting upgrade will be implemented in multiple phases in order to yield the best energy savings as soon as possible. The phasing will be as follows,

- Phase I: Key areas: Sensor and sensor light installation
- Phase II: Remaining areas: Sensor installation and sensor light installation
- Phase III: Ongoing maintenance

3.1.2. During a survey undertaken in September 2023, it was noted that a degree of change over from fluorescent to LED had already taken place with a majority of fluorescent lamps having been changed from 36W tubes to 18W LED tubes. As such, changing to another LED source would not yield a significant saving. Therefore, the focus of this strategy has changed to ensure lighting was not on or reduced at times when it is not required.

3.1.3. Due to cost outlays, the sensor installation has been put into two separate phases. The first phase will require little additional wiring other than some alterations to the switches to compensate for the use of sensors requiring a permanent live. Phase two will require additional wiring costs in order to zone the lights to separate areas meaning lighting is only active where it is required. To ensure that the light levels surrounding an area do not create glare the units will be required to communicate with each other using smart technologies.

3.1.4. Where appropriate, smart sensors will be advised. Where this has been specified during phase one, the intention is to offer control within the immediate area and the potential for a further integration for that area (zone).

3.1.5. The opportunity to integrate the system as a whole maybe possible at a later stage (phase II and phase III) should a signal test confirm that the BLE signal will travel from node to node.

3.1.6. Lighting will be of an appropriate specification and designed in accordance with British Standards outlined in Section 2.

3.1.7. Lighting for specific tasks will be of a suitably designed Unified Glare Rating (UGR) for the assigned duty.

3.1.8. Emergency controls have been advised. These controls have been advised as self-test, should the system require manual testing a manually tested option, where possible, should be selected as opposed to the development of a hybrid system. This may not be possible. If this is the case, please ensure that the appropriate actions are taken to outline the sections that have been altered to a hybrid emergency lighting system.

4. PHASE I

4.1. Brief

4.1.1. The initial phase of the strategy will predominantly focus on areas that require motion detection upgrades.

4.1.2. Additional works maybe required to ensure the loading of the equipment does not impact the sensors.

4.1.3. All recessed motion sensors are to be programmed via a remote method, giving the option to change the settings at a later stage. All motion detectors are to have a daylight control element ensuring the lights are only on when the area is not receiving sufficient lighting via any potential natural lighting.

4.1.4. Some areas currently have motion detection sensors.

4.1.5. Motion sensors will be required to the following areas.

- Stairways
- Lift Lobby's
- Kitchens
- Archive rooms/stationary cupboards
- Reception and entrance
- Standard occupancy offices/meeting rooms (not open plan)

4.2. Stairways

4.2.1. Lighting in this area will be designed in accordance with the relevant section of the British Standard BS EN 12464-1:2022 as seen in Figure 4

4.2.2. Equipment specification in Table 1

										and pedestrians
9.2	Stairs, escalators, travolators	100	150	0,40	40	25	50	50	30	Illuminance at floor level. Requires enhanced contrast on leading edge of the steps.

Figure 4 - Performance requirements

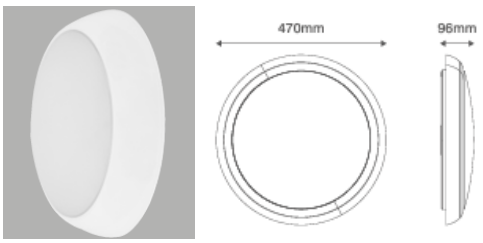
Equipment Specification	Description		
Correlated Colour Temperature (Kelvin)	≤ 4500K		N/A
Manufacturer	Ovia Lighting (or similarly approved)		BEG Luxomat (or similarly approved)
Luminaire/Sensor Model	OV9800WHMW (or similarly approved)	OV9800WHEMMWST (or similarly approved)	PD3N-1C (or similarly approved)
Brief description	20W LED Bulkhead Microwave Sensor	20W LED Bulkhead Microwave Sensor & Self-Test Emergency	Remote control-capable ceiling motion detector
Light Source	LED		N/A
Installation Position	Replace like for like		Central to the area
Mounting Arrangement	Wall Mounted		Ceiling mounted
Example Luminaire Image			
Controls	When presence not detected, lighting is to be dimmed to 25% of the original output.		On when presence detected for 15 minutes, lux level set to 100Lux
Additional Notes	Ceiling mounted PIR may require a Parent and Child sensor, if area is not covered by a singular parent sensor; contact the regional representative [1]for more information.		

