

VOLVO Ireland Lighting VRE Performance Specification 2026



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ArcSolas X ERCO

ERCO is a leading international specialist in efficient architectural lighting with LED technology. The family-owned business in Lüdenscheid in the heart of Germany, operates as a global player with independent sales and partner organisations in around 55 countries. Founded in 1934, ERCO pioneered architectural lighting across Europe in the 1960s. In 2015, the company became the first established luminaire manufacturer with a portfolio based entirely on LED technology. ERCO Greenology®, the corporate strategy for sustainable lighting, combines ecological responsibility with technological expertise. Around 1,000 committed and dedicated ERCO employees worldwide ensure that LED technology does not remain just a technology, but is further developed into sustainable lighting tools.

Arcsolas Lighting serves as the official Irish sales agency and partner for ERCO, seamlessly bridging high-end German lighting engineering with the local architectural and design community. By combining ERCO's premium portfolio of sustainable, precision-engineered architectural LED luminaires with Arcsolas's deep regional market knowledge, hands-on technical consulting, and localized project support, the partnership delivers end-to-end lighting solutions across Ireland. Together, they guide architects, interior designers, lighting designers, and engineers through every project phase - from initial concept design and sampling to final installation and commissioning - ensuring world-class optical performance and efficient light application for commercial, cultural, and public spaces.

The world around us is three-dimensional. We understand light as an independent, fourth dimension of architecture – and thus as an integral part of sustainable building. Light is the contribution to making society and architecture better and, at the same time, preserving our environment. Our lighting solutions lend buildings, offices and outdoor facilities an additional design dimension and give added value to the people who use them on a daily basis.

Cornerstones of our activity are a passion for visual comfort, technology, design, energy efficiency and customer consultation. We develop high quality, tailor-made and effective lighting solutions for both small and large pioneering construction projects in the urban centres of this world. Light should only be used where it is needed – in other words, where human perception requires it. Perception-orientated lighting design (Human Centric Lighting), implemented in the context of efficient visual comfort, is our mission.

The luminaires are carefully developed and manufactured with a view to the future in our Lüdenscheid light factory, and at the same time our lighting consultants support lighting designers around the globe in implementing their lighting concepts in the best possible way. We develop luminaires according to specifications that are individually tailored to the projects and requirements of our customers.



Light is our contribution to making society and architecture better and, at the same time, preserving our environment. We understand light as the fourth dimension of architecture – and thus as an integral part of sustainable building.

ERCO Greenology as a term combines ecological responsibility with technological expertise and is our strategy for sustainable lighting. The sustainable production of durable and efficient luminaires as well as perception-oriented lighting design according to the Human Centric Lighting principle are the pillars of this strategy. Our goal is the CO2 neutral production of lighting tools to make light as effective and therefore as sustainable as possible in application. Lighting Durability stands for our development goal, according to which all newly developed ERCO products are designed for a service life of no less than 20 years. This corresponds to about 75,000 operating hours with a period of illumination of about ten hours per day over 365 days.

ERCO was the first classic luminaire manufacturer to exclusively develop LED light. Production at our location in Germany guarantees the maximum precision and quality of our lighting tools – one more reason why we call ourselves the Light Factory. But is the metaphor of a factory not slightly outdated in the era of digitalisation? Not at all. Whilst development work for our innovations may, in some ways, be more representative of the agile, networked approach of digital start-ups, we combine this with the deep-seated experience of a traditional industrial company that enables us to concentrate on what ERCO has always done best – perfecting architectural light with ultimate precision. The fact that design, production and assembly are all carried out under one roof simplifies our interdisciplinary dialogue and enables maximum quality. Supported by our

international network of ERCO lighting consultants and partner agents, the latest requirements from practice as specified by architects, lighting designers and electrical contractors consistently flow into our development processes.

Our attitude

Lighting requires energy. Manufacturers, designers, engineers and users are obliged to use limited resources to the greatest effect. We help you rise to this challenge by supplying only the most efficient LED technology. Efficient visual comfort (EVC) means a permanent and consistent optimisation of both the energy efficiency and the light quality through innovative technical concepts that enable sustainable lighting design. EVC, as a strategy, rests on the intent of designing light with focus on the user based on the principles of human perception, requirements of the space and efficient glare control, thereby minimising energy usage. We have defined five quality factors that describe efficient visual comfort:

Qualitative lighting design

In putting people at the heart of its strategy, we develop and design products with focus on a careful, perception-orientated approach to lighting design. ERCO lighting technology uses light to create hierarchies of perception, and specifically, to ensure optimised performance of the visual task at hand. Qualitative lighting design centres on vertical illuminance and accentuation, as well as glare control. Glare-free surroundings with consistent luminance levels are easier on the eye, eliminating the need to adapt constantly to changing lighting conditions. This enables the designer to produce an energy-efficient solution based on lower illuminance levels and subtle contrasts.

Vertical illuminance

Due to the natural orientation of our visual field, the vertical planes of an environment constitute around 80% of our perception, making them far more important to the subjective perception of brightness than the light on horizontal surfaces. Vertical illuminance, therefore, is a characteristic feature of well-designed and economical lighting concepts. ERCO offers an exceptionally wide range of appropriate lighting tools. Our wallwashers produce a wide and spacious impression of the room whilst reducing visual contrasts to provide excellent lighting for the workplace with minimal energy requirements. The use of LED technology pays off yet again here by producing light of utmost precision and uniformity and ensuring maximum efficiency in energy use and maintenance. The large luminaire spacing possible with ERCO's wallwashers supports the cost-efficient context of vertical illuminance.

Effective lighting technology

Efficient, precise optical systems lower the energy requirement for lighting. A comprehensive array of solutions ensures optimised light distribution for specific lighting tasks. This extends from the asymmetrical wallwasher to various spotlight characteristics. ERCO lighting tools offer highly effective technology designed to direct the light

specifically onto surfaces relevant to perception. The projected light of LEDs, combined with the high-quality lens systems provided by ERCO, ensures significant efficiency advantages over conventional light guidance through reflection.

Intelligent lighting control

ERCO offers luminaires for wireless and wired control technologies such as Casambi Bluetooth, DALI and phase dimming. This makes scenic lighting uncomplicated and accessible. Typical is the use of sensors to dim or switch off light in unused rooms according to presence and daylight. With Casambi Bluetooth control via smartphone or tablet, luminaires can be individually switched and dimmed, light scenes set up and sensors integrated. ERCO lighting tools, thanks to in-house developed control gear, feature optimised dimming behaviour, are mostly suitable for film recording and can be continuously dimmed down to 1%.

Efficient LED technology

ERCO's accomplishments and leading role in architectural lighting with LED are based on the decision to draw on its own expertise in optoelectronics. With in-house development – from LED PCBs and electronics to thermal management – ERCO is always in control of its products and their specific characteristics. Therein lies the basis for the efficiency of our luminaires and the principle at the core of each and every ERCO lighting tool: specifying the highest standards for our high-power LEDs, based on criteria such as colour rendering and constancy, luminous flux and thermal stability, enables us to guarantee consistently exceptional quality in terms of luminous efficacy and long life.

Qualitative lighting design

ERCO lighting tools afford the creative scope required for the lighting design of complex building projects. With this in mind, our products are developed on the basis of a perception-orientated approach to lighting design. The American architect and lighting designer Richard Kelly (1910-1977) distinguished the qualities of light into three basic functions: ambient luminescence, focal glow and play of brilliants. This “language of light” is an optimal solution for the illumination of architecture – from the large open-plan office and boutique through to the library – as it contributes significantly to meeting the requirements of its users. Experience has shown that lighting concepts are considered to be pleasing and successful when all three components – ambient lighting, directed accent light and decorative lighting effects – are present in a well-balanced relationship. The “language of light” is a reliable approach used to analyse and structure lighting concepts and to select the right lighting tools. With a variety of light distribution patterns, warm white and neutral white light, different sizes and lumen categories, the system design for the luminaires in our extensive ERCO range offers all the components required for a differentiated and user-focused lighting concept.

Light is essential. Light is poetic. Light provides atmosphere and orientation. People have always used light as a way of creating harmonious places. ERCO understands light as the fourth dimension of architecture. As a design feature in its own right, light can model space and objects using different levels of illuminance and alter the nocturnal appearance of architecture significantly. The ERCO product range is based entirely on LED technology, as a logical consequence of our position in delivering perfect light. LED light, with its flexibility and precision, has

widened the options of modelling architecture significantly and can now satisfy any and all requirements. Our lighting tools are developed in close collaboration with architects, lighting designers and electrical consultants. Intensive dialogue with the industry stakeholders gives ERCO a clear, realistic and yet also a visionary idea of what the designer requires. Creative thinking inspires us, and we want to share this inspiration. We see our role as consultants, working in the background to support designers in the implementation of their concepts with targeted solutions.

Engineering excellence for the light of the future

ERCO develops, designs and produces all the digital lighting tools at its Lüdenscheid base on the southern edge of the Rhine-Ruhr metropolitan area, in an award-winning facility including laboratories, production and offices, that has been recognised for its architectural merits. It was here that ERCO made the strategic decision in 2006 to focus consistently on LED technology – and to draw on its expertise in optoelectronics. This timely decision has taken the ERCO LED lighting technology to an unparalleled level of excellence that combines with an intelligent system design to offer sophisticated solutions for many and diverse applications in architectural lighting. Genuine passion for innovative technology and state-of-the-art architecture was, is, and remains a key component of the ERCO brand. The synthesis of our perfectionist approach to technical detail and our strategic insight into sustainable, sophisticated and user-oriented architectural lighting permeates every aspect of our work. It is defined by a holistic mind-set that centres on close interdisciplinary collaboration with lighting technicians, design and production engineers, and designers. This dynamic dialogue between the ERCO experts manifests itself in highly efficient and agile product development and enables us to drive innovations, regularly launching premium products at a fast pace.

