TRILUX
SIMPLIFY YOUR LIGHT.

BREEAM BROCHURE

TRILUX & SUSTAINABLE BUILDINGS

Sustainability has been an integral part of TRILUX for many years. As a family owned company we feel the need to take care of future generations.

We are therefor always looking for the most efficient composition of our luminaires in combination with the right lighting management systems for the specific application and task. In this way, we have been producing innovative, energy-efficient and sustainable lighting solutions for office, industry, logistics, retail and health & care. Our solutions lift a building to a higher level in terms of energy efficiency safety, comfort and wellbeing.

Our lighting solutions are therefore extremely energy-efficient during operation. But even in the development and production we take important measures to minimize the impact on our environment to an absolute minimum. For example, the design of our luminaires are as modular as possible, which fits in life cycle approach. And we set up take back and recycling programs in which we stay the owner of our fixtures to keep them in our production loop as long as possible.

With TRILUX lighting solutions you are choosing certainty. In addition our products contribute significantly to the sustainability level of buildings and thus to the achievement of points for building certification, such as BREEAM.

Want to know more about BREEAM? Please contact us via **+44 1245 463 463** or visit **trilux.com/breeam**

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WHAT IS BREEAM?

BREEAM

Building Research Establishment Environmental Assessment Method

BREEAM® is an assessment method for determining and comparing the sustainability performance of buildings. As a quality label it stimulates the market to focus throughout the construction process on the environmental impact of the products and services used.

As the label assesses the overall building concept it is assessed and evaluated on the basis of nine main categories and one innovation category. The credits are weighted and awarded for each category to determine the scoring of a building; this level goes from pass to outstanding.

The products presented in this brochure have been evaluated and assessed by independent engineering firm Encon, on the basis of the BREEAM-UK guidelines. The guideline used for this analysis is BREEAM-UK New Construction (NC) 2018.

Want to know more about BREEAM? Please contact us via **+44 1245 463 463** or visit **trilux.com/breeam**

TRILUX & BREEAM

The scores per product

A

SONNOS LED
Downlight

17 credits

MORE INFORMATION

B

ARIMO FIT LED
Recessed luminaire

18 credits

MORE INFORMATION

C

ARIMO SLIM MRX LED
Recessed luminaire

18 credits

MORE INFORMATION

D

ARIMO FIT D LED
Surface-mounted luminaire

18 credits

MORE INFORMATION

E

CREAVO LED
Recessed luminaire

18 credits

MORE INFORMATION

F

CREAVO D LED
Surface-mounted luminaire

18 credits

MORE INFORMATION

G

CREAVO H LED
Pendant luminaire

18 credits

MORE INFORMATION

H

FINEA LED
Lightchannel

18 credits

MORE INFORMATION

I

OPENDO LED
Pendant luminaire

18 credits

MORE INFORMATION

J

E-LINE NEXT LED
Continuous line luminaire

19 credits

MORE INFORMATION

K

ARAGON FIT LED
Weatherproof luminaire

19 credits

MORE INFORMATION

L

MIRONA FIT LED
Highbay luminaire

19 credits

MORE INFORMATION

M

JOVIE LED
Post-top luminaire

19 credits

MORE INFORMATION

VIEW CREDIT SCORING IN DETAIL ›

TRILUX & BREEAM

The scores per product

CATEGORY	ISSUE	MAX CREDITS	TRILUX PRODUCTS												
			A	B	C	D	E	F	G	H	I	J	K	L	M
Management (MAN)	MAN 02 - Life cycle cost and service life planning	4	3	3	3	3	3	3	3	3	3	3	3	3	3
	MAN 03 - Responsible construction practices	6	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAN 04 - Commissioning and handover	4	3	3	3	3	3	3	3	3	3	3	3	3	3
	MAN 05 - Aftercare	3	2	2	2	2	2	2	2	2	2	2	2	2	2
Health & Wellbeing (HEA)	HEA 01 - Visual comfort	4	1	1	1	1	1	1	1	1	1	1	1	1	1
	HEA 02 - Indoor Air Quality	4	-	-	-	-	-	-	-	N/A	-	-	-	-	-
	HEA 07 - Safe and healthy surroundings	2	-	-	-	-	-	-	-	-	-	-	-	-	1
Energy (ENE)	ENE 01 - Reduction of energy use and carbon emissions	13	2	3	3	3	3	3	3	3	3	4	4	4	1
	ENE 02 - Energy monitoring	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	ENE 03 - External Lighting	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Materials (MAT)	MAT 01 - Building Life Cycle Assessment	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	MAT 06 - Material efficiency	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Waste (WST)	WST 01 - Construction Waste Management	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	WST 06 - Design for disassembly and adaptability	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Pollution (POL)	POL 04 - Reduction of Night Time Light Pollution	1	-	-	-	-	-	-	-	-	-	-	-	-	1
	MAXIMUM CREDITS*		17	18	18	18	18	18	18	18	18	19	19	19	19

A Sonnos LED
B Arimo Fit LED
C Arimo slim MRX LED
D Arimo Fit D LED
E Creavo LED
F Creavo D LED
G Creavo H LED
H Finea LED
I Opendo LED
J E-line Next LED
K Aragon Fit LED
L Mirona Fit LED
M Jovie LED

