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February 2023

London Luton Airport Expansion

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Volume 5 Environmental Statement and Related Documents

5.02 Appendix 5.2 Light Obtrusion Assessment - Part B

Application Document Ref: TR020001/APP/5.02

APFP Regulation: 5(2)(a)

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

London Luton Airport Expansion Development Consent Order 202x

5.02 ENVIRONMENTAL STATEMENT APPENDIX 5.2 LIGHT OBTRUSION ASSESSMENT - PART B

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Appendix F

F1 Lighting Design Strategy and Landside Lighting Design

Performance Criteria

This section below describes the lighting design strategy for the Main Application Site and the landside lighting design used for this assessment.

ARUP

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London Luton Airport Expansion Development

Exterior Lighting Strategy Stage 3C Report

19th August 2022

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Contents

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INTRODUCTION

PURPOSE

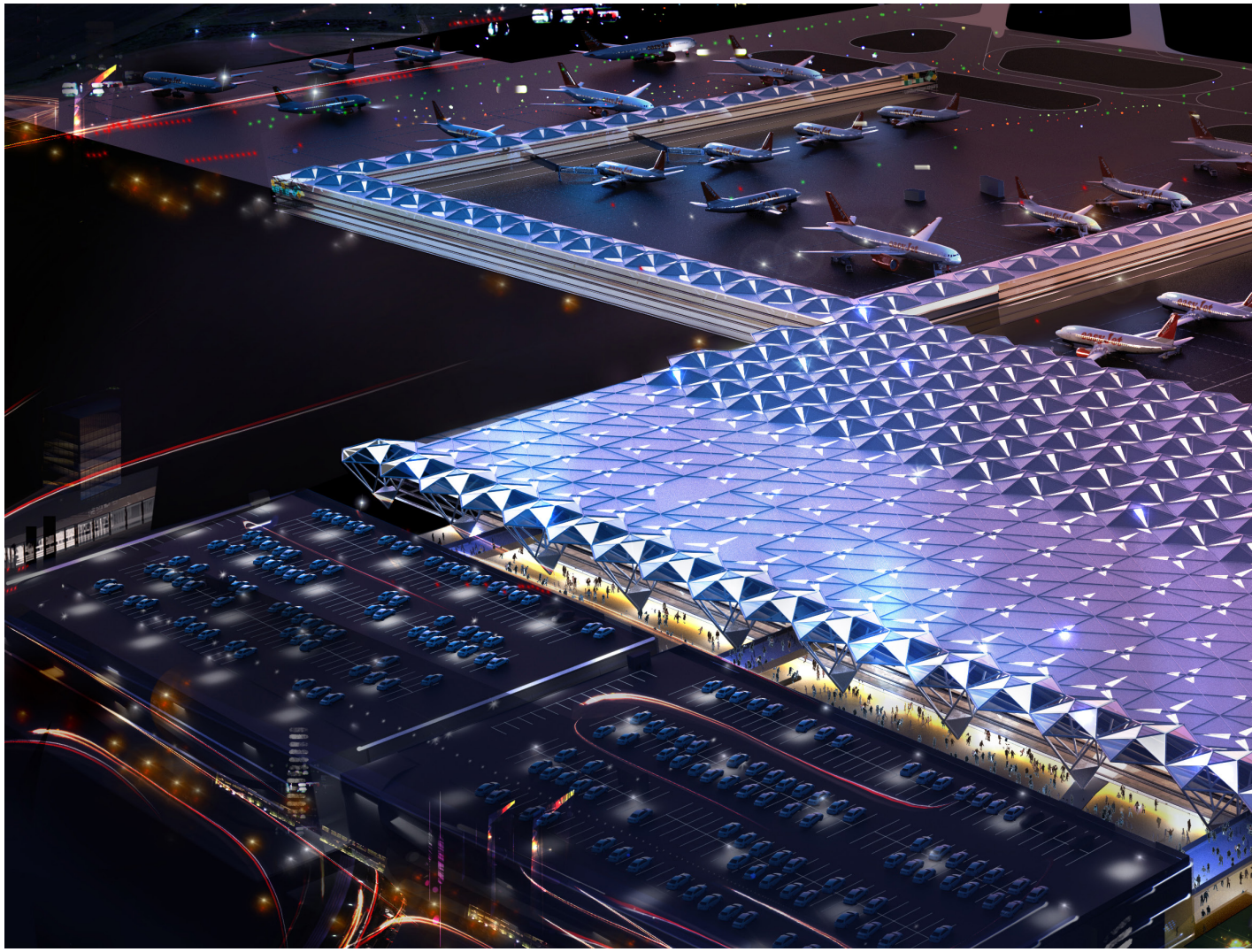
Summary

The Lighting Strategy provides both a creative and technical framework by which the true potential of Luton Airport Expansion Project Development can be realised, creating a welcoming and safe environment after dark.

The recommendations for limiting obtrusive light have been considered to minimise potential adverse impacts on local biodiversity, local area residents and users of the space. Equally, optimising value with respect to both capital and running costs is a key element, in relation to project life, energy costs, hours of use, labour rates and light source and control gear replacement periods.

Finally, consideration has been given to the types of lighting equipment selected as well as their mounting locations, materials, the longevity of the finishes and the types of light sources utilised, to ensure minimal disruption to day and night-time activities when the installation needs maintenance or replacement.

The following strategy provides guidance not only on providing a sense of safety



and security, but also to ensure that this is done in a sustainable manner. The Lighting Strategy considers the visual requirements for each type of space. The Technical Addendum at the end of this report covers many aspects of the standards and guidance to consider when developing design solutions.

Purpose of report

The purpose of this report is to present the Stage 3c Exterior Lighting Strategy (landside and airside) for the Luton Airport Expansion Project. As well as communication of the current design progress, the main goal of this report is to provide an indication of the character of light proposed for each space.

This report is intended to create a comprehensive Lighting Strategy for the Luton Airport Expansion Project, present the concepts and assist the appointed lighting designers in developing the concepts and the schematic design for the exterior areas at the next stage of the design. This is a concept stage report of the masterplan; the proposed strategy and schematic design shall be validated by the means of lighting calculations at the next stage of the design.

CONTEXT

THE SITE

Location

Luton Airport is located 2.8km to the south-east of Luton town centre. The site covers an area of 43.35km^2 and includes all the amenities associated with an airport on an operational and commercial basis.

The area to the east of the existing terminal, where the long-stay car park is currently located, is approximately the preferred location of the proposed second terminal.

Topography

- Runway on a raised platform and at a higher level than the rest of the site.
- Landfill to the north of the site.
- Expansion to the east of the site.

Land use

- The land to the north of the site is mainly residential; to the west is a mixture of industrial and residential and to the east and south is predominantly rural.
- The airport runway is located directly to the south, with the existing airport terminal building to the east.

- The proposed expansion will replace the current long-term parking, part of Wigmore Park and agricultural land.

Landscape and Heritage

- The surrounding landscape includes several areas designated for their value at local and national levels.
- The existing airport is a visually prominent feature within views from the surrounding areas including Chiltern Way and Chiltern Way Cycle Route, and in distant views from the Chilterns AONB, near Warden.
- Someries Castle, located to the south is the only scheduled monument in the vicinity of the site

Surface Access

- Junction 10 of the M1 motorway is located 5 km west of the site, serving as a primary transport link.
- Airport Way (A1081) connects the M1 to the airport (via Percival Way) and Vauxhall Way.
- LLAL is currently in discussion with the DfT for the introduction of four fast trains per hour.
- These additional services, compared to one train per hour at present, would reduce the journey to 30 minutes.
- Thameslink services provide connections to other stations along the route as well as stations toward the Brighton mainline.
- Several bus services also operate in the proximity of the airport including local services which serve the airport.
- Traffic-free cycle paths, signposted cycle routes and advisory cycle routes away from main roads and dual carriageways have been identified by Sustrans in the Luton area.
- Footways are provided adjacent to all roads surrounding the site.

LIGHTING STRATEGY

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THE MASTERPLAN

Introduction

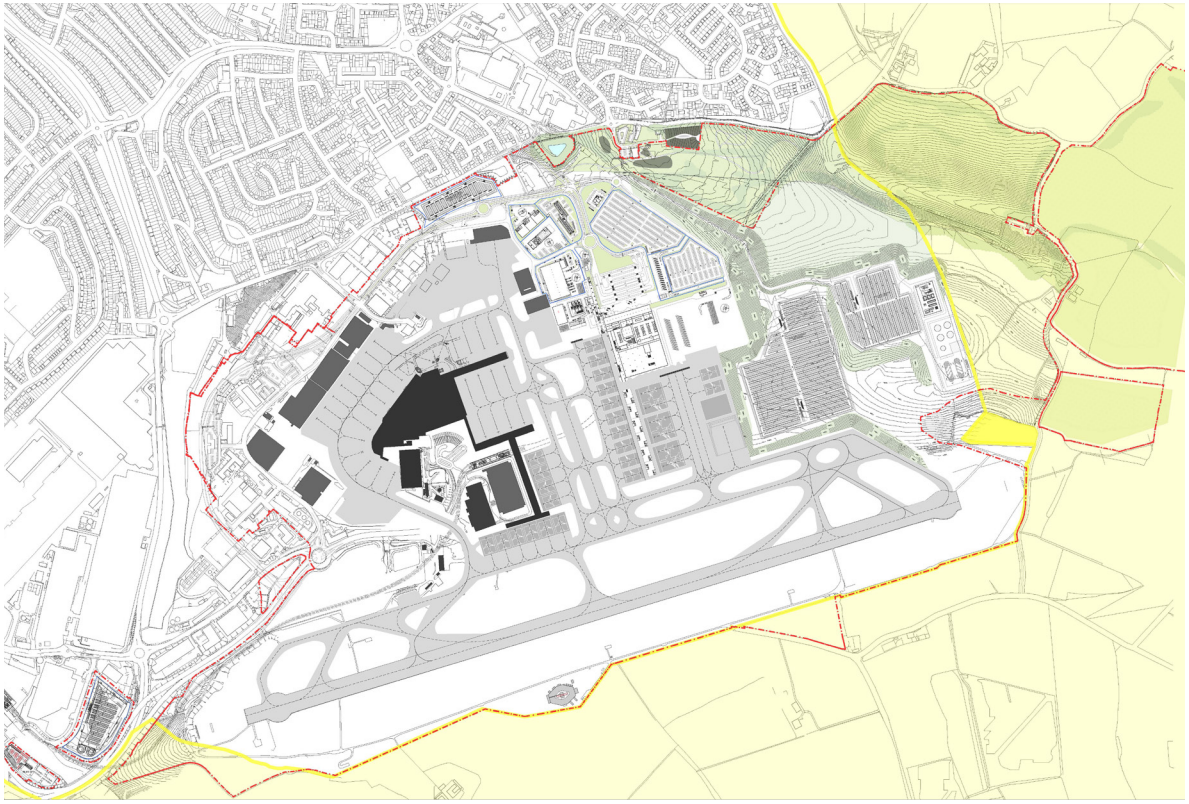
Two development layouts have been proposed for Luton Airport Expansion Project, that will be developed in two phases:

- Phase 1 - Layout to achieve a target capacity of 21.5mppa
- Phase 2 - Layout to achieve a target capacity of 27mppa
- Phase 3 - Layout to achieve a target capacity of 32mppa

21.5mppa site plan

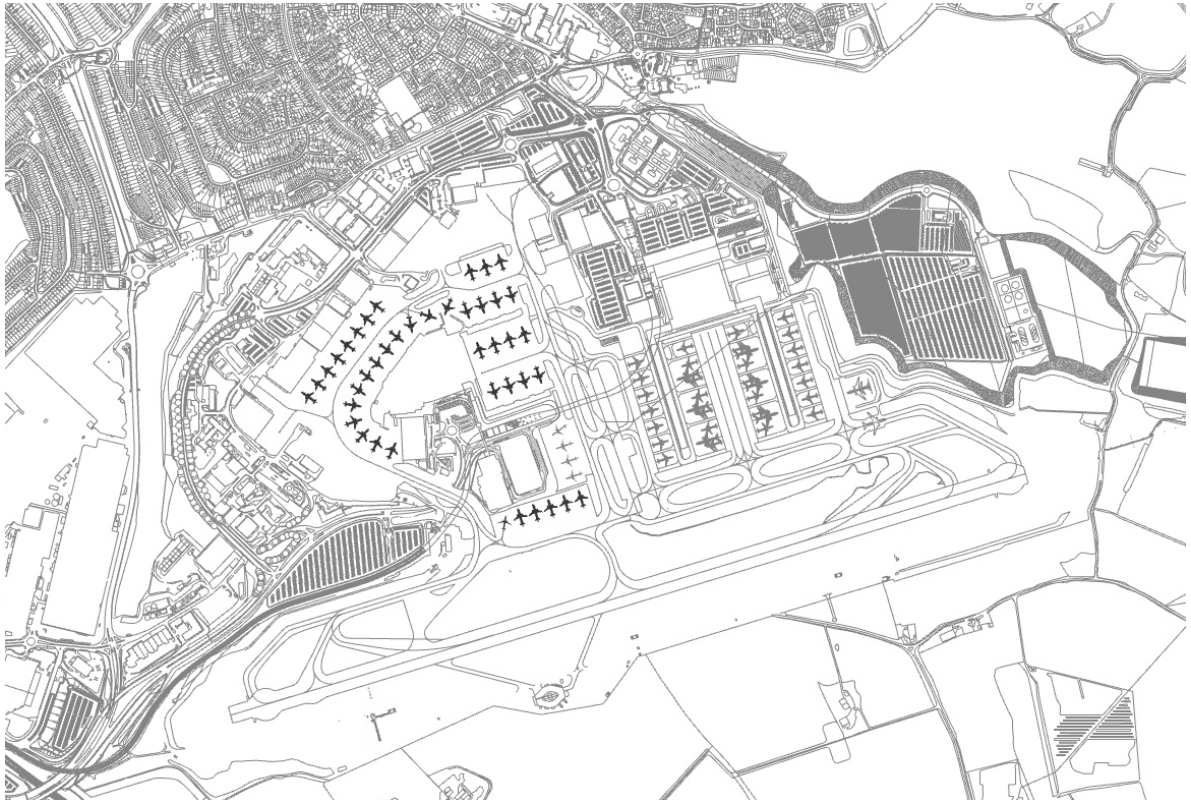
The masterplan to the right shows the 21.5mppa site plan proposal. When compared to the 32mppa site plan, the main differences between the phased proposals are:

- Less expansion to the north-east of the site with a smaller size of surface car park.
- Less expansion to the apron accommodating a reduced number of aircraft stands and taxiways.
- A slight decrease of the new Terminal building size towards west.



21.5mppa proposed development layout

- A surface car park replacing the office/retail park to the north.



32mppa proposed development layout

32mppa site plan

The masterplan to the left shows the 32mppa site plan proposal. When compared to the 21.5mppa site plan, the main differences between the phased proposals are:

- Further expansion to the north-east of the site with additional spaces of surface car parks.
- Further expansion to the apron to accommodate more aircraft stands and taxiways.
- A slight increase of the new Terminal building size towards east.
- An office/retail park to the north replacing the previous surface car park.

The exterior Lighting Strategy described in this report can be applied to both proposed development layouts of the masterplan regardless of the phasing and preferred target capacity achieved.

BASIS OF DESIGN

The exterior lighting vision for Luton Airport will define the experience and environment through which the staff and passengers will move, whether they are at the start or the end of their journey or going to work.

Design Objectives

The underlying strategy for the use of light at Luton Airport has four elements:

- To create a comfortable environment and passenger experience that is positively memorable.
- To aid way-finding and help passengers on their journey to, through and from the airport.
- To create continuity and coherence between spaces.
- Conservation of energy.

Amenity

A primary function of the lighting will be to provide appropriate levels of illumination to enable people to see in the absence of natural light. The extent to which people need to see after dark will vary from area to area, with some requiring high levels of visual acuity whilst others should enable just a basic understanding of scale and the ability to identify a safe passage through a space.

The lighting designers responsible for each project must therefore gain a clear understanding of the manner in which the space that they are designing will be used after dark as well as its relationship to spaces adjoining it.

Legibility and Wayfinding

During daylight hours people use elements of the man-made and natural environments to build a 'mental map' of an area. This helps them to orientate themselves, navigate from place to place and gain an understanding of the scale and nature of a space and its relationship to the wider context.

After dark many of these 'visual signs' disappear and it is largely left to artificial light and natural darkness to inform the interpretation of a space and its relationship to those around it.

The most visible elements in a nocturnal landscape can tend to take on a more dominant role in a person's 'mental map'. The most visually prominent elements are generally those that are perceived as being the brightest, although other factors such as colour, scale, animation and personal association also play important roles.

Without careful planning an environment can easily be rendered 'illegible' after dark, with skewed spatial hierarchies that can hinder people (particularly passengers) from orientating themselves and finding their way in the absence of daylight.

By developing a considered and consistent approach to the lighting of key navigational tools such as roads and pedestrian paths, light will play a crucial role in supporting legibility and accessibility and in reinforcing specific visual and physical connections across the airport.

Accessibility

The design of artificial light must support the various needs of the passengers and staff of the airport after dark. This includes those with special needs and the elderly. Supporting a highly

accessible after-dark environment will include avoiding excessive contrasts, avoiding direct and reflected sources of glare, avoiding shiny, mirror-like surfaces at pedestrian level, controlling shadow and limiting potentially confusing upward lighting.

Energy and Costs

Energy is a very important element in the operation and maintenance of any building. An airport building is a 24 hour 365 day a year concern. As a consequence the control of lighting and thus the energy consumption is of vital importance. Lighting shall respond to the presence or absence of staff and passengers, reducing the light output when a space is empty. Lighting schemes must be designed to optimise value with respect to both capital and running costs. Whole life-cycle costs must be considered in relation to project life, energy costs, hours of use, labour rates and light source and control gear replacement periods.

Safety and Security

Artificial light must be designed to assist in maintaining a safe environment at all times. This includes positively defining potential hazards such as steps and ramps and areas where pedestrians encounter moving vehicles – e.g. at pedestrian crossings. Such areas may be defined after dark through passive techniques, such as landscape materials with appropriately contrasting reflectances, as well as through active illumination - e.g. the use of focused light and increased intensity.

Light should be designed to provide an overall sense of security throughout the airport, including supporting both active surveillance (e.g. CCTV) if/when required and passive surveillance. Adequate recognition and modelling of people and surfaces should be provided where required.

It should be noted that perceptions of security are not necessarily dependant on providing high intensities of light and indeed, in some cases, low levels of light can be important in maintaining a sense of security and privacy. Creating an environment that feels secure will largely be dependent on ensuring that spaces are legible, appear well maintained and do not inhibit adaptation.

Maintenance

As part of the development of individual lighting schemes, consideration must be given to the types of lighting equipment selected as well as their mounting locations, materials, the longevity of their finishes and the types of light sources utilised.

This will ensure minimal disruption to day and night-time activities when the installation needs maintenance or replacement. A reduced portfolio of luminaires and light sources will also help to simplify maintenance regimes. Maintenance issues will need to be addressed in terms of cost effectiveness and maintenance programmes. Lighting control systems can also be used to provide remote monitoring of individual luminaires to report lamp-life and lamp failure to further ease maintenance regimes.

Light Source

LED technology is proposed to be the light source of choice for applications across the Project site, with a colour temperature of 3,000K. However, where ecological considerations or human factors take precedence, warmer colour temperatures (<2,700K) will be considered for the advantages of reduced blue spectral content (minimised wavelength <550nm) and promotion of a warmer and more intimate setting. Refer to ILP Guidance Note GN08 (Bats and Artificial Lighting).

Generally all white-light light sources will have a colour rendering index Ra greater than 80 in accordance with the international colour code. This is of particular importance in areas with higher levels of illumination, where improved visual quality and accurate rendition of skin tones and signage, etc. can facilitate tasks and interactions and help to improve a user journey.

LED light sources can be susceptible to high frequency flicker and sensitivity varies between humans and different species of ecological receptors. Visible blinking, flickering or strobing will not be acceptable at full lumen output, nor at any dimming level should dimming be specified. Many drivers available on the market are able to dim down to 1% output while maintaining Flicker Frequency above 500Hz. The requirements of IEEE 1789–2015 will apply to all LED drivers, where unless specified otherwise drivers will aim to limit the other biological effects of flicker.

Consultation with an Ecologist is an essential activity when selecting appropriate light sources as part of the Lighting Design development.

Lighting Controls

Lighting controls form an essential part of the Initial Lighting Strategy and can provide benefits ranging from the reduction of lighting energy consumptions to self reporting and testing of lighting equipment to streamline maintenance activities.

The degree of electric lighting control provided can vary from a simple switched system to a networked solution across buildings, and shall be assessed on a project by project basis to ensure that a proportionate system is put into place.

The following considerations shall guide the selection of a suitable lighting controls system:

- Requirements for interfacing or integration with an existing or desired Central Management System (CMS) or Building Management System (BMS).
- Monitoring dashboard to display and time-log operational performance data, for example (but not limited to); operational hours (for maintenance planning), power load, temperature, voltage, switching cycles, luminaire status, device addressing, grouping, dimming level, communication faults and energy use on a zonal basis
- Automatic reporting of luminaire failure, including but not limited to failure to respond to instructions or driver failure.
- Control protocol (it is recommended that a standard open protocol is utilised for greater commercial selection and compatibility of control equipment, sensors, etc).
- Addressability and dimmability (e.g., individual control of luminaires, or

grouping / zonal control).

- Schedule control, programmable with predefined events per day, per zone.
- Degree of feedback to the lighting system (eg. photocells for daylight-linked dimming, PIR sensors for occupancy based control and astronomical timeclock for time of day linked control).
- Integral ability for luminaires to have constant light output (CLO) control, allowing energy use to be minimised while achieving lighting targets and extending the life of the LED sources.
- Design Accreditations (eg. BREEAM) or energy targets.
- Astronomical timeclock programmable schedule with a minimum of six events per day per zone, and with a 365-day calendar function.

THE JOURNEY

Introduction

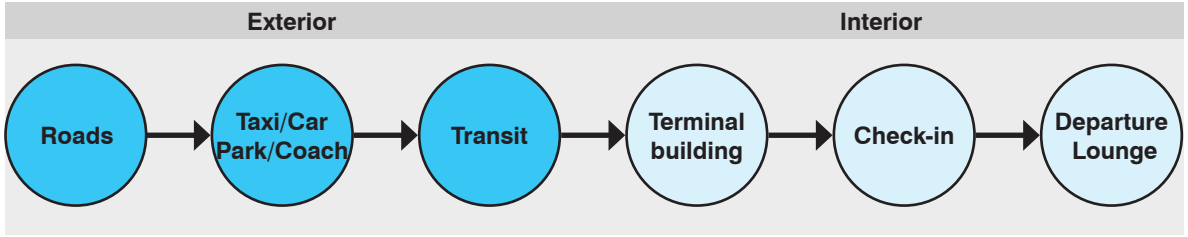
In this section, we identify the variation in the lighting environments experienced on the journeys to and from the airport. The exterior lighting is the first and last impression of each journey and it should be a memorable one.

Each project commissioned (Exterior or Interior) whilst being a stand alone project is also part of the airport's overall development. As such each project shall be integrated with its surroundings and adjacent spaces.

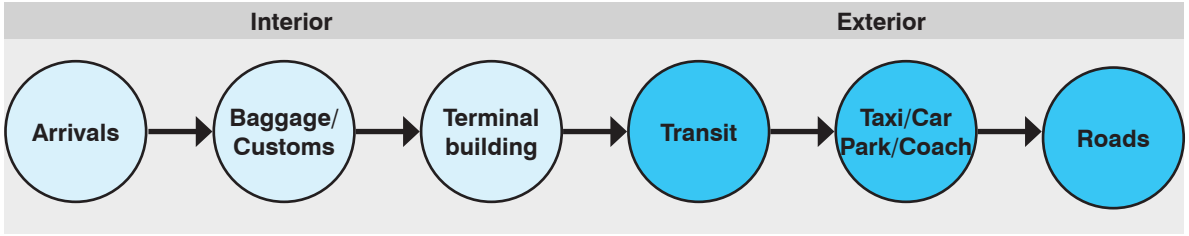
Any new or refurbished space forms part of the wider context and it shall be designed to compliment the surrounding spaces so passengers can move seamlessly through the visual environment, without the journey appearing to be a series of diverse experiences lacking in cohesion.

There are two main journeys through the site:

- Outward journey or departures, starting at the set down point, the roads, the car park or the

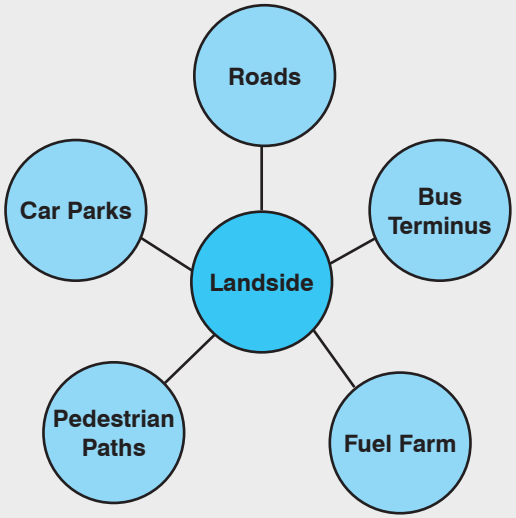


Outward journey (Departures)

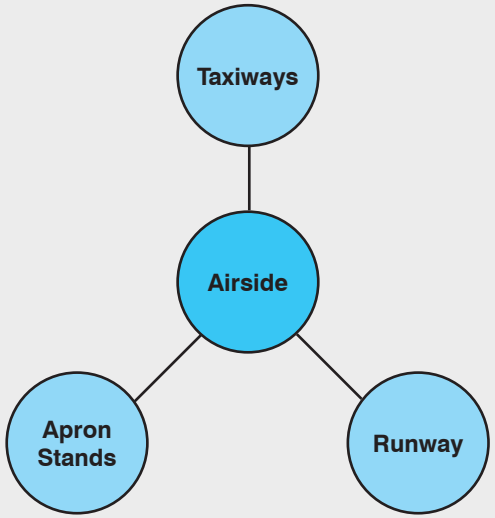


Inward journey (Arrivals)

Exterior Lighting Strategy (by Arup)



Landside Schematic Lighting Design (by Arup)



Airside Schematic Lighting Design (by AECOM)

bus terminus or the taxi, through the check-in hall, and finally the departures lounge.

- Inward journey or arrivals, starting at air bridges, baggage reclaim and customs and finally to the car park, bus terminus, taxi, pick-up points, roads, etc.

The scope of this report is the overall exterior Lighting Strategy; Landside and Airside (as shown at the diagram to the left).

Landside includes the outward/inward journey from the car park or bus terminus to the Terminal building and vice-versa.

Airside includes the apron stands, taxiways and runways lighting (by AECOM).

The overall lighting design strategy is developed by Arup (Landside and Airside). The schematic lighting design for Landside is developed by Arup and the schematic lighting design for Airside is developed by AECOM.

Exterior Lighting Strategy and Schematic Lighting Design Scope of Works

HIERARCHY

Light Levels

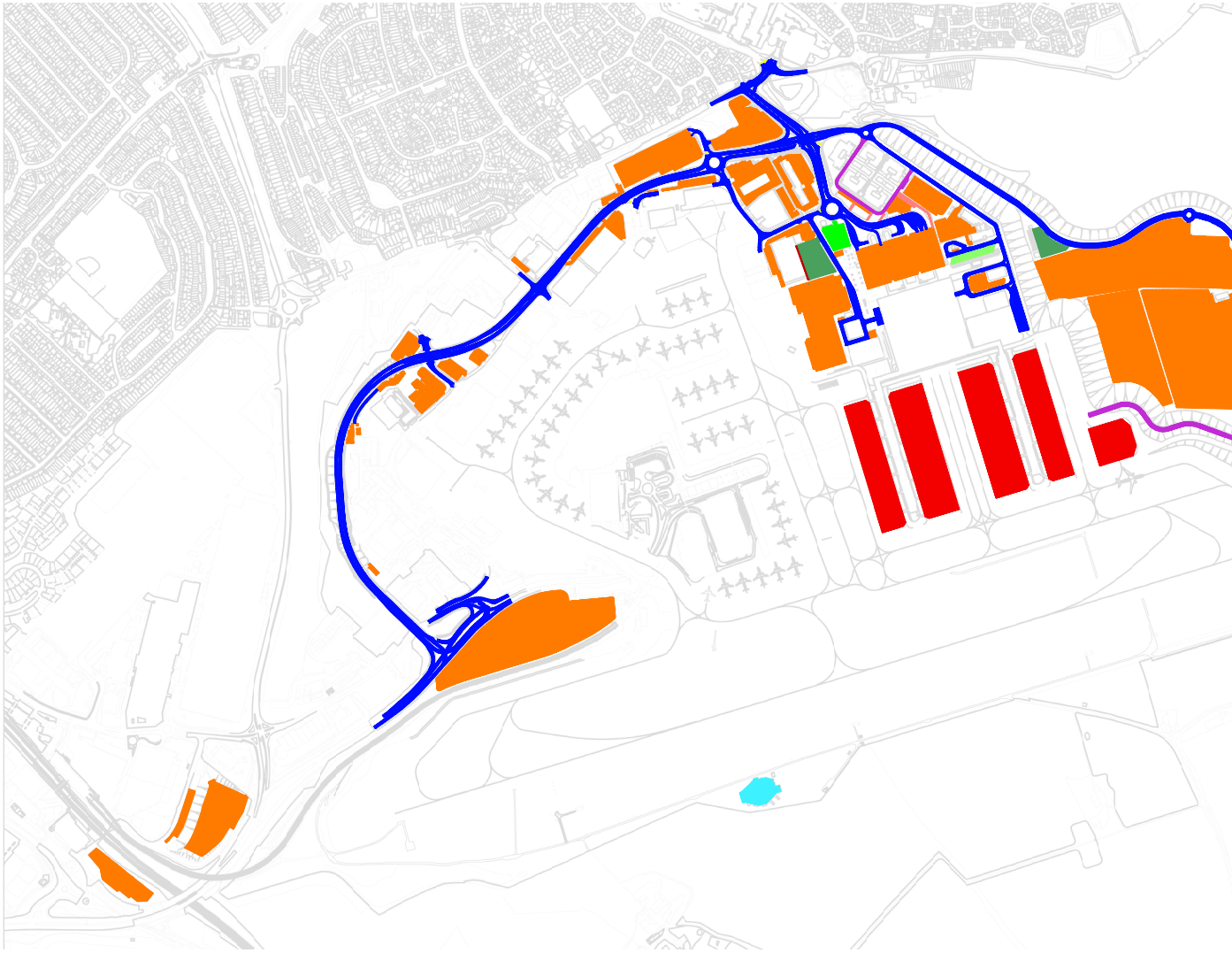
The opposite diagram describes the hierarchy and approach of the lighting for the proposed masterplan.

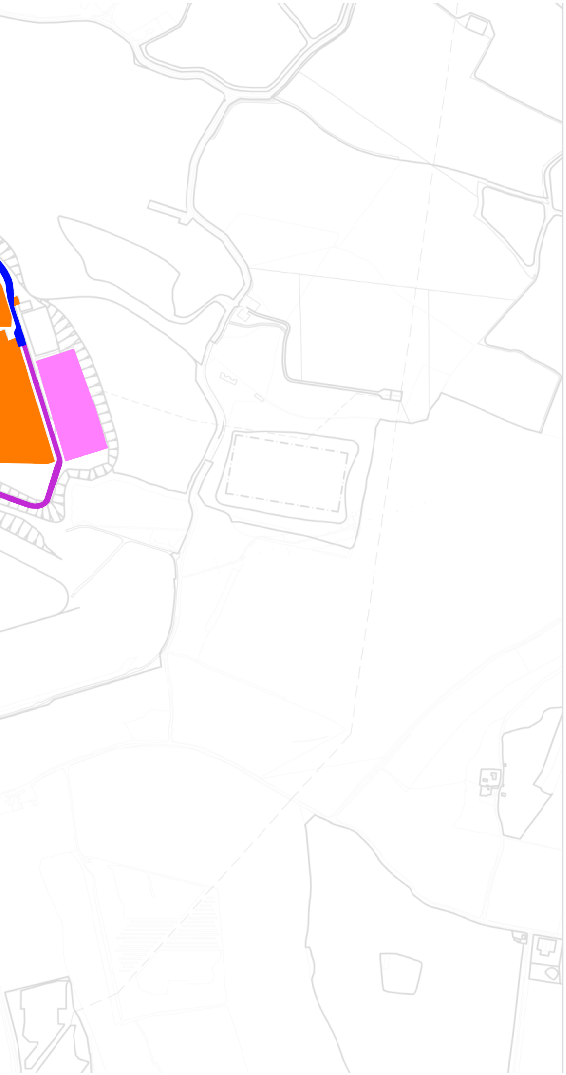
As a first step towards determining appropriate lighting performance for Luton Airport, an ‘Environmental Zone’ (as defined by the Institute of Lighting Professionals’, publication, “Guidance Notes for the Reduction of Light Pollution”) has been selected.

This categorisation system represents current best practice and aims to ensure that the relative brightness of the site with respect to its environmental context is appropriate.

Environmental Zones are categorised in the ILP document as follows:

- E1: Intrinsically dark landscapes (national parks, areas of outstanding natural beauty, etc.)
- E2: Low district brightness areas (rural, small village, or relatively dark urban locations)





Key

- Car Park
- Roads Primary
- Roads Secondary
- Coach Parking
- Pedestrian Crossing
- Apron Stand
- Emergency Muster
- Loading Bay
- Pedestrian Route
- Fuel Farm
- Fire Training

Refer to the technical addendum of this report for the lighting levels.