Research and development

As a cosmopolitan company with a global brand, ERCO keeps its finger on the pulse of the international lighting and architecture scene, allowing us to translate major trends in technology and design into sophisticated lighting tools. Considering that the quality of the lens system has a huge impact on the characteristics, performance and efficiency of an LED luminaire, ERCO sees a focus of its development work on optoelectronics as the interface between optical systems, electronics and information technology. All products are tested in our in-house laboratory to ensure that they meet the highest standards of performance, light quality and longevity. This holistic approach of considering light as a single unit, from the specification of high-power LEDs to the development of lens systems and control gear through to the creative challenges of a targeted design concept for each project, enables us to guarantee a consistently high quality of our products based on state-of-the-art LED technology.

Product design

From the corporate architecture of our factory through to the clear style of our lighting tools and our meticulous corporate image – design has always been at the heart of ERCO's process. Strong concepts and creativity form the backbone of a design team focused on the creation of a distinct design language for our LED product range on the principles of functional minimalism. At the same time, our team is permanently engaged with advancing our archetypal, modular system principles, whereby aesthetic aspects of spatial design are given the same attention as functional parameters such as efficient thermal management and glare control. Available

in several sizes and with different mounting options, the luminaires in the ERCO range offer an appropriate solution for a wide variety of applications as well as spatial settings and dimensions.

Production and Assembly

All processes at the Lüdenscheid facility, from electronics and tool manufacturing all the way to polymer production and metal-working, are closely monitored by ERCO experts and consistently optimised to guarantee efficiency and superior quality. Our electronics production is ESD-secure and the controlled reflow process is continuously monitored, for optimised assembly based on a meticulously researched time and temperature profile. The result is products that ensure long life and remarkably low failure rates. The same attention to detail carries through to the in-house production of ERCO track, providing designers and fitters with the best possible infrastructure to support the installation of lighting systems. Our suppliers are just as carefully selected for lasting partnerships built on trust. Working closely as a team, with short distances between development and production, ensures that ERCO customers can rely on our products 100%.

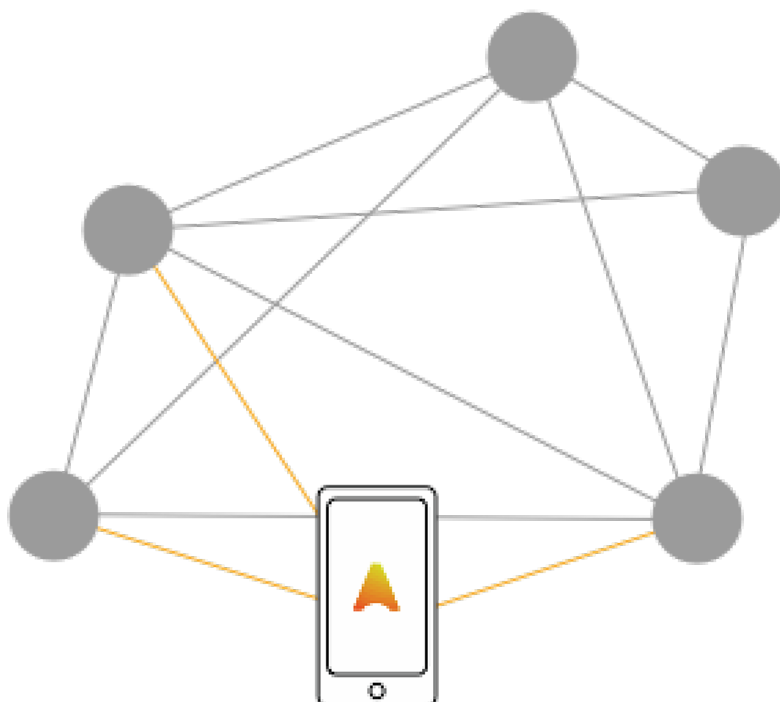
Casambi Bluetooth Control

Casambi is the leading provider of smart lighting control solutions, connecting wireless, wired (DALI), and hybrid systems into one unified platform. Casambi is an open ecosystem that includes thousands of luminaires, drivers, sensors, and switches from more than 300 leading manufacturers.

Casambi is partnered with ERCO Lighting to provide fully integrated control solutions within all ERCO platforms.

Advantages of Casambi Bluetooth control:

- **Simple Operation** – The Casambi app interface enables luminaires to be switched and dimmed via radio technology. Even the programming of light scenes is simple via tablet or smartphone.
- **Gallery Function** – control individual or grouped luminaires by self-photographed images in the showroom designated to particular areas.
- **Integrated** – Casambi Bluetooth technology is integrated into our in-house developed control gear. Without additional hardware components, the luminaires communicate with each other and with compatible smartphones or tablets via the Bluetooth LE wireless standard.
- **Secure Cloud Technology** – Network settings are saved and synchronized across all devices. This enables high flexibility and security – even if mobile devices change.
- **Robust Mesh Network** – luminaires form a mesh network in conjunction with operating units and function as both transmitter and receiver. This makes Casambi Bluetooth fail-safe, even in expansive or enclosed spaces.



Mood Board Lighting Concept

The lighting design of the showroom has the task to enhance the materials and shapes of cars and other products. The light should also feel inviting, bring out the best of the architecture to give the customers an experience. At the same time it should be a good work environment for the employees working in the showroom.

The Street area will use a crisp 4000K 97CRI lighting CCT to emphasise the product zones and bring out the crisp lines of each vehicle whilst the Living Room and office areas will differentiate with a 3000K 97CRI lighting CCT to create a sense of comfort and luxury.

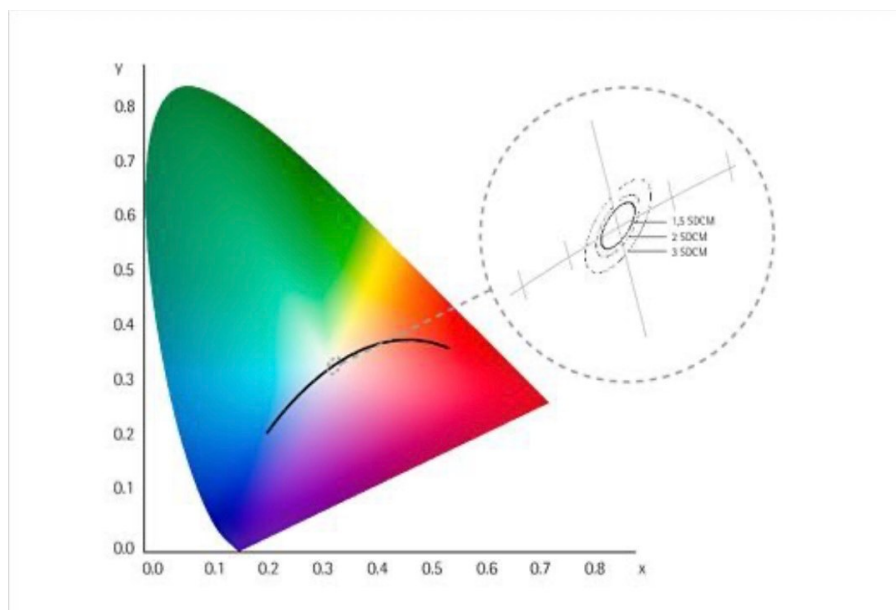
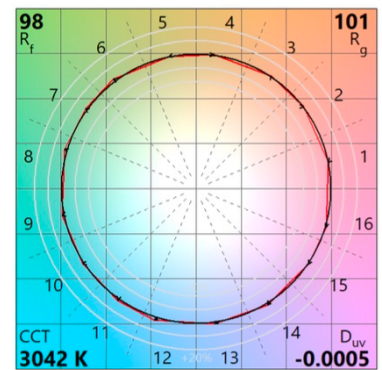
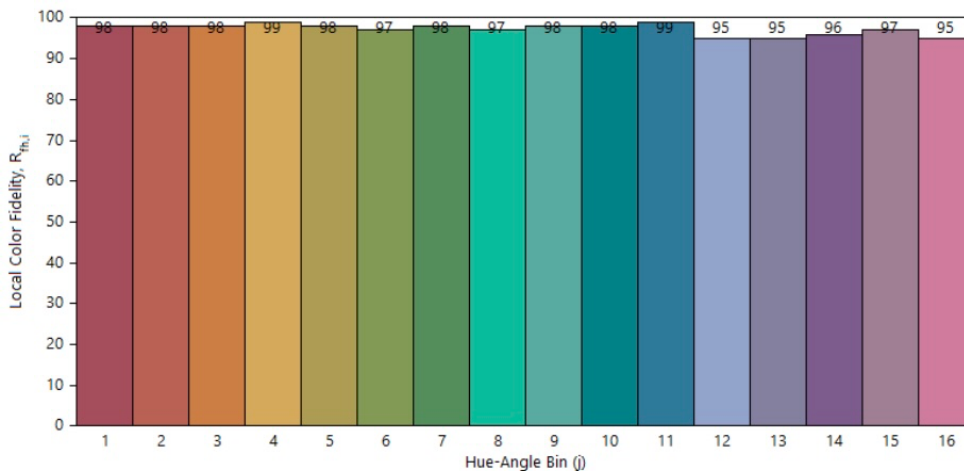