Table 1 - Equipment specification

[1] BEG Luxomat, Jonathan Mckane: 07795143314: https://www.beg-luxomat.com/en/contact/

4.3. Lift Lobbys

4.3.1. Lighting in this area will be designed in accordance with the relevant section of the British Standard BS EN 12464-1:2022 as seen in Figure 5

4.3.2. Equipment specification in Table 2

9.3	Elevators, lifts	100	150	0,40	40	25	50	50	30	Illuminance at floor level. Light in front of elevator, see Ref.no. 8.4.

Figure 5 - Performance requirements

Equipment Specification	Description
Correlated Colour Temperature (Kelvin)	N/A
Manufacturer	BEG Luxomat (or similarly approved)
Luminaire/Sensor Model	PD3N-1C – Micro – With acoustic sensor (or similarly approved)
Brief description	Remote control-capable ceiling motion detector
Light Source	N/A
Installation Position	Central to the area
Mounting Arrangement	Ceiling mounted
Example Luminaire Image	
Controls	On when presence detected for 15 minutes, lux level set to 100Lux
Additional Notes	Ceiling mounted PIR may require a Parent and Child sensor, if area is not covered by a singular parent sensor; contact the regional representative for more information.

Table 2 - Equipment specification

4.4. Kitchens

4.4.1. Lighting in this area will be designed in accordance with the relevant section of the British Standard BS EN 12464-1:2022 as seen in figure 6

4.4.2. Equipment specification in Table 3

Ref. no.	Type of task/activity area	$\bar{E}_m$ lx		U_o	R_a	R_{UGL}	$\bar{E}_{m,z}$ lx	$\bar{E}_{m,wall}$ lx	$\bar{E}_{m,ceiling}$ lx	Specific requirements
		required[a]	modified[b]				$U_o \geq 0,10$			
10.1	Canteens and break areas	200	500	0,40	80	22	75	75	50	
10.2	Resting rooms	100	200	0,40	80	22	50	50	30	

Figure 6 - Performance requirements

Equipment Specification	Description
Correlated Colour Temperature (Kelvin)	N/A
Manufacturer	BEG Luxomat (or similarly approved)
Luminaire/Sensor Model	PD4N-CAS (or similarly approved)
Brief description	Smart control-capable ceiling motion detector
Light Source	N/A
Installation Position	Central to the area
Mounting Arrangement	Ceiling mounted
Example Luminaire Image	
Controls	On when presence detected for 30 minutes, lux level set to 300Lux
Additional Notes	Ceiling mounted PIR may require a Parent and Child sensor, if area is not covered by a singular parent sensor; contact the regional representative for more information.

Table 3 - Equipment specification

4.5. Archive rooms / stationary cupboards

4.5.1. Lighting in this area will be designed in accordance with the relevant section of the British Standard BS EN 12464-1:2022 as seen in Figure 7.

4.5.2. Equipment specification in Table 4.

										station tasks these should be lit accordingly.
34.7	Archiving	200	300	0,40	80	25	75	75	50	

Figure 7 - Performance requirements

Equipment Specification	Description
Correlated Colour Temperature (Kelvin)	N/A
Manufacturer	BEG Luxomat (or similarly approved)
Luminaire/Sensor Model	PD4N-CAS (or similarly approved)
Brief description	Smart control-capable ceiling motion detector
Light Source	N/A
Installation Position	Central to the area
Mounting Arrangement	Ceiling mounted
Example Luminaire Image	
Controls	On when presence detected for 15 minutes, lux level set to 200Lux

Table 4 - Equipment specification

4.6. Reception and entrance

4.6.1. Lighting in this area will be designed in accordance with the relevant section of the British Standard BS EN 12464-1:2022 as seen in Figure 8.