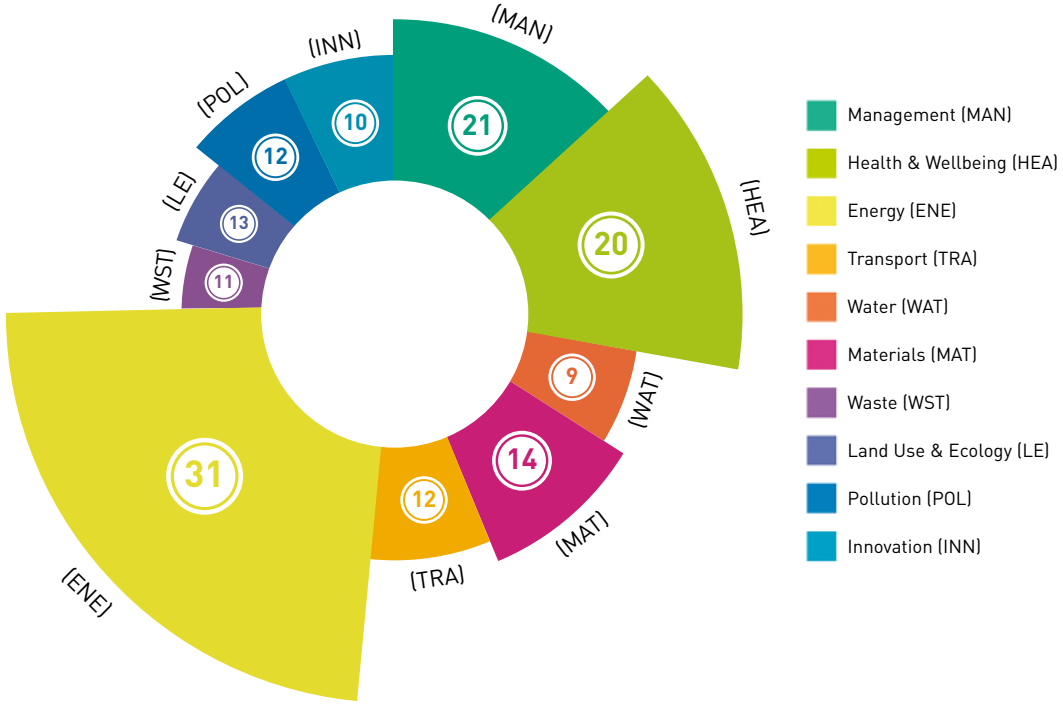
VIEW PRODUCTS

* TRILUX lighting makes a strong contribution to the achievement of BREEAM credits but does not influence every credit within an issue.
Lighting also doesn't offer the guarantee of credits, since all other criteria within an issue - on which light has no influence - must be met in order to score the credits.

CATEGORIES

CATEGORIES

CATEGORY	MAX CREDITS
Management (MAN)	21
Health & Wellbeing (HEA)	20
Energy (ENE)	31
Transport (TRA)	12
Water (WAT)	9
Materials (MAT)	14
Waste (WST)	11
Land Use & Ecology (LE)	13
Pollution (POL)	12
Innovation (INN)	10
Total	**156**



BREEAM-UK-QUALIFICATION

★	★★	★★★	★★★★	★★★★★
PASS ⩾ 30%	GOOD ⩾ 45%	VERY GOOD ⩾ 55%	EXCELLENT ⩾ 70%	OUTSTANDING* ⩾ 85%

* Additional requirements are mandatory for the 'outstanding' qualification.
The final score achieved is converted into a BREEAM-UK qualification in accordance with the table above.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 4 ★★★★

LIFE CYCLE COST AND SERVICE LIFE PLANNING

GOAL

To promote the business case for sustainable buildings and to deliver whole life value by encouraging the use of life cycle costing to improve design, specification, through life maintenance and operation.

CRITERIA

CRITERIUM 1 (2 CREDITS) ★★

- **Elemental life cycle cost (LCC)**

- An elemental LCC plan (future replacement, service life, maintenance, operation costs) has been carried out at the Concept Design stage
- The elemental LCC plan has been used to minimise life cycle costs and maximise critical value

CRITERIUM 2 (1 CREDIT) ★

- **Component level LCC options appraisal**

- A component level LCC options appraisal (envelope, services, finishes, external spaces) has been developed in line with PD 156865: 2008
- The component level LCC options appraisal has been used to minimise life cycle costs and maximise critical value

CRITERIUM 3 (1 CREDIT) ★

- **Capital cost reporting**

- Report the capital cost for the building, via the BREEAM Assessment Scoring and Reporting tool

TRILUX-scores

Product in scope	BREEAM-UK MAN02 credits	Feasibility product*
Sonnos LED	3	+++
Arimo Fit LED	3	+++
Arimo slim MRX LED	3	+++
Arimo D LED	3	+++
Creavo LED	3	+++
Creavo D LED	3	+++
Creavo H LED	3	+++
Finea LED	3	+++
Opendo LED	3	+++
E-line Next LED	3	+++
Aragon Fit LED	3	+++
Mirona Fit LED	3	+++
Jovie LED	3	+++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

By focusing on high-quality LED lighting with a long service life, luminaires last longer and require less frequent replacement. Link fixtures with the LiveLink lighting management system to further extend the service life thanks to daylight presence detection. According to various studies (Repro-light) light management is a way to contribute to a longer life cycle.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 6 ★★★★★★

RESPONSIBLE CONSTRUCTION

GOAL

To recognize and encourage construction sites which are managed in an environmentally and socially considerate, responsible and accountable manner.

PREREQUISITE

- Only use legally harvested and traded timber and the client and contractor need to agree on performance targets

CRITERIA

CRITERIUM 1 (1 CREDIT) ★

- **Environmental management**

- All parties who manage the construction site:
  - *Operate an environmental management system (ISO 14001/ EMAS)*
  - *Implement best practice pollution prevention policies and procedures on site*

CRITERIUM 2 (1 CREDIT) ★

- **Appoint a sustainability champion**

- Monitors the project to ensure ongoing compliance with the relevant sustainability performance and process criteria

CRITERIUM 3 (2 CREDITS) ★★

- **Responsible construction management**

- The principal contractor achieves listed items in each of the seven sections of table 4.1
- The principal contractor achieves listed and additional six items in each of the seven sections of table 4.1

CRITERIUM 4 (2 CREDITS) ★★

- **Monitoring of construction site impacts**

- Monitor and record data on the utility consumption of the project site (energy and water)
- Monitor and record data on transport of construction materials and waste

TRILUX-scores

Product in scope	BREEAM-UK MAN03 credits	Feasibility product*
Sonnos LED	1	+++
Arimo Fit LED	1	+++
Arimo slim MRX LED	1	+++
Arimo D LED	1	+++
Creavo LED	1	+++
Creavo D LED	1	+++
Creavo H LED	1	+++
Finea LED	1	+++
Opendo LED	1	+++
E-line Next LED	1	+++
Aragon Fit LED	1	+++
Mirona Fit LED	1	+++
Jovie LED	1	+++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

TRILUX reports the CO2 emissions of transport and distance to project site. To reduce the impact we encourage delivery to nearby projects and the use of bulk transport (if possible). For several product series we have also developed project packaging without (or with less) cardboard and plastic. For urban construction sites we use electric transport for last mile delivery if necessary.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 4 ★★★★

COMMISSIONING AND HANDOVER

GOAL

To encourage a properly planned handover and commissioning process that reflects the needs of the building occupants.