- E3: Medium district brightness areas (small town centres or urban locations)
- E4: High district brightness areas (town/city centres with high levels of night-time activity

It has been assumed that the Luton Airport falls under the category E3.

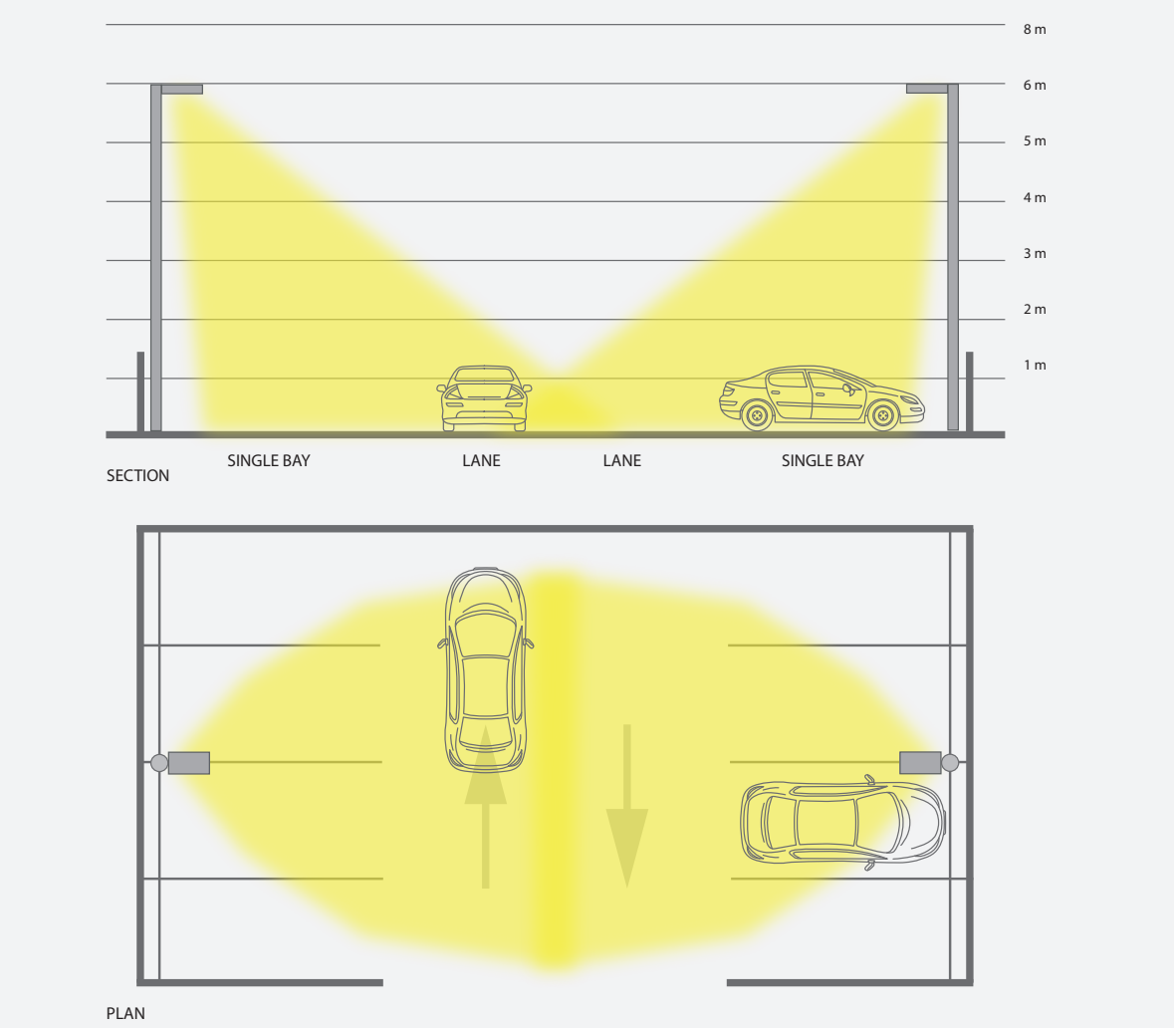
SURFACE CAR PARKS

Car Parks Surface Level (single bay)

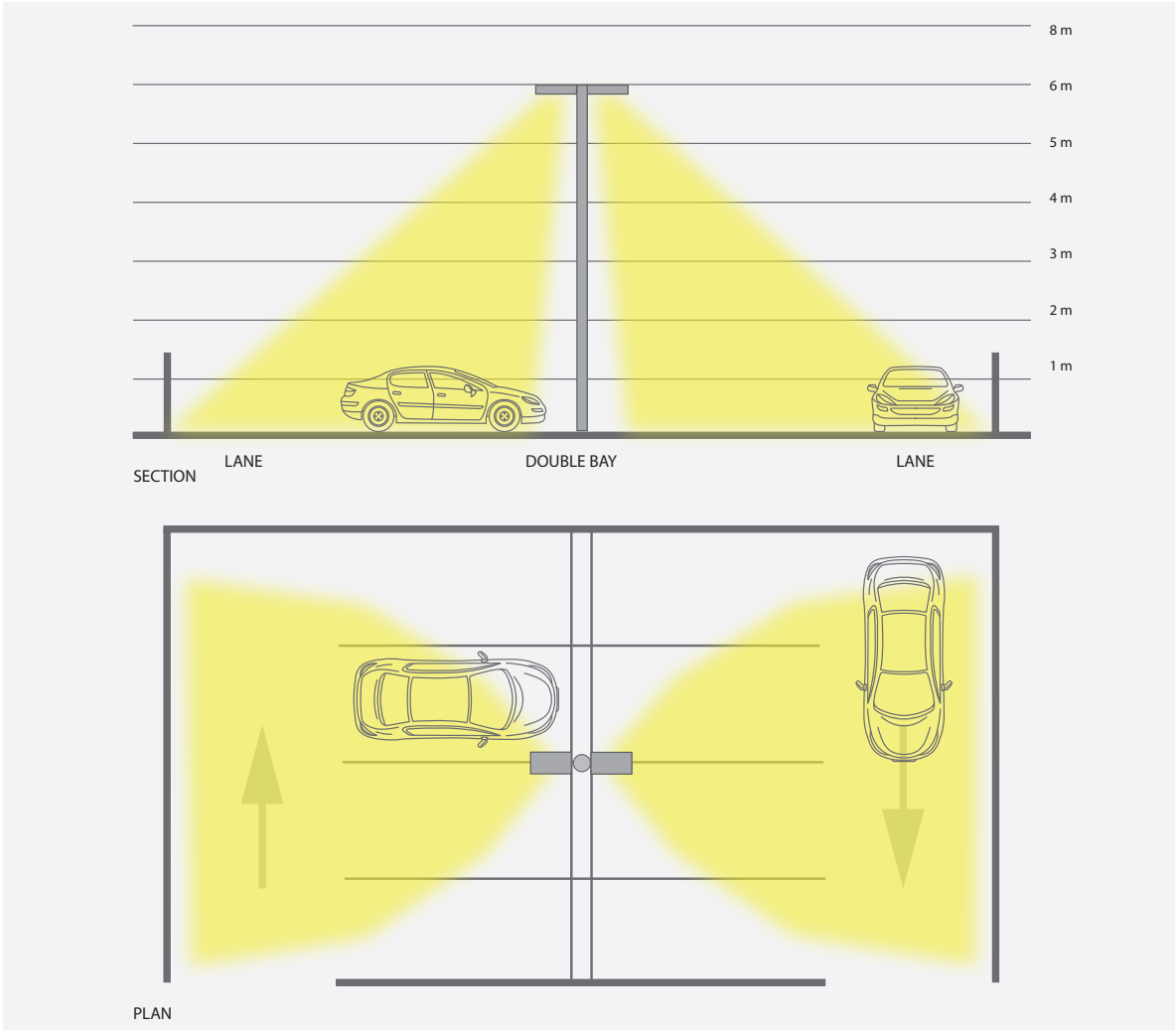
The figure to the right shows a typical arrangement for a car park, single parking bay and access.

In principle:

- Car park lighting shall use white light sources which shall be dimmable.
- A good uniformity over the space shall be achieved by utilising lanterns mounted on columns at the perimeter of the car park.
- Columns shall be aligned with the parking space lines to avoid collision.
- The preferred height of the column mounted lanterns shall not exceed 6m above finished ground level to minimise light obtrusion and environmental impact. Equally the lantern chosen shall be of flat glass with 0° uplight and no tilt above horizontal level.



Single parking bay typical lighting arrangement



Double parking bay typical lighting arrangement

Car Parks Surface Level Car (double bay)

The figure to the left shows a typical arrangement for a car park, double parking bay and access.

In principle:

- Car park lighting shall use white light sources which shall be dimmable.
- A good uniformity over the space shall be achieved by utilising lanterns mounted on columns located in between the parking spaces.
- Columns shall be aligned with the parking space lines to avoid collision.
- The preferred height of the column mounted lanterns shall not exceed 6m above finished ground level to minimise light obtrusion and environmental impact. Equally the lantern chosen shall be of flat glass with 0° uplight and no tilt above horizontal level.

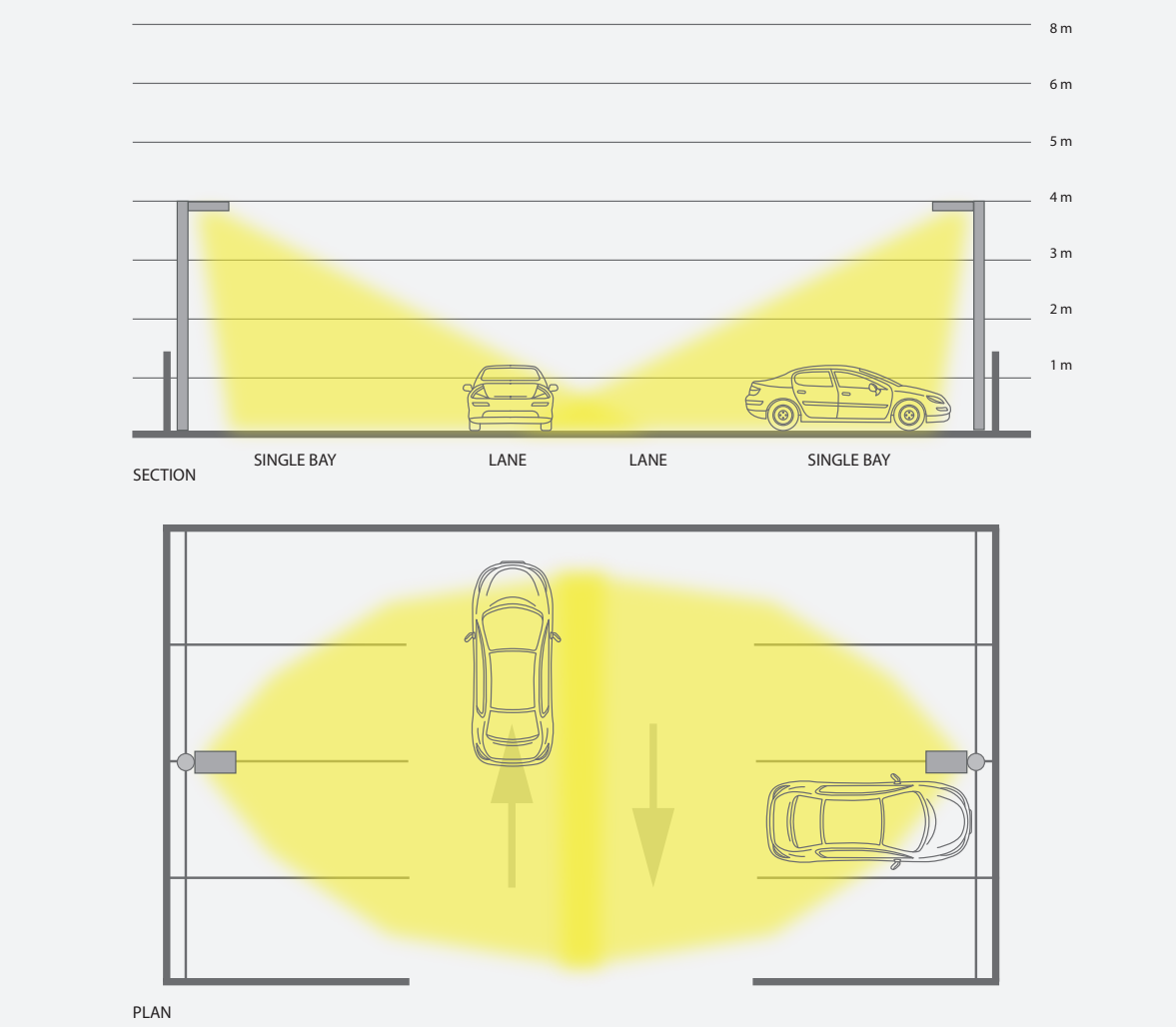
DECKED CAR PARKS

Car Parks Decked (open roof) single parking bay

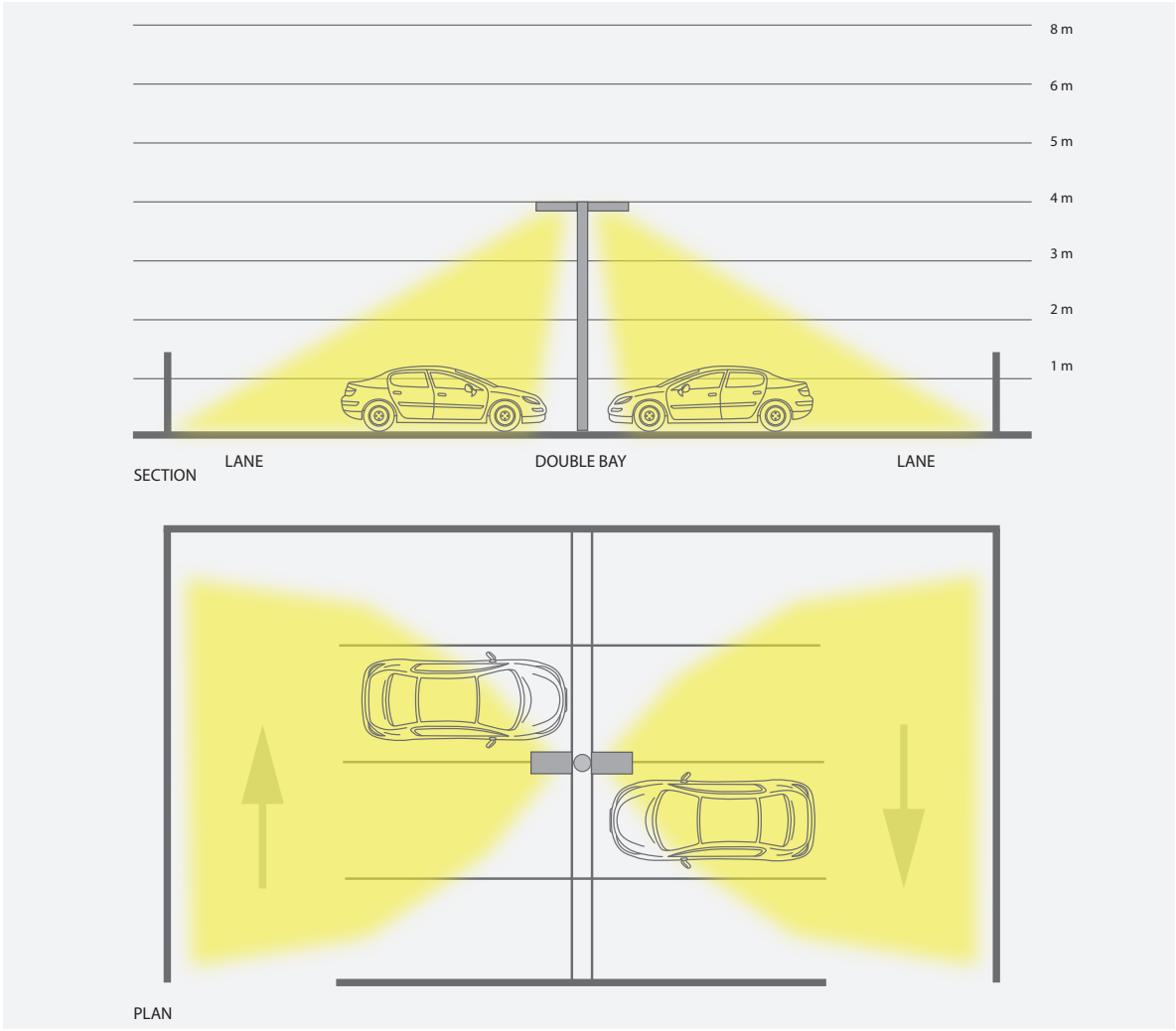
The figure to the right shows a typical arrangement for an open roof car park, single parking bay and access.

In principle:

- Car park lighting shall use white light sources which shall be dimmable.
- A good uniformity over the space shall be achieved by utilising lanterns mounted on columns at the perimeter of the car park.
- Columns shall be aligned with the parking space lines to avoid collision.
- The preferred height of the column mounted lanterns shall not exceed 4m above finished deck level to minimise light obtrusion and environmental impact. Equally the lantern chosen shall be of flat glass with 0° uplight and no tilt above horizontal level.
- Barrier design shall limit vehicle head light spill externally.



Single bay parking spaces lighting arrangement (open roof)



Double bay parking spaces lighting arrangement (open roof)

Car Parks Decked (open roof) double parking bay

The figure to the left shows a typical arrangement for an open roof car park, double parking bay and access.

In principle:

- Car park lighting shall use white light sources which shall be dimmable.
- A good uniformity over the space shall be achieved by utilising lanterns mounted on columns located in between the parking spaces.
- Columns shall be aligned with the parking space lines to avoid collision.
- The preferred height of the column mounted lanterns shall not exceed 4m above finished deck level to minimise light obtrusion and environmental impact. Equally the lantern chosen shall be of flat glass with 0° uplight and no tilt above horizontal level.
- Barrier design shall limit vehicle head light spill externally.

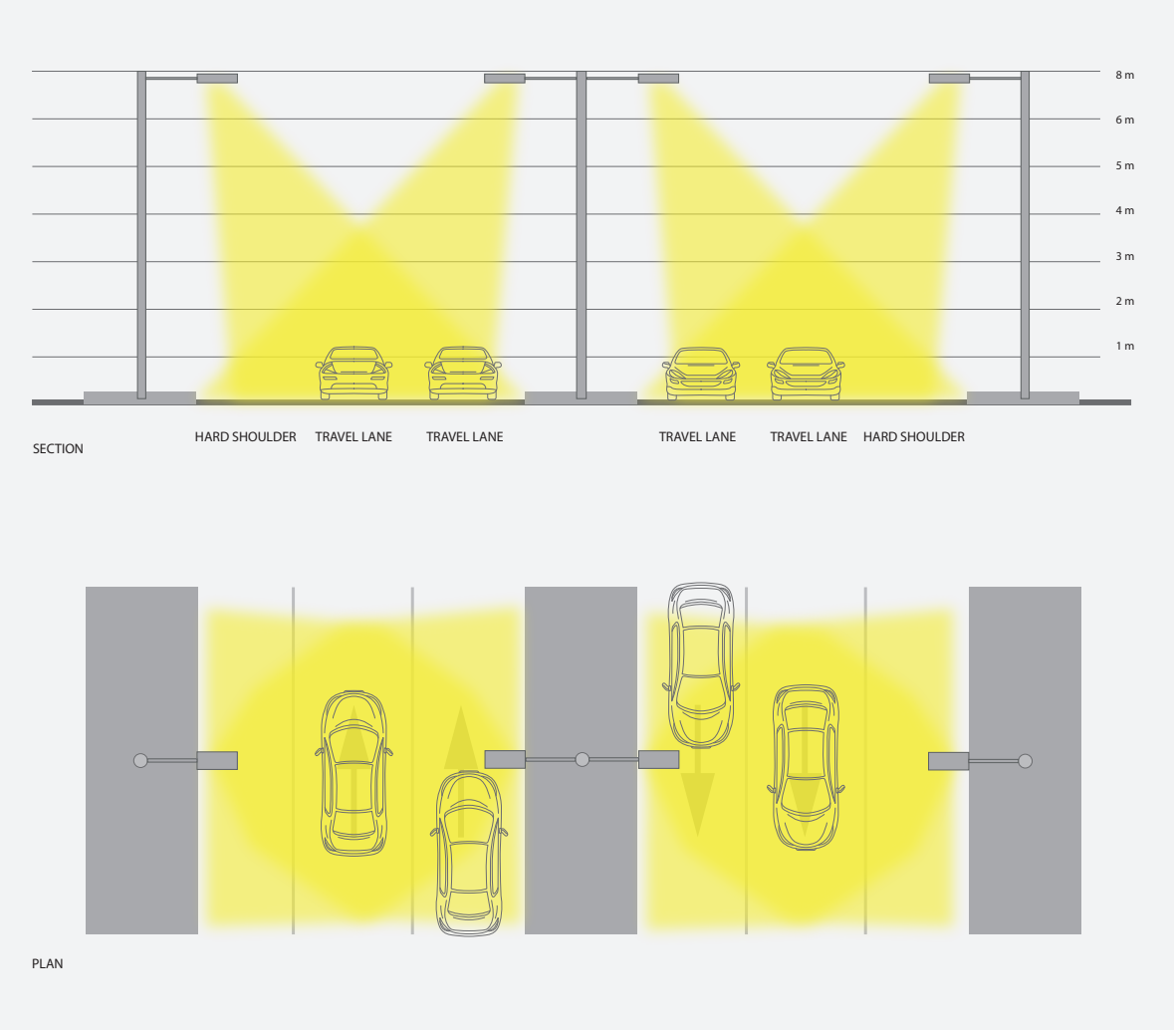
ROADS

Primary Vehicular

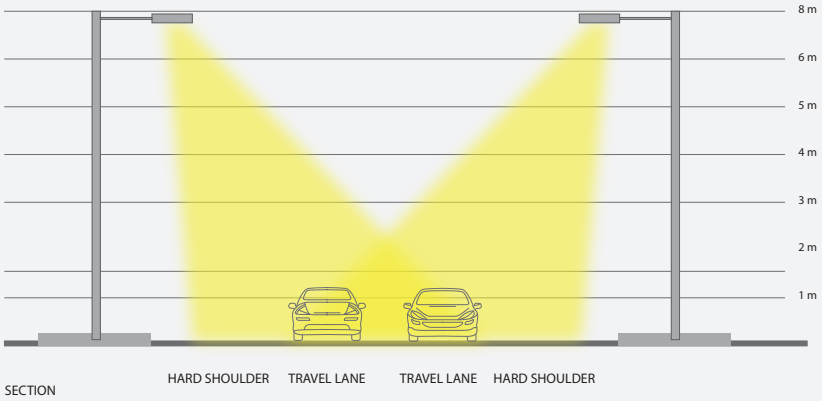
The figure to the right shows a typical arrangement for a primary vehicular road (dual carriageway).

In principle:

- Road lighting shall use white light sources.
- A good uniformity over the road shall be achieved by utilising road lighting lanterns mounted on columns with an opposite arrangement.
- Dual carriageways can be satisfactorily lit by means of opposite arrangements mounted on the outside edges of the road, or by twin lanterns on the central reserve only. The appropriate arrangement will be defined at the next stage of the design and will be depended on the column height and the width of the road.
- The preferred height of the road lighting lanterns shall be 8m above finished ground level to minimise light obtrusion and environmental impact. Equally the lantern chosen shall be of flat glass with 0° uplight and no tilt above horizontal level.



Primary vehicular lighting arrangement



Secondary vehicular lighting arrangement

Secondary Vehicular

The figure to the left shows a typical arrangement for a secondary vehicular road (single carriageway).

In principle:

- Road lighting shall use white light sources.
- A good uniformity over the road shall be achieved by utilising road lighting lanterns mounted on columns with a staggered arrangement.
- Single carriageways can be satisfactorily lit by means of staggered arrangement mounted on the outside edges of the road.
- The preferred height of the road lighting lanterns shall be 8m above finished ground level to minimise light obtrusion and environmental impact. Equally the lantern chosen shall be of flat glass with 0° uplight and no tilt above horizontal level.

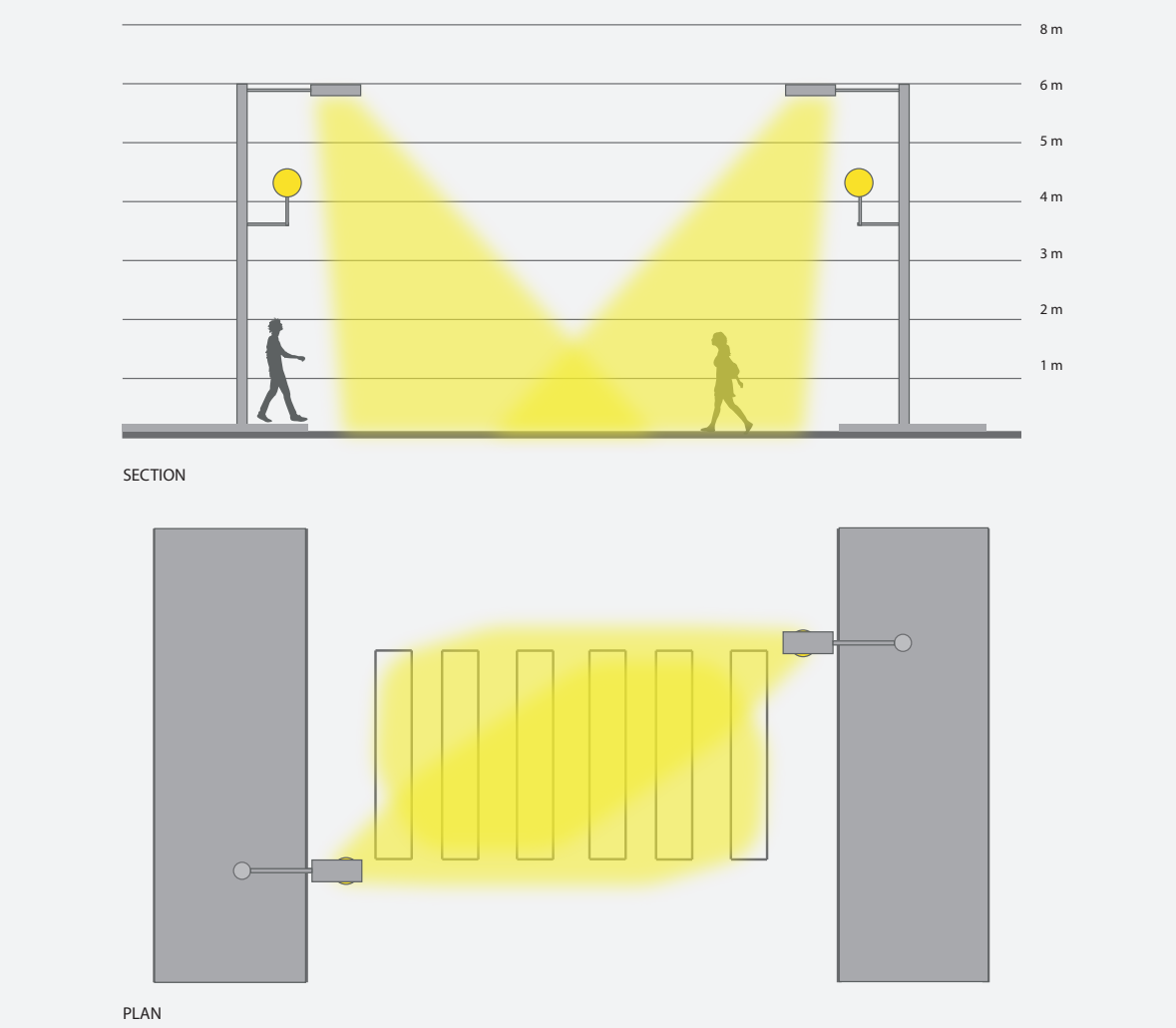
PEDESTRIAN CROSSING

Pedestrian Crossing

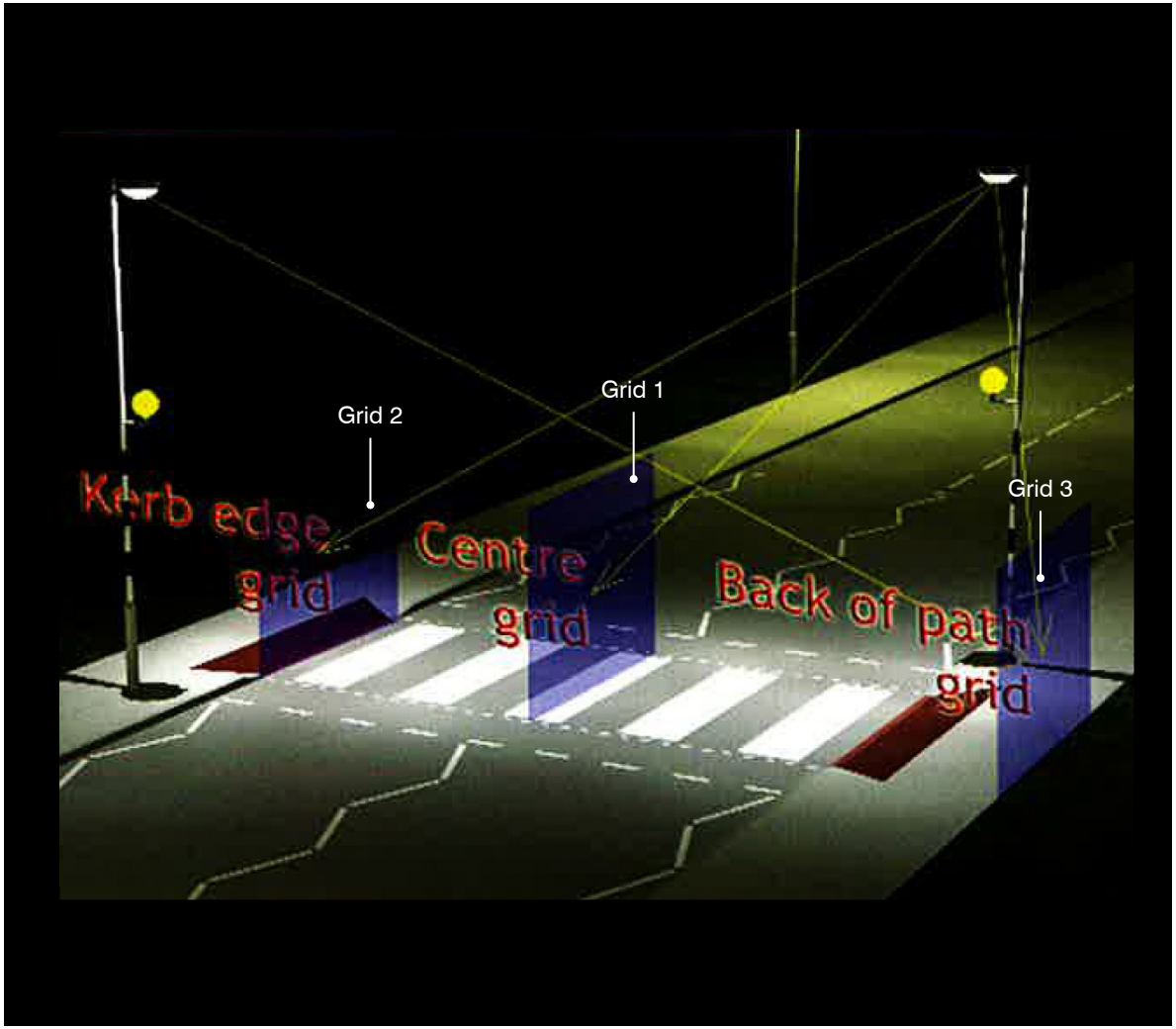
The figure to the right shows a typical arrangement for a pedestrian crossing.

In principle:

- Pedestrian crossing lighting shall illuminate any pedestrian who is approaching, at and on the crossing in such manner as to make them clearly visible to the approaching driver.
- A good uniformity over the road shall be achieved by utilising road lighting lanterns mounted on the outside edges of the road with a staggered arrangement. The road lighting lanterns shall be of side asymmetric distribution specifically designed for this application to provide adequate illumination at horizontal and vertical level.
- At pedestrian crossings it is best practice to have supplementary luminaires mounted on an extended beacon pole either located on an offset bracket or designed to wrap around the pole. This aids the lighting of the crossings, reduces street clutter and improves all-round visibility.



Pedestrian Crossing typical lighting arrangement



Pedestrian crossing (extract from ILP TR12 Lighting of Pedestrian Crossings)

Pedestrian Crossing (continued)

As pedestrian crossings are considered to be conflict areas for the purpose of lighting it is recommended that the carpet and adjacent footway “waiting area” are illuminated to a higher level than of the road to draw the attention of the approaching driver to the proximity of a pedestrian crossing and to illuminate the pedestrian on the crossing and adjacent footways.

The figure to the left is an extract from ILP TR12 Lighting of Pedestrian Crossings. It shows the three recommended vertical grids that should be calculated, each 1.5 meters high and the width of the crossing mat, located as follows:

- Grid 1: At the centre of the crossing running along the centre line of the road
- Grid 2: Along the kerb edge with the measurement field facing across the road
- Grid:3 At the rear of the waiting area or 1.8 meters back from the kerb, whichever is less, and again with its axis along the road line.