4.6.2. As the reception area will need to be seen during periods where the area is unoccupied a replacement of the current luminaires will be required.

4.6.3. Equipment specification in Table 5.

34.6	Reception desk	300	750	0,60	80	22	100	100	75	If reception desk includes regular work station tasks these should be lit accordingly.

Figure 8 - Performance requirements

Equipment Specification	Description		
Correlated Colour Temperature (Kelvin)	≤ 4500K		N/A
Manufacturer	Ovia Lighting (or similarly approved)		BEG Luxomat (or similarly approved)
Luminaire/Sensor Model	OV771361CW & OVCGMF001 (or similarly approved)	OVEMCG50ST (or similarly approved)	PD4N-CAS (or similarly approved)
Brief description	600 x 600 LED Lights low glare panel	Self-Test Emergency pack	Smart control-capable ceiling motion detector
Light Source	LED		N/A
Installation Position	Replace like for like		Central to the area
Mounting Arrangement	Ceiling mounted		Ceiling mounted
Example Luminaire Image	 		

Controls	100% brightness for 15 minutes when presence is detected, 50% when area is inactive
Additional Notes	Ceiling mounted PIR may require a Parent and Child sensor, if area is not covered by a singular parent sensor; contact the regional representative for more information. Removal of the current 1200 x 600 panels in the reception area may require additional ceiling tiles and t bars.

Table 5 - Equipment specification

4.7. Standard occupancy offices/Meeting rooms (seating area)

4.7.1. Lighting in this area will be designed in accordance with the relevant section of the British Standard BS EN 12464-1:2022 as seen in Figure 9

4.7.2. Equipment specification in Table 6

Ref. no.	Type of task/activity area	$\bar{E}_m$ lx		U_o	R_a	R_{UGL}	$\bar{E}_{m,z}$ lx	$\bar{E}_{m,wall}$ lx	$\bar{E}_{m,ceiling}$ lx	Specific requirements
		required[a]	modified[b]				$U_o \geq 0,10$			
34.1	Filing, copying, etc.	300	500	0,40	80	19	100	100	75	
34.2	Writing, typing, reading, data processing	500	1 000	0,60	80	19	150	150	100	DSE-work, see 5.9 Room brightness, see 6.7 and Annex B Lighting should be controllable, see 6.2.4. For smaller cellular offices the wall requirement applies to the front wall. For other walls a lower requirement of minimum 75 lx could be accepted.
34.3	Technical drawing	750	1 500	0,70	80	16	150	150	100	DSE-work, see 5.9 room brightness, see 6.7

Figure 9 - Performance requirements

Equipment Specification	Description
Correlated Colour Temperature (Kelvin)	N/A
Manufacturer	BEG Luxomat(or similarly approved)
Luminaire/Sensor Model	PD4N-CAS – (or similarly approved)
Brief description	Smart control-capable ceiling motion detector
Light Source	N/A
Installation Position	Central to the area
Mounting Arrangement	Ceiling mounted
Example Luminaire Image	
Controls	On when presence detected for 30 minutes, lux level set to 300Lux (minimum)
Additional Notes	Ceiling mounted PIR may require a Parent and Child sensor, if area is not covered by a singular parent sensor; contact the regional representative for more information.

Table 6 - Equipment specification

5. PHASE II

5.1. Brief

5.1.1. A basic survey will need to be undertaken to establish the additional wiring requirements at the initial stage of this phase.

5.1.2. Luminaires, where specified, will be used with integral LED's. This is to ensure the reliability and longevity of the product.

- Open Office areas
- Walkways

5.2. Open Office Area

5.2.1. The open office areas will require a variety of light levels based on the task at hand, however an assumption that the minimal requirement in accordance with BS EN 12464-1:2021 will be required.

5.2.2. The Office areas will require grouping into areas between 3 – 6 tables of the required light levels outlined below in Figure 10.