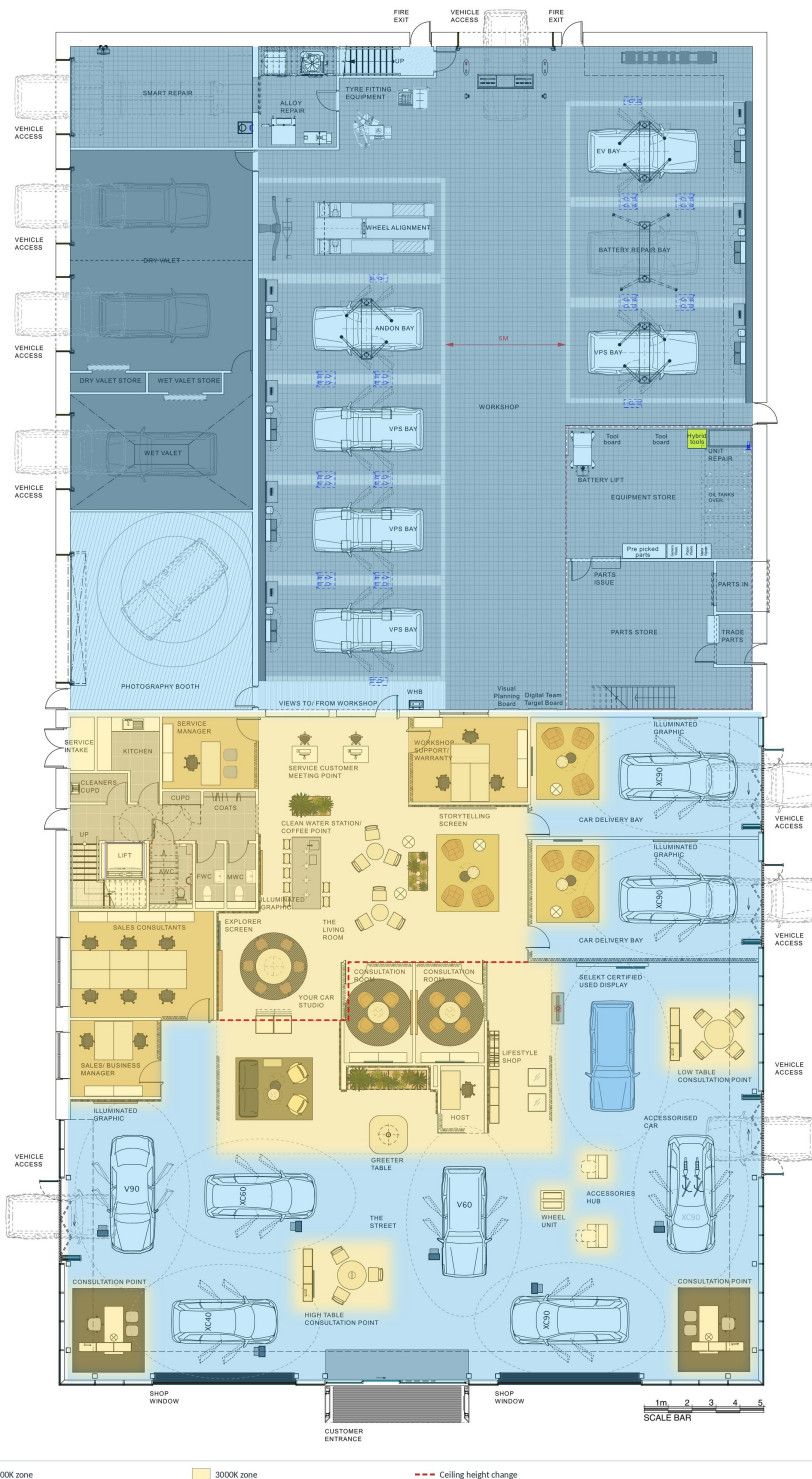
Colour Temperature Overview

4000K Ra 97 3000K Ra 97

We suggest LED with excellent colour rendering for the lighting design of the showroom. All lighting elements in the Street and Living Room areas as well as in the office and staff areas will be 97CRI to ensure the closest possible representation of all materials in relation to natural daylight.

Further to the above, CRI calculations must be supported by detailed TM30-15 colour charts and reports to define the quality of the LED chip in terms of its combined Colour Ra. This must also be combined with the SDCM chart – colour deviation over beam angle – and must be between industry leading at 2SDCM or less.





4000K is perfect to show the materials of the cars. This will be used in The Street, the Selekt display and the car handover bays as well as in the workshop and ancillary areas for continuity.

The living room, consultation points, merchandise plinths, handover seating, reception, meeting rooms and back office will have a warmer and more luxurious feeling with colour temperature of 3000K.

(Universal layout – revised October 2026)

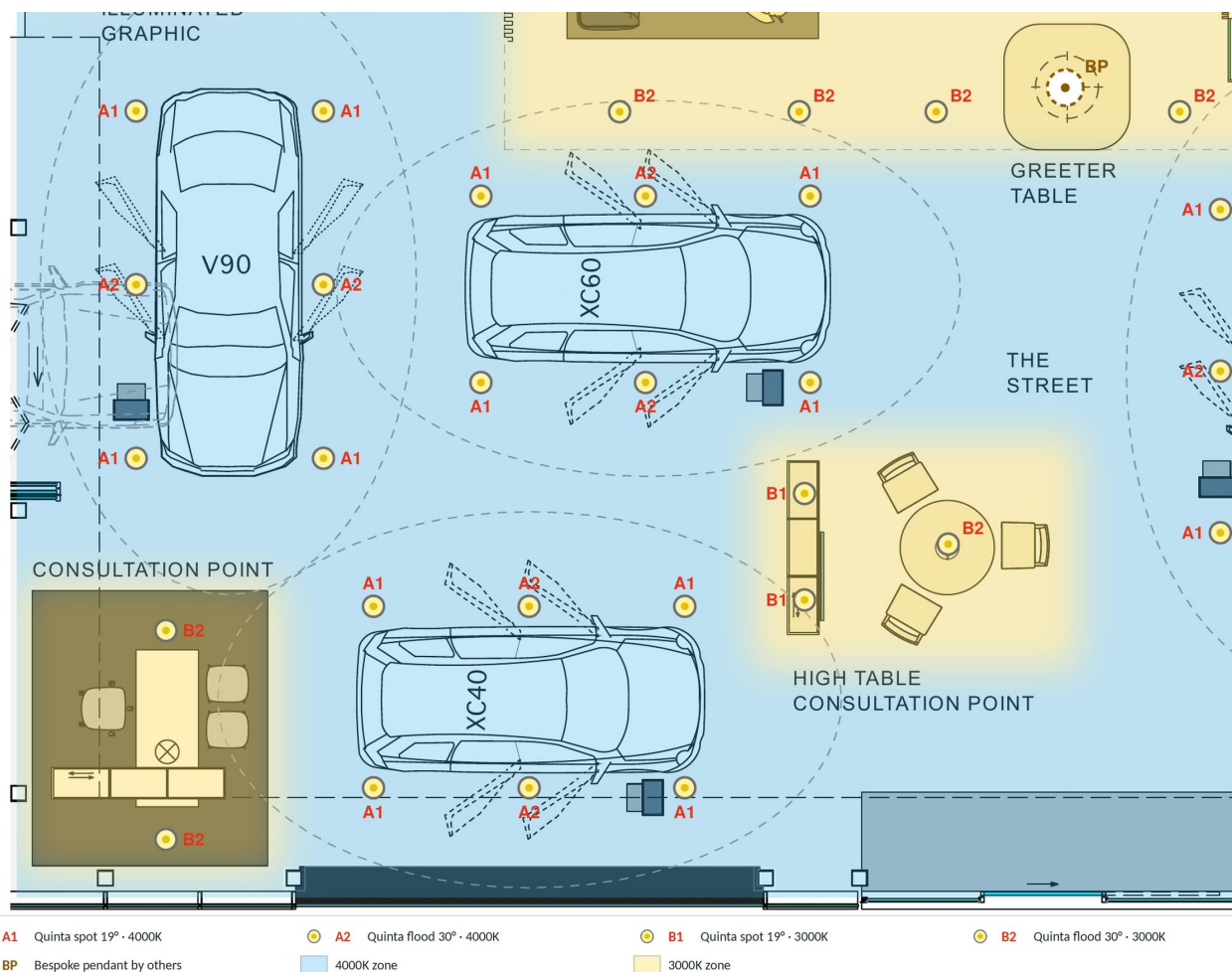
The Street

To only highlight the cars and not the areas in between is both good for the experience of the product and for the energy consumption. Less is more!