CRITERIA

CRITERIUM 1 (1 CREDIT) ★

- **Commissioning, testing schedule and responsibilities**
- There is a schedule of commissioning
- Identify the appropriate standards
- Appropriate project team member is appointed

CRITERIUM 2 (1 CREDIT) ★

- **Commissioning, design and preparation**
- For buildings with complex building services and systems, a specialist commissioning manager is appointed
- For simple building services, this role can be carried out by an appropriate project team member

CRITERIUM 4 (1 CREDIT) ★

- **Handover**
- Develop 2 building user guides
  - *Technical for facilities manager*
  - *Non technical for building occupiers*
- Prepare two training schedules
  - *Technical for facilities managers*
  - *Non technical for building occupiers*

TRILUX-scores

Product in scope	BREEAM-UK MAN04 credits	Feasibility product*
Sonnos LED	3	+++
Arimo Fit LED	3	+++
Arimo slim MRX LED	3	+++
Arimo D LED	3	+++
Creavo LED	3	+++
Creavo D LED	3	+++
Creavo H LED	3	+++
Finea LED	3	+++
Opendo LED	3	+++
E-line Next LED	3	+++
Aragon Fit LED	3	+++
Mirona Fit LED	3	+++
Jovie LED	3	+++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

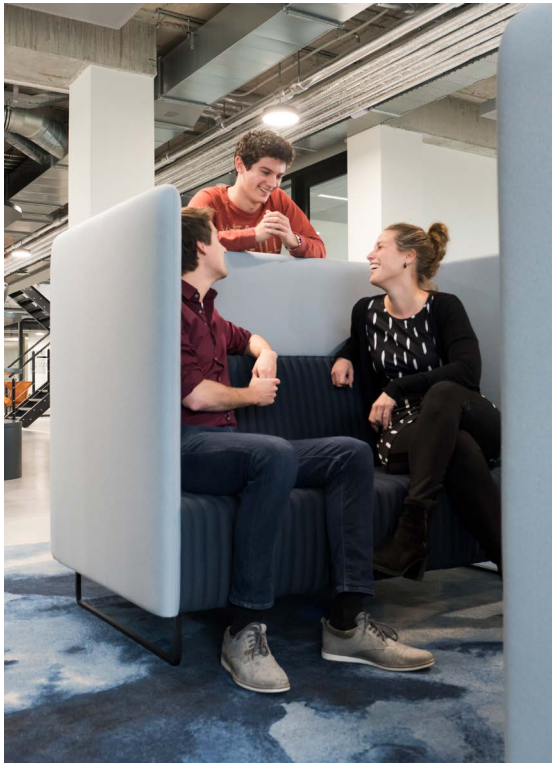
TRILUX systems are tested in the appropriate phases. They perform as agreed and have comprehensive manuals (if applicable) to guide the user of the of the building to understand and operate the building. operate the building.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 3 ★★★

AFTERCARE

GOAL

To ensure the building operates in accordance with the design intent and operational demands, through providing aftercare to the building owner and occupants during the first year of occupation.



CRITERIA

CRITERIUM 1 (1 CREDIT) ★

- **Aftercare support**

- Operational infrastructure and resources in place to:
  - *Provide aftercare support to the building occupiers*
  - *Collection and monitoring of energy and water consumption data for a minimum of 12 months once the building is occupied*

CRITERIUM 2 (1 CREDIT) ★

- **Commissioning implementation**

- The seasonal commissioning activities will be completed over a minimum 12 month period, once the building becomes substantially occupied

CRITERIUM 3 (1 CREDIT) ★

- **Post occupancy evaluation (POE)**

- A review of the design intent and construction process
- Feedback including Internal environmental conditions (light, noise, temperature, air quality), maintenance, facilities and amenities, access...
- Energy consumption, water consumption, materials, renewable energy, rainwater harvesting etc.

TRILUX-scores

Product in scope	BREEAM-UK MAN 05 credits	Feasibility product**
Sonnos LED	2	+++
Arimo Fit LED	2	+++
Arimo slim MRX LED	2	+++
Arimo D LED	2	+++
Creavo LED	2	+++
Creavo D LED	2	+++
Creavo H LED	2	+++
Finea LED	2	+++
Opendo LED	2	+++
E-line Next LED	2	+++
Aragon Fit LED	2	+++
Mirona Fit LED	2	+++
Jovie LED	2	+++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

An (optional) service to provide after-care support and seasonal commissioning (3/6/9/12 months) during the first year of operation of the building (LiveLink monitoring). Upon delivery of large projects, a handover protocol is always followed and a mini training of the lighting installation and lighting installation and the lighting management system. A service contract is also an option.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 4 ★★★★

VISUAL COMFORT

GOAL

To encourage best practice in visual performance and comfort by ensuring daylighting, artificial lighting and occupant controls are considered.

CRITERIA

CRITERIUM 1 (2 CREDITS) ★★

- **Daylighting**
  - Provision of daylight designed in compliance with national best practice
  - Daylight simulation study required

CRITERIUM 2 (1 CREDIT) ★

- **View out**
  - 95% of the floor area in 95% of spaces provides an adequate view out (windows)
- **Glare control**
  - Potential of glare has been designed out of all relevant building areas
  - Glare control system maximizes daylight levels in all weather

CRITERIUM 3 (1 CREDIT) ★

- **Internal and external lighting levels, zoning and control**
  - Illuminance levels, UGR limits and uniformity ratio are compliant with national best practice
  - Internal: SLL Code for Lighting 2012 and other industry standard
  - External: BS 5489 1:2013 and BS EN 12464 2:2014
  - Zoned lighting allows occupant control

TRILUX-scores

Product in scope	BREEAM-UK HEA 01 credits	Feasibility product**
Sonnos LED	1	+++
Arimo Fit LED	1	+++
Arimo slim MRX LED	1	+++
Arimo D LED	1	+++
Creavo LED	1	+++
Creavo D LED	1	+++
Creavo H LED	1	+++
Finea LED	1	+++
Opendo LED	1	+++
E-line Next LED	1	+++
Aragon Fit LED	1	+++
Mirona Fit LED	1	+++
Jovie LED	1	+++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

TRILUX products guarantee a high-quality solution and are in conformity with the standards for outdoor workplaces and public lighting (EN 12464, NPR 13201+A1:2018 en). Zoned lighting can be achieved with DALI and LiveLink lighting management. Zones are determined by the type of building (office - 1 zone = 4 workplaces or 40m²).