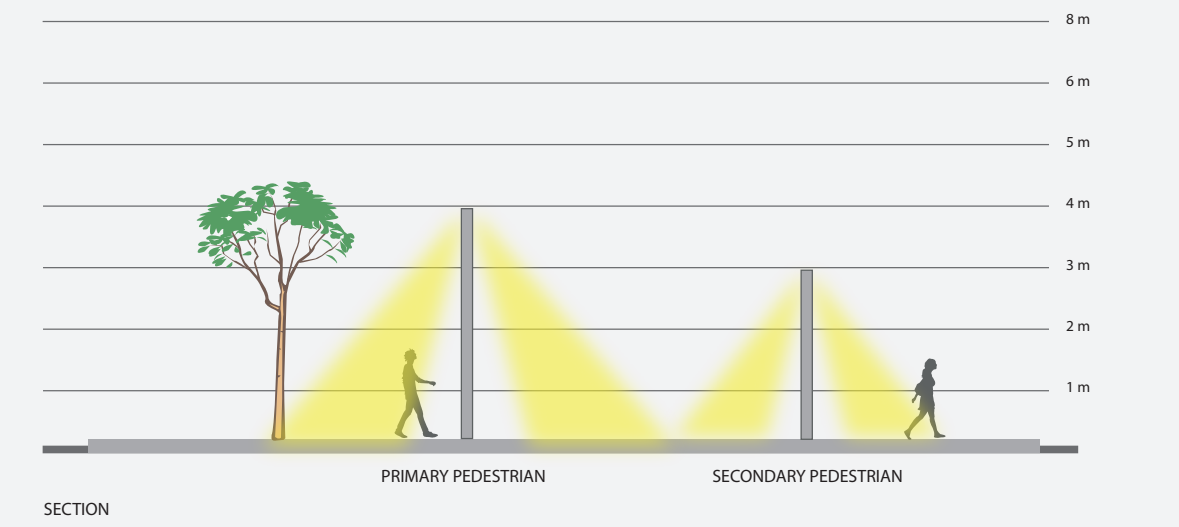
PEDESTRIAN PATHS

Primary & Secondary Pedestrian

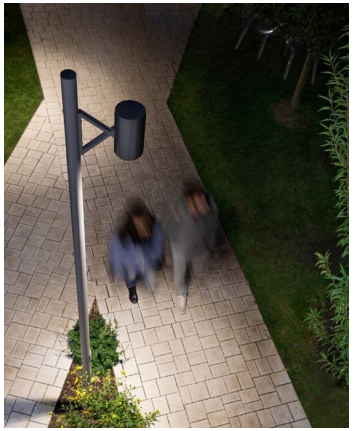
The figure to the right shows a typical arrangement for a primary and secondary path exclusive to pedestrians.

In principle:

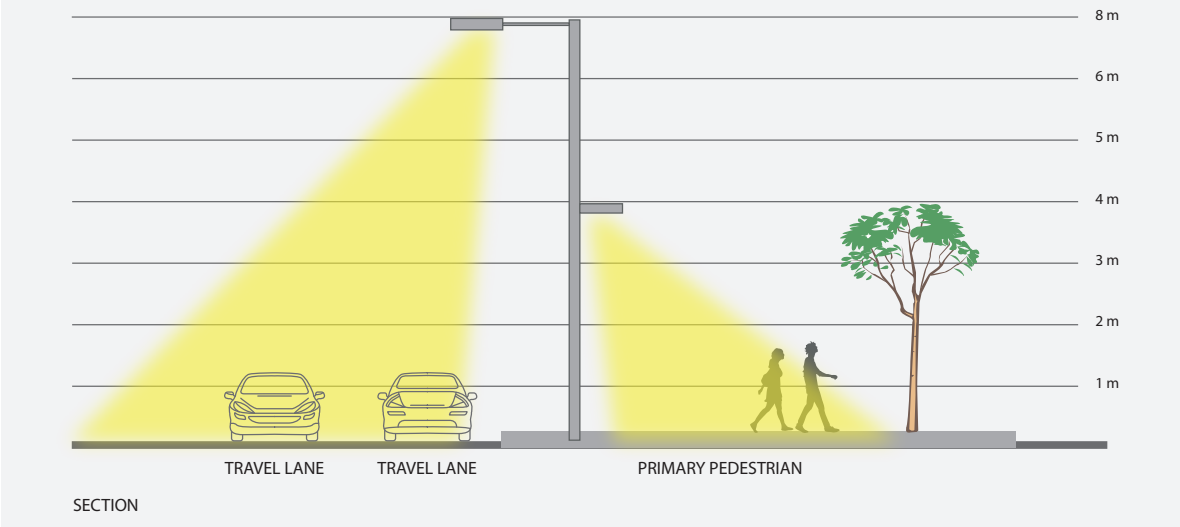
- Pedestrian paths lighting shall use white light sources.
- A good uniformity over the ground shall be achieved by utilising lanterns with a side throw that direct the light towards the ground and not upwards. The lantern chosen shall be of 0° uplight to minimise light obtrusion and environmental impact.
- A single side through or a dual side through can be used depending on the width of the path. The paths can be satisfactory lit by means of opposite or staggered arrangement mounted on the outside edges of the road, or by twin lanterns on the central path only.
- The preferred height of the pedestrian paths lighting lanterns shall be 4m and 3m above finished ground level for primary and secondary pedestrian respectively, which is closer to the human scale.



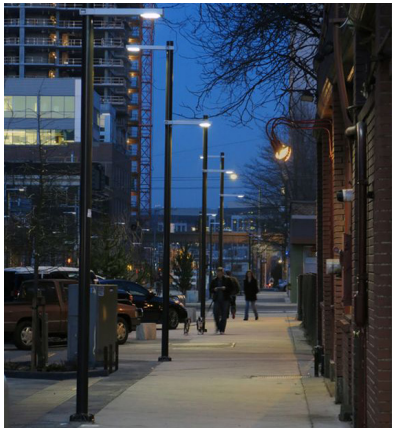
Typical lighting arrangement of Primary and Secondary pedestrian paths



Precedents of pedestrian paths



Typical lighting arrangement of Pedestrian paths combined with vehicular



Precedents of pedestrian paths

Pedestrian paths adjacent Vehicular routes

In instances where pedestrian pathways, either primary or secondary, are adjacent to any vehicular routes, the pedestrian path lighting shall be provided by using the road lighting lantern. This will aim to de-clutter the roads and paths by combining the same column.

The height of the lighting lanterns for pedestrian paths shall follow the same strategy of either 4m (primary paths) or 3m (secondary paths) that is closer to the human scale, whereas the road lighting lanterns shall follow the strategy of 8m.

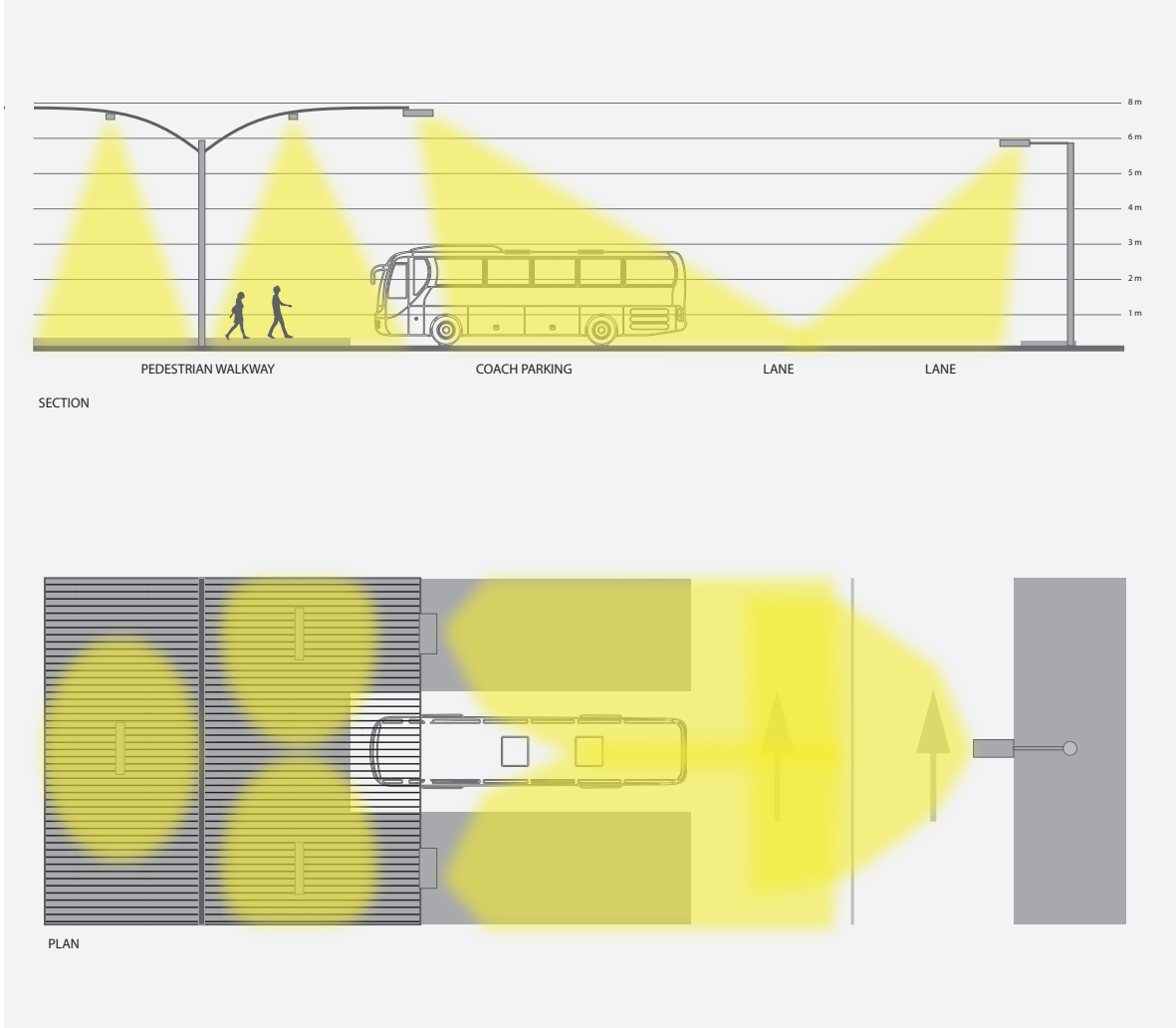
COACH STATION

Coach station

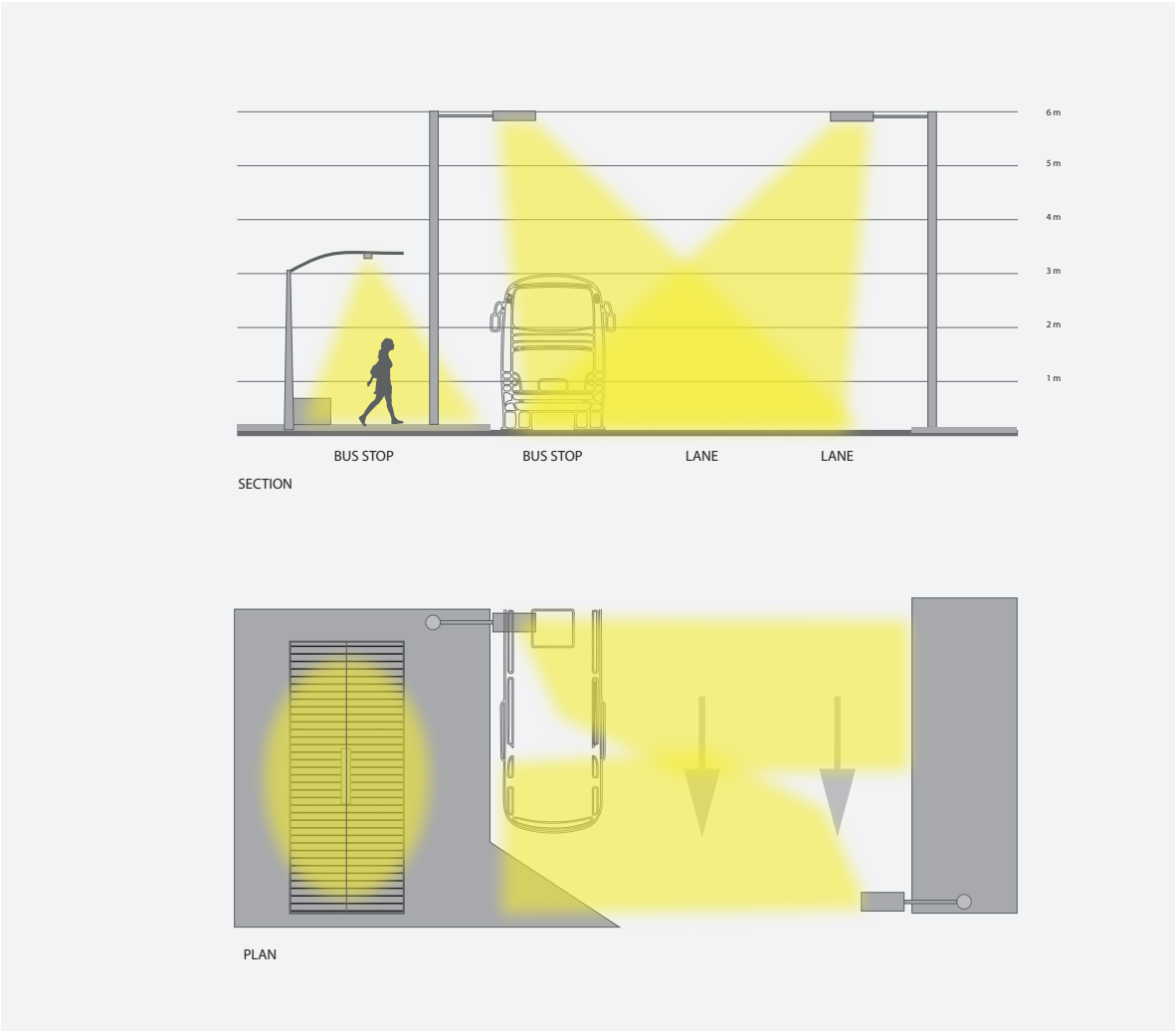
The figure to the right shows a typical lighting arrangement for a coach station.

In principle:

- The area under the canopy shall be illuminated by the use of luminaires at canopy level. Lighting shall use white light sources which shall be dimmable. A good uniformity over the space shall be achieved.
- The lighting shall have reduced output during off peak periods, dimming the lighting uniformly down to an appropriate level. Lighting under the canopy shall be switched off where daylighting levels permit.
- Luminaires shall be installed in between the coach parking spaces to provide lighting from both sides when the coach is parked.
- The drive lanes shall be illuminated by a combination of road lighting lanterns on the outside edges of the road and by road lighting projectors mounted at canopy level to avoid vehicle movement disruption by columns next to coach parking.



Coach station typical lighting arrangement



Bus stop typical lighting arrangement

Bus stop

The figure to the left shows a typical lighting arrangement for a bus stop.

In principle:

- The area under the canopy shall be illuminated by the use of luminaires at canopy level. Lighting shall use white light sources which shall be dimmable.
- The lighting under the canopy shall have reduced output during off peak periods, dimming the lighting uniformly down to an appropriate level. Lighting shall be switched off where daylighting levels permit.
- A good uniformity over the road and bus stop shall be achieved by utilising road lighting lanterns mounted on columns with a staggered arrangement.
- The preferred height of the road lighting lanterns shall be 6m above finished ground level to minimise light obtrusion and environmental impact. Equally the lantern chosen shall be of flat glass with 0° uplight and no tilt above horizontal level.

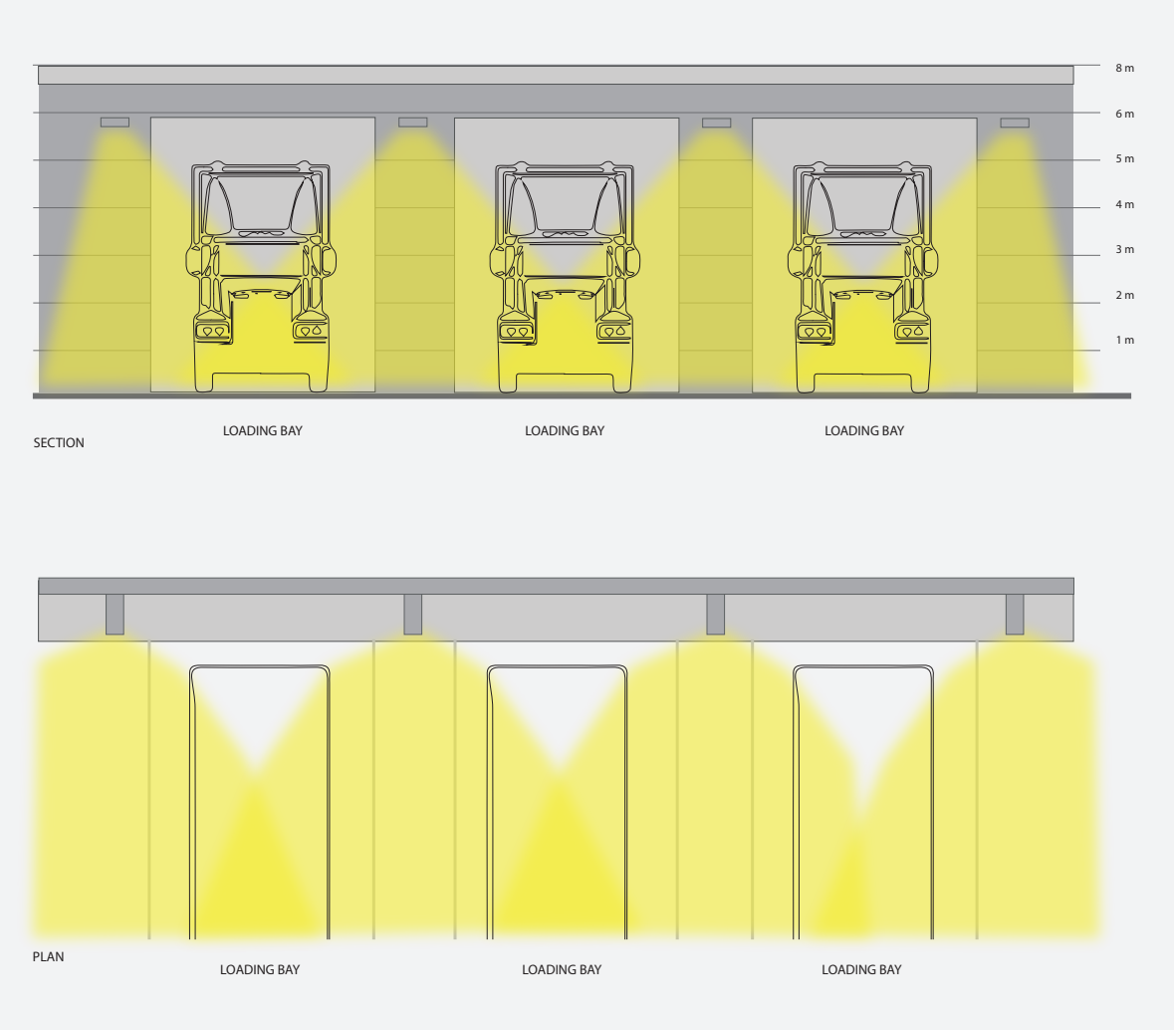
LOADING BAYS

Loading Bays

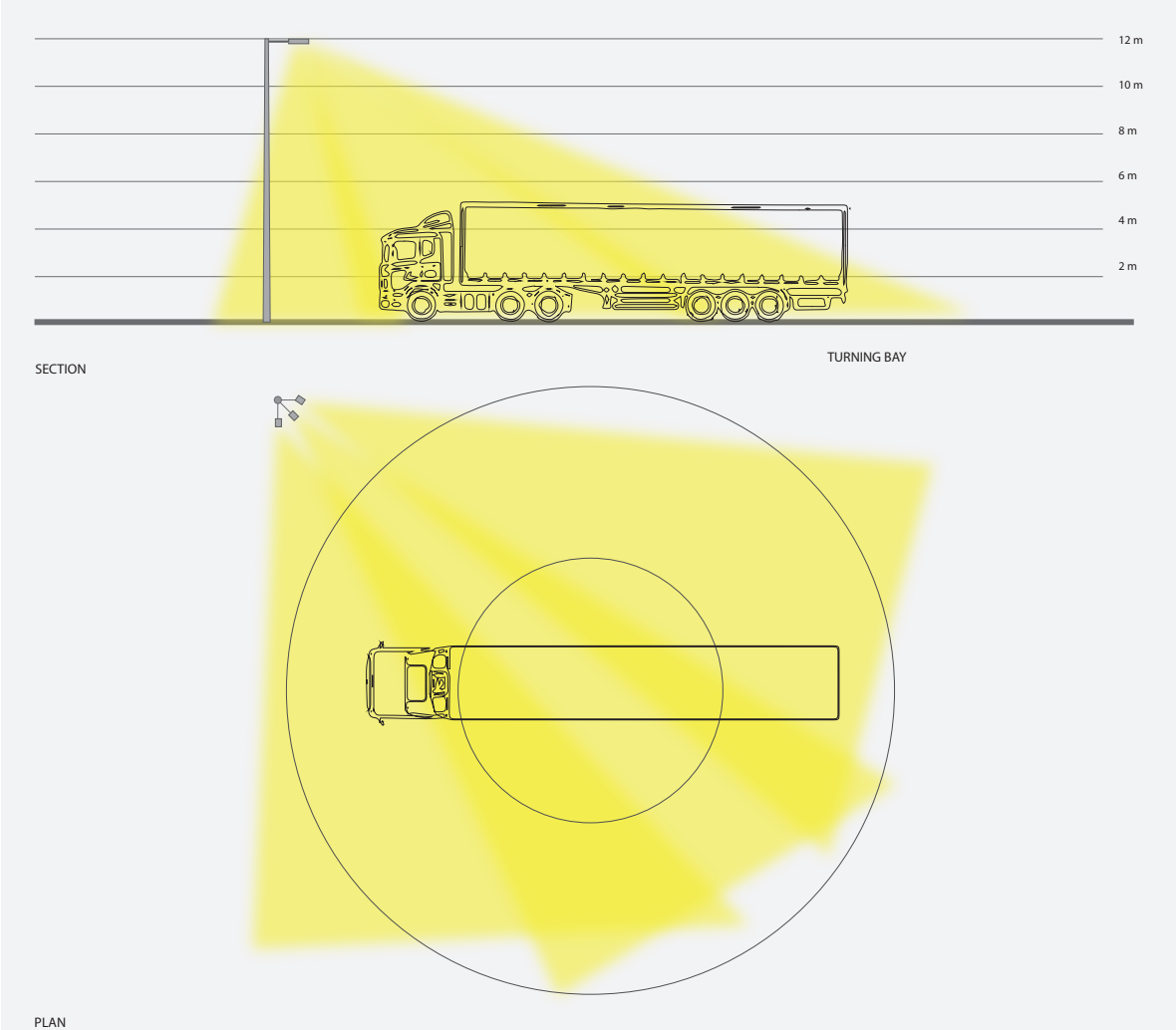
The figure to the right shows a typical lighting arrangement for a Loading Bay, and a similar approach shall be used at the PV store.

In principle:

- The area under the canopy shall be illuminated by the use of luminaires at canopy level. Lighting shall use white light sources which shall be dimmable. A good uniformity over the space shall be achieved.
- The lighting shall have reduced output during off peak periods, dimming the lighting uniformly down to an appropriate level. Lighting under the canopy shall be switched off where daylighting levels permit.
- Luminaires shall be installed in between the bay spaces to provide lighting from both sides when the truck is unloading.
- The drive lanes shall be illuminated by a combination of road lighting lanterns on the outside edges of the road and by road lighting projectors mounted at canopy level to avoid vehicle movement disruption by columns next to loading areas.



Loading bays typical lighting arrangement



Vehicle turning circle typical lighting arrangement

Vehicle turning circle

The figure to the left shows a typical lighting arrangement for turning circle.

In principle:

- Lighting shall use white light sources which shall be dimmable.
- A good uniformity over the turning area shall be achieved by utilising road lighting lanterns mounted on columns.
- The preferred height of the road lighting lanterns shall be 12m above finished ground level to minimise light obtrusion and environmental impact. Equally the lantern chosen shall be of flat glass with 0° uplight and no tilt above horizontal level.

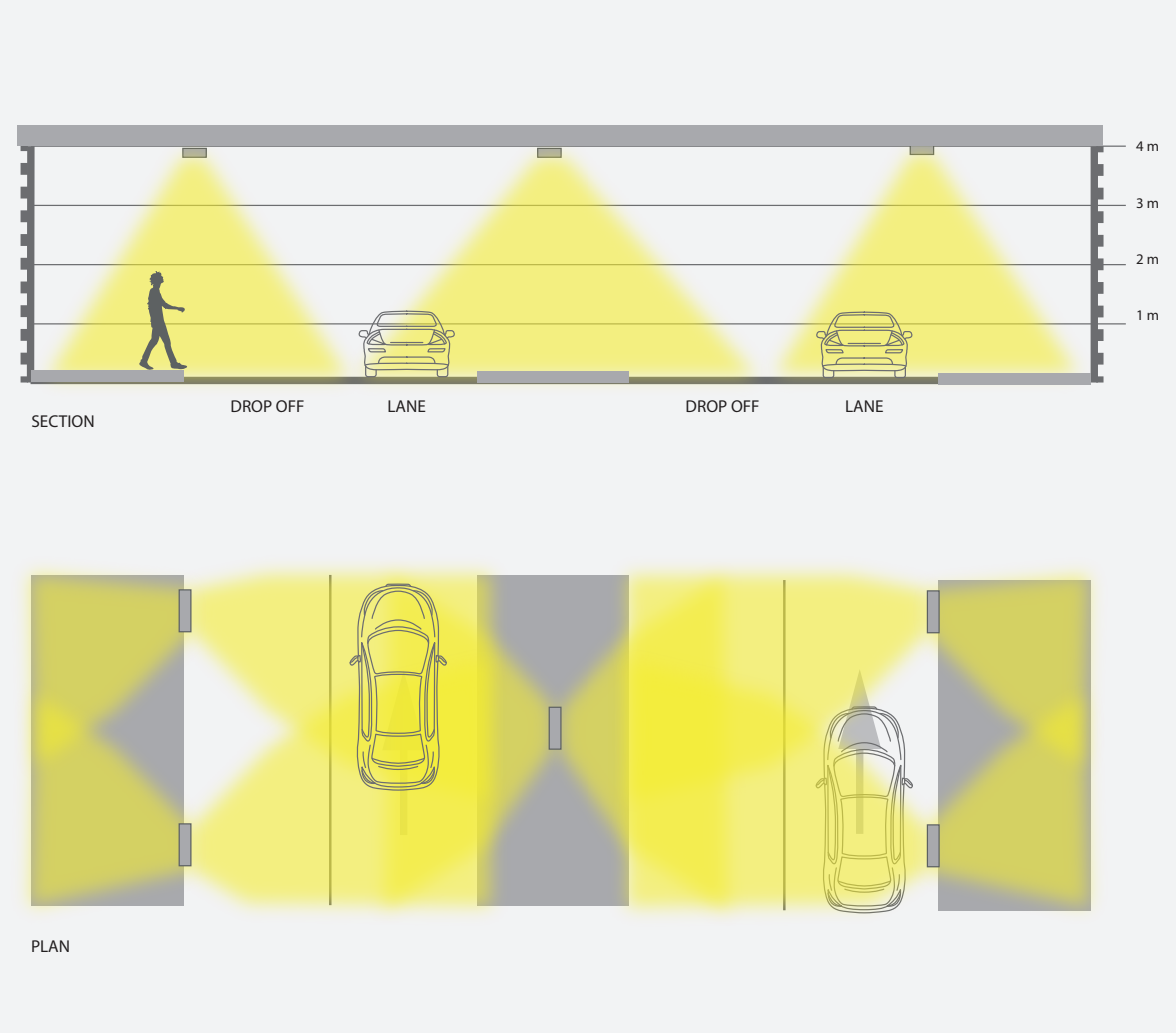
MSCP

Drop-off/Pick-Up (Forecourt)

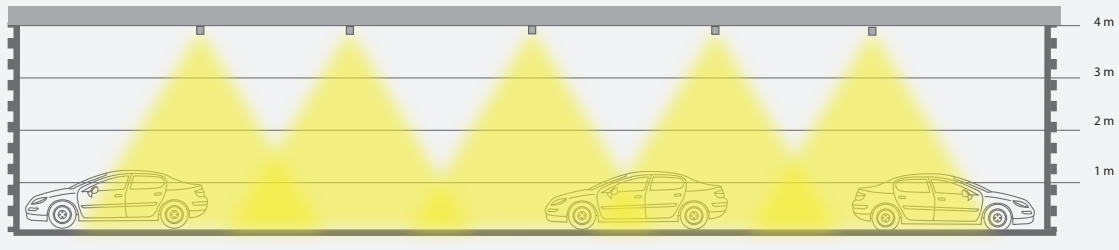
The figure to the right shows a typical lighting arrangement for a drop-off/pick-up area and access.

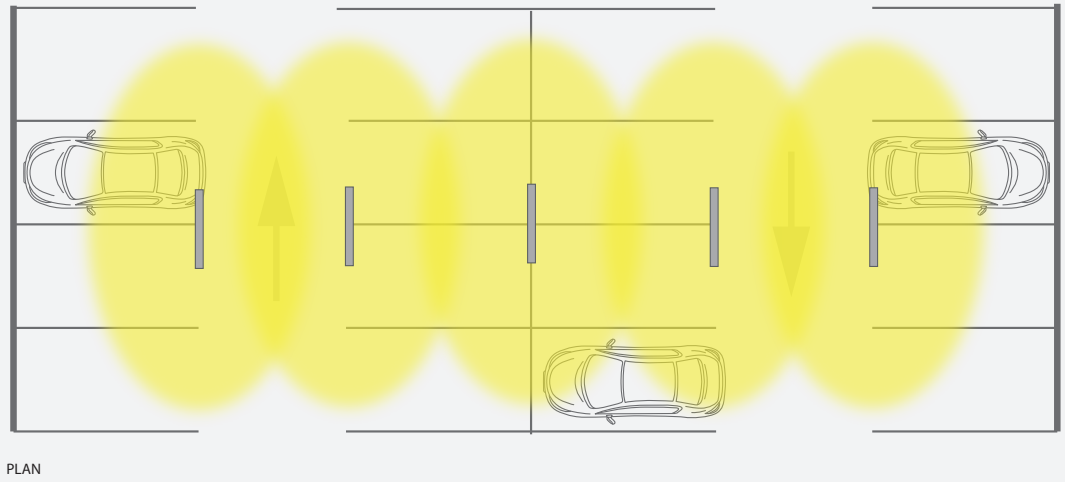
In principle:

- Drop-off/pick-up area lighting shall use white light sources which shall be dimmable. A good uniformity over the space shall be achieved, with higher illuminances over the drive lane and walkways.
- The lighting shall have reduced output during off peak periods, dimming the lighting uniformly down to an appropriate level.
- Perimeter lighting shall be switched off where daylighting levels permit.
- Luminaires shall be installed to the side of the road and along the travel lanes and drop-off to ease maintenance and minimise vehicle movement disruption.



Drop-off/Pick-up typical lighting arrangement





Interior car park typical lighting arrangement

Car-park (interior)

The figure to the left shows a typical lighting arrangement for an interior car park, parking bays and access.

In principle:

- Car park lighting shall use white light sources which shall be dimmable. A good uniformity over the space shall be achieved, with higher illuminances over the drive lane and walkways.
- The lighting shall have reduced output during off peak periods, dimming the lighting uniformly down to an appropriate level. When a passenger walks onto a floor through any access point the illumination for that floor shall ramp up to full output, reducing again after a reasonable length of time.
- Perimeter lighting shall be switched off where daylighting levels permit.
- Luminaires shall be installed to the side of the drive lanes to ease maintenance and minimise vehicle movement disruption.