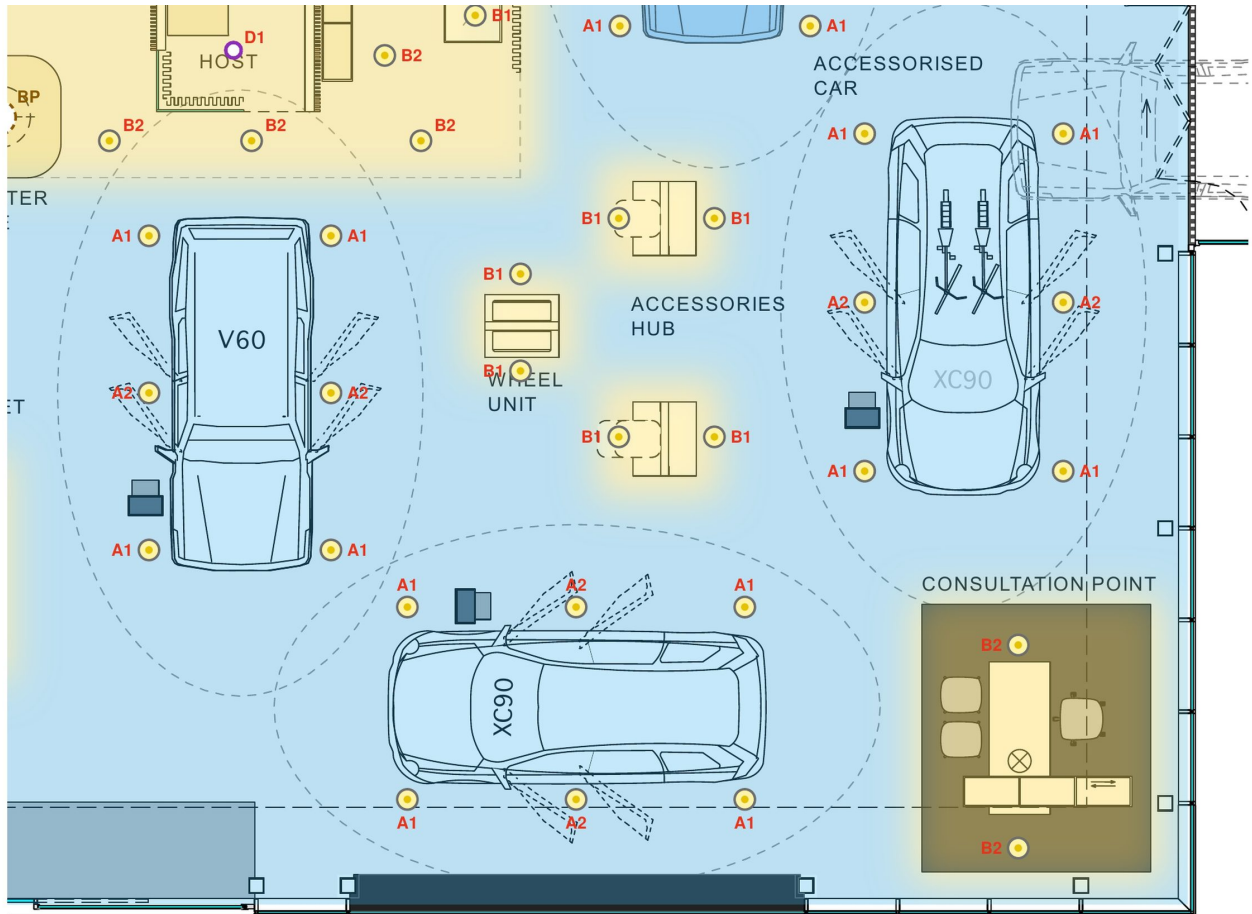
To watch the cars in the window display should be an experience too.

The luminaires in the Street are only aimed towards the cars to accentuate them. The general lighting comes from the reflected light from the cars. The luminaires that illuminate the car bonnet should be mounted and aimed from the sides so you don't have disturbing shadows when opening the bonnet.

- Accent lighting cars: 1200-1500 lux
- General lighting between the cars: 150-300 lux



(Universal layout – The Street, west)



- | | | | |
|------------------------------|-------------------------------|------------------------------|-------------------------------|
| ● A1 Quinta spot 19° - 4000K | ● A2 Quinta flood 30° - 4000K | ● B1 Quinta spot 19° - 3000K | ● B2 Quinta flood 30° - 3000K |
| ○ D1 IKU wide flood 55° | ■ 4000K zone | ■ 3000K zone | |

(Universal layout – The Street, east)



The Living Room

The Living Room area should emphasise luxury and comfort. Use of 3000K warm white lighting with focal and ambient lighting layers will create a welcoming space and a natural transition from the cooler tone of the Street space.

In addition to any architectural pendant lighting, the lighting concept will be transformed to work in a homogenous way with the architectural wood slatted ceiling. ERCO Compar cell downlights with a black mounting frame will create a floating effect to the luminaire within the wood slat spaces whilst providing focal and ambient lighting to the space below.

Special emphasis will be given – through lux level changes – to the service interaction points so as to provide subconscious direction and circulation within the space.

A lower, more comfortable lux level will be implemented in this space, with desks and interaction points lit to 500lux and then tapering off to seating areas at 200lux and ambient light levels of 150lux.

Back office, consultation rooms, office and staff room are illuminated with downlights fulfilling LG7 guidelines and EN12464-1 standards with specific goals of achieving 300-500 lux on the desk areas and <UGR19 for glare ratings in each space.







Car Delivery Experience

This area should inject some drama into the lighting concept. Where possible, recessed directional lighting with dark light optic should be used to create an over-emphasised halo effect on the car without any glare distraction from the lighting elements.

The customer will experience their new vehicle in the most luxurious setting, perfectly lit and secluded from the wider showroom scene.



Workshop Lighting (VSE)

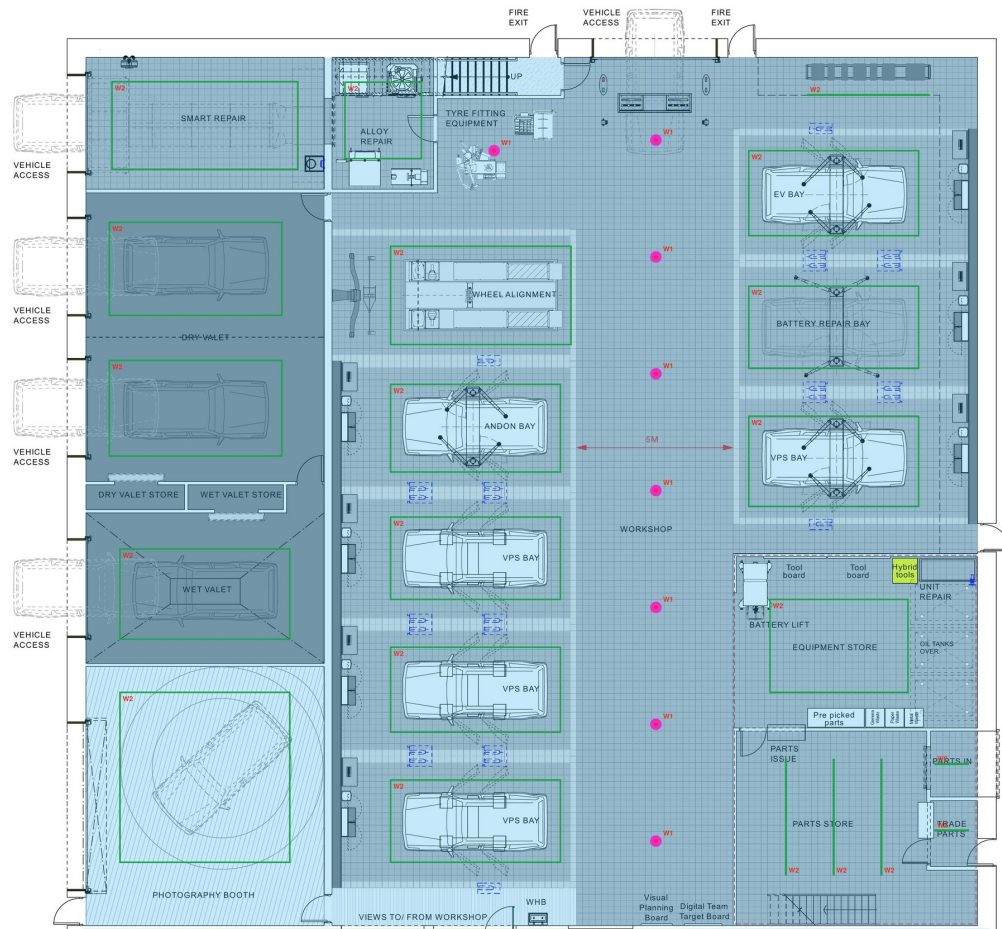
In line with the Volvo VSE standard, the workshop lighting will be upgraded and matched with The Street to create a comprehensive lighting design language between front and back of house areas.

To achieve this, each car bay will have its own dedicated lighting scheme, consisting of a large suspended rectangle of high output cell linear, with a minimum IP40 rating and grazing optic to project light towards each vehicle.

Each bay will be lit to approx. 2000 lux for maximum visual clarity whilst working on the vehicle and to provide ambient light within each bay.

The lighting CCT will be 4000K matched to The Street so there is consistency in lighting tone and feel with a Colour Rendering Index of 90+CRI.

Supplementary lighting to the space will be provided by high output, double focus, low glare pendants as per the ERCO Atrium luminaire.



W1 Atrium pendant 28°

W2 Jordan IP linear grazer

Exterior Lighting

The exterior lighting off all dealerships should emphasise the premium nature of the brand and also display the inventory clearly.

Where there are specific raised or defined locations for new or used vehicles, these should be emphasised through the use of focal lighting.