MAXIMUM NUMBER OF **BREEAM-CREDITS** 4 ★★★★

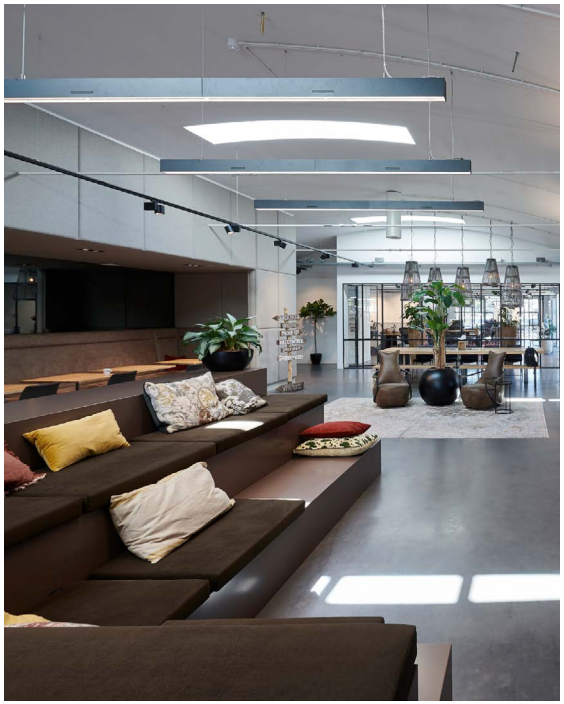
INDOOR AIR QUALITY

GOAL

To encourage and support healthy internal environments with good indoor air quality.

PREREQUISITE

- Indoor Air Quality (IAQ) plan



CRITERIA

CRITERIUM 1 (1 CREDIT) ★

• Ventilation

- National best practice standard for ventilation
- Sufficient distance between air intake & exhaust
- CO2 or air quality sensors

CRITERIUM 2 (2 CREDITS) ★★

• Emissions from construction products

- VOC emissions of internal finishes integral to the building

CRITERIUM 3 (1 CREDIT) ★

• Post construction indoor air quality measurement

- Measurement (formaldehyde, VOC) by external party in the building

TRILUX-scores

Product in scope	BREEAM-UK HEA 02 credits	Feasibility product*
Sonnos LED		
Arimo Fit LED		
Arimo slim MRX LED		
Arimo D LED		
Creavo LED		
Creavo D LED		
Creavo H LED		
Finea LED		
Opendo LED	N/A	N/A
E-line Next LED		
Aragon Fit LED		
Mirona Fit LED		
Jovie LED		

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

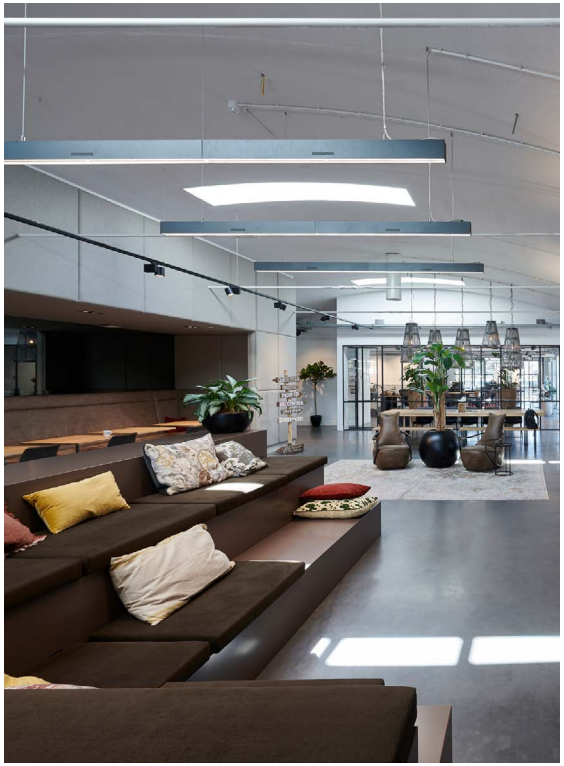
TRILUX products have very low to no impact on the ventilation system. However, the Opendo LED system can be installed with an optional CO2 sensor that indicates the air quality and the need for ventilation.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 2 ★★

SAFETY AND HEALTHY SURROUNDINGS

GOAL

To encourage the provision of safe access around the site and outdoor space that enhances the wellbeing of building users.



CRITERIA

CRITERIUM 1 (1 CREDIT) ★

- **Safe access**
  - The lighting for access roads, pedestrian routes and cycle lanes is in accordance with BS 5489 1:2013

CRITERIUM 2 (1 CREDIT) ★

- **Outside space**
  - There is an outside space providing building users with an external amenity area

TRILUX-scores

Product in scope	BREEAM-UK HEA 07 credits	Feasibility product*
Sonnos LED		
Arimo Fit LED		
Arimo slim MRX LED		
Arimo D LED		
Creavo LED		
Creavo D LED		
Creavo H LED		
Finea LED		
Opendo LED		
E-line Next LED		
Aragon Fit LED		
Mirona Fit LED		
Jovie LED	1	+++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

TRILUX products guarantee a qualitative solution and conform to the standards for outdoor workplaces and public lighting (NENEN 12464-2:2014 and NPR 13201+A1:2018 en). TRILUX outdoor lighting ensures a pleasant, safe and well-lit arrival at a building.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 13 ★★★★★★★★★★★★★

REDUCTION OF ENERGY USE AND CARBON EMISSIONS

GOAL

To minimize operational energy demand, primary energy consumption and CO_2 emissions.