AIRCRAFT STANDS

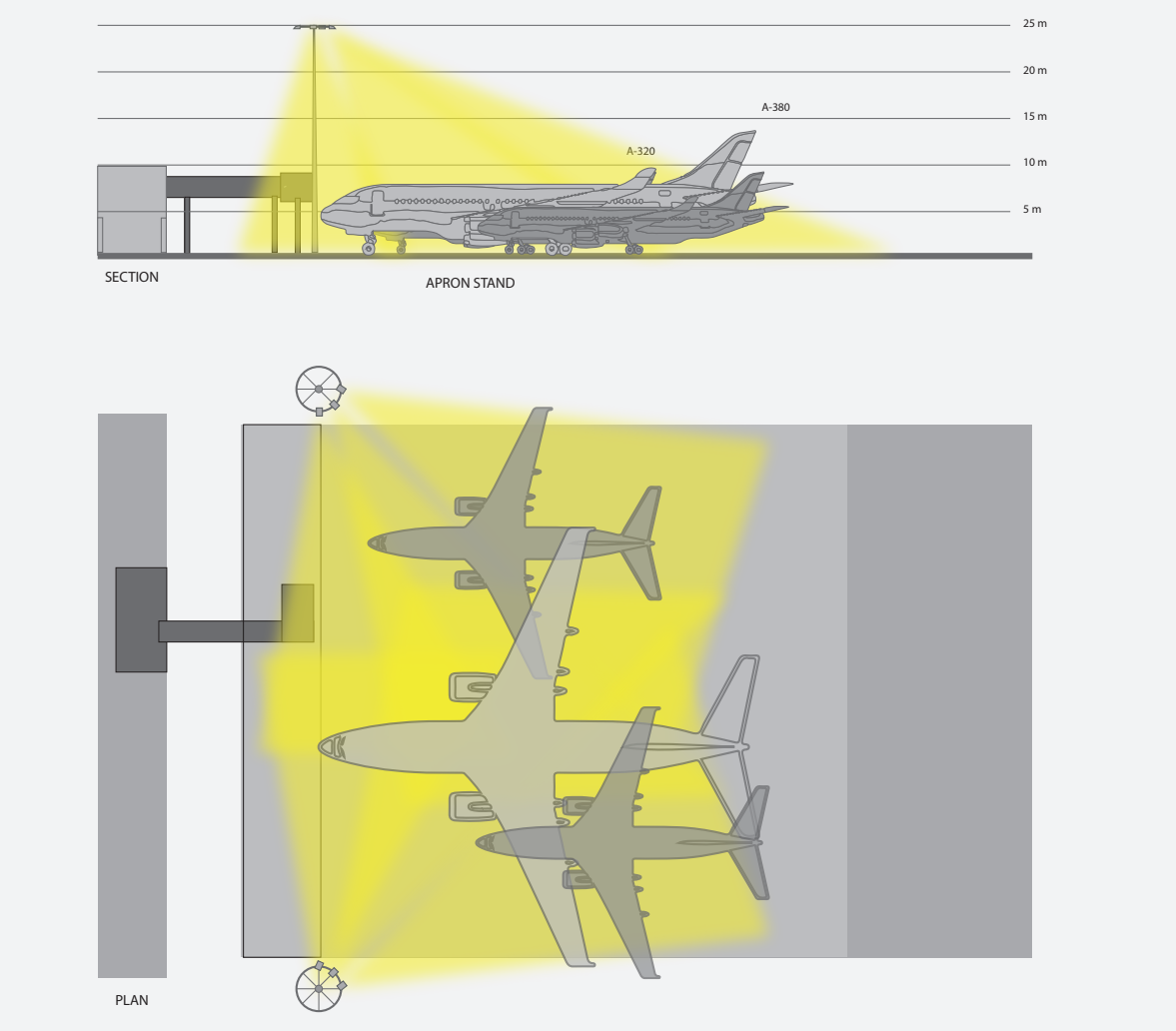
Aircraft stands

The lighting installation for the aircraft stand shall consist of high-mast floodlighting from 25m in height located in specific areas in the airfield apron.

Design constraints of the airfield planning and the services infrastructure will affect both the height and position of the floodlight masts. The masts shall also be sited so that floodlights do not create glare, which could adversely affect visibility of ground staff, pilots or Air Traffic Control (ATC) tower operatives.

The ATC tower must be able to view all aircraft movements both in the air and on the ground at all times. Direct view of apron lighting from the ATC tower shall be avoided. Floodlight masts maybe used to light more than one stand but consideration shall be given to electrical circuitry and lighting control design on a stand by stand basis to allow shut-down without affecting adjacent stands.

The type of stand for Luton Airport is a pier-served stand. The preferred lighting arrangement illustrated at the figure to the right is a typical high-mast floodlighting column configuration.



Aircraft stands lighting arrangement

Precedents of apron stands lighting

The appropriate light source for the aircraft stand lighting should have a long lifetime expectancy and good quality of colour rendering.

Lighting to the back of stand roads service area, and inter-stand roads shall be provided by the high-mast floodlighting columns. Attention shall be taken to positions of shadows (e.g. under air-bridges), where additional lighting shall be provided if required.

TECHNICAL ADDENDUM

Luton Rising
Our airport.
Our community.
Our planet.

LIGHTING CRITERIA

Standards and Guidance

The standards and guidance documents used for the external Lighting Strategy are described in Table 1 to the right.

Document No.	Title
BS 5489-1:2020	Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas.
BS EN 12464-2:2014	Light and lighting - Lighting of work places Part 2: Outdoor work places.
BS EN 12464-1:2011	Light and lighting - Lighting of work places Part 1: Indoor work places.
BS EN 13201-1:2014	Road Lighting - Part 1: Guidelines on selection of lighting classes.
BS EN 13201-2:2015	Road Lighting - Part 2: Performance requirements.
BS 8300:2018	Design of buildings and their approaches to meet the needs of disabled people - Code of practice.
ILP GN01 (2021)	Guidance Notes for the Reduction of Obtrusive Light.
ILP GN08/18 (2018)	Bats and artificial lighting in the UK; Bats and the Built Environment series.
ILP PLG 03	Lighting for Subsidiary Roads: Using white light sources to balance energy efficiency and visual amenity.
ILP PLG 02	The Application of Conflict Areas on the Highway.
ILP TR 12	Lighting of Pedestrian Crossing.
ILP TR 24	Guidance on the Development of Public Lighting Policy.
CIBSE SLL LG6 (2016)	Lighting Guide LG6: The exterior environment.
CIBSE SLL LG15 (2017)	Lighting Guide LG15: Transport buildings.
CAP 168 (2019)	Licensing of Aerodromes Edition 11
ICAO Annex 14 (2018)	International Civil Aviation Organisation: Aerodromes Volume I Aerodrome Design and Operation

Table 1: Standards and Guidance documents

Type of area, task or activity	Illuminance E_m (lux)	Uniformity U_o	Glare UGR_L	Colour Rendering R_a	Notes/Specific Requirements
Airport Landside - External Car Parks					
Long stay Car Park (Light Traffic)	5	0,25	55	20	• Illuminance at ground level or deck level for open roof car parks.
Mid stay Car Park (Light Traffic)	5	0,25	55	20	• Illuminance at ground level or deck level for open roof car parks.
Short stay Car Park (Light Traffic)	10	0,25	50	20	• Illuminance at ground level or deck level for open roof car parks.
Staff Parking (Light Traffic)	5	0,25	55	20	• Illuminance at ground level or deck level for open roof car parks.
Airport - Airside					
Aircraft stand Horizontal	20	0.25	-	-	
Aircraft stand Vertical	20	-	-	-	• Illuminance at 2m above the apron in relevant directions.
Other apron areas	10	0.25	-	-	• 50% of average illuminance on aircraft stands.
Airport - Other areas					
Hangar Apron	20	0,10	55	20	
Terminal Apron	20	0,25	50	20	
Loading Areas	20	0,25	50	40	• For reading labels E_m = 50 lux
Fuel Depot	50	0,25	50	40	

Table 2: General lighting requirements - Airport exterior areas

Illuminance Recommendations

The following tables have been compiled from the standards and guidance documents described in Table 1, to present the minimum maintained recommended general lighting requirement for the airport.

Table 2 to the left presents the exterior airside and landside illuminance recommendations for the various external areas of the airport.

Illuminance Recommendations (continued)

Table 2 to the right presents the minimum maintained landside illuminance recommendations for the internal car parks areas.

Type of area, task or activity	Illuminance E_m (lux)	Uniformity U_o	Glare UGR_L	Colour Rendering R_a	Notes/Specific Requirements
Airport Landside - Internal Car Parks					
In/Out Ramps (daytime)	300	0,4	25	40	• Illuminance at floor level. • Safety colours shall be recognisable.
In/Out Ramps (night time)	75	0,4	25	40	• Illuminance at floor level. • Safety colours shall be recognisable.
Traffic Lanes	75	0,4	25	40	• Illuminance at floor level. • Safety colours shall be recognisable.
Parking Areas	75	0,4	-	40	• Illuminance at floor level. • Safety colours shall be recognisable. • A high vertical illuminance increases recognition of people's faces and therefore the feeling of safety.
Ticket Office / Machine	300	0,6	19	80	• Reflections in the window should be avoided. • Glare from the outside shall be prevented.

Table 2: General lighting requirements - Airport exterior areas (continued)

Class	Luminance of the road surface of the carriageway for dry road surface conditions			Disability glare (dry conditions)	Lighting of surroundings (dry conditions)
	L (minimum maintained) cd m²	U_o (minimum)	U_1 [a] (minimum)	f_{TI} [c] (maximum) %	R_{EI} [d] (minimum)
M1	2.00	0.40	0.70	10	0.35
M2	1.5	0.4	0.7	10	0.35
M3	1.0	0.4	0.6	15	0.3
M4	0.75	0.4	0.6	15	0.3
M5	0.50	0.35	0.4	15	0.3
M6	0.30	0.35	0.4	20	0.3

[a] to provide for uniformity, the actual value of the maintained average illuminance shall not exceed 1.5 times the minimum E value indicated for the class.
[c] The values stated in the column f_{TI} are the maximum recommended for the specific lighting class, however, they may be amended where specific national requirements appertain.
[d] This criterion shall be applied only where there are no traffic areas with their own lighting requirements adjacent to the carriageway. The values shown are tentative and may be amended where specific national or individual scheme requirements are specified. Such values may be higher or lower than the values shown, however care should be taken to ensure adequate illumination of the areas is provided.

Table 3: Extract from BS EN 13201-2:2015 (Table 1 - M lighting classes)

Road Lighting Classes

As part of the strategy, lighting classes have been determined.

These classes will predominantly be applied to roadways and pedestrian paths.

Table 3 to the left is an extract from BS EN 13201-2:2015 and describes the minimum maintained lighting requirements for the various road classes.

Road Lighting Classes (continued)

Table 4 to the right presents the P classes.

Hemispherical illuminance

On pedestrian paths, hemispherical illuminance 'HS' classes will be recommend as alternatives to horizontal illuminance 'S' and 'P' classes, in accordance with the British Lighting Standards BS EN 13201-2:2015 (Table 4).

Hemispherical illuminance calculations consider the amount of light falling onto (and modelling) objects in space. They provide an indication of the amount of light falling onto 3-dimensional objects and people and so can provide a clearer understanding of the way in which an object can be seen and understood after dark.

As such, hemispherical illuminance criteria are considered an appropriate option for pedestrian areas, where the illumination and uniformity levels applied to objects in space can be more critical

Class	Horizontal Illuminance		Additional requirements if facial recognition is necessary	
	E^a (minimum maintainted) lux	E_{mn} (maintained) lux	$E_{v,mn}$ (maintained) lux	$E_{x/mn}$ (maintainted) lux
P1	15.0	3.0	5.0	5.0
P2	10.0	2.0	3.0	2.0
P3	7.5	1.5	2.5	1.5
P4	5.0	1.0	1.5	1.0
P5	3.0	0.6	1.0	0.6
P6	2.0	0.4	0.6	0.2
P7	Performance not determined	Performance not determined	-	-

[a] to provide for uniformity, the actual value of the maintained average illuminance shall not exceed 1.5 times the minimum E value indicated for the class

Table 4: Extract from BS EN 13201-2:2015 (Table 3 - P classes)

Class	Hemispherical Illuminance	
	E_{hs} (minimum maintained) lux	U_o (minimum)
HS1	5.0	0.15
HS2	2.5	0.15
HS3	1.0	0.15
HS4	Performance not determined	Performance not determined

Table 5: Extract from BS EN 13201-2:2015 (Table 4 - HS lighting classes)

than those on the ground plane alone. Hemispherical illuminance classes are particularly usefully applied in situations where luminaire mounting heights are very low.

Table 5 to the left is an extract from BS EN 13201-2:2015 and describes the lighting requirements of hemispherical Illuminance for each class.

Obtrusive Light and Environmental Impact

As part of the Lighting Strategy, environmental zones have been selected. Table 6 is an extract from the ILP Guidance and describes the lighting environment for each environmental zone. Luton Airport is assumed fall under E3.

Obtrusive light shall consider road users as part of the exterior lighting installation. Table 7 describes the obtrusive light limitations for road lighting.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks.
E1	Natural	Dark	National Parks, Areas of Outstanding Natural Beauty etc.
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations.
E3	Suburban	Medium district brightness	Small town centres or suburban locations.
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity.

Table 6: Extract from ILP Guidance Note 01 (Table 1 - Environmental Zones)

Road Classification (1)	Threshold Increment (TI)	Veiling Luminance (Lv)
No road lighting	15% based on adaptation luminance of 0.1cd/m^2	0.037
ME6 / ME5	15% based on adaptation luminance of 1cd/m^2	0.23
ME4 / ME3	15% based on adaptation luminance of 2cd/m^2	0.40
ME2 / ME1	15% based on adaptation luminance of 5cd/m^2	0.84

TI = Threshold Increment is a measure of the loss of visibility caused by the disability glare from the obtrusive light installation.
Lv = Veiling Luminance is a measure of the adaptation luminance caused by the disability glare from the obtrusive light installation.
(1) = Road Classifications as given in BS EN 13201-2:2003 Road lighting Performances requirements. Limits apply where users of transport systems are subject to a reduction in the ability to see essential information. Values given are for relevant positions and for viewing directions in path of travel. For a more detailed description and methods for determining, calculating and measuring the above parameters see CIE Publication 150:2003.

Table 7: Extract from ILP Guidance Note 01 (Table 3 - Obtrusive Light Limitations for Exterior Light) Installations - Road Users

SITE LIGHTING

Introduction

Every part of the site that is in use should, as far as possible, be arranged so that natural light is available for people to see to do their work and move about the site safely. Where natural light is inadequate or not available, artificial lighting should be provided.

Site Lighting General Requirements

To enable the safety and security of the construction sites, site lighting and signage shall be provided by the lead contractors. The site lighting will provide the minimum illumination levels required to enable a safe and secure construction site and will use low energy consumption fittings. Where necessary, and for health and safety, lighting to site boundaries will be provided and illumination will be sufficient to provide a safe route for the construction workforce and passing pedestrians.

Measures shall be adopted to enhance feelings of safety and security within and around the construction sites. Of note, precautionary measures will be adopted to avoid shadows cast from the site on surrounding footpaths, walkways, roads and amenity areas. Further measures include lighting combined with smart-technology where appropriate, such as lighting activated with motion sensors to avoid unnecessary usage and act as a security method.

Task-based lighting will be provided for specific high-risk tasks. The lead contractors will be responsible for switching off task-based lighting after use and at the end of the working hours.

Lighting will also be designed, positioned and directed to account for aesthetic and environmental conditions using horizontal cut-off optics and zero floodlight tilt angles (where possible).

Lighting will seek to avoid intrusion on adjacent buildings, sensitive receptors, ecological receptors and structures used by other protected species, and additional land uses to prevent unnecessary disturbance. The identified aesthetic and environmental measures will be most applicable to sites where night working will be undertaken.

Site lighting will be located and directed so that it will not cause undue interference with railway operations, highway users or airport operations.

Particular attention shall be paid to the likelihood of sky glow and light intrusion beyond the construction site. Lighting will be visually checked from the perspective of sensitive receptors (e.g. nearby residential properties) and any necessary adjustments made.

The lead contractors will keep a record of lighting installed on the construction site. The record will be available on request to show that all lighting fixtures comply with the requirements of the Code of Construction Practice prepared for this project. Where requirements have not been met, the record will explain why and detail why and what alternative approaches have been implemented.

Lighting Recommendations

Where work will continue outside daylight hours or the building or structure is enclosed, artificial lighting will be required. The artificial lighting should not change the apparent colour or visibility of any safety signs or other safety-related items such as fire extinguishers.

With both daylight and artificial light, shadows can obscure hazards both at the workplace (e.g. making it difficult to see the blade of a cutting disc or a drill bit) and on the site generally (e.g. at stairwells). If necessary, additional lighting should be provided to illuminate shadow areas.

Where failure of the primary artificial lighting would be a risk to the health or safety of anyone (e.g. someone working on a tower scaffold in a basement may fall while trying to descend in the dark), provide emergency lighting. Where it is not possible to have lighting that comes on automatically when the primary lighting fails, torches or other similar lights may provide suitable lighting.

In addition, emergency routes (the corridors, passageways etc that people must follow in an emergency to escape from danger) should be kept well lit while there are workers on the site.

Where daylight provides adequate lighting, no further action is required. Where emergency routes need artificial light, provide emergency lighting that comes on if the primary lighting fails (e.g. battery or emergency generator-powered lighting).

Surveillance systems also require lighting to be effective and lighting also has a key role to play in supporting security operations and site health and safety.

Lighting consideration should also be given to the need to minimise light pollution, possibly through focusing of lighting downwards and inwards into the site or development and to the need to limit excess energy expenditure. Use of photo-electric activation, which allows lighting to remain inactive when ambient light levels are at an acceptable level, should be considered.

Regulations Standards and Guidance

The regulations, standards and guidance documents used for the external construction lighting strategy are described in Table 8.

Document No.	Title
HSE HSG150 (2006)	Health and safety in construction (third edition)
HSE L153 (2015)	Managing health and safety in construction
Building Construction	Building Construction Handbook (eleventh edition)
SLL Code for Lighting (2012)	Society of Light and Lighting - Code for Lighting
CDM Regulations (2015)	The Construction Design and Management Regulations
BS EN 12464-2:2014	Light and lighting - Lighting of work places Part 2: Outdoor work places.

Table 8: Regulations, Standards and Guidance documents

Type of area, task or activity	Illuminance E_m (lux)	Uniformity U_o	Glare UGR_L	Colour Rendering R_a
Airport Landside - External Car Parks				
Clearance, excavation and loading	20	0,25	55	20
Construction areas, drain pipes mounting, transport, auxiliary and storage tasks	50	0,40	50	20
Framework element mounting, light reinforcement work, wooden mould and framework mounting, electric piping and cabling	100	0,40	45	40
Element jointing, demanding electrical, machine and pipe mounting	200	0,50	45	40

Table 9: General Lighting requirements - Building sites

Illuminance Recommendations

Table 9 to the left is an extract from BS 12464 Part 2 and presents the exterior building site illuminance recommendations for the various types of areas, tasks and activities.

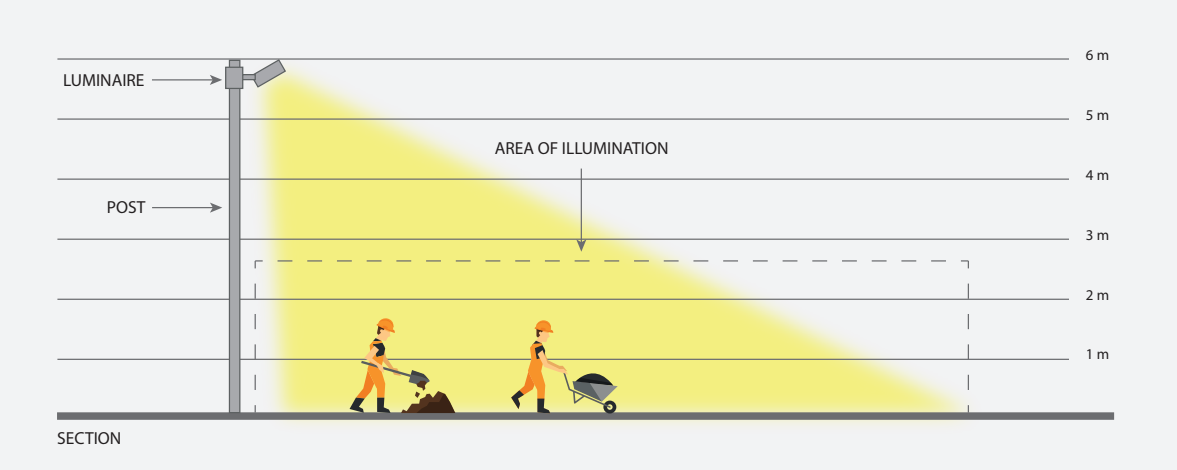
Typical Site Lighting Arrangement Post-mounted luminaires

Site lighting arrangements vary and are dependent on the area of illumination and the activity undertaken. The following section describes typical lighting arrangements for building sites that should be adopted alongside the progression of the construction works. Lighting shall be switched off when daylighting levels permit.

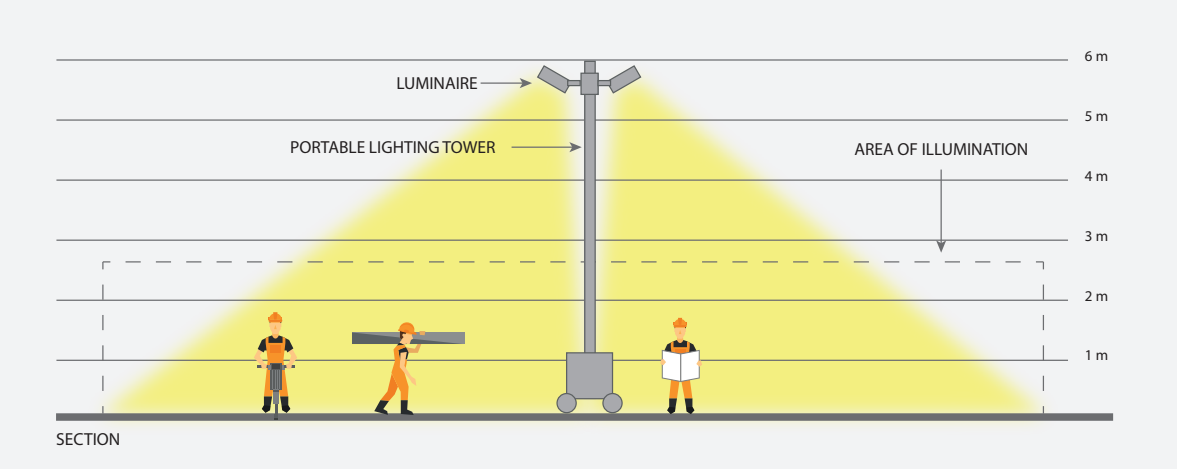
The figure to the right shows a typical post-mounted lighting arrangement for a building site.

In principle:

- Luminaires are installed on posts or mast supports to provide lighting to the area of illumination from either one side or both sides (as necessary).
- The lighting shall be limited within the intended area of illumination and shall not tresspass the site boundaries.
- This lighting arrangement allows vehicle movement and minimises disruption.



Post-mounted site lighting arrangement



Post-mounted site lighting arrangement

Pedestrian crossing (extract from ILP TR12 Lighting of Pedestrian Crossings)

Typical Site Lighting Arrangement Surface mounted luminaires

The figure to the right shows a typical post-mounted lighting arrangement for a building site.

In principle:

- Luminaires are installed on posts or mast supports to provide lighting to the area of illumination from either one side or both sides (as necessary).
- The lighting shall be limited within the intended area of illumination and shall not tresspass the site boundaries.
- This lighting arrangement allows vehicle movement and minimises disruption.

Typical Site Lighting Arrangement Walkway and local lighting

Every part of the site that is in use should, as far as possible, be arranged so that natural light is available for people to see to do their work and move about the site safely. Where natural light is inadequate or not available, artificial lighting should be provided.

Site lighting arrangement - Post-mounted

Pedestrian crossing (extract from ILP TR12 Lighting of Pedestrian Crossings)

Typical Site Lighting Arrangement Overhead suspended luminaires

Lighting Calculations

The section below presents the lighting calculations of the landside lighting design used for this assessment.

Luton Airport Expansion

Loading Bays

Date: 27.09.2021
Operator: Justin Boyd

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Table of contents

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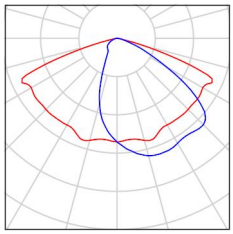
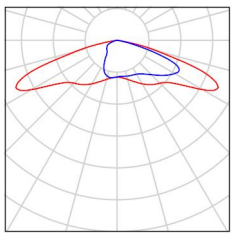
Luton Airport Expansion / Luminaire parts list

11 Pieces	WE-EF;Eulumdat2 108-0907 VFL540 [S60] IP66:LED-36/72W/4K;VFL540, Street and Area Lighting Article No.: 108-0907 Luminous flux (Luminaire): 7973 lm Luminous flux (Lamps): 8854 lm Luminaire Wattage: 81.0 W Luminaire classification according to CIE: 100 CIE flux code: 40 74 97 100 90 Fitting: 36 x LED-36/72W/840 - 4000K (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.



97 Pieces	WE-EF;Eulumdat2 147-0682 FLA740 [R65] IP66:LED-24/72W/4K;FLA740 LED, Area Floodlights Article No.: 147-0682 Luminous flux (Luminaire): 7884 lm Luminous flux (Lamps): 10800 lm Luminaire Wattage: 81.0 W Luminaire classification according to CIE: 100 CIE flux code: 28 61 95 100 73 Fitting: 24 x LED-24/72W/840 - 4000K (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.



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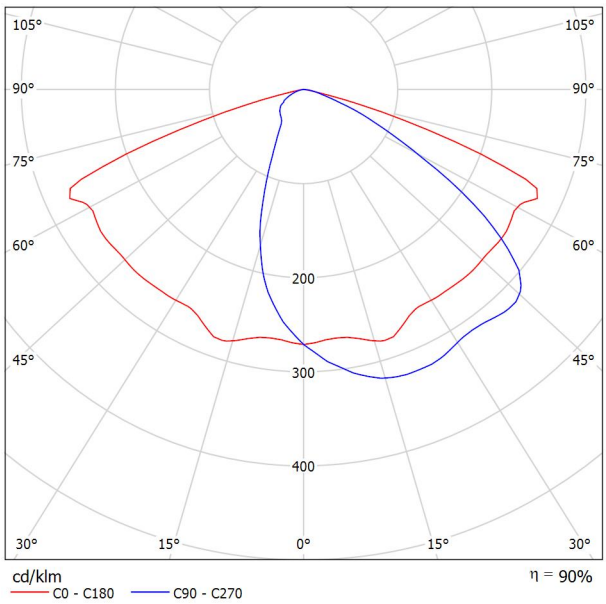
WE-EF;Eulumdat2 108-0907 VFL540 [S60] IP66:LED-36/72W/4K;VFL540, Street and Area Lighting / Luminaire Data Sheet

See our luminaire catalog for an image of the luminaire.

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 40 74 97 100 90

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

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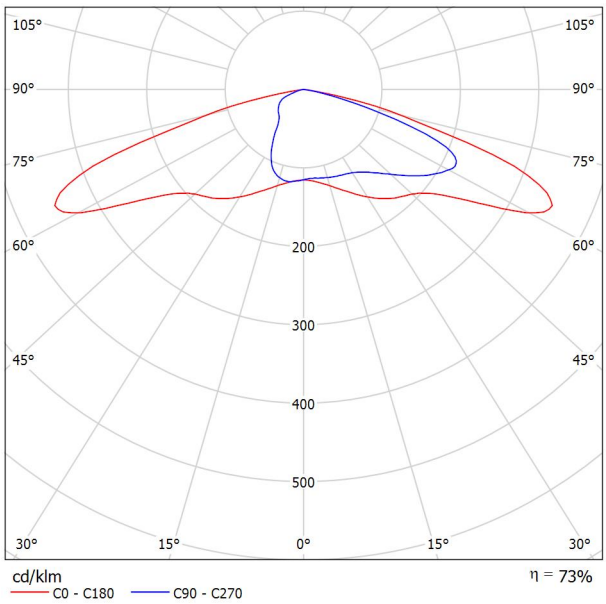
WE-EF;Eulumdat2 147-0682 FLA740 [R65] IP66:LED-24/72W/4K;FLA740 LED, Area Floodlights / Luminaire Data Sheet

See our luminaire catalog for an image of the luminaire.

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 28 61 95 100 73

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

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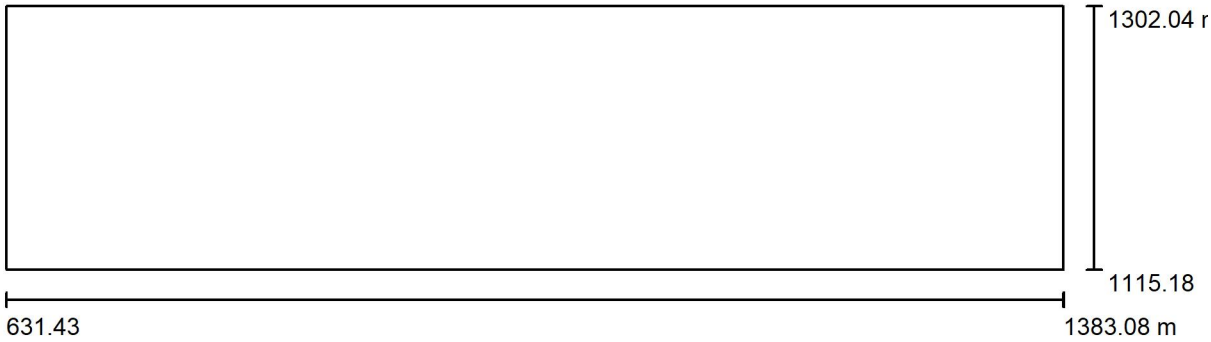
Loading Bay / PV Store / Planning data



Light loss factor: 0.80, ULR (Upward Light Ratio): 0.0% Scale 1:5374

Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	11	WE-EF;Eulumdat2 108-0907 VFL540 [S60] IP66:LED-36/72W/4K;VFL540, Street and Area Lighting (1.000)	7973	8854	81.0
2	48	WE-EF;Eulumdat2 147-0682 FLA740 [R65] IP66:LED-24/72W/4K;FLA740 LED, Area Floodlights (1.000)	7884	10800	81.0
		Total:	466142	Total: 615794	4779.0

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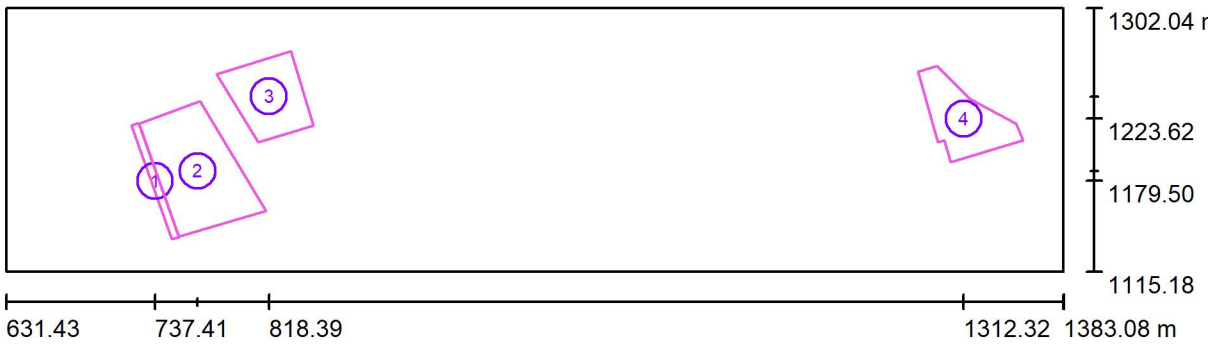
Loading Bay / PV Store / Calculation surfaces (results overview)



Scale 1 : 5374

Calculation Surface List

No.	Designation	Type	Grid	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
1	Loading Bay 50lux Target	perpendicular	128 x 16	47	16	65	0.346	0.252
2	Loading Bay 20lux Target	perpendicular	128 x 128	21	8.49	53	0.405	0.159
3	Emergency Muster	perpendicular	128 x 128	19	7.76	33	0.400	0.235
4	Loading Bay (PV) 20lux	perpendicular	128 x 128	20	5.09	47	0.249	0.109

Summary of Results

Type	Quantity	Average [lx]	Min [lx]	Max [lx]	u0	E_{min} / E_{max}
perpendicular	4	22	5.09	65	0.24	0.08

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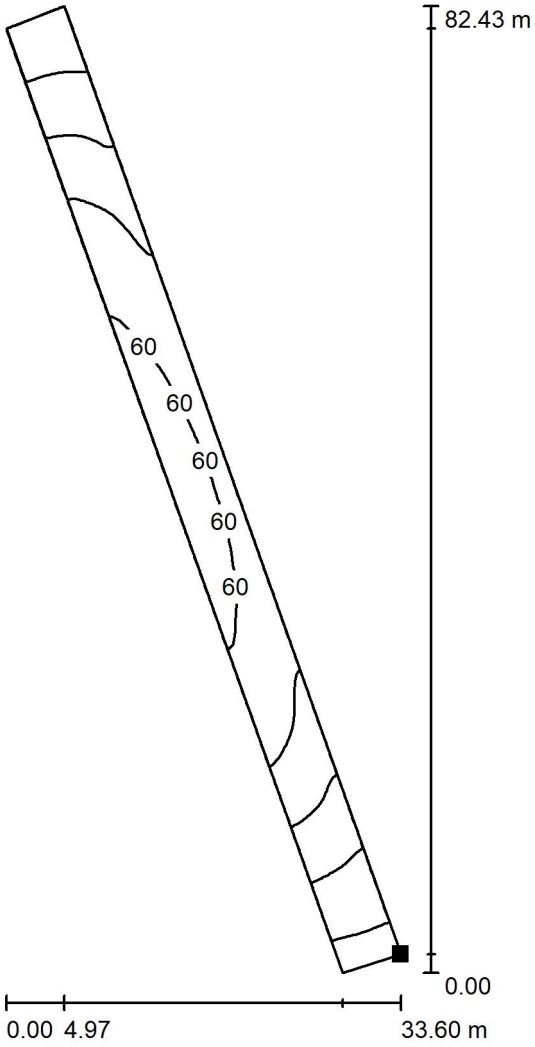
Loading Bay / PV Store / Loading Bay 50lux Target / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 645

Position of surface in external scene:
Marked point:
(754.270 m, 1139.771 m, 0.750 m)

Grid: 128 x 16 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
47	16	65	0.346	0.252