Consideration should be given for the surrounding area not only in terms of use and interaction but also in terms of visual comfort and lighting temperature. Recessed in ground up lights as well as projectors should be used to emphasise cars and define these areas away from the ambient levels of light achieved by simple flood lighting and exterior street lighting.



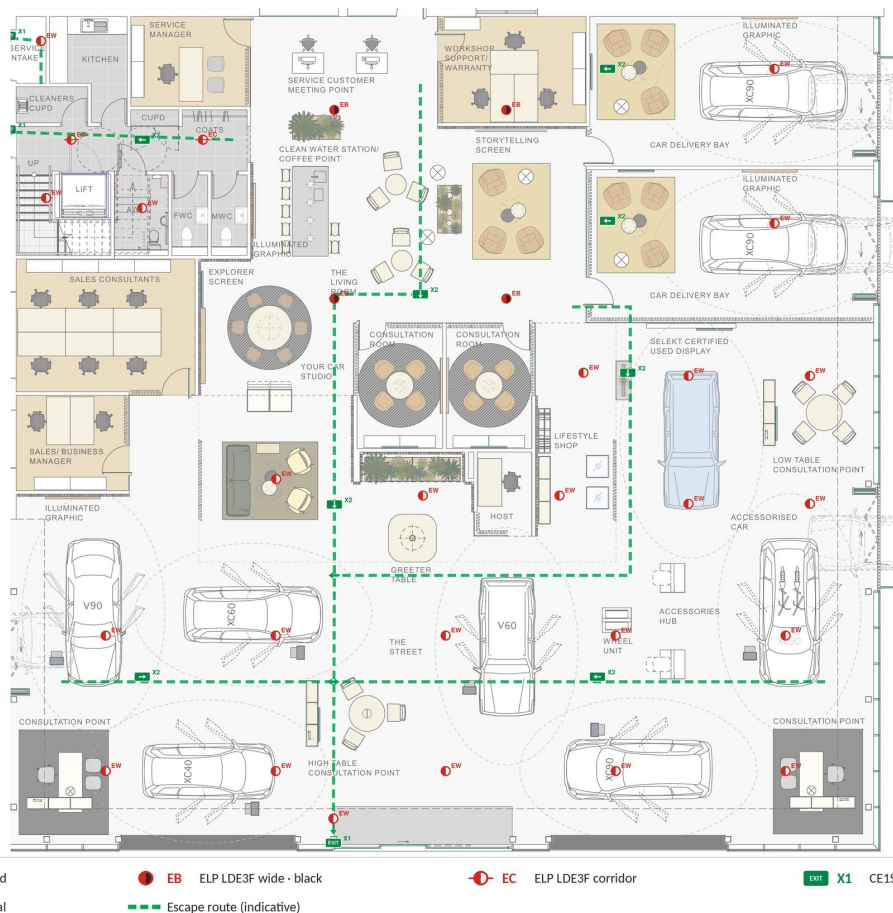
Emergency Lighting

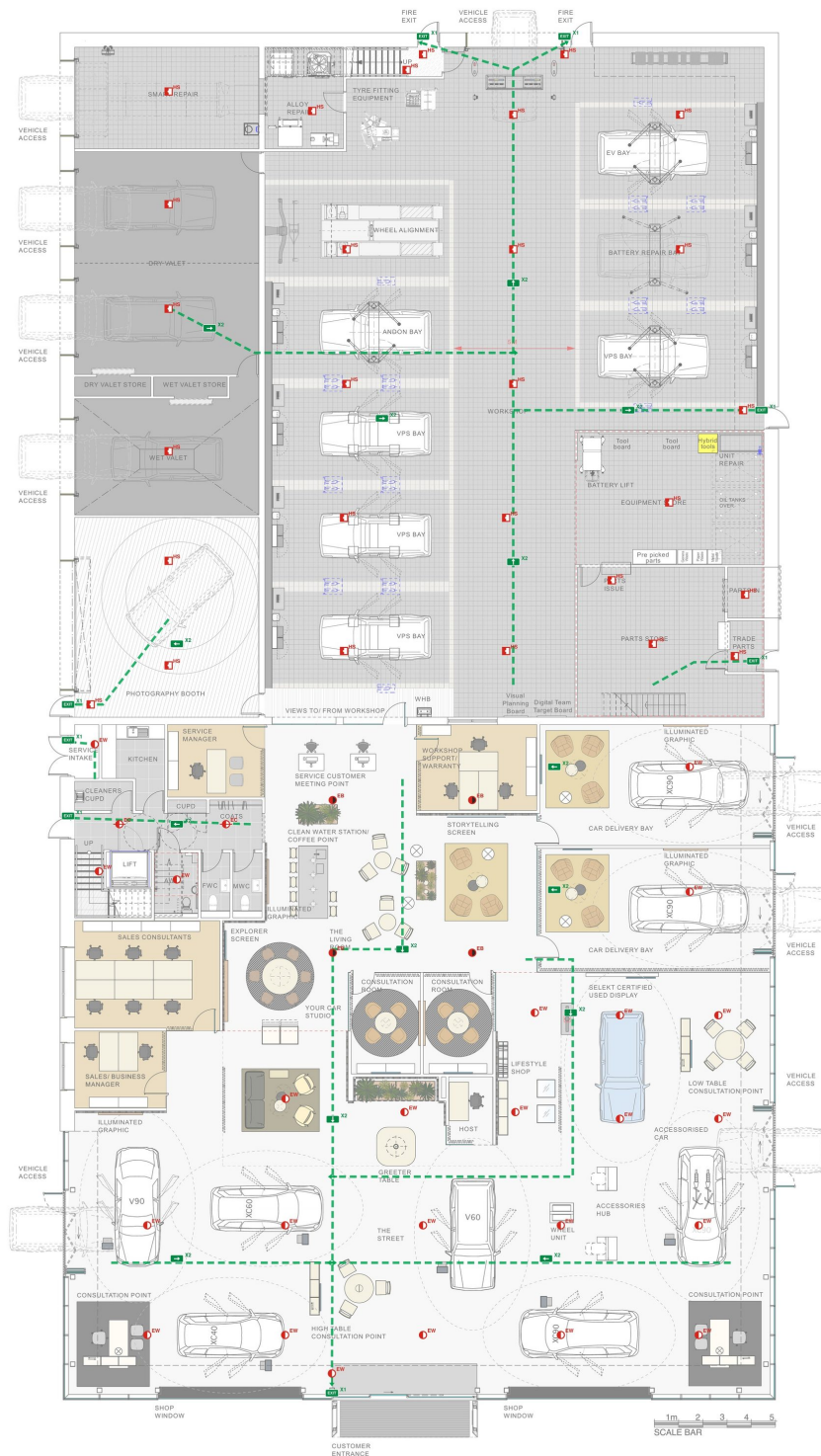
Emergency lighting has been coordinated with the architectural lighting scheme so that escape routes, open areas and exits are clearly lit on failure of the normal supply, without compromising the clean ceiling planes of the showroom.

Front of house areas – The Street, Living Room, offices and staff areas – use miniature recessed ELP LDE3F emergency downlights with in-line LDCK330/40 emergency kits. A black body version is used within the Living Room's dark slatted ceiling so the fittings recede into the architecture.

The workshop, valet bays, photography booth and parts stores use Liteplan Halo Surface Square emergency luminaires, suspended on conduit drops to approx. 4m for improved coverage and ease of testing and maintenance. Liteplan CE1S exit signs are provided above all final exits, with double-sided directional signs at each change of direction along the escape routes.

- Escape routes: minimum 1 lux on the centre line • open areas: minimum 0.5 lux
- Duration: 3 hours non-maintained • DALI-2 self-test to Halo luminaires and exit signs
- Design to I.S. 3217:2023 and I.S. EN 1838





Emergency luminaires and exit signs are located to cover all escape routes, open areas and points of emphasis including every final exit, stair, accessible WC and change of direction.

- EW** LDE3F wide, white ×24
- EB** LDE3F wide, black ×4
- EC** LDE3F corridor ×2
- HS** Halo surface ×28
- EXIT X1** Exit sign, final exit ×8
- EXIT X2** Exit sign, directional ×14
- Escape route (indicative)

Front of house fittings are recessed; workshop fittings are surface mounted and suspended.