CRITERIA

CRITERIUM 1 (9 CREDITS) ★★★★★★★★★

• Calculate energy performance Ratio for New Construction (EPR NC) and compare with benchmarks

		Minimum standards	
BREEAM Credits	**EPR NC**	**Rating**	**Minimum requirements**
1	0.1		Requires a performance improvement progressively better than the relevant national building regulations compliant standard.
2	0.2		
3	0.3		
4	0.4	Excellent	Requires 4 credits to be achieved (equivalent to an EPR NC of at least 0.4) or 4 credits for Prediction of operational energy consumption (where operational energy performance has been substantially improved)
5	0.5		
6	0.6	Outstanding	Requires 6 credits to be achieved (equivalent to an EPR NC of at least 0.6) and 4 credits for prediction of operational energy consumption.
7	0.7		
8	0.8		
9	0.9 AND zero net regulated CO2- eq emissions		

CRITERIUM 2 (4 CREDITS) ★★★★

• Prediction of operational energy consumption

- Involve relevant members of the design team in an energy design workshop
- Additional energy modelling during design and post construction stage to generate predicted operational energy consumption figures
- Report predicted energy consumption targets by end use, design assumptions and input data
- Carry out a risk assessment to highlight any significant design, technical, and process risks

TRILUX-scores

Product in scope	BREEAM-UK ENE 01 credits	Feasibility product*
Sonnos LED	2	+++
Arimo Fit LED	3	+++
Arimo slim MRX LED	3	+++
Arimo D LED	3	+++
Creavo LED	3	+++
Creavo D LED	3	+++
Creavo H LED	3	+++
Finea LED	3	+++
Opendo LED	3	+++
E-line Next LED	4	+++
Aragon Fit LED	4	+++
Mirona Fit LED	4	+++
Jovie LED	1	+++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

Energy efficiency is based on the comparison between a real and a fictitious building. TRILUX uses LED lighting and possible optimisation with LiveLink. A specific analysis is required for each project. (E-line Next has the best performance 190 lm/W)

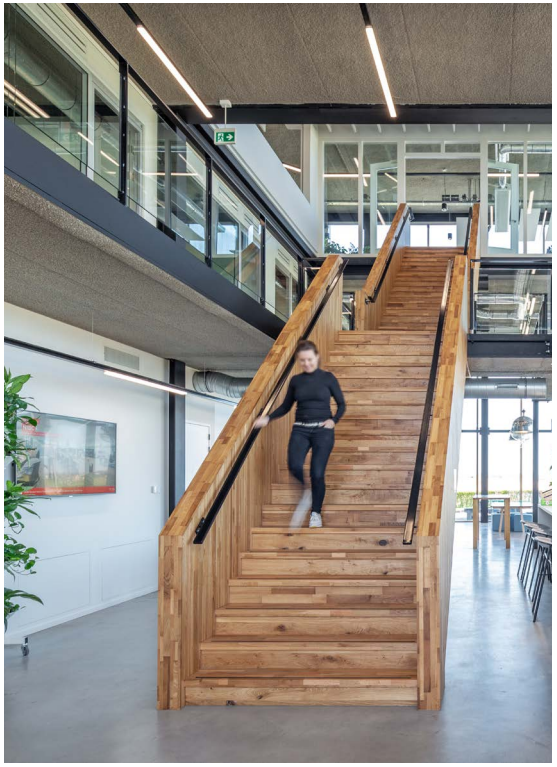
TRILUX products have high energy efficiency. The ENE01 is to be determined for each project. If the project implements energy-efficient installations (in addition to TRILUX products) there is the possibility of scoring up to 13 credits.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 2 ★★

ENERGY MONITORING

GOAL

To encourage the installation of energy sub-metering to facilitate the monitoring of operational energy consumption.



CRITERIA

CRITERIUM 1 (1 CREDIT) ★

- **Sub-metering of end-use categories**
- Track annual energy consumption
- Energy monitoring & management system or pulsed energy sub-meters

CRITERIUM 2 (1 CREDIT) ★

- **Sub-metering of high energy load and tenancy areas**
- Sub-metering per floor
- Energy monitoring & management system or pulsed energy sub-meters

TRILUX-scores

Product in scope	BREEAM-UK ENE 02 credits	Feasibility product*
Sonnos LED	2	+++
Arimo Fit LED	2	+++
Arimo slim MRX LED	2	+++
Arimo D LED	2	+++
Creavo LED	2	+++
Creavo D LED	2	+++
Creavo H LED	2	+++
Finea LED	2	+++
Opendo LED	2	+++
E-line Next LED	2	+++
Aragon Fit LED	2	+++
Mirona Fit LED	2	+++
Jovie LED	2	+++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

Energy monitoring is possible by using DALI and LiveLink to monitor luminaires in a building. The collected luminaire data can be linked back into the freely accessible LiveLink Cloud, or delivered as raw data for an open API integration with third party software and platforms.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 1 ★

EXTERNAL LIGHTING

GOAL

To reduce energy consumption through the specification of energy efficient light fittings for external areas of the development.

CRITERIA

CRITERIUM 1 (1 CREDIT) ★

- **The building has been designed to operate without the need for external lighting**

OF

- **Average initial luminous efficacy of the external light fittings (> 70 lumens per circuit Watt)**
- **All external light fittings are automatically controlled**

TRILUX-scores

Product in scope	BREEAM-UK ENE 03 credits	Feasibility product*
Sonnos LED		
Arimo Fit LED		
Arimo slim MRX LED		
Arimo D LED		
Creavo LED		
Creavo D LED		
Creavo H LED		
Finea LED		
Opendo LED		
E-line Next LED		
Aragon Fit LED		
Mirona Fit LED		
Jovie LED	1	+++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

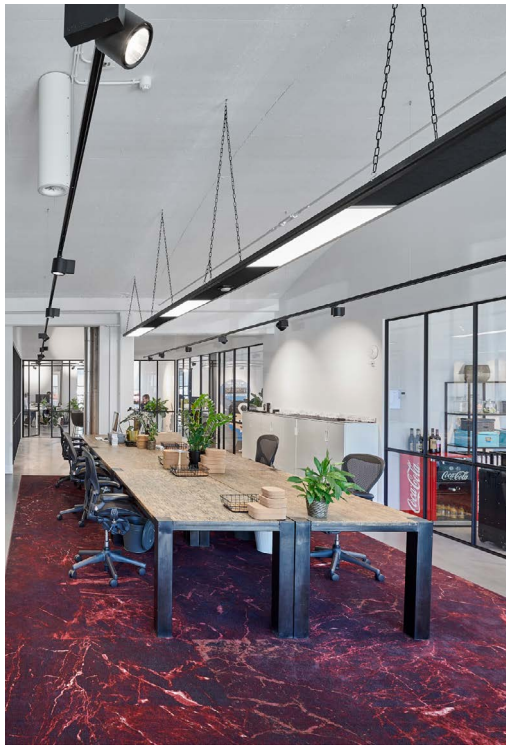
High energy efficiency (lm/W) of TRILUX products in conjunction with automatic LiveLink lighting control (daylight sensor or time switch) make it possible to provide very energy-efficient lighting. An analysis is required per project and product. The Jovie LED scores very well with 125 lm/W.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 7 ★★★★★★★