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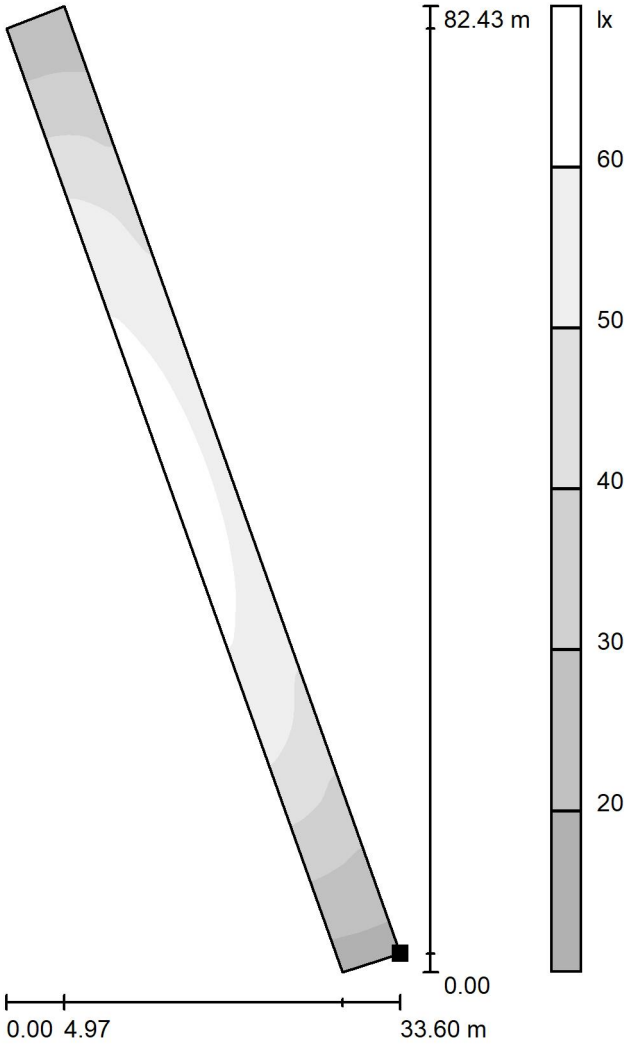
Loading Bay / PV Store / Loading Bay 50lux Target / Greyscale (E, Perpendicular)



Scale 1 : 645

Position of surface in external scene:
Marked point:
(754.270 m, 1139.771 m, 0.750 m)

Grid: 128 x 16 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
47	16	65	0.346	0.252

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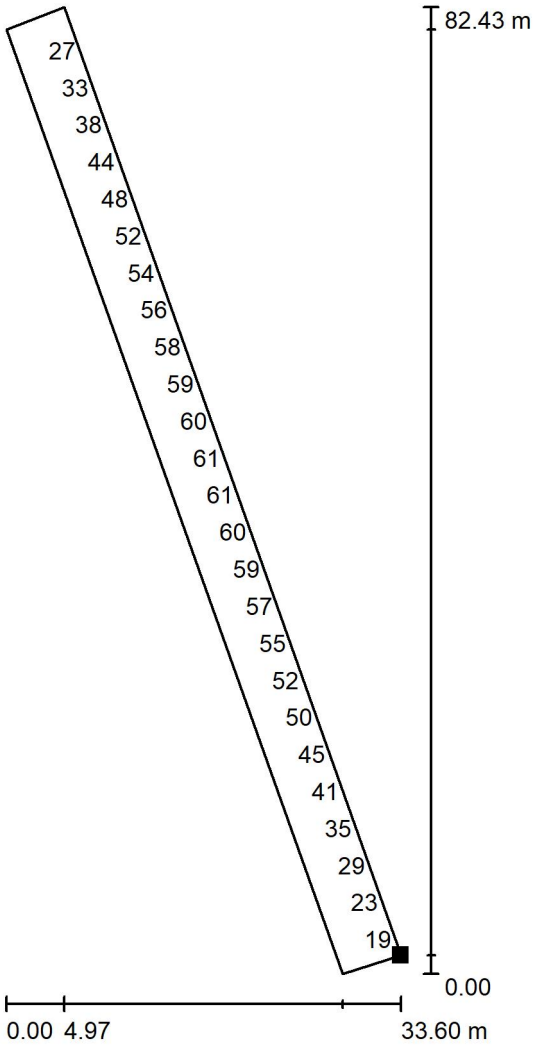
Loading Bay / PV Store / Loading Bay 50lux Target / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 645

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(754.270 m, 1139.771 m, 0.750 m)

Grid: 128 x 16 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
47	16	65	0.346	0.252

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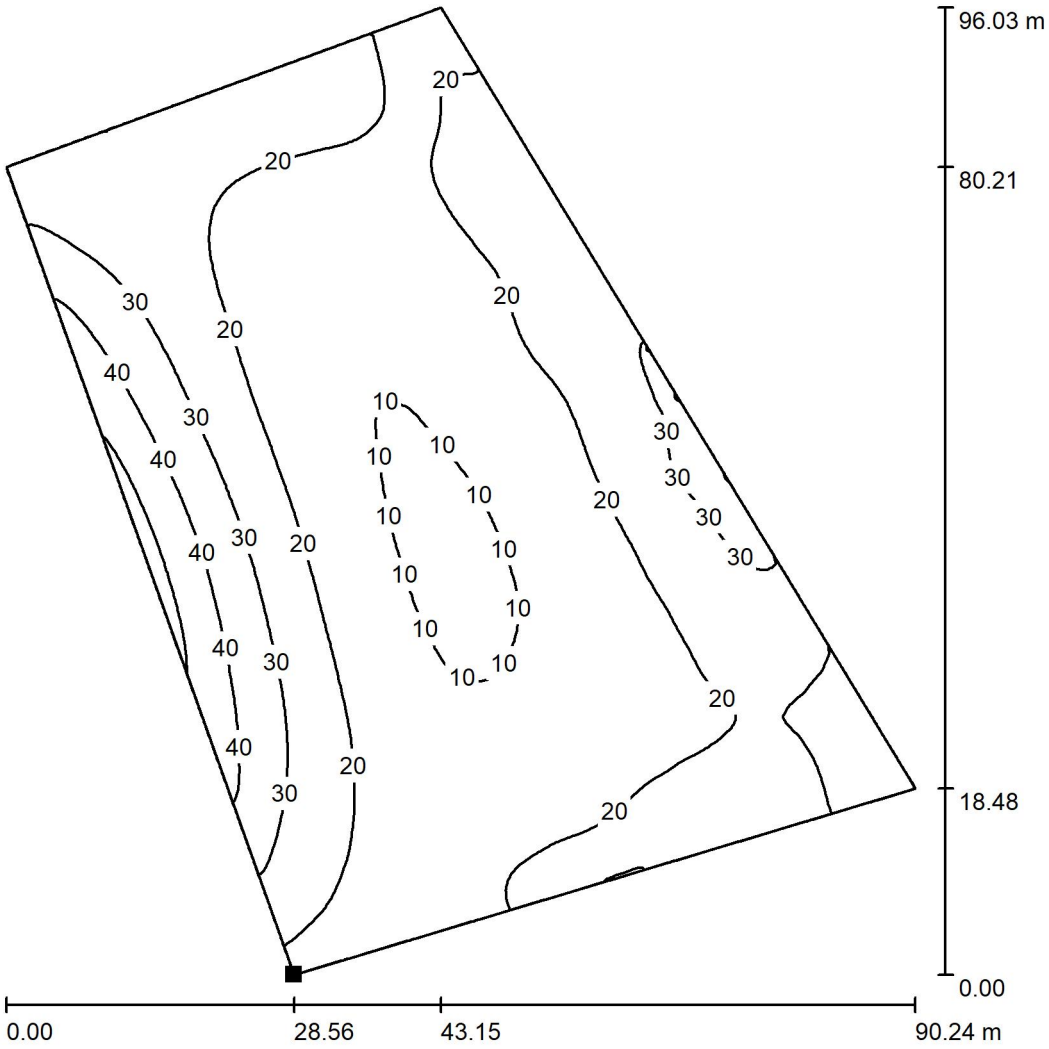
Loading Bay / PV Store / Loading Bay 20lux Target / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 751

Position of surface in external scene:
Marked point:
(754.408 m, 1139.935 m, 0.750 m)

Grid: 128 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
21	8.49	53	0.405	0.159

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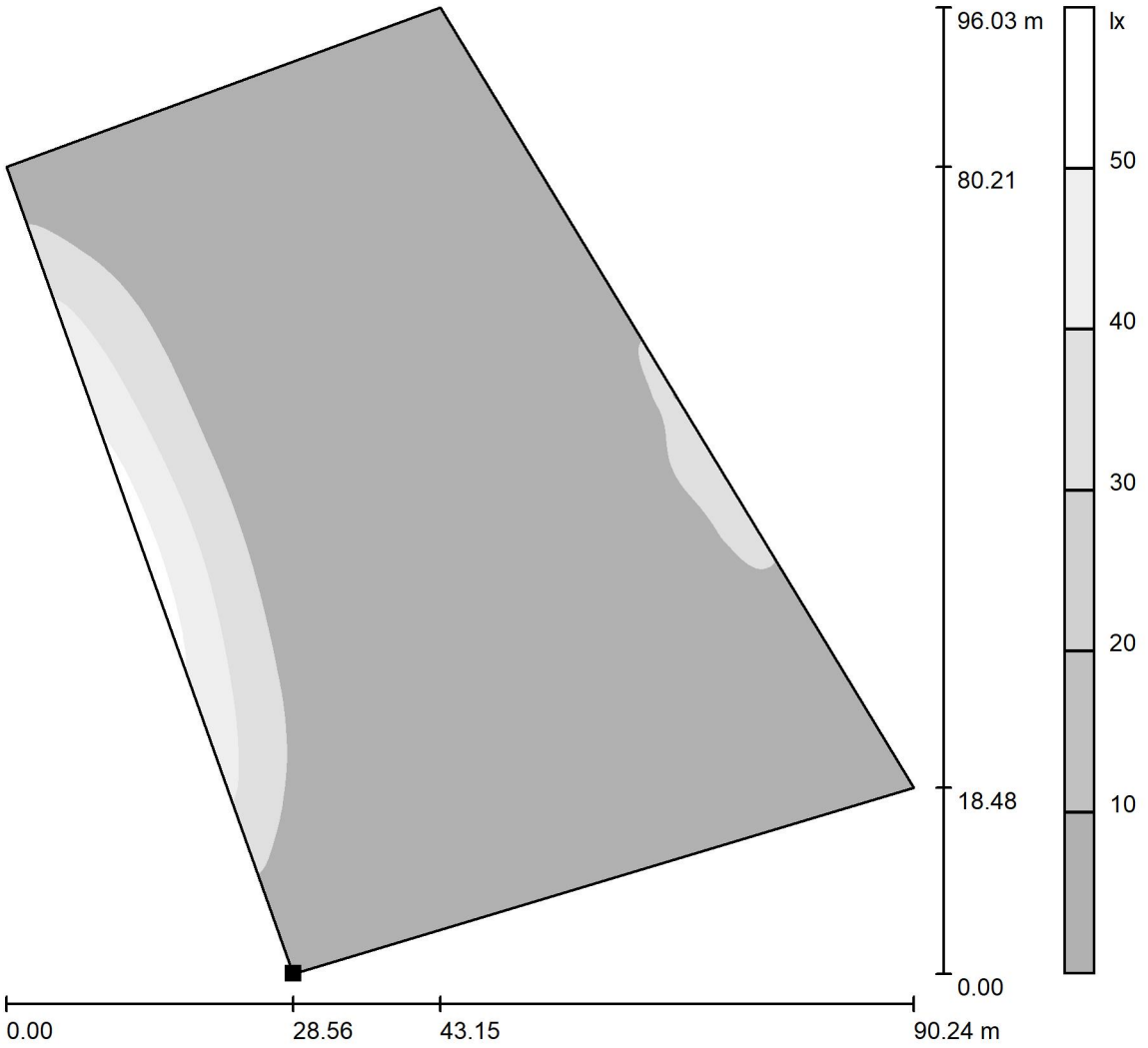
Loading Bay / PV Store / Loading Bay 20lux Target / Greyscale (E, Perpendicular)



Scale 1 : 751

Position of surface in external scene:
Marked point:
(754.408 m, 1139.935 m, 0.750 m)

Grid: 128 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
21	8.49	53	0.405	0.159

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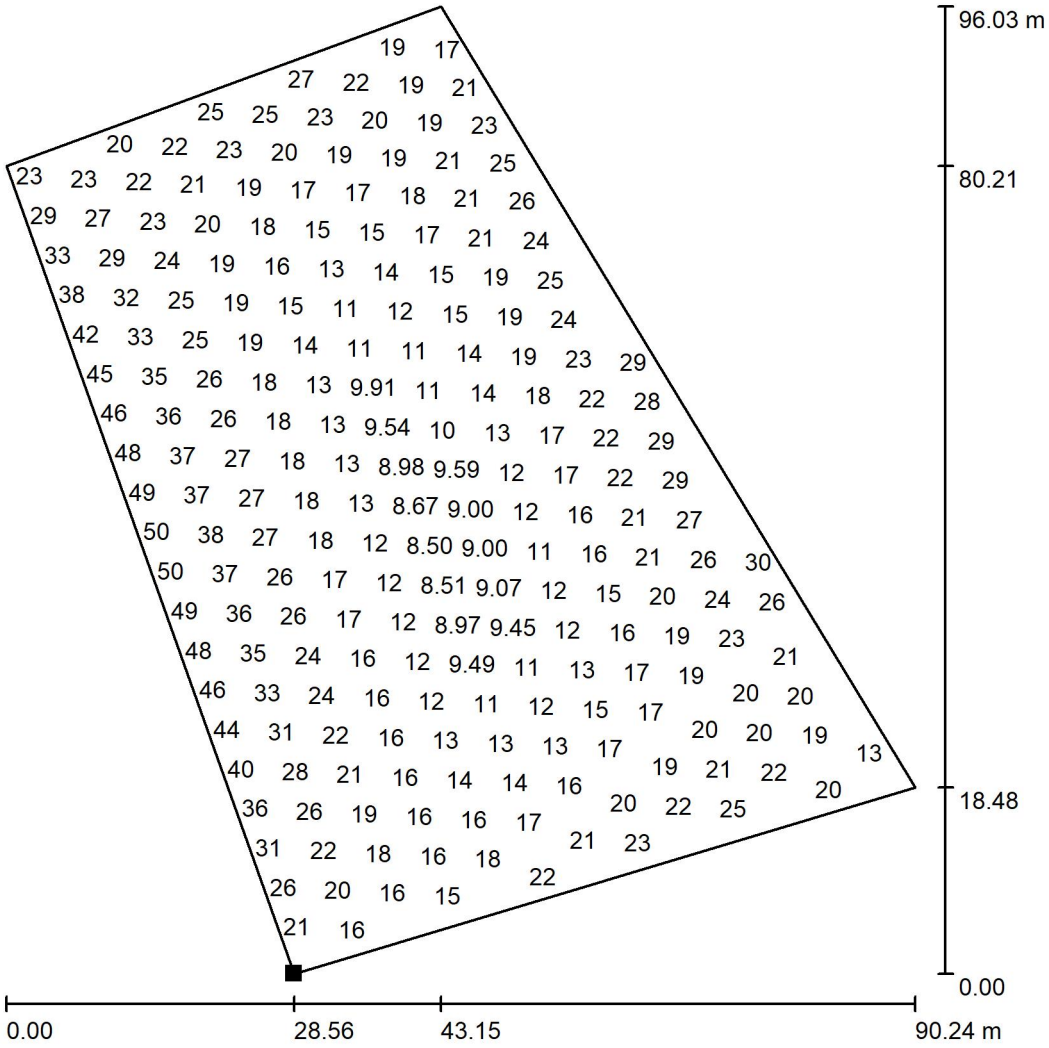
Loading Bay / PV Store / Loading Bay 20lux Target / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 751

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(754.408 m, 1139.935 m, 0.750 m)

Grid: 128 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
21	8.49	53	0.405	0.159

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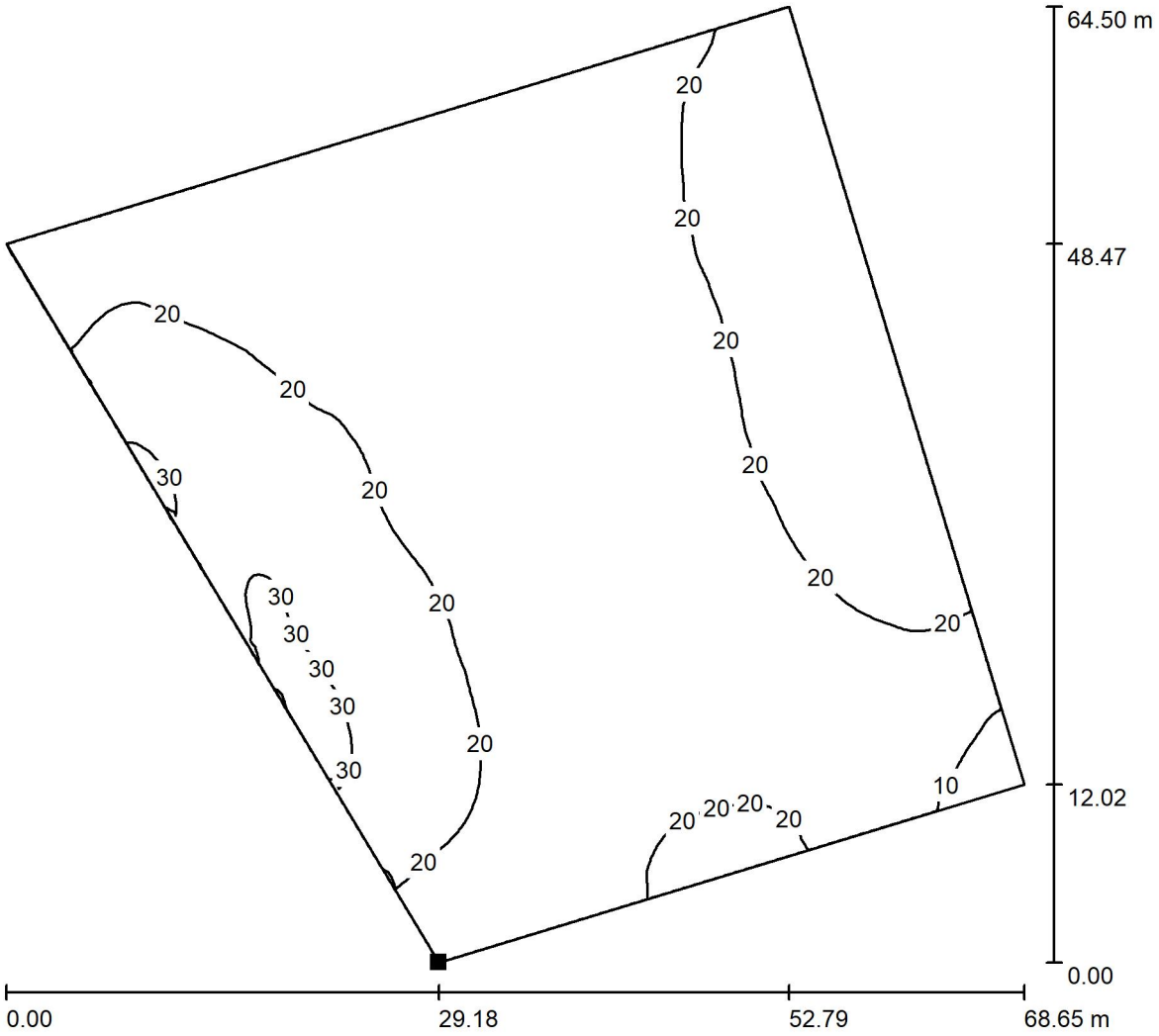
Loading Bay / PV Store / Emergency Muster / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 505

Position of surface in external scene:
Marked point:
(810.454 m, 1206.981 m, 0.750 m)

Grid: 128 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
19	7.76	33	0.400	0.235

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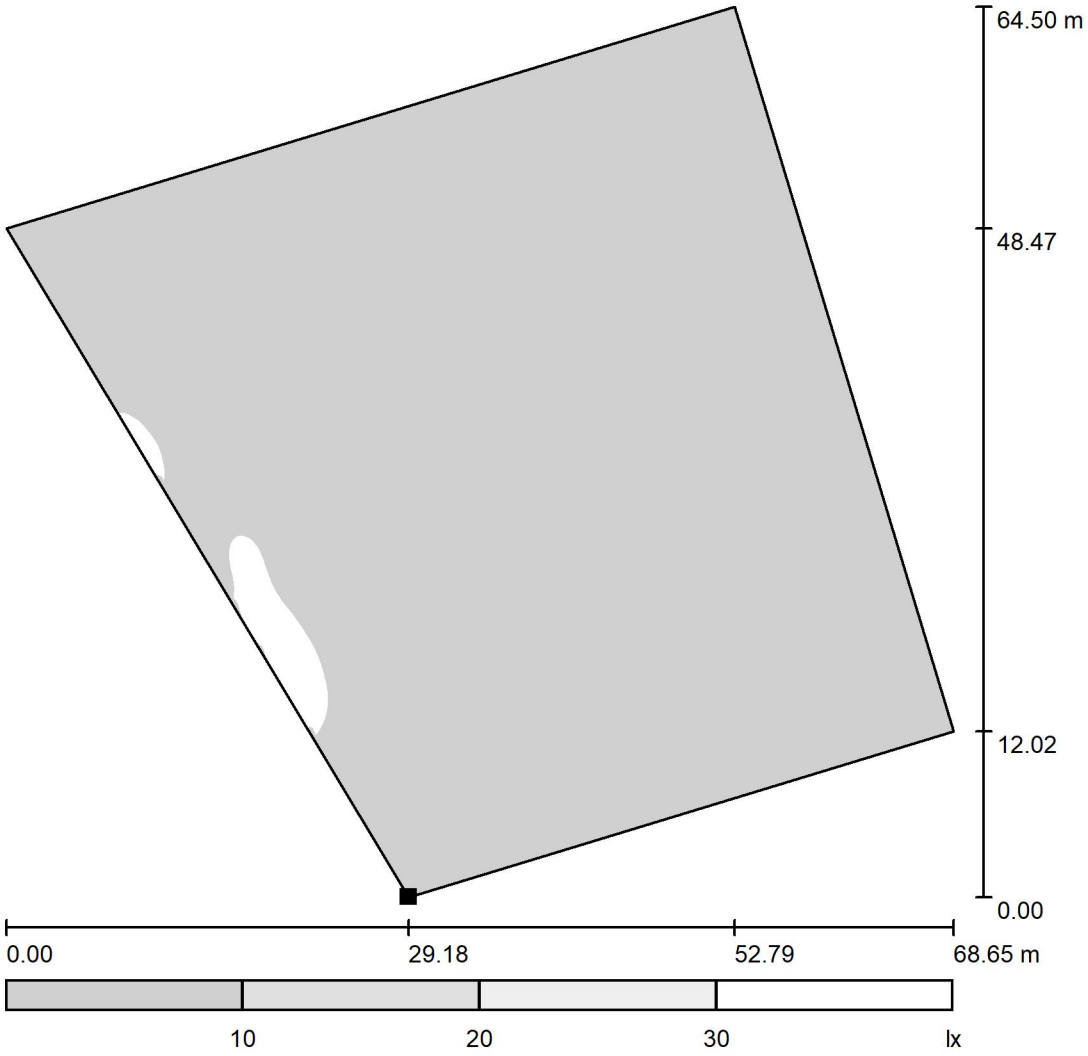
Loading Bay / PV Store / Emergency Muster / Greyscale (E, Perpendicular)



Scale 1 : 548

Position of surface in external scene:
Marked point:
(810.454 m, 1206.981 m, 0.750 m)

Grid: 128 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
19	7.76	33	0.400	0.235

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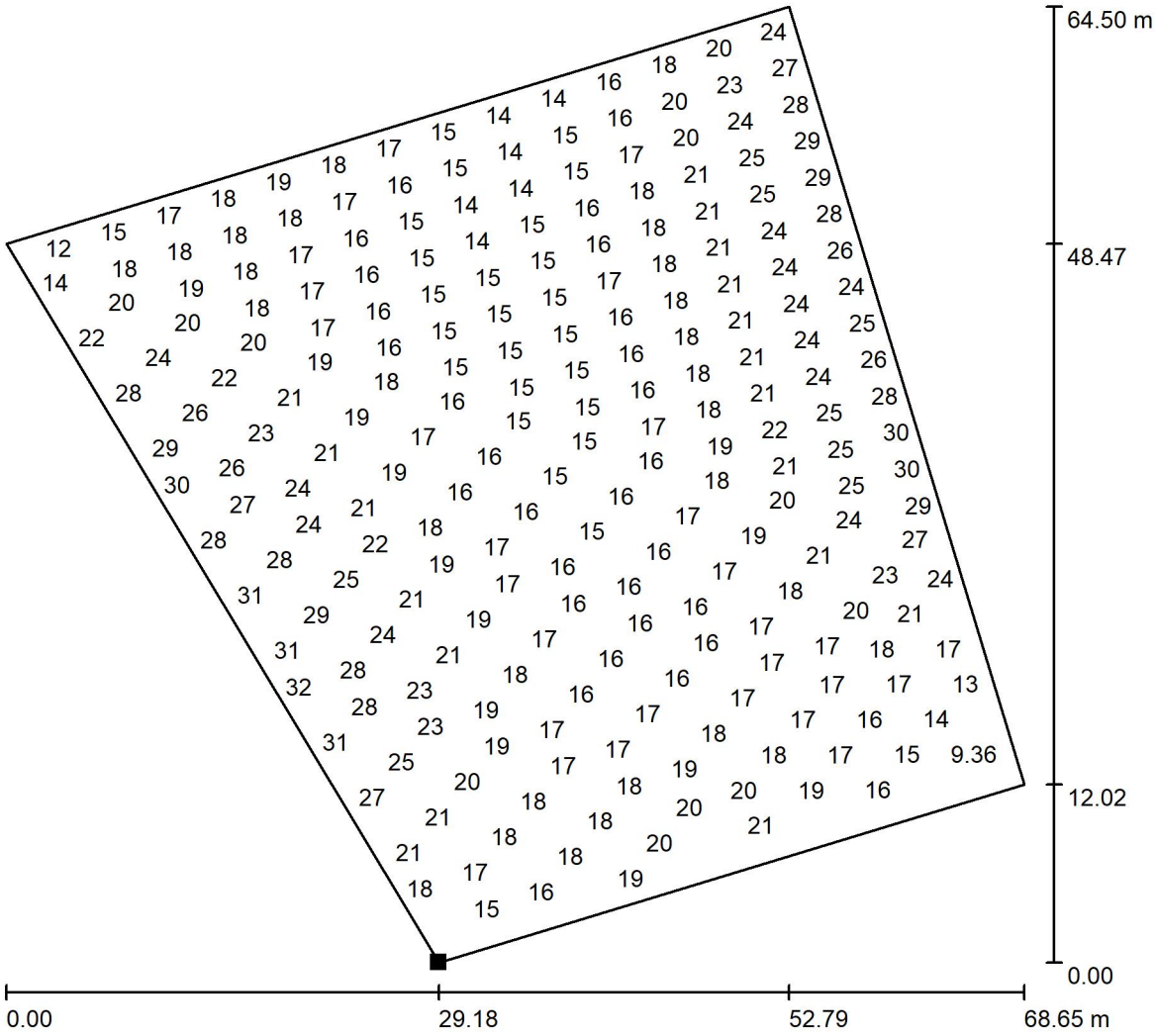
Loading Bay / PV Store / Emergency Muster / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 505

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(810.454 m, 1206.981 m, 0.750 m)

Grid: 128 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
19	7.76	33	0.400	0.235

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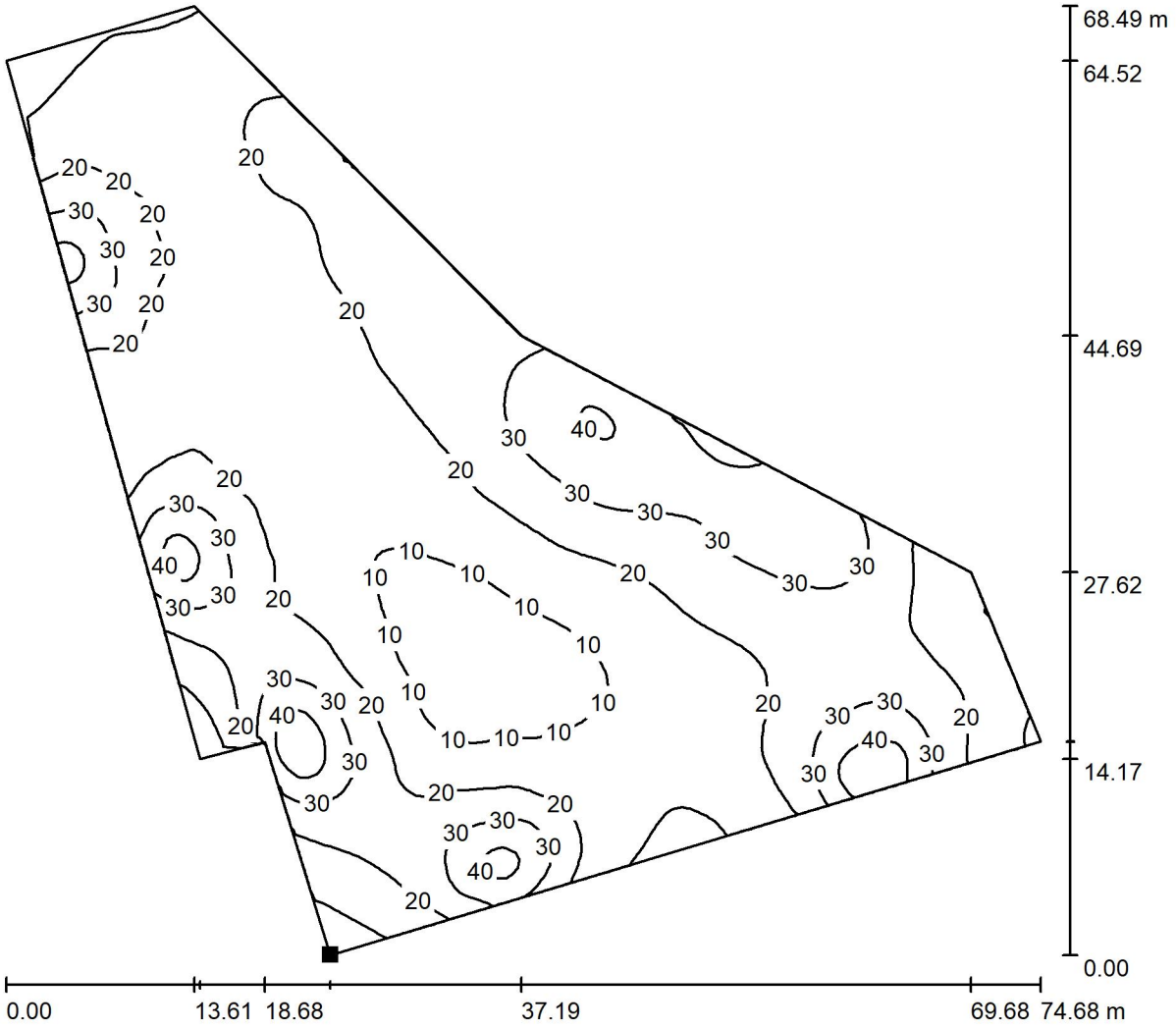
Loading Bay / PV Store / Loading Bay (PV) 20lux / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 536

Position of surface in external scene:
Marked point:
(1303.212 m, 1192.784 m, 0.750 m)

Grid: 128 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
20	5.09	47	0.249	0.109

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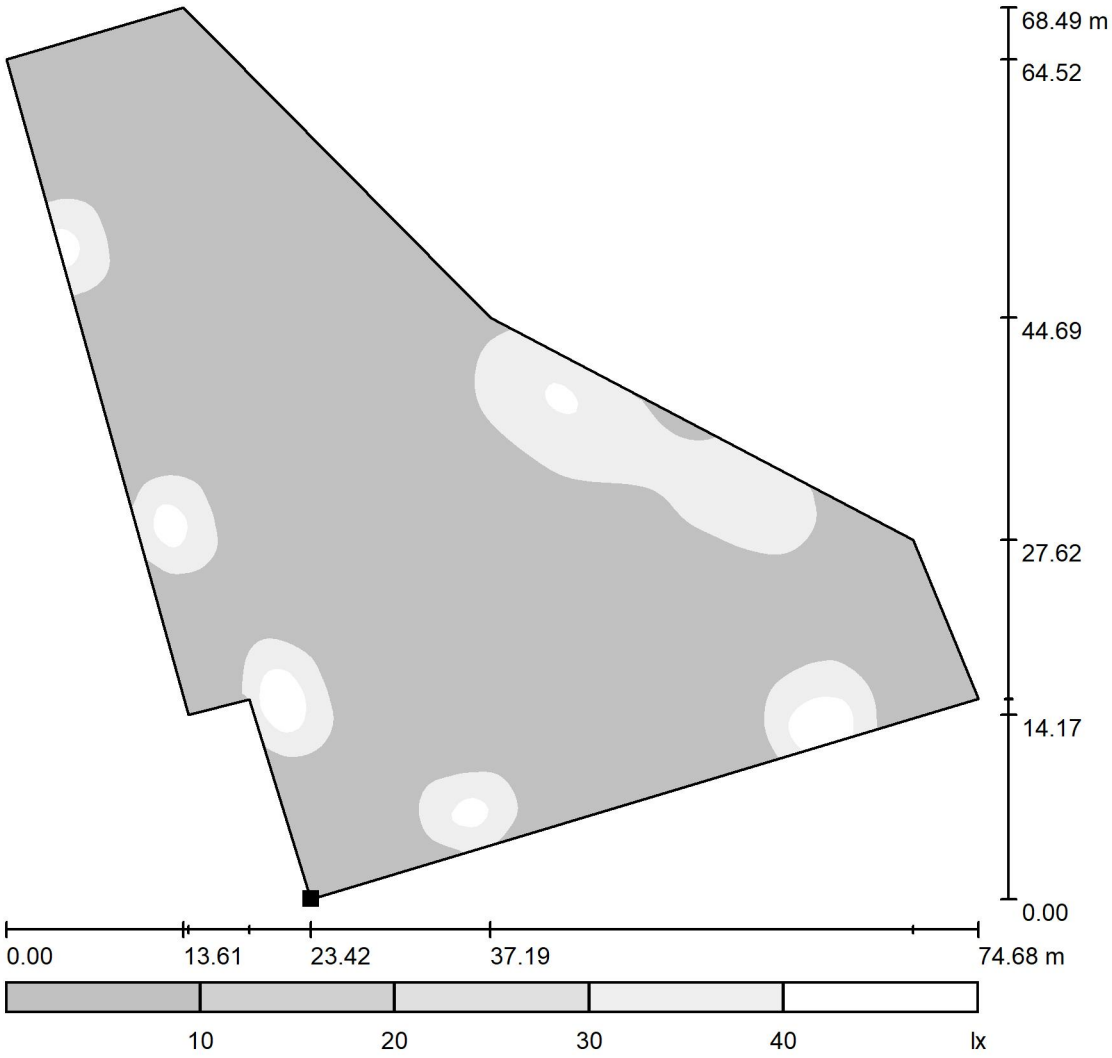
Loading Bay / PV Store / Loading Bay (PV) 20lux / Greyscale (E, Perpendicular)