(Universal layout – emergency lighting)

Approved Luminaires

The Street

ERCO Quinta Directional Downlight Family

Example: A6000213, A6001957 etc



The Living Room

ERCO Compar Cell Downlight Family

Example: Flood 55215, Oval 54134



Offices

ERCO IKU Downlight Family

Example: A2000427, A2000384



Bathrooms & W/C

ERCO Skim Downlight Family

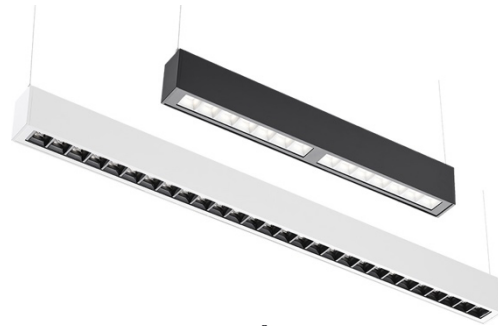
Example: 52130, 52145



Workshop

Jordan Reflektors

Example: Linialite Cell Black Bespoke



ERCO Atrium Pendant Family



Exterior

ERCO Beamer Projector Family



ERCO Tesis In-Ground Uplight



****Volvo Ireland and ArcSolas Lighting reserve the right to adjust approved fittings in use based on project and site constraints but within the performance specification parameters****

Approved Luminaires – Emergency

Front of House

ELP LDE3F Miniature Emergency Downlight

Example: LDCK330/40/WW, /WB, /CW



Workshop & Back of House

Liteplan Halo Surface Square Emergency LED

Example: CSW/1/DA/OA



Exit Signage

Liteplan CE1S Surface Mount Exit Sign

Example: CE1S/DA/AU, CE1S/DA/ALAR



****Volvo Ireland and ArcSolas Lighting reserve the right to adjust approved fittings in use based on project and site constraints but within the performance specification parameters****

LUMINAIRE SCHEDULE & SPECIFICATION

Solvo Ireland — Universal Retail — Ground Floor Plan (Overall)

MINAIRE SPECIFICATION



Quanta directional downlight

- A1, A2, B1, B2
- ERCO - movement, adjustable
- 255 x 250mm white
- A: 30.5W 388lm/14000K
- B: 30.5W 388lm/2700K
- IP20, 10000h
- RA 97+, ESCO 1.5
- Spot 19° flood 30°
- Control: DALI or integral
- Load 10-250W



IKU downlight
D1
 EERO - recessed
 113 x 101 mm white/silver
 9W 151lm 3000K
 Beam angle 11.5°
 Wide beam 90°
 Cosine 0.95 Integral
 L80B19 50,000h



Skin downlight

E1

E1ECO recessed
 118 x 75mm white
 12-4W 133lm 3000K
 Max. load 10W
 Max. height 1.5
 Wide flood 80°
 Casambi BLE Integral
 L90819 50,000h



Atrium double-focus pendant
W1

BRCC suspended
 187 x 351 mm
 37.2W 4427lm 4000K
 180° beam angle
 1000lm CCT 1.3
 Fixed 20°
 Switched on/off
 L90/B10 50,000h



Hi-LED IP linear
W2

- Available by ENEC suspended
- IP40 minimum
- 150W - 400W
- Micro dimmer
- Micro dimmer optic
- Switched output
- L90B10 TBC

MINAIRE SCHEDULE

	Ref	Luminaire type	Manufacturer	LED spec	Output (LMF)	Dimensions	Location	Beam	Control	CCT	CRI	Finish	Oty
A1	A1	Directional Downlight – Quanta	ERCO	30.5W 3832lm	295lm ~ 79lm/W	255 x 220mm	Street – vehicles	Spot 19°	Casambi BLE integral	4000K	97+	White	36
	A2	Directional Downlight – Quanta	ERCO	30.5W 3832lm	2975lm ~ 79lm/W	255 x 230mm	Street – vehicles	Flood 30°	Casambi BLE integral	4000K	97+	White	18
B1	B1	Directional Downlight – Quanta	ERCO	30.3W 2854lm	2004lm ~ 59lm/W	255 x 230mm	Merchandise printers / benches / recycle shop	Spot 19°	Casambi BLE integral	3000K	97+	White	14
B2	B2	Directional Downlight – Quanta	ERCO	30.3W 2854lm	1987lm ~ 58lm/W	255 x 230mm	Consultation points / Living Room higher ceiling	Flood 30°	Casambi BLE integral	3000K	97+	White	23
	B3	Compax Linear Cell	ERCO	12.1W 1163lm	1015lm ~ 70lm/W	210 x 62 x 100mm	Service customer meeting points	Flood 30°	Casambi BLE integral	3000K	97+	Black	2
C1	C1	Compax Linear Cell	ERCO	12.1W 1163lm	854lm ~ 59lm/W	210 x 62 x 100mm	Living Room planters	Over flood 32° x 64°	Casambi BLE integral	3000K	97+	Black	4
C2	C2	Compax Linear Cell	ERCO	12.1W 1163lm	879lm ~ 51lm/W	210 x 62 x 100mm	Living Room lower ceiling – ambient	Over wide flood 86° x 53°	Casambi BLE integral	3000K	97+	Black	13
	C3	IKU	ERCO	9W 1517lm	1133lm ~ 107lm/W	113 x 101mm	Offices / consultation rooms / rest	Wide flood 55°	Casambi BLE integral	3000K	92	White/Silver	28
D1	D1	Slim	ERCO	12.4W 1338lm	1172lm ~ 76lm/W	118 x 75mm	Bathrooms /itchens	Wide flood 60°	Casambi BLE integral	3000K	92	White	11
E1	E1	Aidon Double Focus Pendant	ERCO	37.3W 4427lm	3117lm ~ 71lm/W	167 x 351mm	Service area	Flood 28°	Switch on/off	4000K	90+	TBC	8
E2	E2	H-LED P Linear	Jordans by ERCO	TBC	TBC	TBC	Service bays / stores / alloy wheel area	Microstrip – grazer	Switch on/off	4000K	90+	TBC	21
Total luminaires													178

NOTES

- Luminaire references, types and input currents provided over from the *Avicasts* & *EVRO Lighting Tender Spec Doc* – volume 150 (see First).
 Luminaires types: Street wall and indirect 1200–1600 lm, general 150–300 lm, general 150–300 lm, EVRO lighting 500 lm type, ceiling 200 lm type, ambient 150 lm type.
 Types 300–500 lm of desk, LR 37 with 1200–1500 lm, 2000 lm.
 Front of house luminaires, LR 37 with 1200–1500 lm, 2000 lm.
 Greater scale, Luminaires from ceiling areas and handover housing provide bespoke pendant types for others – included in collection.
 LED based the making the Luminaires from ceiling height ceiling, lower ceiling with Cuspier C-type, higher ceiling with Cuspier B-type, bond 3000K to bond 3000K.
 Luminaires are indicative only, and are to be set out for the respective selected ceiling type. Quantities to be verified at the final RCP.
 Some ceiling types (e.g. Cuspier) may require through (quantity and location) to be confirmed.

PROJECT
Ireland — Universal Retail Showroom

DRAWING
Luminaire Schedule & Specification

BASE PLAN
0002-VCI UNIVERSAL Ground Floor Plan (Overall)

REVISION	SHEET	DATE
Rev G — Issued for client review	2 of 2	12 October 2026



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EMERGENCY LIGHTING — SCHEDULE & DESIGN BASIS

Volvo Ireland — Universal Retail · Ground Floor Plan (Overall)

EMERGENCY LUMINAIRE SPECIFICATION



LDE3F + LDCK330/40 EM kit

- Miniature recessed downlight, .45mm cut-out
- In-line EM driver kit through cut-out
- Non-maintained - 3 hr - 150lm @ 350mA
- 4500K LED - 2.4V 1.8A NiCd - 1.5W
- IP42 (front) - Class II - Ta 0-40°C
- Min. ceiling void 175mm
- Optics: Wide 160° (W) - Corridor (C)
- Body: white (WW/CW) or black (WB)



Halo Surface Square

- Surface mount, besa box & fixing points
 - Non-maintained - 3 hr - DALI 2 self-test
 - 268 delivered lm (OA) @ 700mA - 5700K
 - 135° open area lens (corridor option)
 - 3.2V 3.84h LiFePO4 - 1.7W charging
 - 155 x 155 x 58mm - 0.42kg - white
 - IP20 - max Ta 25°C
- Order code CSW/1/DA/OA



CE1S surface exit sign

- Double-sided LED sign, wall or ceiling
- ISO 7010 legends - 25cm viewing distance
- CEI5DA; DALI-2 Type B self-test
- Duration 3 hr - recharge 24 hr
- 3.2V 3.6Ah LiFePO₄ - charged 0.25W
- 297 × 222 × 52mm - 0.82kg
- IP40 (datsheet table)
- Legends: AU (arrow up) ALAR (L/R)

DESIGN BASIS & ASSUMPTIONS

STANDARDS	IS: 2017:2023 [15], EN 1828 [16], EN 90172 [17], EN 60998-5:202 [18], ISO 7110 [19]
ESTIMATED OPEN AREAS	≥ 1 m x 0.5 m (min width), uniformity > 40%
OPEN AREAS > 50M	≥ 1 m x 0.5 m (min width), uniformity > 40%
POINTS OF IMPASS	End and door, change of direction, stairs, accessible WC, fixed and 5 fire points
ASSURED DURATION	2 hours, non-maintained EM extinguishing, exit lights, smoke detectors maintained
ADDITIONAL HEIGHTS	Street & Living Room higher ceiling than Living Room ceiling ~3m. balcony of house ~2.7m - workshop, 2 m (stairs suspended on central doors) ~4m, AFL
SPECIES USED	LC50 @ 4m - 4m (open area) 2.7m (dormitory) 7.5-9.0m () @ 3m (spacing 1.1m LC50 @ 4m - 4m (open area) 2.7m (dormitory) 7.5-9.0m () @ 3m (spacing 1.1m Hole @ 4m - 4m (open area) 2.7m (dormitory) 7.5-9.0m () @ 3m (spacing 1.1m Hole @ 4m - 4m (open area) 2.7m (dormitory) 7.5-9.0m () @ 3m (spacing 1.1m
TESTING	Hole @ 4m - 4m (open area) 2.7m (dormitory) 7.5-9.0m () @ 3m (spacing 1.1m Hole @ 4m - 4m (open area) 2.7m (dormitory) 7.5-9.0m () @ 3m (spacing 1.1m Hole @ 4m - 4m (open area) 2.7m (dormitory) 7.5-9.0m () @ 3m (spacing 1.1m Hole @ 4m - 4m (open area) 2.7m (dormitory) 7.5-9.0m () @ 3m (spacing 1.1m
VERIFICATION	Using UPL, LUT and agreed with the project's engineer and contractor