BUILDING LIFE CYCLE ASSESSMENT

GOAL

To reduce the burden on the environment by recognizing and encouraging measures to optimise construction product consumption efficiency and the selection of products with a low environmental impact over the life cycle of the building



CRITERIA

CRITERIUM 1 (7 CREDITS) ★★★★★★★

- **Measuring the life cycle environmental impact of the superstructure in concept and technical design**
  - Frame, upper floors, roof, external and internal walls, windows and external doors, stairs and ramps
  - Substructure and hard landscaping

TRILUX-scores

Product in scope	BREEAM-UK MAT 01 credits	Feasibility product*
Sonnos LED	N/A	N/A
Arimo Fit LED	N/A	N/A
Arimo slim MRX LED	N/A	N/A
Arimo D LED	N/A	N/A
Creavo LED	N/A	N/A
Creavo D LED	N/A	N/A
Creavo H LED	N/A	N/A
Finea LED	N/A	N/A
Opendo LED	N/A	N/A
E-line Next LED	N/A	N/A
Aragon Fit LED	N/A	N/A
Mirona Fit LED	N/A	N/A
Jovie LED	N/A	N/A

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

TRILUX products fall under out of scope elements and are not included in the LCA. However, there will be a positive impact on lighting fixtures that use fewer materials and have higher levels of recycled content.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 1 ★

MATERIAL EFFICIENCY

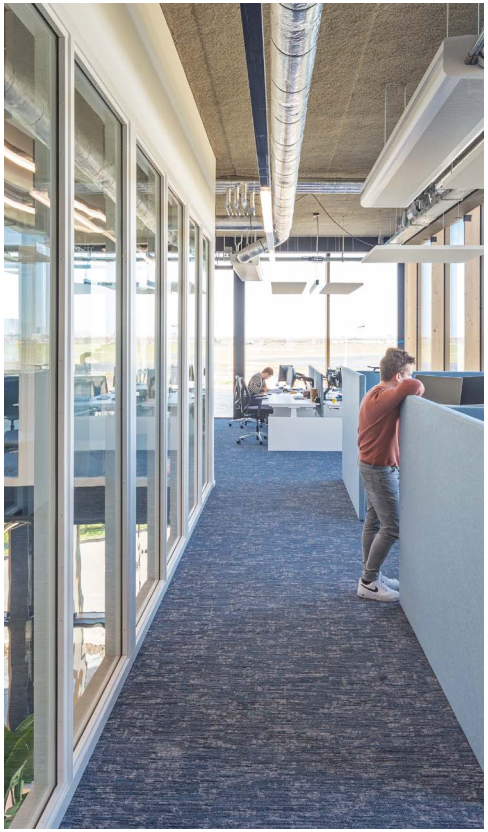
GOAL

To avoid unnecessary materials use arising from over specification without compromising structural stability, durability or the service life of the building.

CRITERIA

CRITERIUM 1 (1 CREDIT) ★

- **During the Preparation and Brief and Concept Design stages, set targets and report on opportunities and methods to optimise the use of materials**
- **Report on achieved targets and the actual material efficiency**



TRILUX-scores

Product in scope	BREEAM-UK MAT 06 credits	Feasibility product*
Sonnos LED	1	++
Arimo Fit LED	1	++
Arimo slim MRX LED	1	++
Arimo D LED	1	++
Creavo LED	1	++
Creavo D LED	1	++
Creavo H LED	1	++
Finea LED	1	++
Opendo LED	1	++
E-line Next LED	1	++
Aragon Fit LED	1	++
Mirona Fit LED	1	++
Jovie LED	1	++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

TRILUX encourages the most efficient use of materials throughout the lifecycle of the building and its components. This includes the use of fewer materials, reuse of existing demolition and stripping materials and purchasing materials with a higher content of recycled materials (Circular systems and modular products).

MAXIMUM NUMBER OF **BREEAM-CREDITS** 5 ★★★★★

CONSTRUCTION WASTE MANAGEMENT

GOAL

To reduce construction waste by encouraging reuse, recovery and best practice waste management practices to minimize waste going to landfill.

CRITERIA

CRITERIUM 1 (1 CREDITS) ★

• Pre demolition audit

- Complete a pre demolition audit of any existing buildings, structures or hard surfaces being considered for demolition
- Maximize the recovery of material for subsequent

CRITERIUM 2 (3 CREDITS) ★★★

• Construction resource efficiency

- Prepare a compliant Resource Management Plan
- Meet or improve upon the benchmarks for non hazardous generated on site
- Site construction waste and management is being monitored and targets are regularly reviewed

CRITERIUM 2 (1 CREDITS) ★

• Diversion of resources from landfill

- Meet or improve upon the benchmarks of non hazardous construction, demolition and excavation waste generated by the project

TRILUX-scores

Product in scope	BREEAM-UK WST 01 credits	Feasibility product*
Sonnos LED	N/A	N/A
Arimo Fit LED	N/A	N/A
Arimo slim MRX LED	N/A	N/A
Arimo D LED	N/A	N/A
Creavo LED	N/A	N/A
Creavo D LED	N/A	N/A
Creavo H LED	N/A	N/A
Finea LED	N/A	N/A
Opendo LED	N/A	N/A
E-line Next LED	N/A	N/A
Aragon Fit LED	N/A	N/A
Mirona Fit LED	N/A	N/A
Jovie LED	N/A	N/A