Scale 1 : 581

Position of surface in external scene:
Marked point:
(1303.212 m, 1192.784 m, 0.750 m)

Grid: 128 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
20	5.09	47	0.249	0.109

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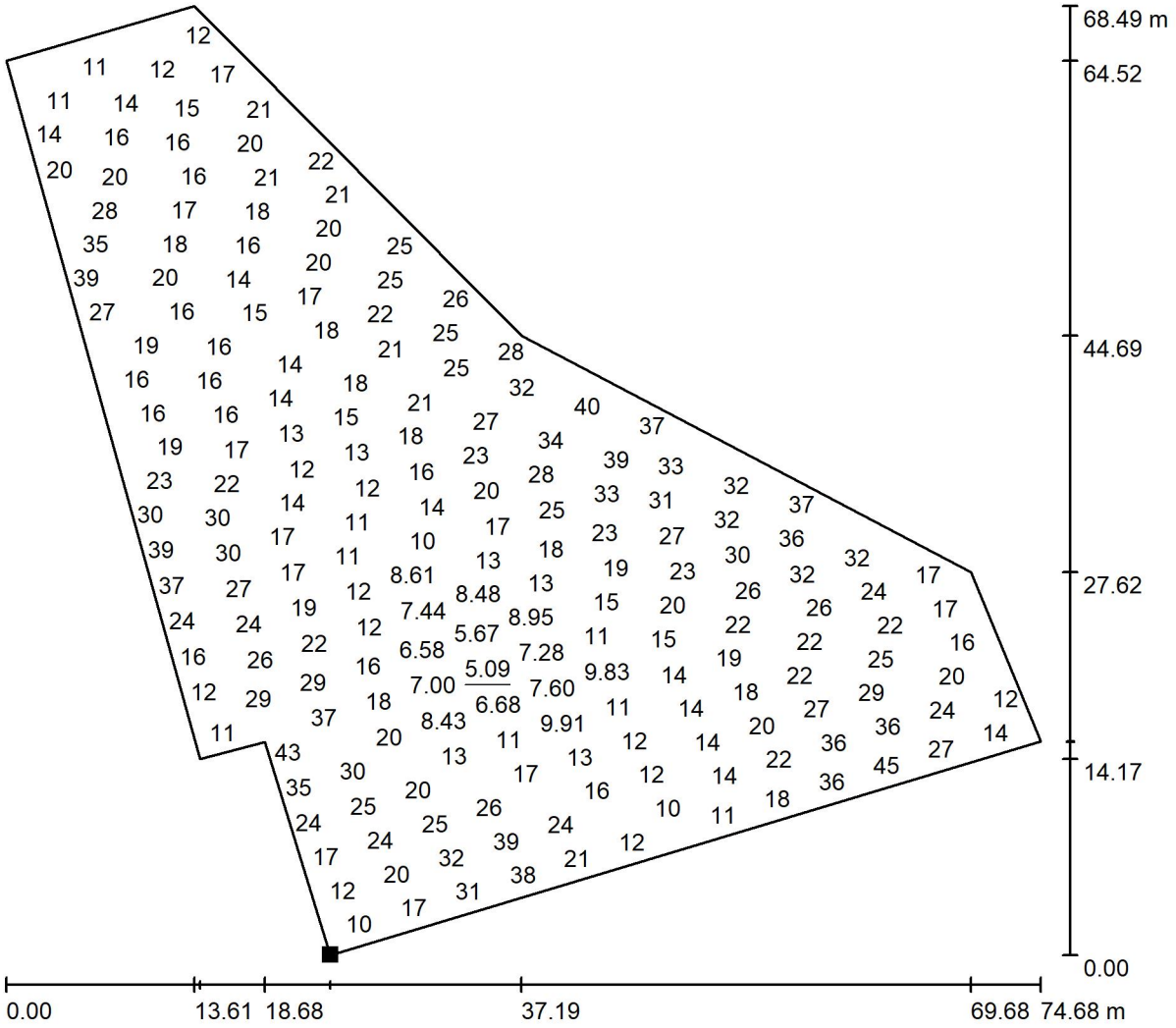
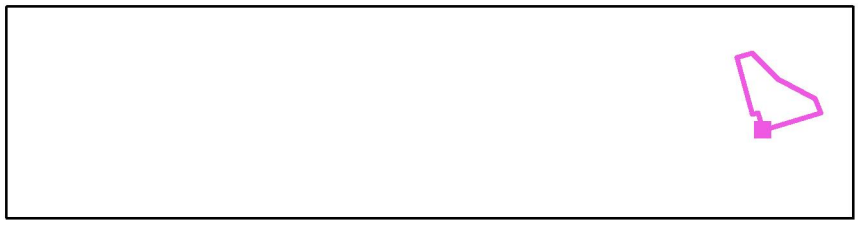
Loading Bay / PV Store / Loading Bay (PV) 20lux / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 536

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(1303.212 m, 1192.784 m, 0.750 m)



Grid: 128 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
20	5.09	47	0.249	0.109

Luton Airport Expansion

Long Stay Car Park 2779 Spaces

Date: 28.06.2019
Operator: Katerina Konsta

Arup

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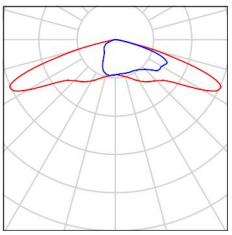
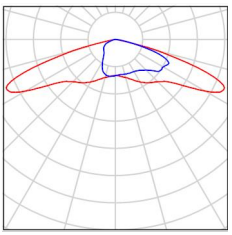
Luton Airport Expansion / Luminaire parts list

30 Pieces WE-EF 108-1493 VFL520 [R65] IP66:LED-12/12W/4K
Article No.: 108-1493
Luminous flux (Luminaire): 1450 lm
Luminous flux (Lamps): 1614 lm
Luminaire Wattage: 14.0 W
Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 90
Fitting: 12 x LED-12/12W/840 - 4000K
(Correction Factor 1.000).



19 Pieces WE-EF 108-1495 VFL520 [R65] IP66:LED-12/24W/4K
Article No.: 108-1495
Luminous flux (Luminaire): 2555 lm
Luminous flux (Lamps): 2951 lm
Luminaire Wattage: 28.0 W
Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 87
Fitting: 12 x LED-12/24W/840 - 4000K
(Correction Factor 1.000).



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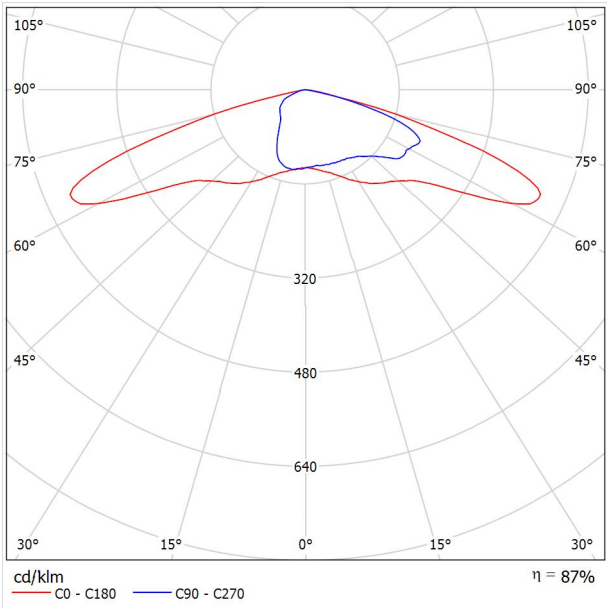
WE-EF 108-1495 VFL520 [R65] IP66:LED-12/24W/4K / Luminaire Data Sheet

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 87

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

IP66, Class I or Class II. IK08. Marine-grade die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. UV stabilised acrylic panel in RFC® technology. Integrated heat sinks. Easy removal and replacement of LED board. CAD optimised OLC® PMMA lens for superior illumination and glare control. The luminaire is factory- sealed and does not need to be opened during the installation.
Spigot D: 76 x 80 mm (optional 60 x 80 mm).
Recommended mounting height 2.5-8.0 m, depending on lamp type selected.

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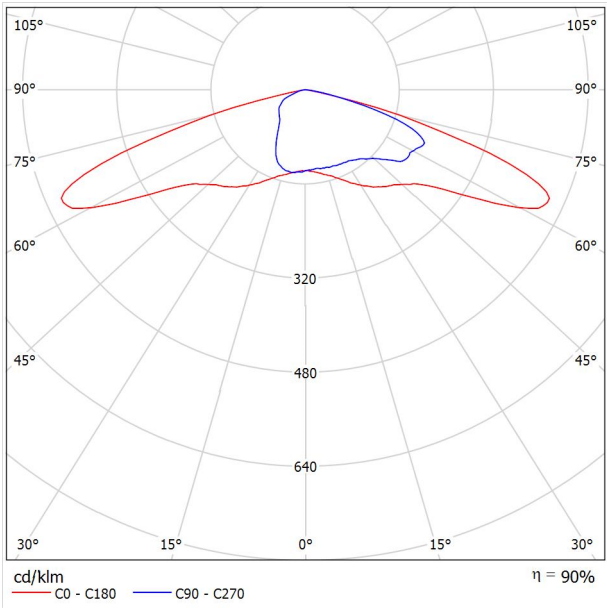
WE-EF 108-1493 VFL520 [R65] IP66:LED-12/12W/4K / Luminaire Data Sheet

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 90

IP66, Class I or Class II. IK08. Marine-grade die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. UV stabilised acrylic panel in RFC® technology. Integrated heat sinks. Easy removal and replacement of LED board. CAD optimised OLC® PMMA lens for superior illumination and glare control. The luminaire is factory- sealed and does not need to be opened during the installation.
Spigot D: 76 x 80 mm (optional 60 x 80 mm).
Recommended mounting height 2.5-8.0 m, depending on lamp type selected.

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

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Long Stay Car Park 2779 Spaces / Planning data

Maintenance factor: 0.57, ULR (Upward Light Ratio): 0.0%

Scale 1:3454

Long Stay Car Park
Average Illuminance Level:
5 lux
Uniformity: 0.25

Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	30	WE-EF 108-1493 VFL520 [R65] IP66:LED-12/12W/4K (1.000)	1450	1614	14.0
2	19	WE-EF 108-1495 VFL520 [R65] IP66:LED-12/24W/4K (1.000)	2555	2951	28.0
			Total: 92042	Total: 104489	952.0

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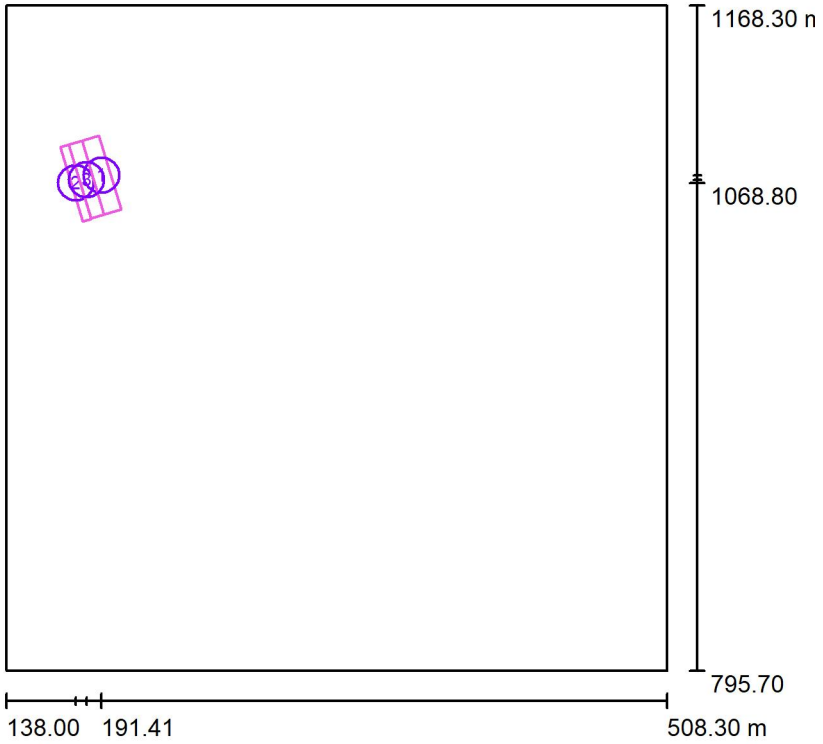
Long Stay Car Park 2779 Spaces / Calculation surfaces (results overview)



Scale 1 : 4240

Calculation Surface List

No.	Designation	Type	Grid	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
1	Typical Calculation - Parking Double Row	perpendicular	32 x 128	7.33	3.68	10	0.502	0.353
2	Typical Calculation - Parking Single Row	perpendicular	32 x 128	7.29	4.58	9.17	0.628	0.499
3	Typical Calculation - Parking Access Road	perpendicular	32 x 128	5.55	4.49	6.94	0.809	0.648

Summary of Results

Type	Quantity	Average [lx]	Min [lx]	Max [lx]	u0	E_{min} / E_{max}
perpendicular	3	6.72	3.68	10	0.55	0.35

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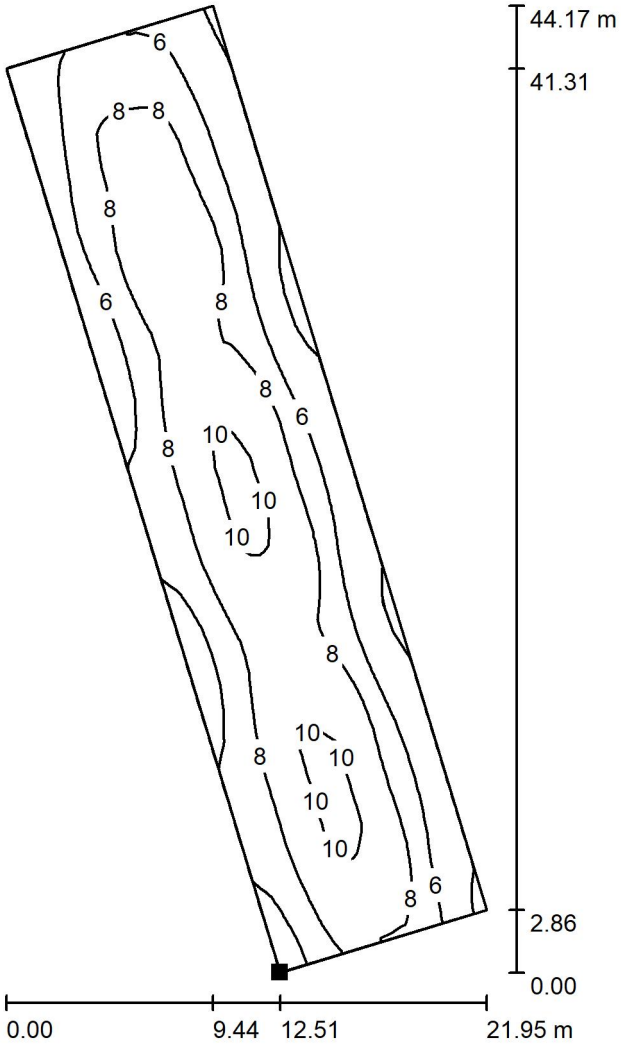
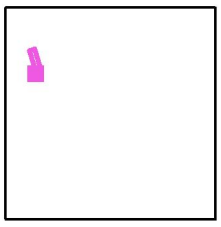
Long Stay Car Park 2779 Spaces / Typical Calculation - Parking Double Row / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 346

Position of surface in external scene:
Marked point:
(192.949 m, 1051.080 m, 0.000 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
7.33	3.68	10	0.502	0.353

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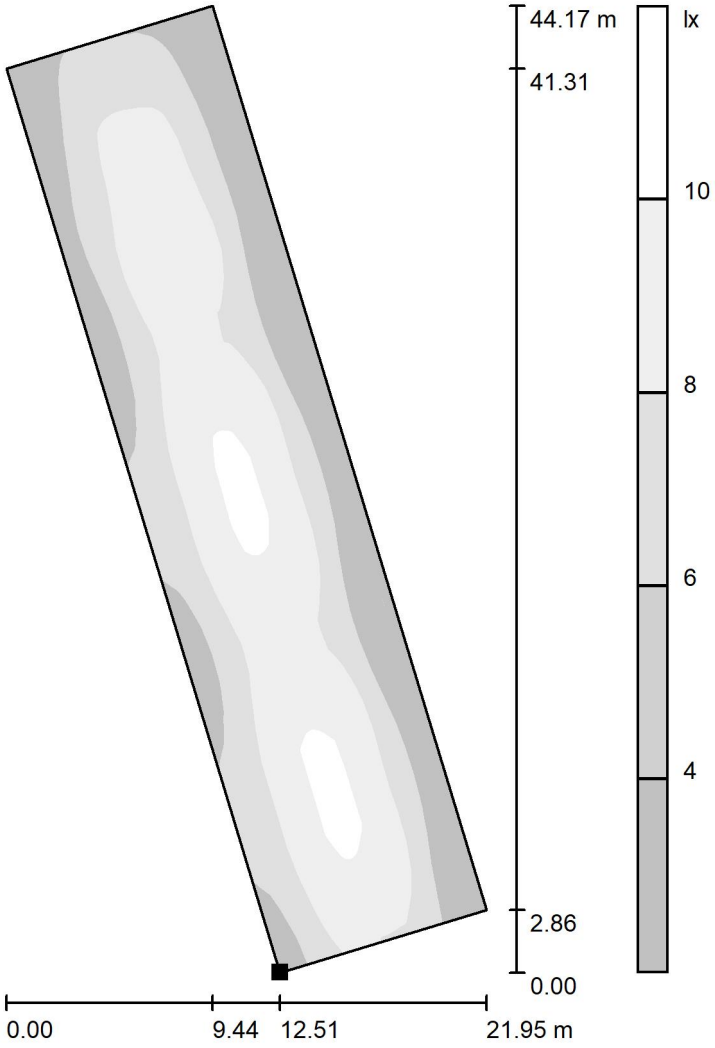
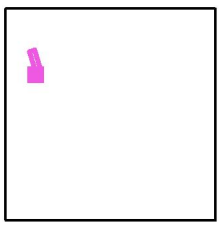
Long Stay Car Park 2779 Spaces / Typical Calculation - Parking Double Row / Greyscale (E, Perpendicular)



Scale 1 : 346

Position of surface in external scene:
Marked point:
(192.949 m, 1051.080 m, 0.000 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
7.33	3.68	10	0.502	0.353

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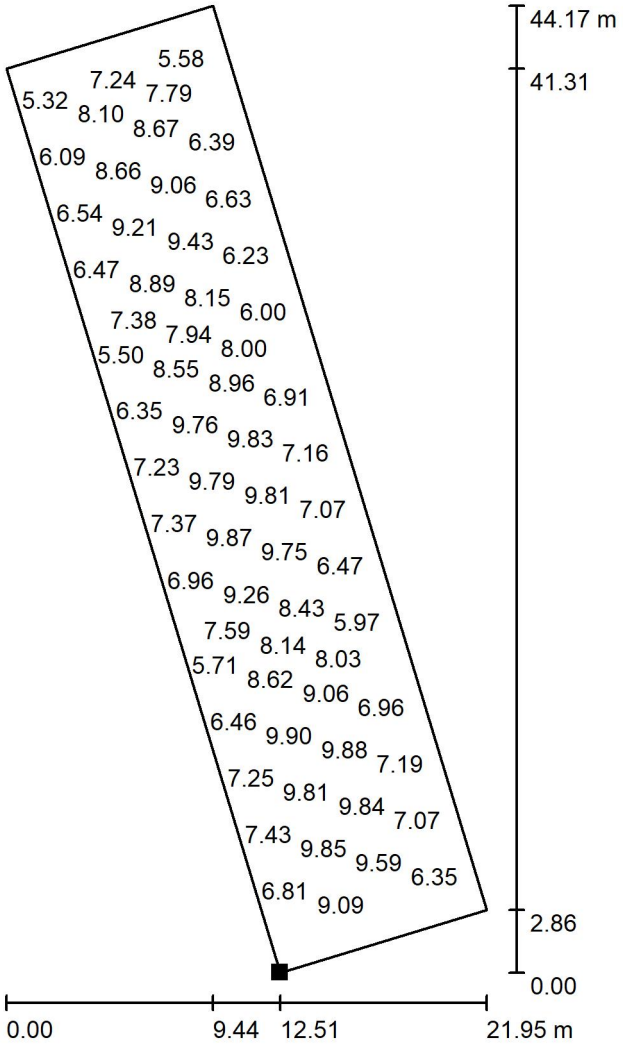
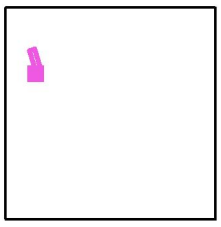
Long Stay Car Park 2779 Spaces / Typical Calculation - Parking Double Row / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 346

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(192.949 m, 1051.080 m, 0.000 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
7.33	3.68	10	0.502	0.353

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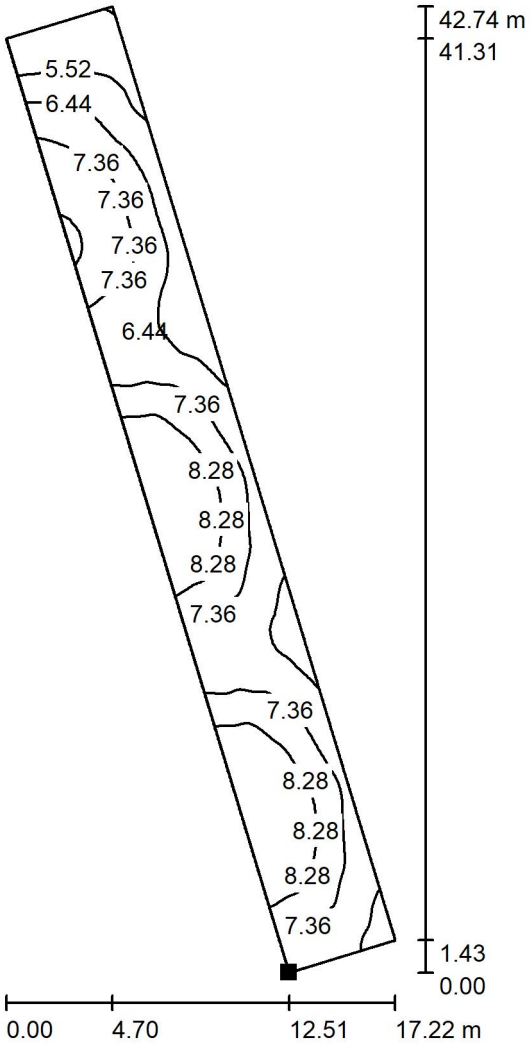
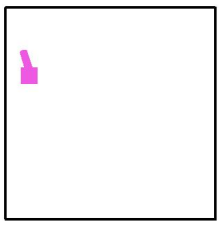
Long Stay Car Park 2779 Spaces / Typical Calculation - Parking Single Row / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 335

Position of surface in external scene:
Marked point:
(180.964 m, 1047.431 m, 0.000 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
7.29	4.58	9.17	0.628	0.499

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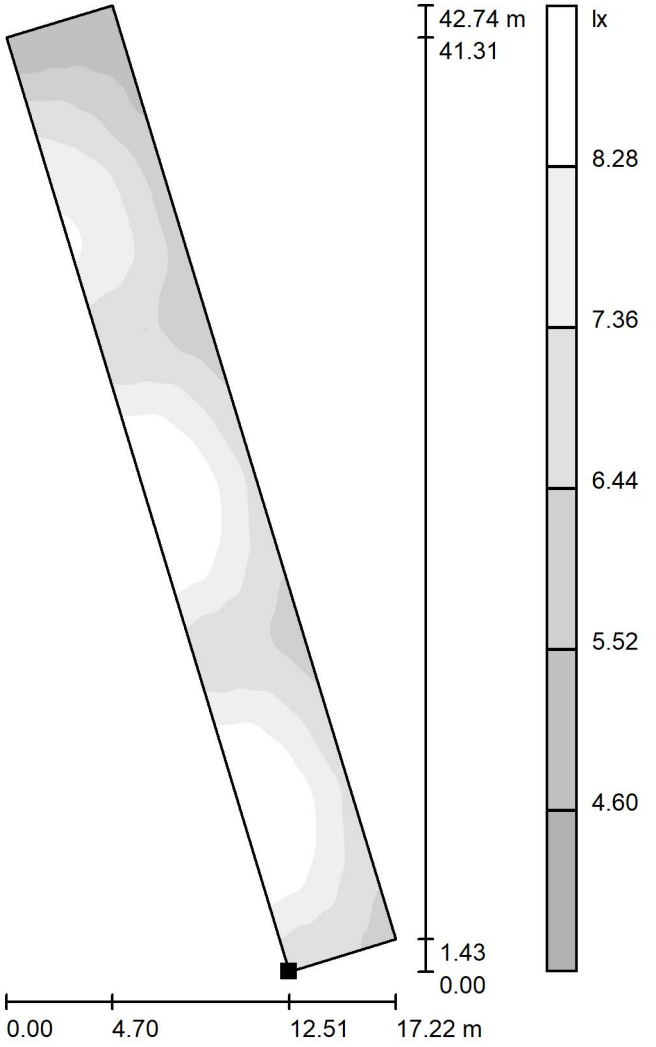
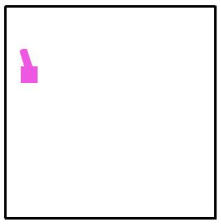
Long Stay Car Park 2779 Spaces / Typical Calculation - Parking Single Row / Greyscale (E, Perpendicular)



Scale 1 : 335

Position of surface in external scene:
Marked point:
(180.964 m, 1047.431 m, 0.000 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
7.29	4.58	9.17	0.628	0.499

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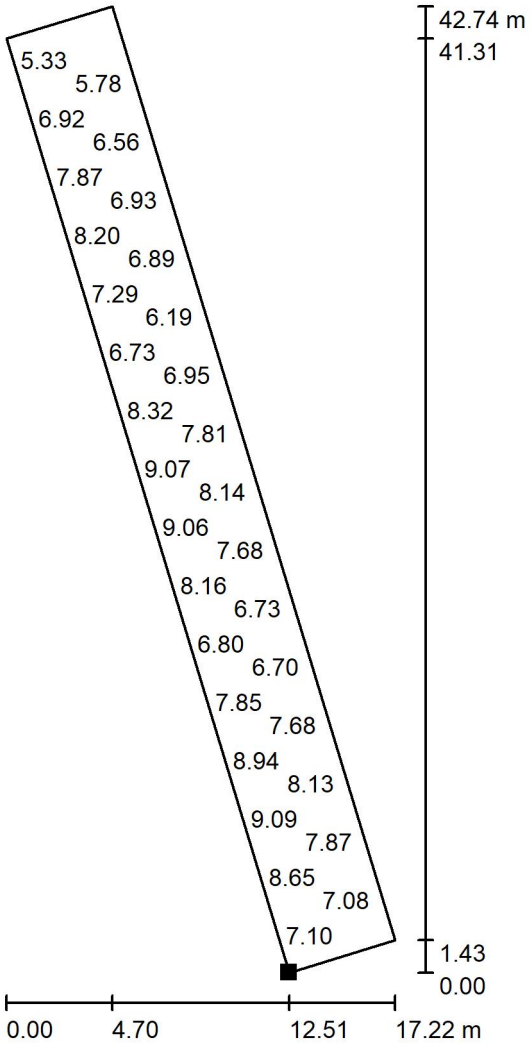
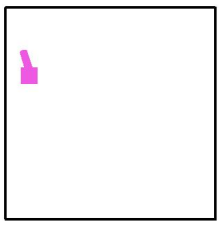
Long Stay Car Park 2779 Spaces / Typical Calculation - Parking Single Row / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 335

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(180.964 m, 1047.431 m, 0.000 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
7.29	4.58	9.17	0.628	0.499

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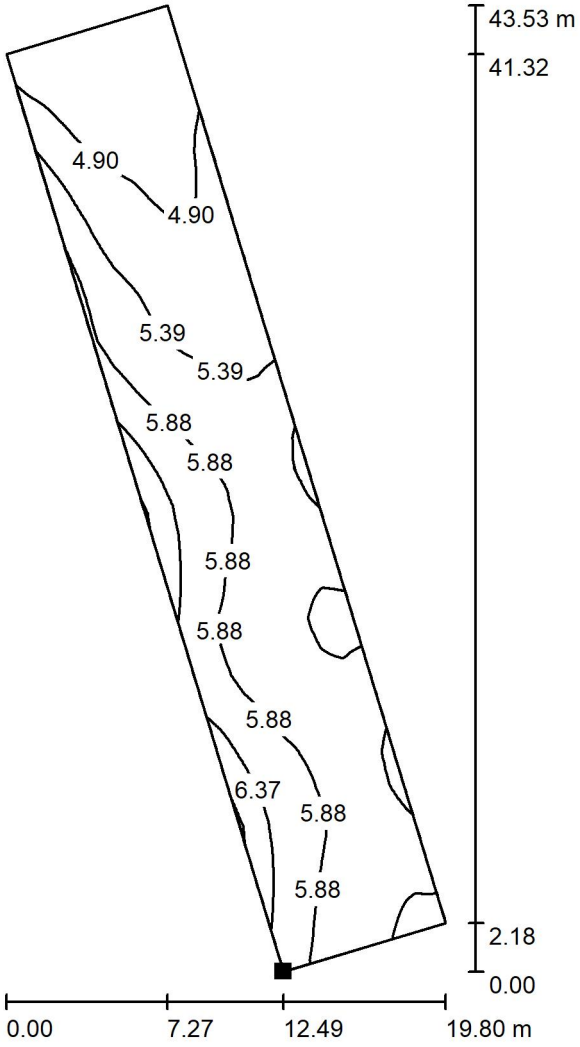
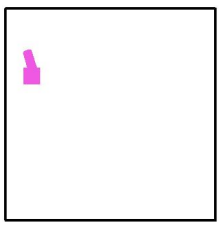
Long Stay Car Park 2779 Spaces / Typical Calculation - Parking Access Road / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 341

Position of surface in external scene:
Marked point:
(185.653 m, 1048.864 m, 0.000 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
5.55	4.49	6.94	0.809	0.648

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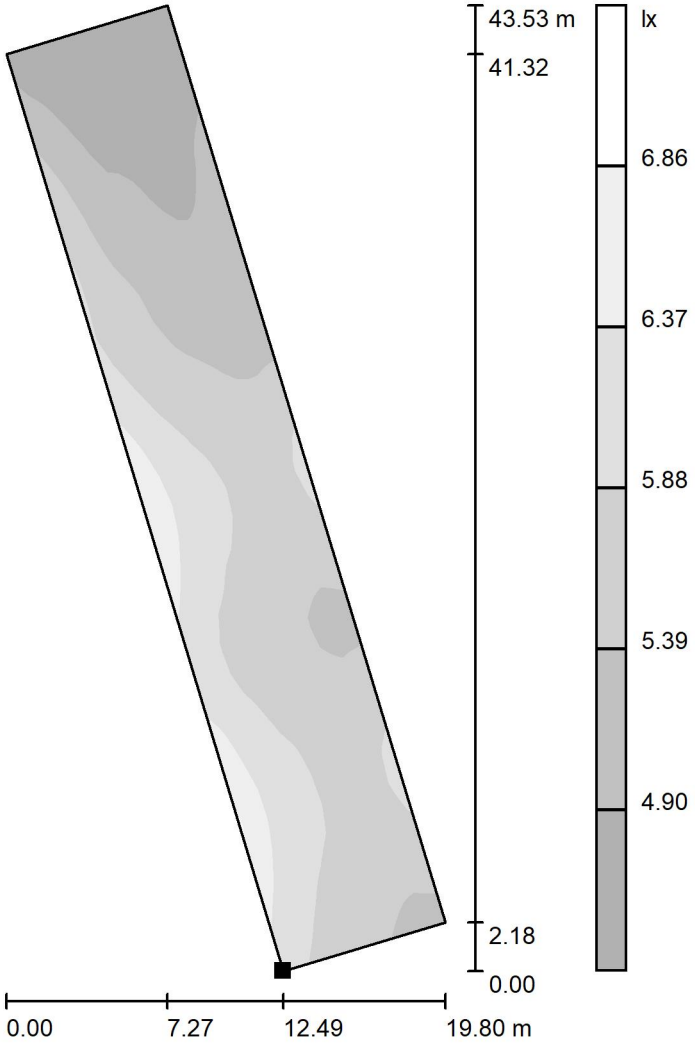
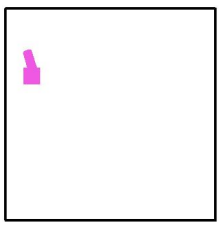
Long Stay Car Park 2779 Spaces / Typical Calculation - Parking Access Road / Greyscale (E, Perpendicular)



Scale 1 : 341

Position of surface in external scene:
Marked point:
(185.653 m, 1048.864 m, 0.000 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
5.55	4.49	6.94	0.809	0.648

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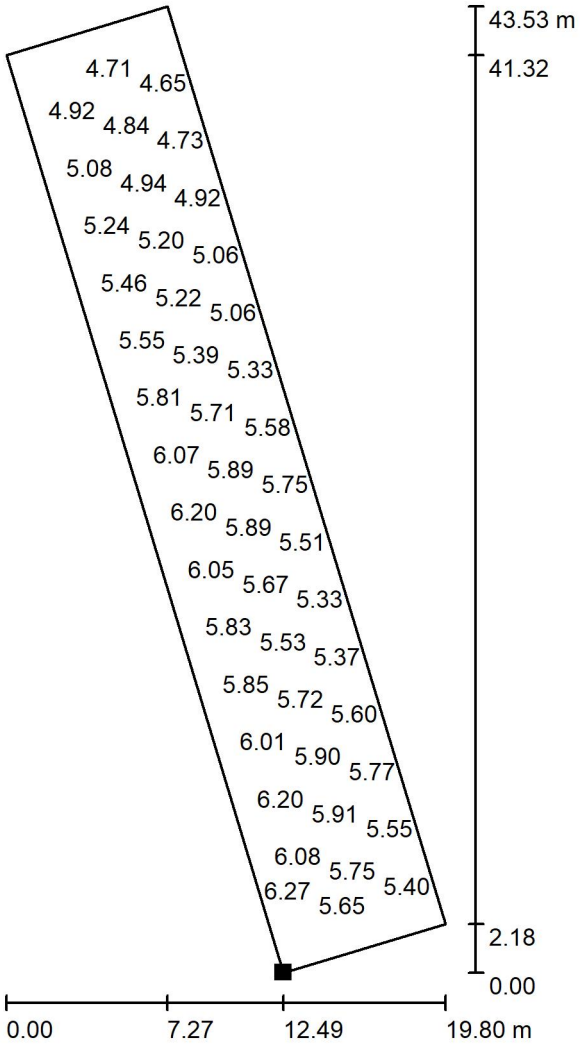
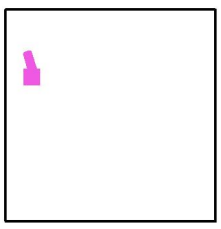
Long Stay Car Park 2779 Spaces / Typical Calculation - Parking Access Road / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 341

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(185.653 m, 1048.864 m, 0.000 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
5.55	4.49	6.94	0.809	0.648

Luton Airport Expansion

Long Stay Single Level Deck Car Park 964 Spaces - Deck Level

Date: 28.06.2019
Operator: Katerina Konsta

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Table of contents

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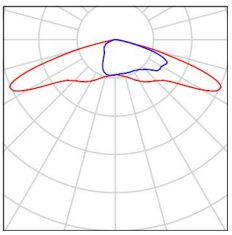
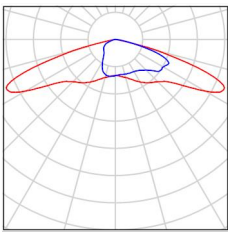
Luton Airport Expansion / Luminaire parts list

36 Pieces WE-EF 108-1493 VFL520 [R65] IP66:LED-12/12W/4K
Article No.: 108-1493
Luminous flux (Luminaire): 1450 lm
Luminous flux (Lamps): 1614 lm
Luminaire Wattage: 14.0 W
Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 90
Fitting: 12 x LED-12/12W/840 - 4000K
(Correction Factor 1.000).