EMERGENCY LIGHTING SCHEDULE

[illegible]

PLACING REFERENCE — MANUFACTURER DATASHEETS (metres)

Item	SP	LEAF	@ 350m	— spacing between fittings	W open 0.5 in	W open 1 in	C open 0.5 in	C open 1 in	W open 0.5 in	W open 1 in	Between 0.5	Between 1
Laplan Hale — open are less												
1	0.0	10.0	8.9	n/a	11.9	2.5	5.4	4.5	12.6	10.7		
2	0.5	9.6	8.2	n/a	12.9	3.0	5.9	4.7	14.0	11.7		
3	1.0	9.0	7.5	n/a	13.1	4.0	6.6	—	16.2	13.2		
4	1.5	8.5	6.8	n/a	13.4	5.0	0.3*	—	17.8	9.7*		
5	2.0	7.9	4.8	n/a	13.5	6.0	—	—	19.0	—		
6	2.5	6.4	4.5	n/a	12.2							

POINTS OF EMPHASIS, TESTING & COORDINATION

Floor plan 701 - EXHIBITION
Workshop area - 2 workshop areas Trade press photography booth service intake staff staff customer entrance

Stairs, lift & WC
Staff stair, lift lobby, accessible WC workshop stairs (mezzanine upper floors to below)

Changes of direction
X2 directional signs on Living Room, Street, back-of-house, workshop and retail routes

Vehicle areas
Car turnaround & valid bays (all other doors are not escape exits)
Hose point – wash areas need an IPQ6 alternative, check main Tls 25°C at high level

Fire / first-aid points
Call points, extinguishers & first aid locations to be confirmed – EX within 2m of each

Small rooms
Canteen / consultation rooms < 60m off the escape route confirmed – confirm by risk assessment

Training & records
Annual fire drill, annual evacuation drill, signage per I.S. 3917 (signs DALI & exit sign)

EX considerations
EX developments set out in calling cards of architectural luminaires, first positions to RCP

* 5m values as printed on Liverpool database — appear erroneous, query with Liverpool.

DRAWING
Emergency Lighting — Schedule & Design Basis
0002- VCI UNIVERSAL Ground Floor Plan (Overall)
BASE PLAN

SHEET
2 of 2

ArcSolas
LIGHTING

Contact person

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Lighting Technical Specification

1. Introduction

This section of the specification covers requirements for the supply of luminaires as scheduled. It must be read and construed in conjunction with the project specific requirements as described in any Particular Specification and any associated schedules and drawings.

Luminaires shall be as described in the Schedule of Luminaires and shall be complete with lamps and control gear. All luminaires shall comply fully with all relevant sections of IS EN 60598-1-2015:+AC:2017.

The Contractor shall supply, install, test and commission a complete general lighting installation as indicated on the drawings, as listed in the Luminaire Schedule and detailed herein.

The use of the lighting installation prior to substantial completion shall only be granted upon formal confirmation that manufacturers standard guarantee periods will not be invalidated and in any event shall be subject to agreement.

2. Schedule of Luminaires

Luminaires shall be specifically described in the Schedule of Luminaires. Where proprietary names are used they shall infer the exact style and standard of luminaire required. In all cases, no deviation from the specified technical specification, manufacturer and any other relevant technical detail shall be allowed. Project specific variations shall be completed within the specified performance spec and approved by the design team.

The Contractor is strongly advised to check all luminaire details as outlined below and as scheduled. The client will not entertain claims for extras arising out of the contractor's lack of knowledge of, or failure to examine, the manufacturers' data sheets for the specified fittings. The contractor must notify the client in writing if he feels that details in the specification are at variance with those specified in the schedule of luminaires.

3. Luminaire Samples

Where appropriate, the Contractor shall include for supplying, erecting, and connecting up at least one sample of each luminaire as scheduled and if requested by the client.

He shall include for temporary power and distribution boards as required. He shall demonstrate the operation of all samples during the hours of daylight and darkness and shall arrange to have electricians and other operatives in attendance as required. He shall include for three separate lighting demonstrations.

4. Lamps and Control Gear

All luminaires shall be supplied complete with lamps and control gear which shall be of mutually compatible manufacture and design. Where control gear is remote from the luminaire it shall be supplied complete with a suitably lengthened cable tail and shall comply with the general requirements for luminaires as described above.

Control gear for high intensity discharge lighting shall be of the same manufacture as the specified lamp or as recommended by the lamp manufacturer. The supplier of the luminaire shall be responsible for the complete assembly. Where lamps or control gear have failed due to manufacturing defects or otherwise fail prematurely, the luminaire supplier shall be responsible for repair or replacement of the luminaire ex works.

5. Luminaires

All luminaires shall be supplied with lamps and control gear which are compatible. Luminaires shall be substantially noise free in operation.

Unless otherwise stated all luminaires designed for general internal use shall be constructed to minimum IP20, for internal use in toilets to a minimum of IP44 and for external use to a minimum of IP65.

Internal wiring shall be heat resistant to suit the service temperatures reached within each luminaire. Minimum acceptable insulation shall be PVC rated to withstand a temperature of 105°C. Where higher internal temperatures are reached silicone rubber or glass insulated wiring shall be used.

Internal wiring shall be colour coded and clipped within the luminaires at maximum 300mm centres. Grommets shall be used where wiring passes through holes. Under no circumstances shall wiring be permitted to rest or rub in raw metal edges and it shall not be allowed to rest on diffusers or louvers.

All non-current carrying metal parts of luminaires shall be effectively electrically continuous to a main earthing terminal which shall be provided within each fitting.

6. Fused Protection of Luminaires

All luminaires shall be fitted with electronically fused ballasts to provide short circuit protection and isolation of faulted ballasts. In the absence of electronic ballast fusing, all luminaires shall be fitted with fused terminal blocks, each terminal capable of taking 2 No. 2.5 mm² stranded copper conductor cable. High temperature sleeving shall be provided where necessary.

7. Polycarbonate, Opal or Prismatic, Type Diffusers

Where polycarbonate, opal or prismatic, type diffusers are called for they shall be manufactured from a material with a TP (a) rigid classification in accordance with BS 2782-0:2011. They shall have a Class 1 surface spread of flame certificate which passes the 850oC hot wire test. They shall be of single piece, injection moulded construction.

8. Suspended Ceilings

Prior to ordering the luminaires, the Contractor shall ensure that they are suitable for installing and fixing to or in the ceiling system/type detailed on the Architect's drawings.

No modification shall be carried out to a luminaire without the manufacturer and the Engineers written agreement.

9. External Fittings

Unless otherwise noted external wall mounted / bulkhead type luminaires shall be robust vandal resistant design. They shall be of die cast aluminium construction fitted with prismatic or opal polycarbonate diffusers as specified in the schedule. They shall have tamper proof screws and shall have a minimum rating of IP 54.

10. LED Luminaires

LED luminaire shall be designed for high heat dissipation capability to ensure optimum performance of the LED in terms of the quality light output and lumen maintenance. To achieve this, the luminaire should have an aluminium housing with the LED chips permanently bonded to a metal core PCB or equivalent.

The LED chip in the luminaire shall have a minimum lifetime of 50,000 hours based on L90B10. This means that after 50,000 hours of use, 90% of the LED will have reached 90% of their initial light output. An additional measure of LED lifetime of 100,000 hours based on L90 is preferable.

The lumen depreciation shall be tested and certified to IEC Standard IEC 62722 and TM-21-2011 which define the method for testing LED lamps, arrays and modules to determine the rated long term lumen maintenance life of LED lamps. The minimum test time is 6,000 hours where the luminous flux is recorded every 1,000 hours. These values should be then extrapolated using a method stated in IES TM21.

LED failure rate should be defined on the manufacturer data sheet with a minimum compliance of $0.1\% > 50,000$ hours. This will define the failure of a single LED chip and does not relate to the entire module or any peripheral elements within the luminaire.

The LED shall be dimmable from 100% down to 0.1% from the DALI or other specified control system. LED luminaires shall be photometrically tested in accordance with 'IESNA LM-79-08, IES Approved Method for the Electrical and Photometric Measurement of Solid-State Lighting Products'. Results certificates shall be provided.

LED modules shall be tested in accordance with 'IESNA LM-80-08, IES approved Method: Measuring Lumen Maintenance of Light Emitting Diode Light Sources'. Results certificates shall be provided.

LED luminaires shall have lifetimes extrapolated in accordance with 'IESNA TM-21-11, IES Approved Method: Making Useful LED Lifetime Projections'.

LED modules and luminaires shall have product information displayed in accordance with 'IEC/PAS 62717 Performance requirements, LED modules for general lighting' and 'IEC/PAS 62722 Performance requirements, LED luminaires for general lighting'. Manufacturers of LED luminaires shall disclose information about the manufacturer of LED modules.

LED luminaire colour variation shall be within a 1.5-step MacAdam ellipse initially. LED luminaire colour variation shall be within a 1.5-step MacAdam ellipse through lumen maintenance, designated at a minimum of 50,000 hours.