5.2.3. Using the smart controls (Casambi[2] or similarly approved) the area controlled by the sensor is to increase to the desired light level in accordance with the relevant regulation, the immediate surrounding zone is to increase to 50% of its set light level, this is to avoid glare whilst saving energy (Figure 11 for a visual explanation).

5.2.4. When looking to install sensors within the bank ensure luminaires and functions of the luminaires surrounding are capable of the functions outlined within this section, any luminaires not capable should be replaced based on the specification outlined in Phase II (see Section 6).

5.2.5. Equipment specification in Table 7.

34.1	Filing, copying, etc.	300	500	0,40	80	19	100	100	75	
34.2	Writing, typing, reading, data processing	500	1 000	0,60	80	19	150	150	100	DSE-work, see 5.9 Room brightness, see 6.7 and Annex B Lighting should be controllable, see 6.2.4. For smaller cellular offices the wall requirement applies to the front wall. For other walls a lower requirement of minimum 75 lx could be accepted.
34.3	Technical drawing	750	1 500	0,70	80	16	150	150	100	DSE-work, see 5.9 room brightness, see 6.7

Figure 10 - Performance requirements

[2] https://casambi.com/

When the green area is occupied, light levels in this area (zone) are at 100% brightness.
Areas (zones) highlighted orange ,when the green area is occupied, will be at 50% brightness.

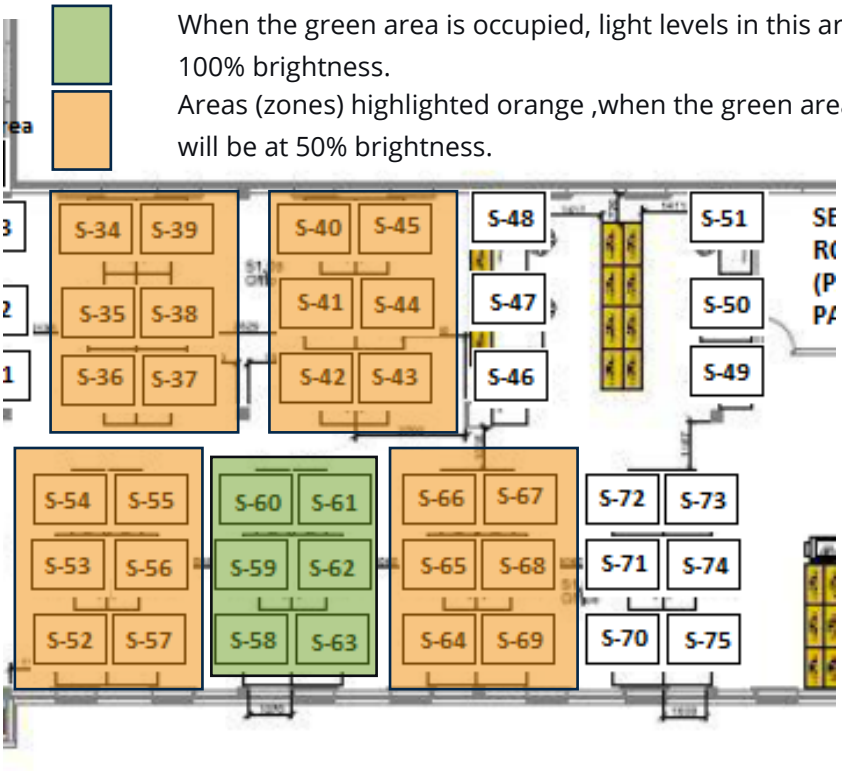


Figure 11: Visual for smart control sensors, zoning interaction.

Equipment Specification	Description
Correlated Colour Temperature (Kelvin)	N/A
Manufacturer	BEG Luxomat (or similarly approved)
Luminaire/Sensor Model	PD4N-CAS – (or similarly approved)
Brief description	Smart control-capable ceiling motion detector
Light Source	N/A
Installation Position	Central to the area
Mounting Arrangement	Ceiling mounted
Example Luminaire Image	
Controls	On when presence detected for 30 minutes, lux level set to 300Lux (minimum)
Additional Notes	Ceiling mounted PIR may require a Parent and Child sensor, if area is not covered by a singular parent sensor; contact the regional representative for more information.