8 Pieces WE-EF 108-1495 VFL520 [R65] IP66:LED-12/24W/4K
Article No.: 108-1495
Luminous flux (Luminaire): 2555 lm
Luminous flux (Lamps): 2951 lm
Luminaire Wattage: 28.0 W
Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 87
Fitting: 12 x LED-12/24W/840 - 4000K
(Correction Factor 1.000).



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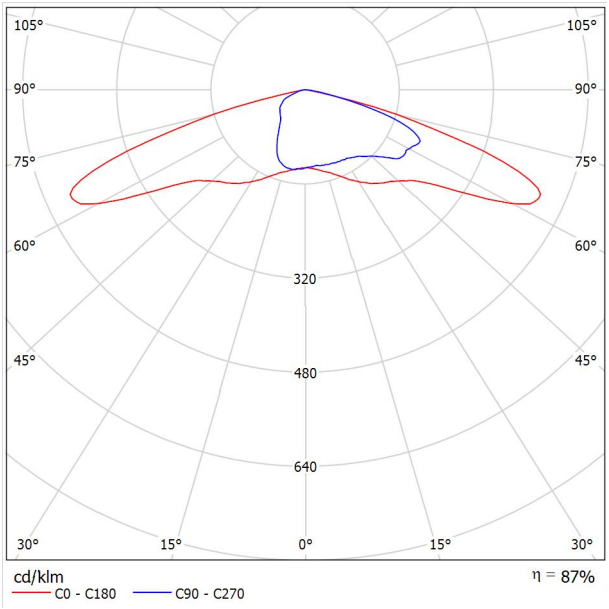
WE-EF 108-1495 VFL520 [R65] IP66:LED-12/24W/4K / Luminaire Data Sheet

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 87

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

IP66, Class I or Class II. IK08. Marine-grade die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. UV stabilised acrylic panel in RFC® technology. Integrated heat sinks. Easy removal and replacement of LED board. CAD optimised OLC® PMMA lens for superior illumination and glare control. The luminaire is factory- sealed and does not need to be opened during the installation.
Spigot D: 76 x 80 mm (optional 60 x 80 mm).
Recommended mounting height 2.5-8.0 m, depending on lamp type selected.

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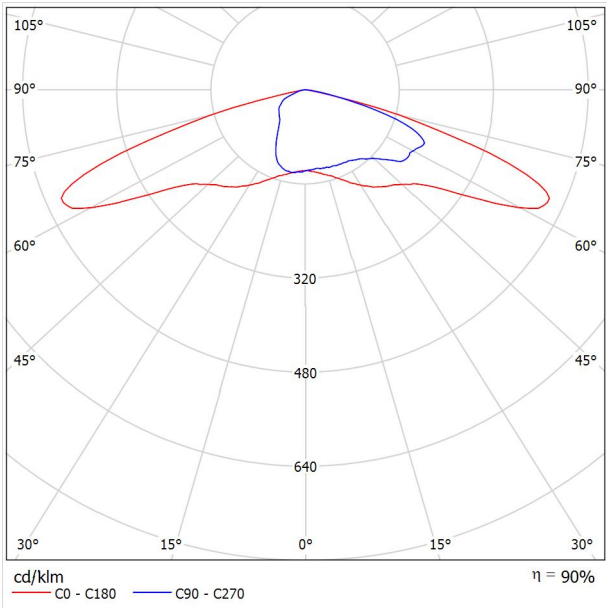
WE-EF 108-1493 VFL520 [R65] IP66:LED-12/12W/4K / Luminaire Data Sheet

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 90

IP66, Class I or Class II. IK08. Marine-grade die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. UV stabilised acrylic panel in RFC® technology. Integrated heat sinks. Easy removal and replacement of LED board. CAD optimised OLC® PMMA lens for superior illumination and glare control. The luminaire is factory- sealed and does not need to be opened during the installation.
Spigot D: 76 x 80 mm (optional 60 x 80 mm).
Recommended mounting height 2.5-8.0 m, depending on lamp type selected.

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

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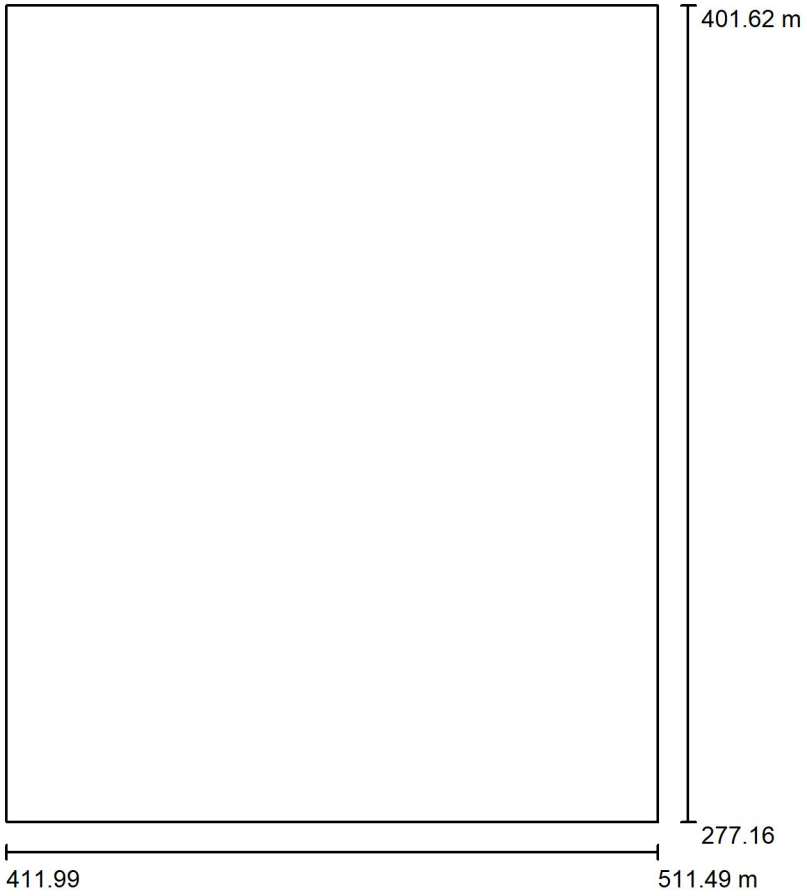
Long Stay Single Level Deck Car Park 964 Spaces / Planning data



Maintenance factor: 0.57, ULR (Upward Light Ratio): 0.0%

Scale 1:1154

Long Stay Car Park - Deck Level
Average Illuminance Level:
5lux
Uniformity:0.25

Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	36	WE-EF 108-1493 VFL520 [R65] IP66:LED-12/12W/4K (1.000)	1450	1614	14.0
2	8	WE-EF 108-1495 VFL520 [R65] IP66:LED-12/24W/4K (1.000)	2555	2951	28.0
			Total: 72633	Total: 81712	728.0

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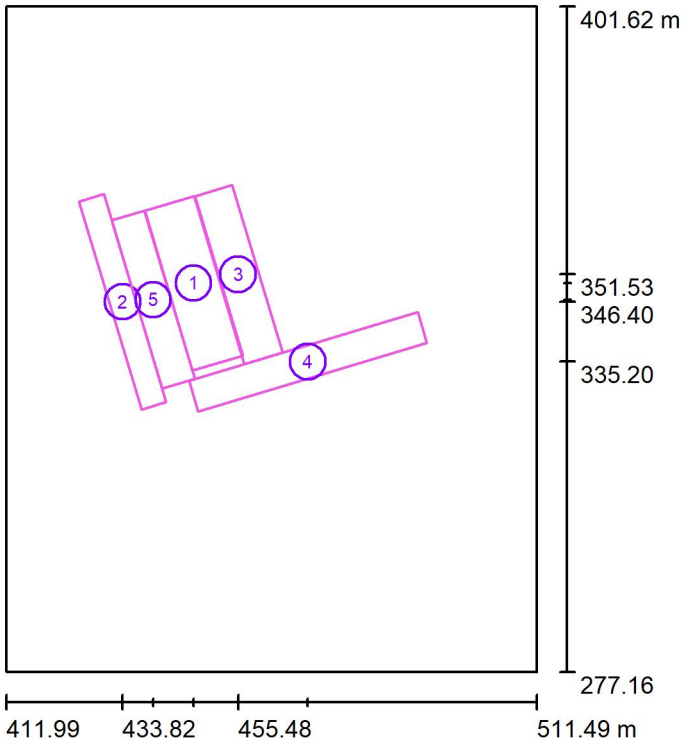
Long Stay Single Level Deck Car Park 964 Spaces / Calculation surfaces (results overview)



Scale 1 : 1417

Calculation Surface List

No.	Designation	Type	Grid	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
1	Typical Calculation - Parking Double Row	perpendicular	128 x 64	9.94	4.83	20	0.486	0.247
2	Typical Calculation - Parking Single Row	perpendicular	128 x 32	8.77	5.20	15	0.593	0.346
3	Typical Calculation - Traffic Lane Area 01	perpendicular	128 x 32	5.02	3.92	8.74	0.780	0.448
4	Typical Calculation - Traffic Lane Area 02	perpendicular	128 x 32	6.62	3.37	12	0.510	0.273
5	Typical Calculation - Traffic Lane Area 03	perpendicular	128 x 32	5.49	4.42	7.06	0.805	0.626

Summary of Results

Type	Quantity	Average [lx]	Min [lx]	Max [lx]	u0	E_{min} / E_{max}
perpendicular	5	7.28	3.37	20	0.46	0.17

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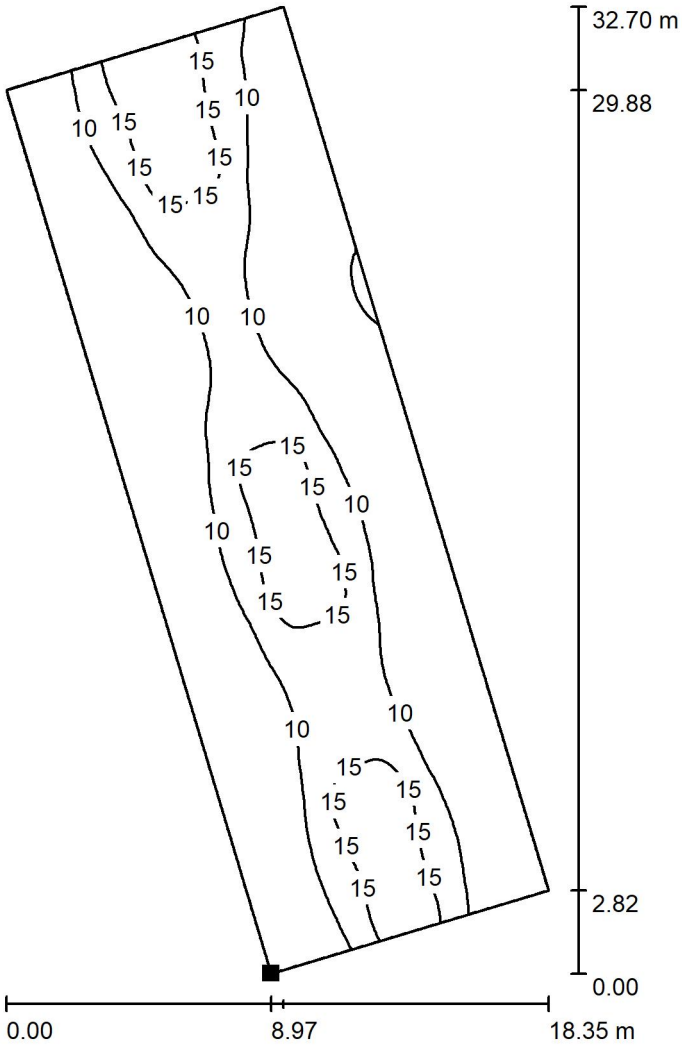
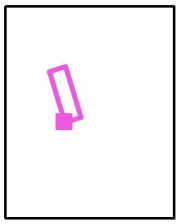
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Parking Double Row / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 256

Position of surface in external scene:
Marked point:
(446.918 m, 333.545 m, 0.000 m)



Grid: 128 x 64 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
9.94	4.83	20	0.486	0.247

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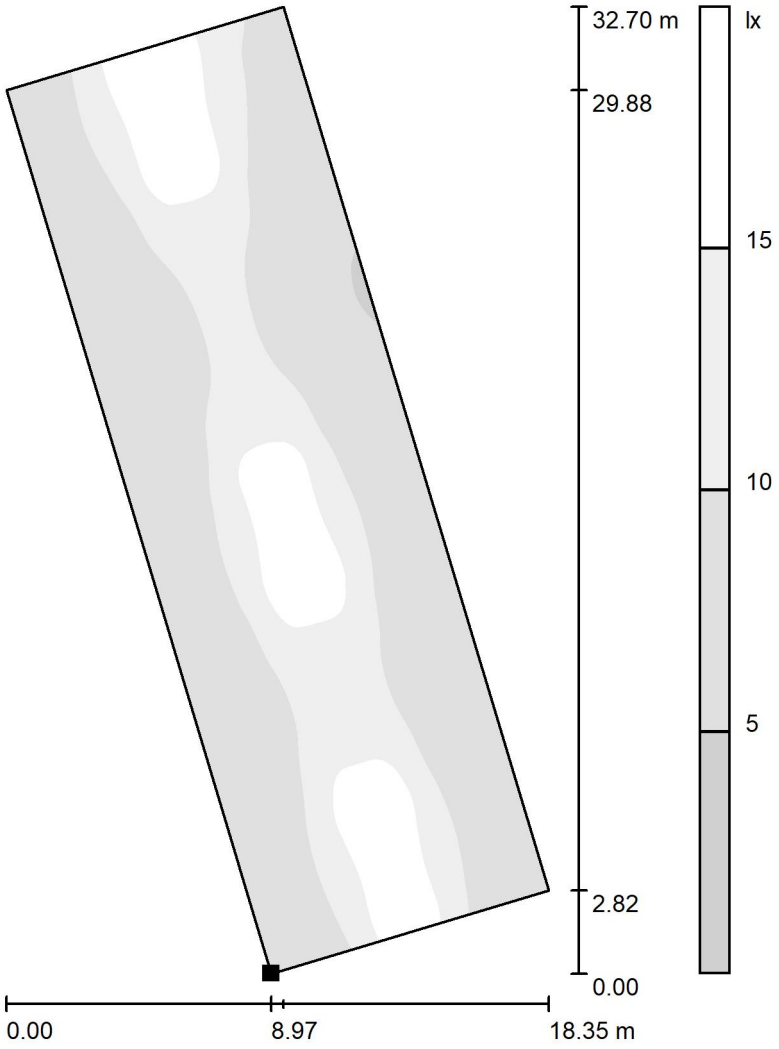
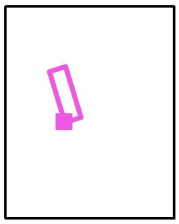
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Parking Double Row / Greyscale (E, Perpendicular)



Scale 1 : 256

Position of surface in external scene:
Marked point:
(446.918 m, 333.545 m, 0.000 m)



Grid: 128 x 64 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
9.94	4.83	20	0.486	0.247

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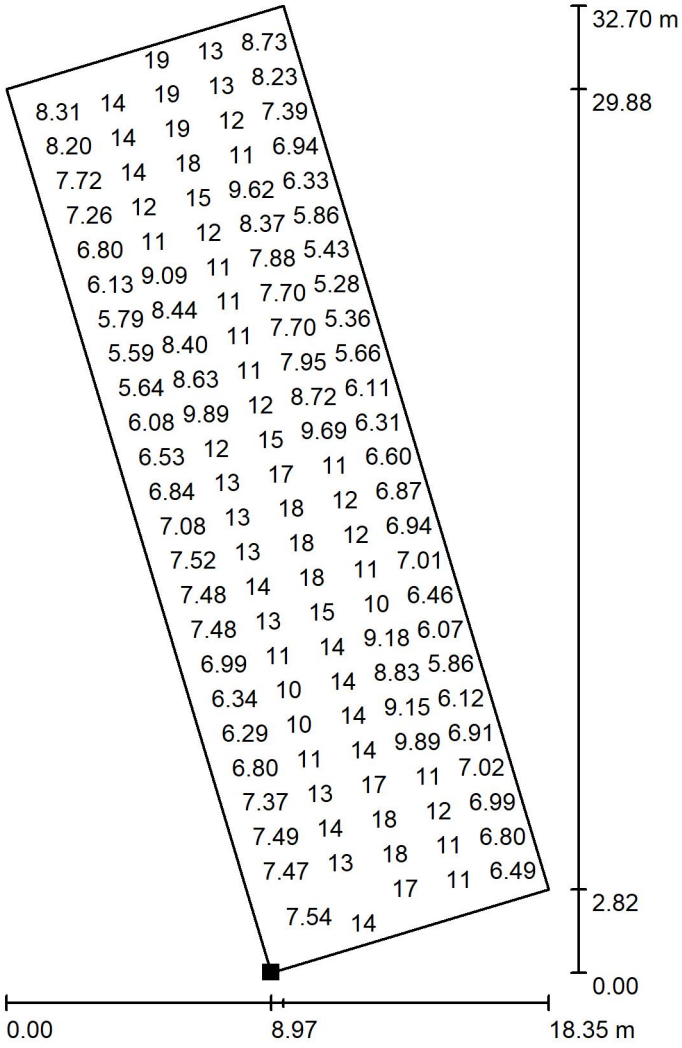
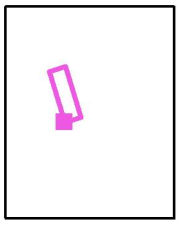
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Parking Double Row / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 256

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(446.918 m, 333.545 m, 0.000 m)



Grid: 128 x 64 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
9.94	4.83	20	0.486	0.247

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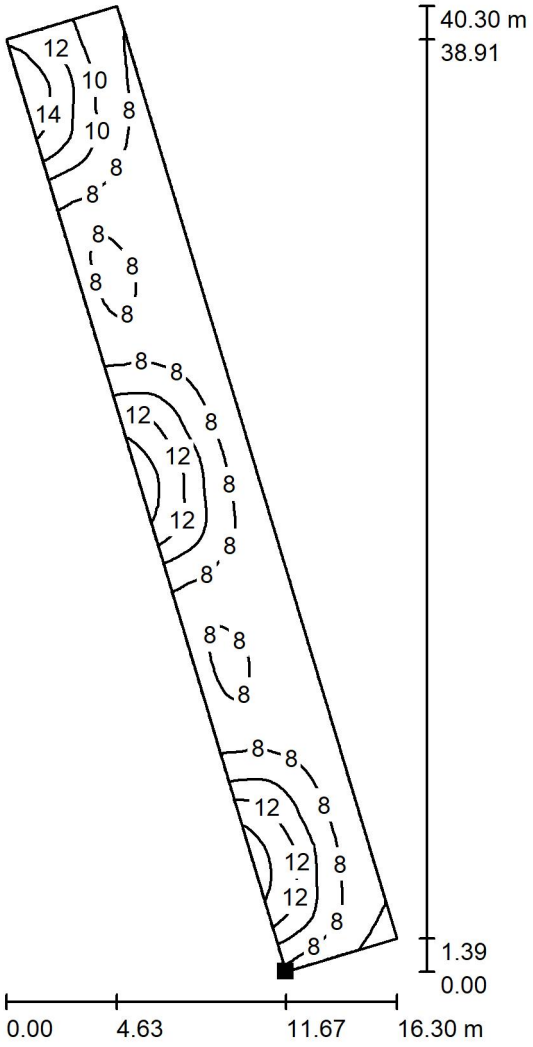
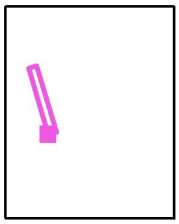
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Parking Single Row / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 316

Position of surface in external scene:
Marked point:
(437.342 m, 326.247 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
8.77	5.20	15	0.593	0.346

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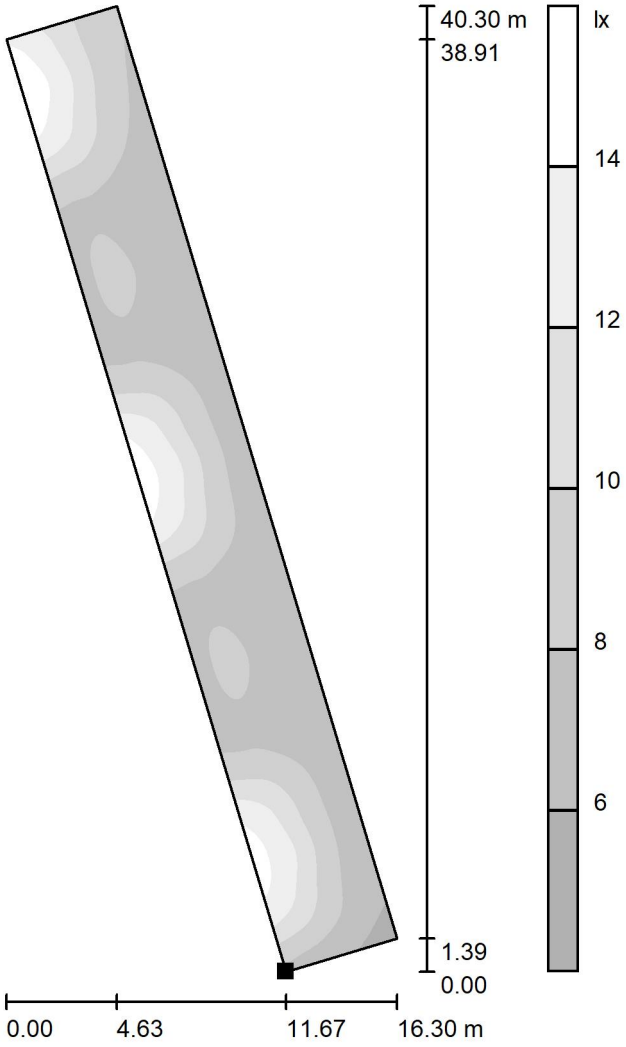
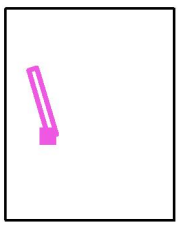
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Parking Single Row / Greyscale (E, Perpendicular)



Scale 1 : 316

Position of surface in external scene:
Marked point:
(437.342 m, 326.247 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
8.77	5.20	15	0.593	0.346

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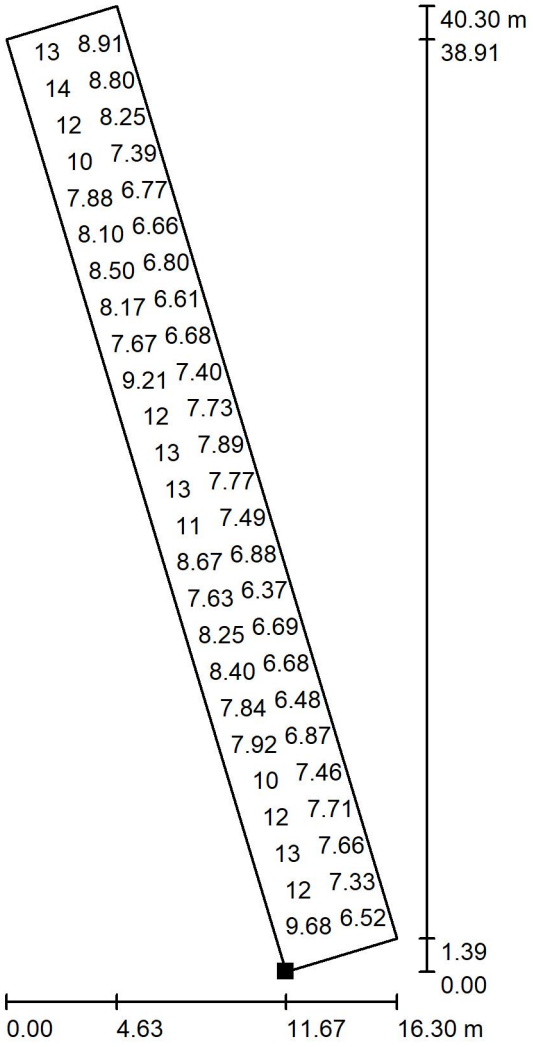
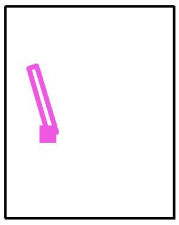
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Parking Single Row / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 316

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(437.342 m, 326.247 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
8.77	5.20	15	0.593	0.346

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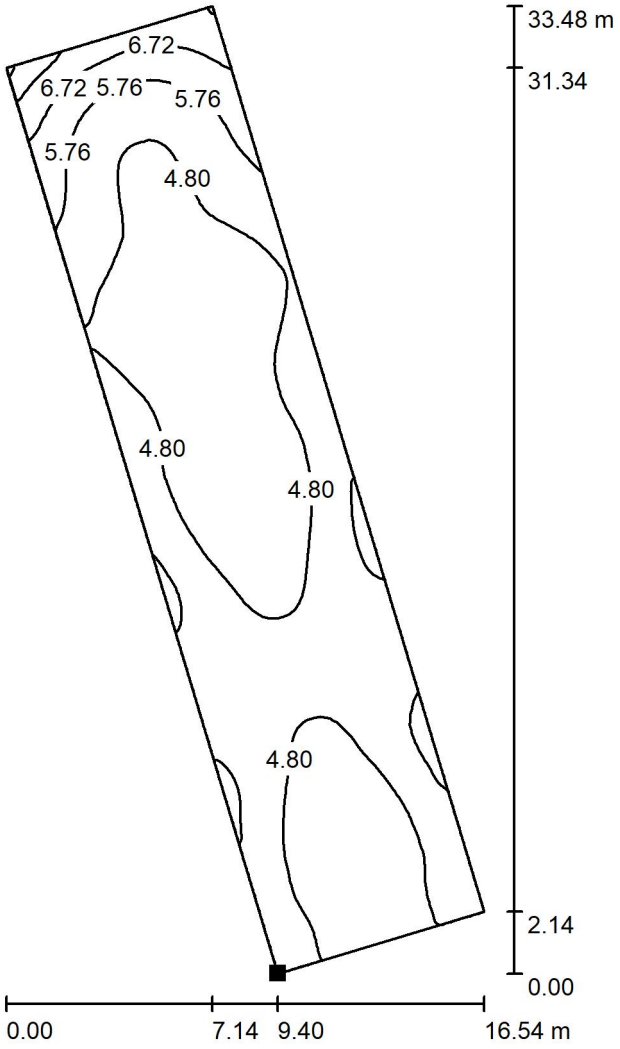
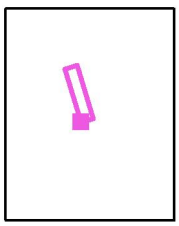
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Traffic Lane
Area 01 / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 262

Position of surface in external scene:
Marked point:
(456.614 m, 334.786 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
5.02	3.92	8.74	0.780	0.448

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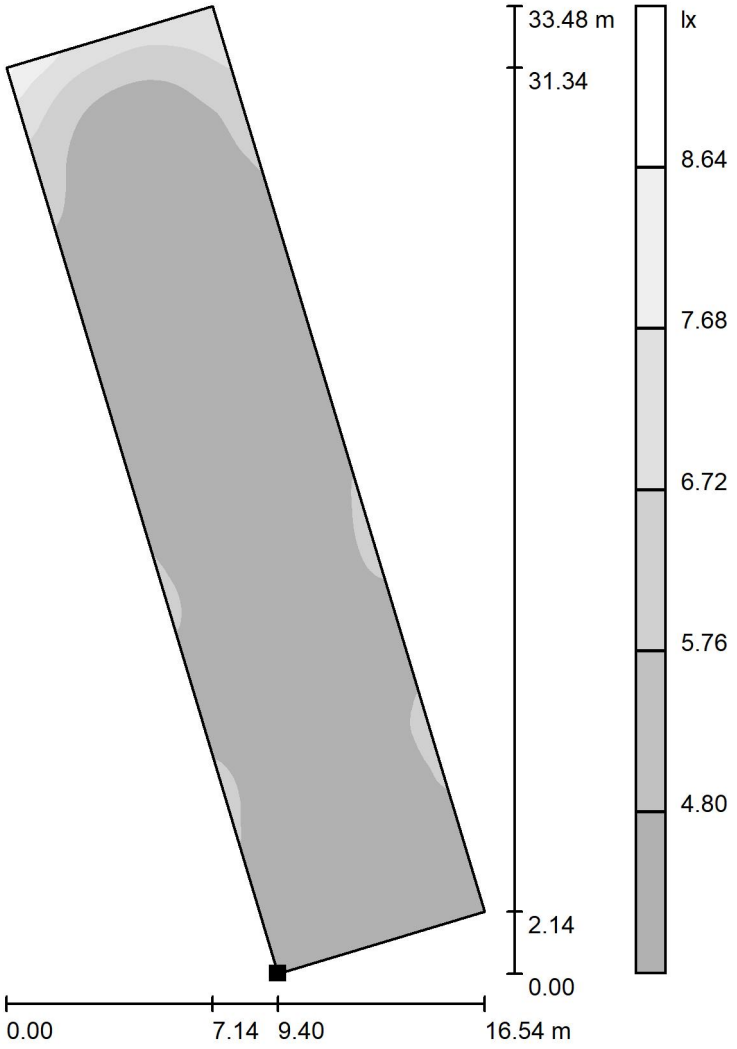
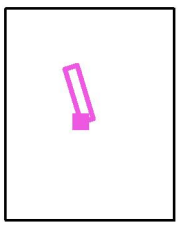
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Traffic Lane
Area 01 / Greyscale (E, Perpendicular)



Scale 1 : 262

Position of surface in external scene:
Marked point:
(456.614 m, 334.786 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
5.02	3.92	8.74	0.780	0.448