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

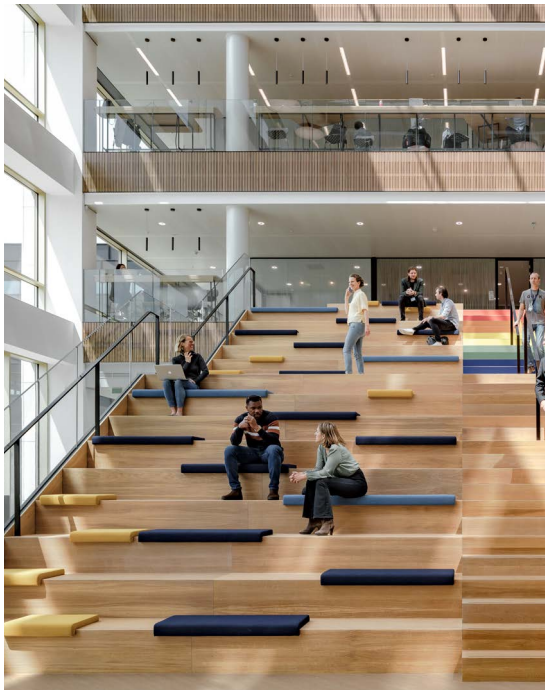
Points are project-dependent and thus difficult to determine, but bulk transport of TRILUX products or a joint bulk transport of TRILUX products with, for example, a ceiling supplier, avoid a large amount of packaging waste. TRILUX products contribute to this credit.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 2 ★★

DESIGN FOR DISASSEMBLY AND ADAPTABILITY

GOAL

To avoid unnecessary materials use, cost and disruption arising from the need for future adaptation works as a result of changing functional demands and to maximize the ability to reclaim and reuse materials at final demolition in line with the principles of a circular economy.



CRITERIA

CRITERIUM 1 (1 CREDIT) ★

• Recommendations

- Conduct a study to explore the ease of disassembly, the functional adaptation potential of different design scenarios and develop recommendations or solutions

CRITERIUM 1 (1 CREDIT) ★

• Implementation

- The proposed recommendations or solutions are implemented
- Produce a building adaptability and disassembly guide

TRILUX-scores

Product in scope	BREEAM-UK WST 01 credits	Feasibility product*
Sonnos LED	2	+++
Arimo Fit LED	2	+++
Arimo slim MRX LED	2	+++
Arimo D LED	2	+++
Creavo LED	2	+++
Creavo D LED	2	+++
Creavo H LED	2	+++
Finea LED	2	+++
Opendo LED	2	+++
E-line Next LED	2	+++
Aragon Fit LED	2	+++
Mirona Fit LED	2	+++
Jovie LED	2	+++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

Easy disassembly of the products. Depending on accessibility, method of fixing and the size of the system. Many of the latest TRILUX product series are developed and produced in this modular production so that components can be exchanged more easily.

MAXIMUM NUMBER OF **BREEAM-CREDITS** 1 ★

NIGHTTIME LIGHT POLLUTION

GOAL

To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimized, thereby reducing unnecessary light pollution, energy consumption and nuisance to neighboring properties.

CRITERIA

CRITERIUM 1 (1 CREDITS) ★

- **The external lighting strategy has been designed in compliance with Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light**
- All external lighting can be automatically switched off between 23:00 and 07:00
- Safety and security lighting complies with the lower levels of lighting in the ILP guidance notes

TRILUX-scores

Product in scope	BREEAM-UK WST 01 credits	Feasibility product*
Sonnos LED		
Arimo Fit LED		
Arimo slim MRX LED		
Arimo D LED		
Creavo LED		
Creavo D LED		
Creavo H LED		
Finea LED		
Opendo LED		
E-line Next LED		
Aragon Fit LED		
Mirona Fit LED		
Jovie LED	1	+++

*) Suitability of the product
- Low chance of feasibility
+ medium chance of feasibility
++ high feasibility probability
+++ very high chance of feasibility

TRILUX ADDED VALUE

Switch off outdoor lighting with a daylight sensor or time switch, control possible with DALI and LiveLink Outdoor.

Lighting with efficiency from the latest LED luminaires

TRILUX LIGHT THE ESSENTIALS FOR **LONDON'S LATEST BREEAM OUTSTANDING BUILDING**

100 Liverpool Street is London's new kid on the block. Already in the top 1% of the UK's sustainable office buildings, it bears no resemblance to its former self. Hopkins Architects and Sir Robert McAlpine recently completed a refurbishment and extension for British Land, which has reinvigorated the existing outdated building, stripping it back to its structural frame and providing it with a dynamic new identity thanks to a new curving façade and revamped public realm.

The building now provides 520,000 sq. ft of light, airy offices, and three new floors at the top of the building. The ninth floor includes one of the largest open-air restaurant spaces in the City of London.

Central to the buildings' design ethos was efficiency. It features an array of sustainable features to meet the ambitious net-zero carbon aims established at the project's outset.

High efficiency building systems, including the lighting, the re-engineering of the existing structural frame, photovoltaic panels, and outdoor planted areas on the upper terraces, all contribute.

Throughout the ten floors, the lighting objective was to take advantage of high efficacy from the latest LED luminaires. TRILUX Oleveon Fit LED's outstanding, low glare, and energy-efficient light supported the energy targets of the project and was selected to light the essential back-of-house areas.

Vick Nanthan, Head of Sustainability and Key Account Manager at TRILUX, describes, "I am incredibly proud of this project. The team was very hands-on and did a remarkable job of delivering on time despite the setbacks of the pandemic. Efficiency and high-quality runs through the core of this landmark redevelopment, and the washrooms were no exception.

The impressive washroom fit-out package included various styles of lighting. Our trimless LC60 light channel, in different shapes and configurations, integrates effortlessly in the changing rooms to provide an exceptional light quality. SNC point downlights with a warm light lens and special sunken optic installation appear hidden within the ceiling, creating atmosphere and accents. But my personal favourite is the bespoke antique brass wall washing luminaires which perfectly add to the oak and brass interior scheme. They use a soft warm colour temperature LED to create a wonderfully comfortable, complementary environment."

Since completion, 100 Liverpool Street has received a BREEAM Outstanding rating and is on target to achieve WELL Gold certification.

Want to know more about BREEAM? Please contact us via **+44 1245 463 463** or visit **trilux.com/breeam**

TRILUX supply a fully controlled education lighting solution

TOP MARKS FOR **EFFICIENCY**

Putteridge High School is a co-educational secondary school located in Luton.The new school has been built as part of the Department for Education's School Priority Building Programme. The funding is part of a wider national programme to invest £2 billion into new and refurbished school buildings between 2015 and 2021.