Table 7 - Equipment specification

5.3. Walkways (circulation)

5.3.1. The Walkways (aka circulation areas) will be designed in accordance with the relevant section of the British Standard BS EN 12464-1:2022 as seen in Figure 12 .

5.3.2. Equipment specification in Table 8

Ref. no.	Type of task/activity area	$\bar{E}_m$ lx		U_o	R_a	R_{UGL}	$\bar{E}_{m,z}$ lx	$\bar{E}_{m,wall}$ lx	$\bar{E}_{m,ceiling}$ lx	Specific requirements
		required[a]	modified[b]				$U_o \geq 0{,}10$			
9.1	Corridors and circulation areas	100	150	0,40	40	28	50	50	30	Illuminance at floor level. R_a and R_{UGL} similar to adjacent areas. 150 lx if there are vehicles on the route. The lighting of exits and entrances shall provide a transition zone to avoid sudden changes in illuminance between inside and outside by day or night. Care should be taken to avoid glare to drivers and pedestrians
9.2	Stairs, escalators,	100	150	0,40	40	25	50	50	30	Illuminance at floor

Figure 12 - Performance requirements

Equipment Specification	Description	
Correlated Colour Temperature (Kelvin)	≤ 4500K	
Manufacturer	Ovia Lighting (or similarly approved)	
Luminaire/Sensor Model	OV9800WHMW (or similarly approved)	OV9800WHEMMWST (or similarly approved)
Brief description	20W LED Bulkhead Microwave Sensor	20W LED Bulkhead Microwave Sensor & Self-Test Emergency
Light Source	LED	
Installation Position	Replace like for like	
Mounting Arrangement	Ceiling mounted	

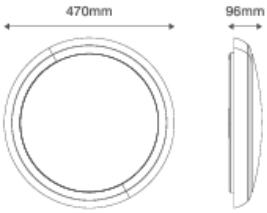
Example Luminaire Image	 
Controls	When Presence not detected, lighting is to be dimmed to 25% of the original output.

Table 4 - Equipment specification

5.4. Plant room

5.4.1. The Walkways (aka circulation areas) will be designed in accordance with the relevant section of the British Standard BS EN 12464-1:2022 as seen in Figure 13.

5.4.2. Equipment specification in Table 9.

Table 11 — General areas inside buildings – Control rooms

Ref. no.	Type of task/activity area	$\bar{E}_m$ lx		U_o	R_a	R_{UGL}	$\bar{E}_{m,z}$ lx	$\bar{E}_{m,wall}$ lx	$\bar{E}_{m,ceiling}$ lx	Specific requirements
		required[a]	modified[b]				$U_o \geq 0{,}10$			
11.1	Plant rooms, switch gear rooms	200	300	0,40	80	25	50	50	30	

Figure 13 - Performance requirements

Equipment Specification	Description	
Correlated Colour Temperature (Kelvin)	≤ 4500K	
Manufacturer	Ovia Lighting (or similarly approved)	
Luminaire/Sensor Model	OV80182 (or similarly approved)	O OV80182EM (or similarly approved)
Brief description	IP65 luminaire	IP65 luminaire & Self-Test Emergency
Light Source	LED	
Installation Position	Replace like for like	
Mounting Arrangement	Ceiling mounted	
Example Luminaire Image		
Controls	ON/OFF via light switch	

Table 95 - Equipment specification

6. PHASE III

6.1. Brief

6.1.1. This phase looks at the future maintenance schedule.

6.1.2. Many of the lights installed are retrofit luminaires, whilst these light sources are useful as an interim replacement for the fluorescent lamps, they pose potential issues such as, but not limited to, lower efficiency once in place, glare control issues, frequency issues, rewiring hazards and long-term reliability issues.

6.1.3. Due to the issues above a base strategy has been outlined below to set a minimum specification for the replacement of the luminaire types as they reach failure.

6.1.4. When a failed luminaire is to be replaced all controls are to be compatible with the sensor controls installed in Phase I and Phase II.