LED luminaire CCT should be complied with based on the specific specification of each luminaire and defined by area. Street, Living Room and all front of house areas should have a minimum CRI of 97 whilst all back of house areas – bathrooms, storage, workshop etc – should have a minimum CRI of 90.

LED luminaire manufacturers shall provide a photometric code as defined within 'IEC/PAS 62717 Performance requirements, LED modules for general lighting' and 'IEC/PAS 62722 Performance requirements, LED luminaires for general lighting'.

Proposed driver current shall be stated, and this shall match with a driver current examined within 'IESNA LM-80-08, IES approved Method: Measuring Lumen Maintenance of Light Emitting Diode Light Sources' test results certificate. Driver currents in excess of what has been independently tested will not be acceptable.

Power consumed by LED luminaires shall be stated inclusive of control gear losses.

All luminaires and drivers should have a defined measure of TLA (Temporal Light Artefacts) with a minimum compliance of $SVM \leq 0.1$; $PstLM \leq 1$.

LED drivers shall conform to IEC 61347-2-13 and IEC 62384.

Control options to allow fully functional DALI/Casambi dimming shall be available.

LED luminaire shall have an on-site replacement product warranty of ten years minimum, as standard. This shall cover all luminaire components, inclusive of electronics, drivers, finishes, etc.

11. Installation of Luminaires

The Contractor shall ensure that the methods of suspension for luminaires are electrically and mechanically sound. The Contractor shall provide all supports, as necessary.

The Contractor shall ensure that all installation accessories (i.e., brackets, clips etc) are provided with the luminaires and are suitable for the location and type of ceiling in which the luminaires are to be mounted.

All fittings shall be installed in accordance with manufacturer's instructions. The method of suspension shall permit easy and accurate adjustment of the fittings to permit accurate alignment with the ceiling and other fittings. The method of fixing shall also allow easy removal of the fittings for inspection and maintenance. Luminaires shall be securely fixed by at least two fixings separated by at least 50% of the greatest dimensions of the light fitting. Luminaires shall not be suspended by their flexible cord. All flexible cords shall be anchored at each end such that the cord is free from strain.

Where an exterior light fitting is mounted directly over a conduit box a neoprene gasket shall be used between the fitting and the box to prevent ingress of moisture. In addition to the primary fixing. Louvres and reflectors shall be packed separately from the luminaire body and protected against damage. They shall not be installed until after the building has been thoroughly cleaned. When installed separately in ceiling voids, transformers shall be supported to avoid the transmission of noise and vibration.

Transformers shall be easily removed for maintenance or replacement. Where access is not provided, the transformer may be installed adjacent to fitting and access may be gained by removal of the fitting.

Transformer shall be connected to the mains via a flexible heat resisting cord and 3-pin plug and socket arrangement. In-line plug and sockets shall be installed between transformers and luminaires. Where multi-point transformers are used, each luminaire shall be separately connected to the transformer. The cables from the transformers shall be sized to limit the volt drops to the minimum recommended by the manufacturers. The flexible cords from the transformers shall be long enough to enable each fitting connected to it, and the transformer itself, to be accessible for inspection and maintenance. All luminaires shall be earthed in accordance with the IS10101. Earth continuity shall be maintained from the conduit trunking system to the earth terminal in the light fitting.

The positions of luminaires as shown on the drawings are approximate. Exact positions shall be determined after reference to the ceiling layout and/or setting out details shown on the Architects installation drawings.

12. Wiring

The internal lighting circuits shall be wired with cables as detailed by the Engineers drawing and circuited as shown on the drawings.

Final connection to luminaires shall be as follows:

For recessed modular and suspended luminaires, connection shall be via flexible cords connected with 3-pin plug and socket luminaire connectors sited immediately adjacent to the fitting. The flexible cord shall be heat resistant with low smoke and fume sheath.

For surface mounted luminaires, wiring shall be looped directly to terminals in luminaires.

Where conduit suspension is used, final circuit wiring shall be contained within the conduit and terminating directly within the luminaire.

Exterior luminaires, fixed to the walls of buildings etc., shall be wired such that wiring terminates within the luminaire.

For luminaires in hazardous areas, armoured cabling shall be looped through luminaires and cores wired directly to terminals.

Heat resistant glass fibre sleeves shall be fitted to all wiring inside luminaires. In hazardous areas, circuits shall be wired with 3c 2.5mm² XLPE/SWA/LSF cables.

The installation is to be wired throughout using 2.5mm² cables as specified in the Particular Specification. Each circuit shall be connected by a 10 Amp Type B MCB (RCBO for domestic use). The loop-in method of wiring shall be used throughout with all loops taken from either the luminaire, the switch, or the distribution board. The maximum load for 2.5mm² cables must not exceed 800W.

In certain circumstances and subject to written approval of the engineers, the installation may be wired using 1.5mm² cables as described below with each circuit protected by a 10 Amp Type B MCB (RCBO for domestic use). The maximum load for 1.5mm² cables must not exceed 600W.

13. Luminaire Isolation Facility

The circuit hard wiring must terminate externally in a luminaire isolation facility as described below. This is to ensure the conductors are not exposed to the hot surfaces of the control gear etc.

Ceiling roses or multigang plug-in lighting distribution boxes shall be located in an accessible position for future maintenance and close to the fittings so that the flexible connection does not exceed 2 metres in length.

In plastered or timber ceilings where large aperture recessed fitting are to be used (i.e., greater than 100mm) the luminaires shall be connected using individual plug-in ceiling roses located in the ceiling void above the fitting and arranged so it can be easily withdrawn through the ceiling aperture in the future.

In plastered or timber ceilings where large aperture recessed fitting are to be used (i.e., less than 100mm) the luminaires shall be connected using a deep pattern BESA box or an oblong plastic lidded box small enough to be withdrawn through the ceiling cut out. The box shall complete with a multipole connector block. The output flex shall be fitted with a 5amp 3 pin flex coupler to provide an isolation facility for the luminaire. This method is not intended for luminaires converted for emergency use.

Where luminaires are surface mounted onto plastered ceilings with an attic or accessible void space above the hard wiring shall terminate in connectors a straight-through or Tee BESA box mounted onto the trunking or on a conduit spurred of the trunking. The BESA box shall be fitted with a stuffing gland for the flexible cable serving the fitting. The output flex shall be maximum 1000mm long and shall be fitted with a 5amp 3 pin flex coupler to provide an isolation facility for the luminaire. This method is not intended for luminaires converted for emergency use.

In the case of luminaires recessed in grid ceilings the luminaire isolation facility shall be located in the ceiling void above the fitting.

In the case of surface luminaires, it shall be located to one side of the fitting as close as possible to the cable entry position so that there is a minimum amount of flexible cable exposed.

Where cables enter luminaires, they shall be fully protected by heat-resistant sleeving.

14. Presence / Absence Detectors

Presence/absence detectors shall be Passive Infrared Detectors (PIRs).

They shall generally be recessed mounted with a white trim to suit the relevant area finishes.

They shall be suitable for ceiling mounting heights of 2.3 to 5.5m

They shall have a minimum detection radius of 3m within which any small movements shall be detected. They shall have a minimum adjustable off delay of 5-60 minutes following the last observed movement. They shall have a maximum standby power requirement of 0.5W.

They shall be programmable with remote programming tools to allow settings to be changed without any disturbance to building occupants or the ceiling. The PIR units shall incorporate infra-red quad person detection technology and photocell hold off facility to inhibit the lighting when adequate daylight is present.

Light level sensors shall have a minimum adjustable lux level of 50-2000 lux.

Time Lag Range varying from 10 seconds to 40 minutes (in 9 steps).

The PIR unit shall incorporate a relay rated for switching 230VAC - 6 Amps/1.5KW of lighting load.

Unless otherwise indicated on the drawings all PIR's serving rooms and lobbies shall be recessed ceiling mounted type with 360° coverage.

Unless otherwise indicated on the drawings all PIR's serving long corridors shall be surface ceiling mounted with long range directional narrow beam type.

15. DALI (Digital Addressable Lighting Interface) / Casambi Wireless

This section of the specification covers requirements for the supply and installation of a DALI/Casambi lighting control system as shown on the drawings. It must be read and construed in conjunction with the project specific requirements as described in the Particular Specification and the associated schedules and drawings.

The overall intent is to provide electric light only when the space is occupied and to provide as little electric light as is necessary to achieve the required light level for the work plane. The system is also intended to facilitate automatic testing, monitoring and reporting of the completed emergency lighting system.

The lighting control system shall be a DALI (Digital Addressable Lighting Interface) or Casambi wireless system with DALI or Casambi controlled fixtures and DALI or Casambi controllers throughout the interior space. The lighting controllers, ballasts, transformers, drivers, emergency fittings and other electronic control gears and devices are to fully comply with IEC 62386 enabling devices from multiple manufacturers, as defined by the design team, to be used in the system.

The lighting control system shall consist of multiple control nodes – lights, switches, sensors etc – to create a whole building mesh network. Where simple control is required, this can be created as a standalone zone i.e. switchable zones.

16. Specialist Controls Contractor

ArcSolas Lighting shall act as the specialist lighting control system commissioning agent, to design, program and commission the system. as specified. The specialist should be the same company that the Contractor uses to supply the luminaires.

ArcSolas Lighting shall be responsible for designing the entire control network and preparation of wiring schematics and the like for the contractor to carry out his wiring.