The £23 million project is now home to 1,200 secondary students and offers state-of-the-art facilities, including modern teaching rooms, a sports hall, and three outdoor all-weather hard courts.

Artificial lighting formed a significant proportion of the previous buildings' energy use and carbon emissions and contributed to over 87,700kWhrs per annum.

Working with Kier Construction, Mechanical and Electrical consultant Hoare Lea was tasked with finding efficient luminaries to contribute to the overall reduction in energy use. Hoare Lea specified TRILUX lighting for all areas of the building to provide high lighting efficiency.

The following approach was applied to minimise the energy consumption of the lighting systems:

- Reducing lighting energy at the source by using LED lighting throughout the building.
- Reducing the time and intensity for which this energy is used using daylight linked controls and manual dimming systems
- Good level of illuminance on the task area as outlined by EN12464

The architectural design of the school goes against the norms of a typical school building. Stylistic choices reflect its forward-thinking approach to learning and inspiring its students, with exposed high concretes ceilings featuring heavily. Designers required a lighting solution that could fit within the ceiling, between the acoustic panels.

The suspended Solvan Flow modular system provides high-quality, energy-efficient light up to143lm/cw optimised for the classroom setting. A wide range of light distributions, including symmetric, asymmetric, or diffusers, are available to suit all education lighting tasks.

For the lobby area, decorative suspended Limba pendants create an eye-catching entrance. The Mirona Fit Sport ball proof luminaire delivers a high light output in the sports hall and is reinforced to withstand high impact to ensure safe operation.

TRILUX's lighting management system, LiveLink, controls the lighting in all spaces other than the stores. The intelligent system combines the LED lighting with various types of sensors to increase energy efficiency.

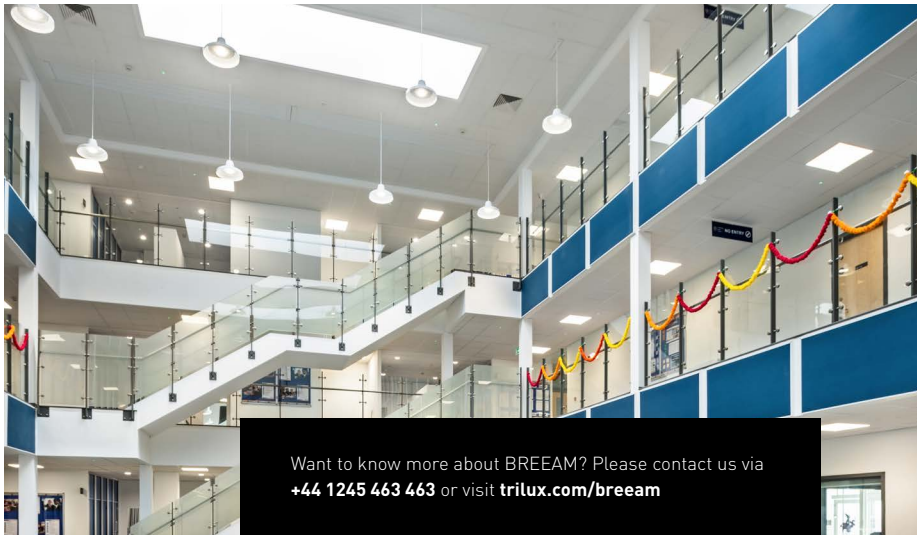
LiveLink forms the basis for the future and can be extended beyond lighting at a later date. The system can independently report maintenance needs and interact with users, opening diverse possibilities for the control and monitoring of lighting solutions that make planning and installation highly simple.

The following lighting control strategy was programmed for the school:

- In all spaces up to 35m², absence detection
- In all spaces over 35m², absence detection provided and including daylight dimming
- In daylit corridors, daylight dimming applied
- In all corridors, stairs, and lobbies without daylighting, PIR control used with manual override switches

In the teaching spaces, each luminaire row is independently controlled via manual inputs and the automatic system. Additionally, emergency lighting versions of the standard luminaires were chosen to provide the required minimum lighting levels in a power failure.

The energy efficient combination of lighting and controls has contributed to the building's BREEAM Very Good rating.



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Lighting that meets the technical specification, budget, and aesthetic vision

TRILUX LIGHT **GROUND-BREAKING** MEDICAL RESEARCH CENTRE

A collaboration between the Royal Free London, the Royal Free Charity, and University College London, the Pears Building is now home to The UCL Institute of Immunity and Transplantation (IIT). This world-class research organisation develops revolutionary new treatments for conditions including leukaemia and diabetes.

Designed to achieve BREEAM Excellent, the Pears Building includes laboratories, patient accommodation, a car park, and the Royal Free Charity's offices. Many residents and organisations have supported the project. Among these is the Pears Foundation, which donated £5million.
John Eagan, Design & Build Contracts Manager, TClarke, comments, "One of the building's main aims was to provide a cost-effective and adaptable facility to improve the provision of care for patients. For the lighting, the TRILUX range was the perfect answer. We were able to meet our buying targets and deliver a complete project of quality lights which meet or in some cases exceed the technical specification."

The TRILUX LC60 LED light channel provides the backbone of the scheme. Both suspended and recessed clean, continuous lines of light are installed throughout the laboratories and offices. The infill spaces are ideal for adding sensors and services. Moreover, the wiring from one end helps with maintenance.

Central to the scheme is the atrium and feature staircase, designed to foster interaction among researchers and create a vibrant hub for clinical research at the heart of the building. Over 200 bespoke diffused glass LED pendants are installed to stunning effect, balancing and contrasting with the robust concrete surroundings.
Further TRILUX luminaires have also been used in the back of house areas, carparks, and circulation routes across the entire building.

John adds, "the lighting complements the industrial design concept; they go together exceptionally well. When you look up from the ground floor, you can see the lighting design signature running throughout the building's fabric. The effect is fantastic and adds to the iconic nature of this project."

Lora Kalvea, Lighting Designer at BDP, concludes, "Overall, the collaboration was very successful. Additionally, the luminaires from TRILUX standard range provided high quality workspace lighting for the labs and write-up areas. The luminaires are dimmable throughout and provide comfortable, glare-free illumination. The TRILUX team was helpful and responded to all our comments and requests, and the cooperative spirit is reflected in the great result – a well-lit building."