6.1.5. Where a luminaire is to be replaced a brief design of the zone (area) to ensure it complies with relevant sections of the British standard BS12464-1, CIBSE LG7, BS 5266 and LG12. Should these standards be superseded before the installation of this phase, please ensure the light levels on site are compliant with the current relevant standard.

6.2. Lighting Specification

6.2.1. See Table 10 for luminaire specifications.

Equipment Specification	Description		
Correlated Colour Temperature (Kelvin)	≤ 4500K		
	Ovia Lighting (or similarly approved)		
Luminaires to be replaced	600 x 600 recessed module	1200 x 600 recessed module	Surface mount batten (IP20, IP44 or IP65)
Minimum Lumens per circuit watt	110 Lumens per Circuit watt		
Diffuser type	Low Glare	Low Glare	Opal/Frosted
Brief description	IP65 luminaire	IP65 luminaire & Self-Test Emergency	
Light Source	LED		
Installation Position	Replace like for like		
Mounting Arrangement	Ceiling mounted		
Warranty	1 year onsite warranty 5 years parts warranty minimum		
TM66 Score[3]	2.4 or greater		1.5 or greater

Table 106 - Equipment specification

[3] https://www.cibse.org/knowledge-research/knowledge-portal/tm66-creating-a-circular-economy-in-the-lighting-industry

7. POTENTIAL FOR ENERGY SAVING PER PHASE.

7.1. Brief

7.1.1. As many of the luminaries/lamps have already been replaced with LED alternatives. Little to no savings will be made in the short term by replacing these fittings, as such Phase III will save long term maintenance fees and not energy consumption.

7.1.2. Phase I and Phase II will see energy savings by ensuring the lights are switched off or dimmed when not in use.

7.1.3. Based on the stairwells the current consumption would be roughly 4.7Kw's per day (excluding ballast consumption), using the proposed luminaries with an estimated constant occupancy of 8 hours in this area this would reduce to an estimated 1.7Kw's a day. The stair well calculation has been based on the original fittings being 28W 2D lamps 7 fittings per stairwell, on for 24 hours, this is then reduced to 8-hour 100% consumption of the new fitting (20W LED) with the remaining 16 hours consuming 25% of the total energy consumption.

7.1.4. Across the 3 stairwells this would look to save a total of 9kw's a day. With the inclusion of the other areas in question, the consumption is estimated to drop by roughly 72Kw's per day, however this may vary based on the foot traffic and daylight factors. This is based on roughly 42 rooms altered with 12 hours current usage, occupied for 4-6 hours a day at varying wattages and the combined savings in the stairwells.

7.1.5. The second phase of the strategy will reduce the energy consumption again by the zoning of the lights and the smart controls approach to the open office areas. Again, the estimated savings will come from the reduction of light where required and has the potential to save an estimated 66.7kw's across the three floors, per day. This is based on an estimated daily consumption of 100.1Kw's a day (12 hours straight usage across 232 Luminaries) reduced to roughly 56.6Kw's (based on 8 hours a day total of 50% running occupancy across the 232 luminaires.

This isn't the end...

We don't just have the solution for what you need today. We also have the solutions you might need for the future. We have dedicated teams that deliver.

- Lighting Impact and Planning teams that focus on delivering the most effective and sensitive lighting solutions to support planning.
- Residential teams that cover all aspects of new development and redevelopment spanning private, section 38 and section 278 design packages.
- Public Realm teams that are experts in enhancing night-time public spaces to create inviting spaces and opportunity for local economies to thrive during the hours of darkness.
- Electrical teams – we don't just put a light in the ground, we can help you get power to it as well! Additionally, we also offer design services for EV charging. As this market rapidly expands, make sure you have the experts managing the load, otherwise your EV charging solutions might not live up to expectations.
- Strategic Infrastructure teams that offer Lighting and Electrical expertise for complex transport networks and interchanges.
- Consultancy Services teams that help when you know what you want but you need someone to help you turn the idea into a project.

Finally, as innovators, you might be facing something bespoke or niche. Don't worry – we might have the answer you need. Feel free to get in touch!

THE POWER TO MAKE LIGHT WORK

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