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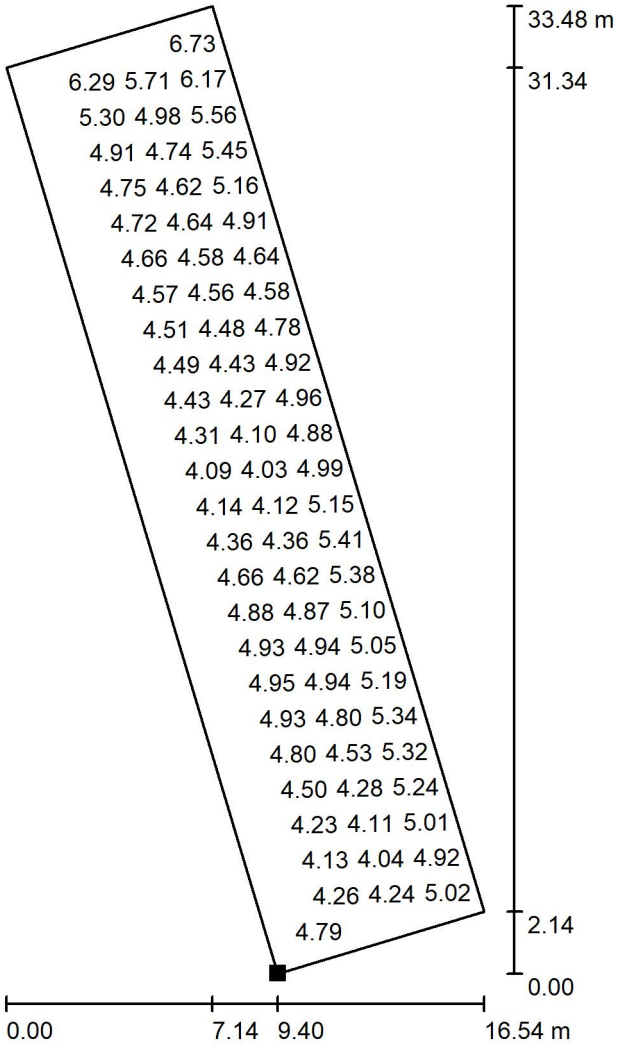
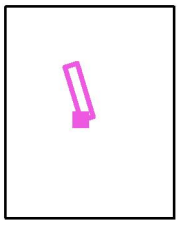
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Traffic Lane
Area 01 / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 262

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(456.614 m, 334.786 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
5.02	3.92	8.74	0.780	0.448

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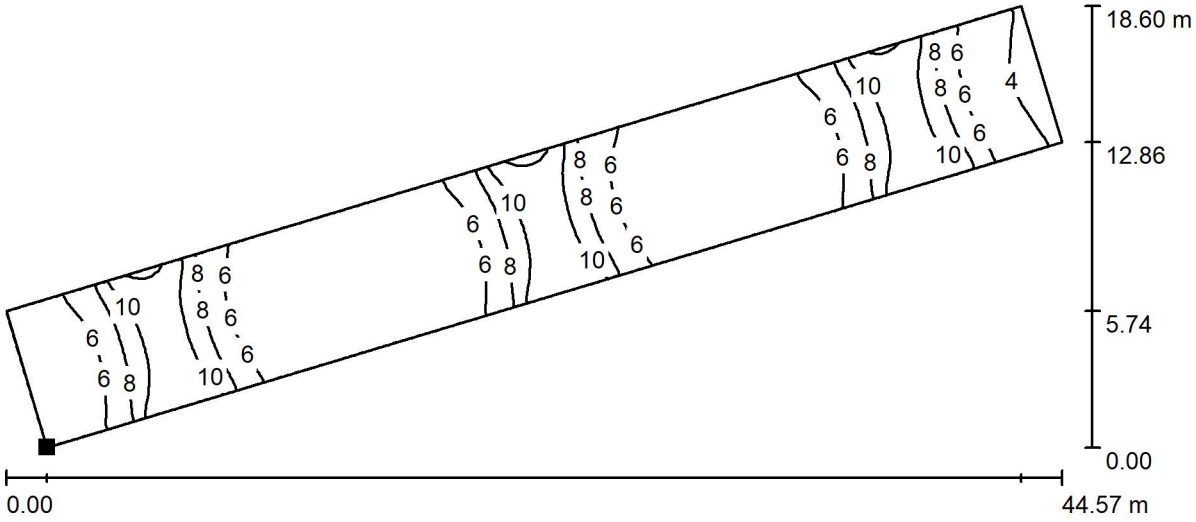
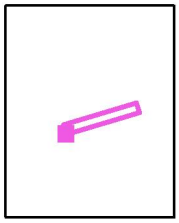
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Traffic Lane
Area 02 / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 319

Position of surface in external scene:
Marked point:
(447.964 m, 325.901 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
6.62	3.37	12	0.510	0.273

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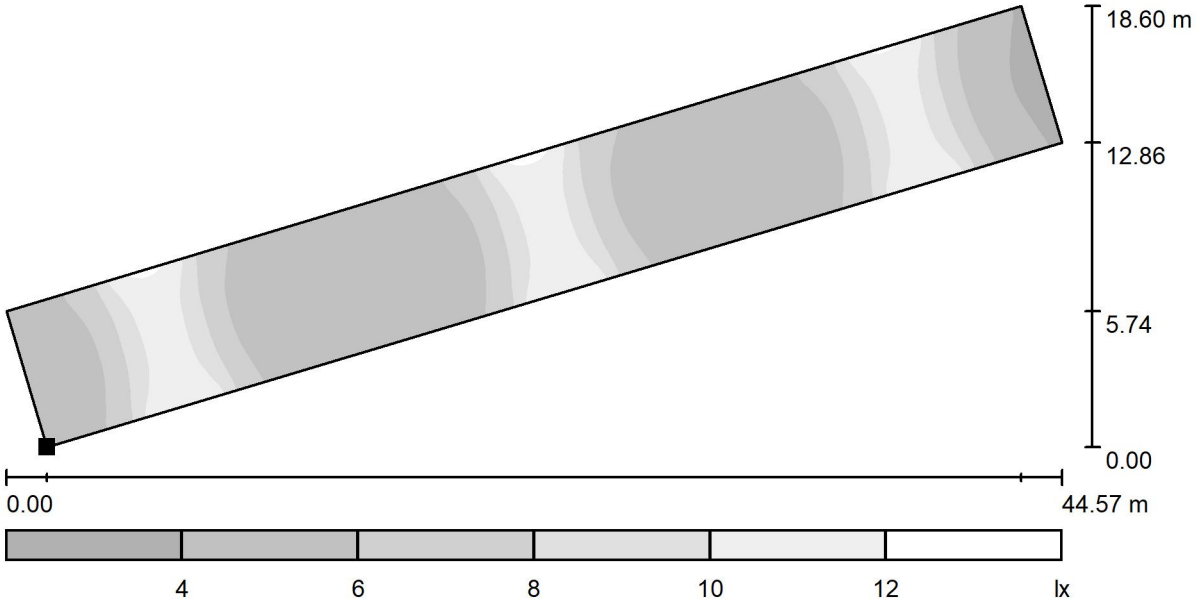
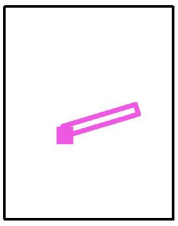
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Traffic Lane Area 02 / Greyscale (E, Perpendicular)



Scale 1 : 319

Position of surface in external scene:
Marked point:
(447.964 m, 325.901 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
6.62	3.37	12	0.510	0.273

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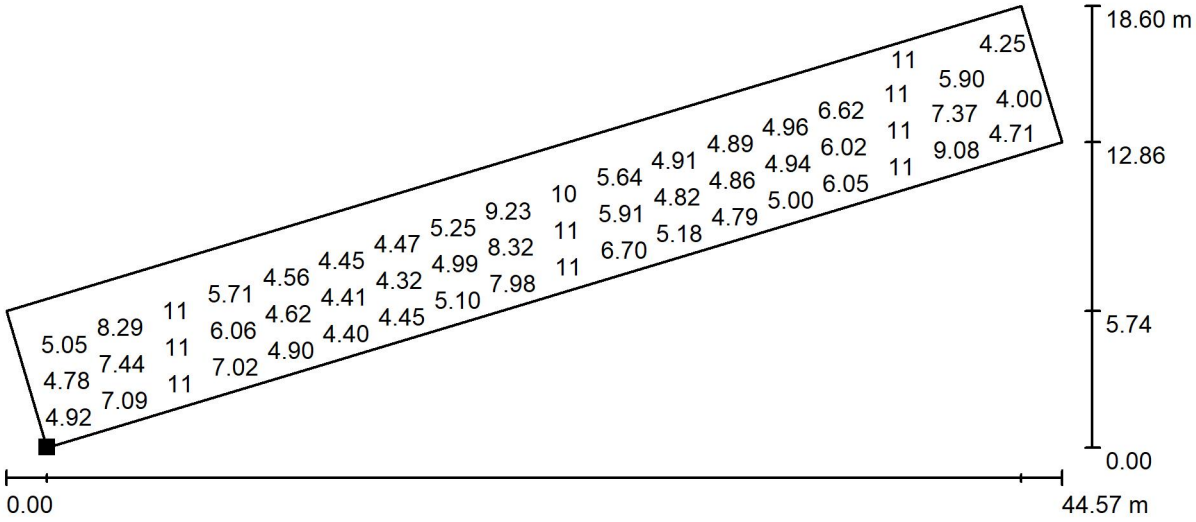
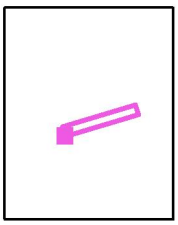
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Traffic Lane
Area 02 / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 319

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(447.964 m, 325.901 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
6.62	3.37	12	0.510	0.273

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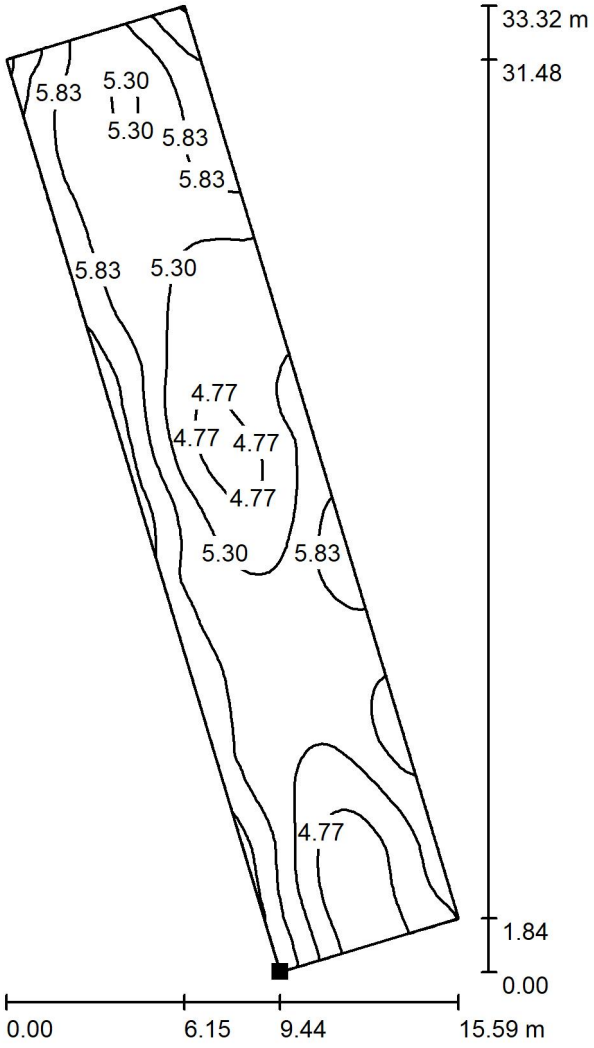
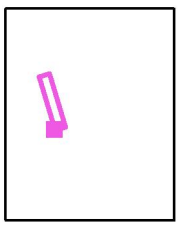
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Traffic Lane
Area 03 / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 261

Position of surface in external scene:
Marked point:
(441.206 m, 330.142 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
5.49	4.42	7.06	0.805	0.626

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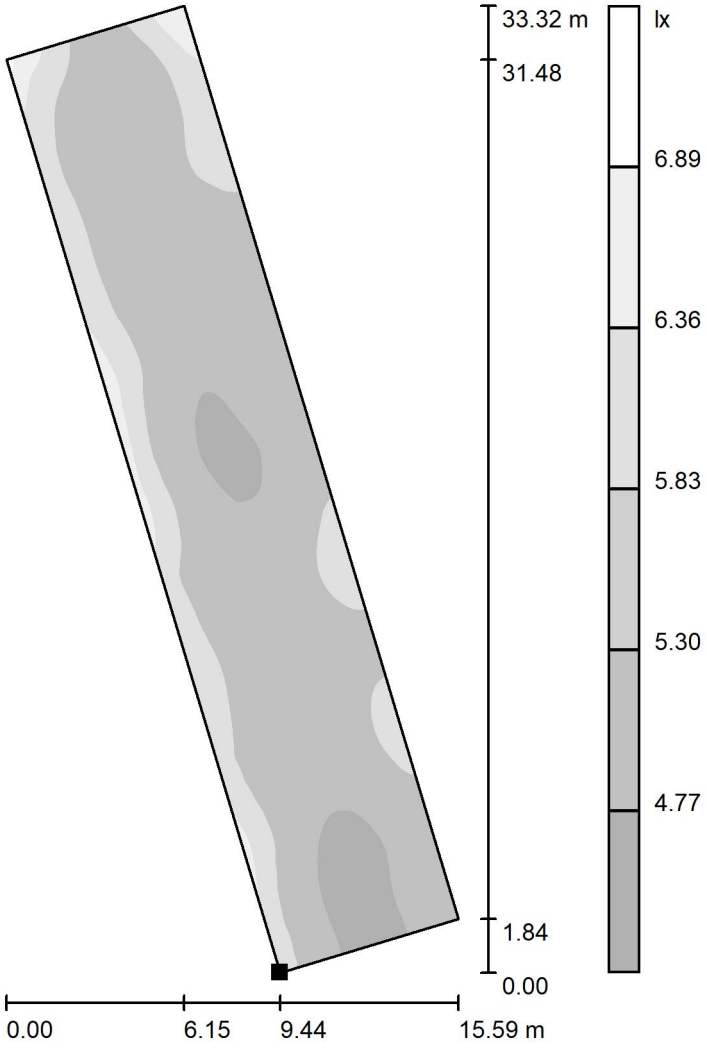
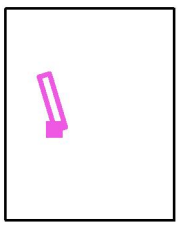
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Traffic Lane
Area 03 / Greyscale (E, Perpendicular)



Scale 1 : 261

Position of surface in external scene:
Marked point:
(441.206 m, 330.142 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
5.49	4.42	7.06	0.805	0.626

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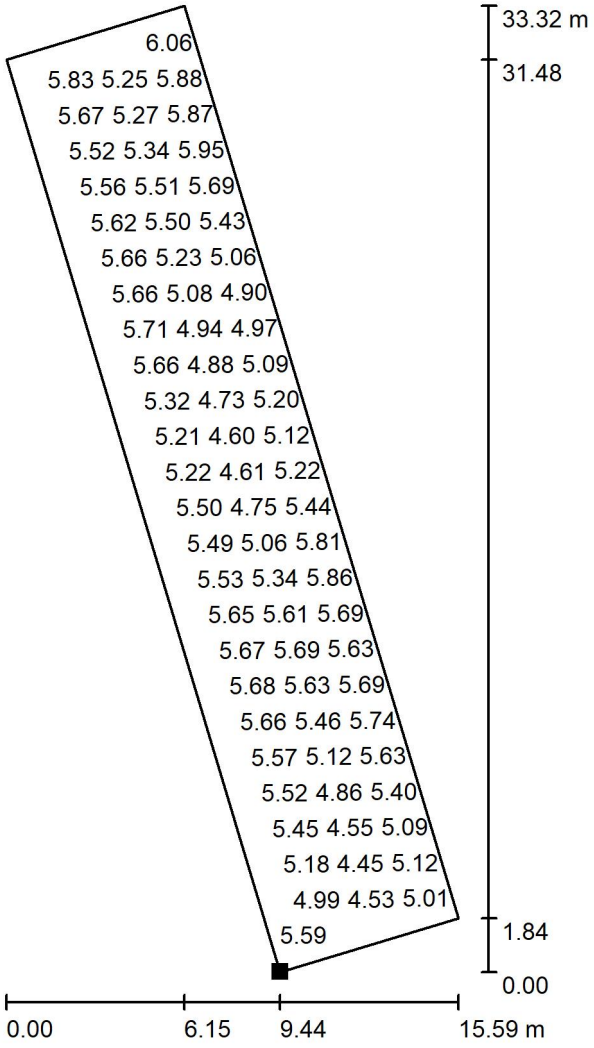
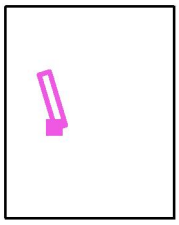
Long Stay Single Level Deck Car Park 964 Spaces / Typical Calculation - Traffic Lane
Area 03 / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 261

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(441.206 m, 330.142 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
5.49	4.42	7.06	0.805	0.626

Luton Airport Expansion

Long Stay Single Level Deck Car Park 967 Spaces - Surface Level Exterior and Interior (Under the Deck)

Date: 28.06.2019
Operator: Katerina Konsta

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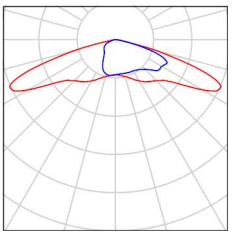
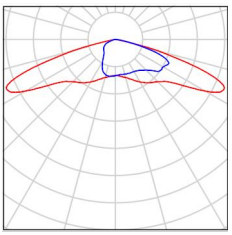
Luton Airport Expansion / Luminaire parts list

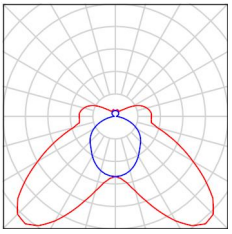
6 Pieces WE-EF 108-1493 VFL520 [R65] IP66:LED-12/12W/4K
Article No.: 108-1493
Luminous flux (Luminaire): 1450 lm
Luminous flux (Lamps): 1614 lm
Luminaire Wattage: 14.0 W
Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 90
Fitting: 12 x LED-12/12W/840 - 4000K (Correction Factor 1.000).



7 Pieces WE-EF 108-1495 VFL520 [R65] IP66:LED-12/24W/4K
Article No.: 108-1495
Luminous flux (Luminaire): 2555 lm
Luminous flux (Lamps): 2951 lm
Luminaire Wattage: 28.0 W
Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 87
Fitting: 12 x LED-12/24W/840 - 4000K (Correction Factor 1.000).



30 Pieces Zumtobel 42930419 AMP L LT 10000-840 PC WB IVG TEC [STD]
Article No.: 42930419
Luminous flux (Luminaire): 9990 lm
Luminous flux (Lamps): 9990 lm
Luminaire Wattage: 74.2 W
Luminaire classification according to CIE: 83
CIE flux code: 34 70 90 83 100
Fitting: 1 x LED-Z42186567 74C2W (Correction Factor 1.000).



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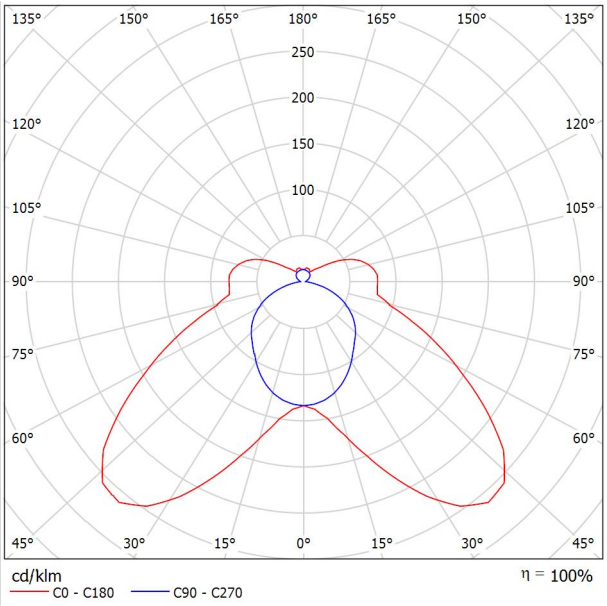
Zumtobel 42930419 AMP L LT 10000-840 PC WB IVG TEC [STD] / Luminaire Data Sheet

Luminous emittance 1:



Luminaire classification according to CIE: 83
CIE flux code: 34 70 90 83 100

LED Moisture-proof diffuser luminaire with IP66 protection rating and drip-edge effect for minimising dirt and collection of dust for maximum hygienic requirements. Total power: 74.2 W, with dimmable constant current LED driver, especially suitable for industrial applications in adverse surroundings such as cold store halls and factories with increased ambient temperatures; patented InvisiClick for clipless mounting and opening of the cover. Cover and basic diffuser made of impact-resistant polycarbonate, temperature- and UV-resistant, made as a single injection-moulded piece. LED service life lasts 50000 h before luminous flux is reduced to 90% of the initial value. Chromaticity tolerance (initial MacAdam): 3. Luminaire luminous flux: 9990 lm, Luminaire efficacy: 135 lm/W. Colour rendering Ra > 80, colour temperature 4000 K. Luminaire with symmetric wide light distribution (wide beam). High quality direct/indirect lighting concept for optimum lighting solutions in parking garages and industrial applications.. Luminaire with TECTON adapter for simple and straightforward installation of luminaire on the TECTON continuous-row lighting system. ambient temperature: -40°C to +25°C. Approved for indoor use with vertical or horizontal wall mounting (see installation instructions). Note: please contact your consultant if you are planning to use the luminaire in environments with chemical pollutants, high or condensing humidity and major variations in temperature. Complies with International Food Standard specifications. Designed for BESA box. Permissible for use in environments where the deposition of conductive dust on the luminaire can be expected (EN 60598-2-24). Class of protection: , 850°C glow-wire tested. Luminaire wired with halogen-free leads and contains no silicone, Dimensions: 1611 x 152 x 92 mm; weight: 3.4 kg.

Luminous emittance 1:

Glare Evaluation According to UGR

ρ Ceiling		70	70	50	50	30	70	70	50	50	30
ρ Walls		50	30	50	30	30	50	30	50	30	30
ρ Floor		20	20	20	20	20	20	20	20	20	20
Room Size X	Y	Viewing direction at right angles to lamp axis					Viewing direction parallel to lamp axis				
2H	2H	21.4	22.6	21.9	23.2	23.8	17.1	18.3	17.6	18.9	19.5
	3H	22.6	23.8	23.2	24.3	24.9	18.4	19.5	18.9	20.1	20.7
	4H	23.1	24.1	23.6	24.7	25.3	18.8	19.9	19.4	20.4	21.1
	6H	23.5	24.4	24.0	25.0	25.7	19.0	20.0	19.6	20.6	21.3
	8H	23.7	24.6	24.3	25.2	25.9	19.1	20.0	19.7	20.6	21.3
	12H	23.9	24.8	24.5	25.4	26.1	19.1	20.0	19.7	20.6	21.3
4H	2H	21.8	22.9	22.4	23.4	24.1	18.9	19.9	19.4	20.5	21.1
	3H	23.2	24.1	23.8	24.7	25.4	20.4	21.3	21.0	21.9	22.6
	4H	23.8	24.6	24.4	25.2	25.9	20.9	21.7	21.5	22.3	23.0
	6H	24.3	25.0	25.0	25.7	26.4	21.1	21.8	21.8	22.5	23.2
	8H	24.6	25.3	25.3	25.9	26.7	21.2	21.8	21.8	22.5	23.3
	12H	24.9	25.5	25.6	26.2	27.0	21.2	21.8	21.9	22.5	23.3
8H	4H	23.9	24.6	24.6	25.2	26.0	21.4	22.0	22.0	22.7	23.4
	6H	24.6	25.1	25.3	25.8	26.6	21.8	22.3	22.5	23.0	23.8
	8H	25.0	25.5	25.7	26.2	27.0	21.9	22.4	22.6	23.1	23.9
	12H	25.5	25.9	26.2	26.6	27.5	22.0	22.4	22.7	23.1	24.0
12H	4H	23.9	24.5	24.6	25.2	25.9	21.4	22.0	22.1	22.7	23.5
	6H	24.6	25.1	25.3	25.8	26.6	21.9	22.4	22.6	23.1	23.9
	8H	25.1	25.5	25.8	26.2	27.0	22.1	22.5	22.8	23.3	24.1

Variation of the observer position for the luminaire distances S

S = 1.0H	+0.1 / -0.1	+0.1 / -0.1
S = 1.5H	+0.4 / -0.4	+0.5 / -0.5
S = 2.0H	+0.6 / -0.9	+1.2 / -1.2
Standard table	BK05	BK05
Correction Summand	0.3	-2.9

Corrected Glare Indices referring to 9990lm Total Luminous Flux

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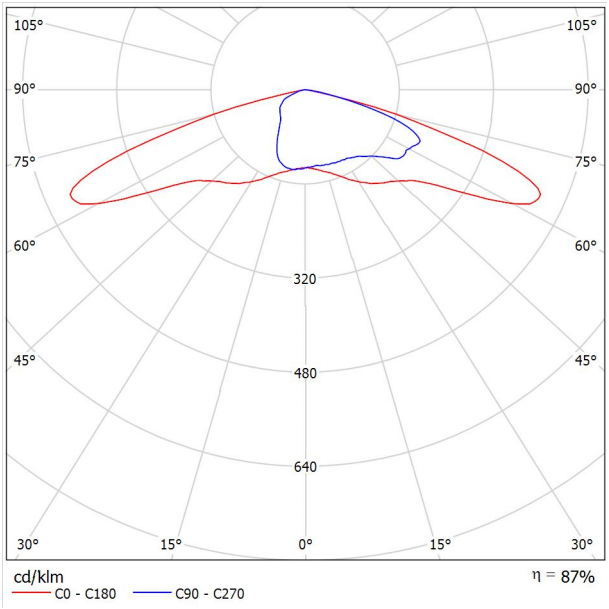
WE-EF 108-1495 VFL520 [R65] IP66:LED-12/24W/4K / Luminaire Data Sheet

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 87

IP66, Class I or Class II. IK08. Marine-grade die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. UV stabilised acrylic panel in RFC® technology. Integrated heat sinks. Easy removal and replacement of LED board. CAD optimised OLC® PMMA lens for superior illumination and glare control. The luminaire is factory- sealed and does not need to be opened during the installation.
Spigot D: 76 x 80 mm (optional 60 x 80 mm).
Recommended mounting height 2.5-8.0 m, depending on lamp type selected.

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

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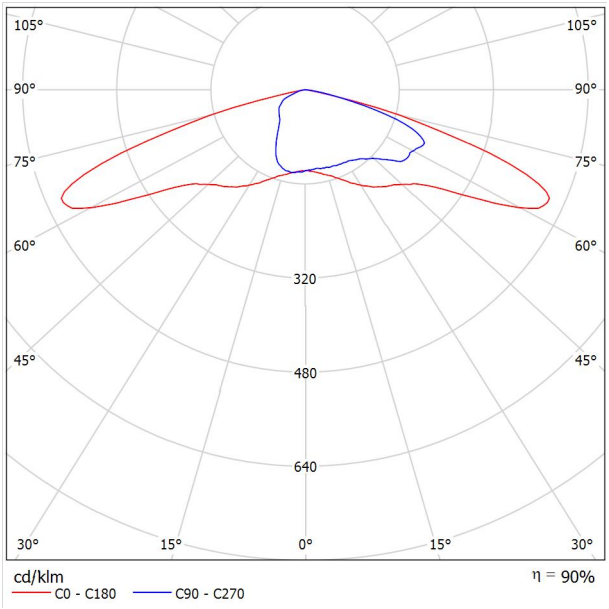
WE-EF 108-1493 VFL520 [R65] IP66:LED-12/12W/4K / Luminaire Data Sheet

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 27 59 93 100 90

IP66, Class I or Class II. IK08. Marine-grade die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. UV stabilised acrylic panel in RFC® technology. Integrated heat sinks. Easy removal and replacement of LED board. CAD optimised OLC® PMMA lens for superior illumination and glare control. The luminaire is factory- sealed and does not need to be opened during the installation.
Spigot D: 76 x 80 mm (optional 60 x 80 mm).
Recommended mounting height 2.5-8.0 m, depending on lamp type selected.

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

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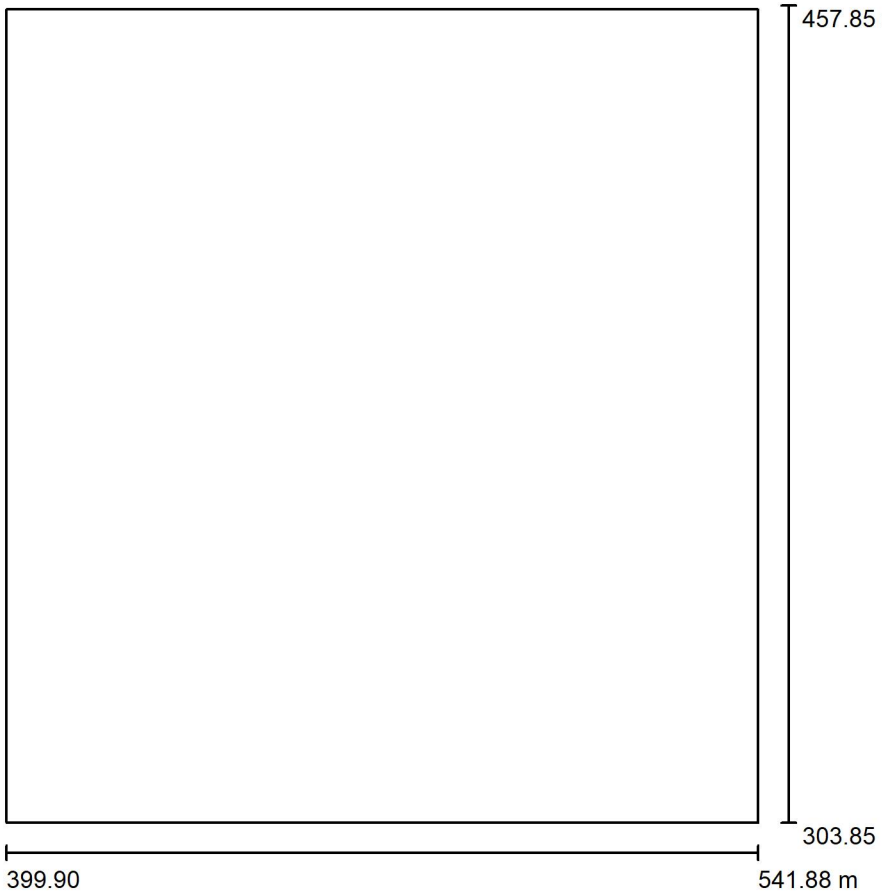
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Planning data



Maintenance factor: 0.57, ULR (Upward Light Ratio): 15.5%

Scale 1:1428

Exterior Parking Areas
Average Illuminance: 5lux
Uniformity: 0.25

Interior Parking Areas
Average Illuminance:75lux
Uniformity: 0.4

(...)

Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	6	WE-EF 108-1493 VFL520 [R65] IP66:LED-12/12W/4K (1.000)	1450	1614	14.0
2	7	WE-EF 108-1495 VFL520 [R65] IP66:LED-12/24W/4K (1.000)	2555	2951	28.0
3	30	Zumtobel 42930419 AMP L LT 10000-840 PC WB IVG TEC [STD] (1.000)	9990	9990	74.2
			Total: 326285	Total: 330041	2506.0

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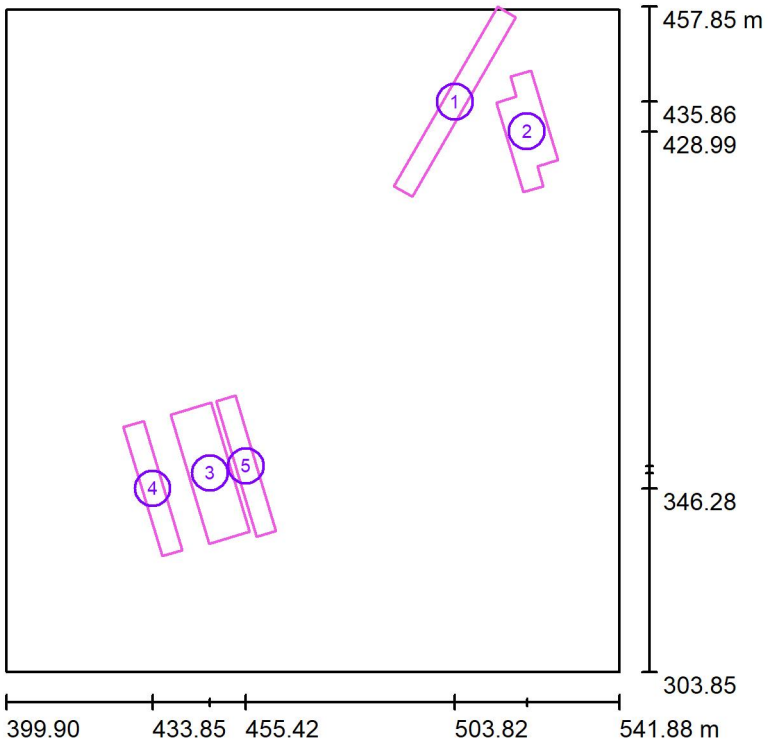
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Calculation surfaces (results overview)



Scale 1 : 1753

Calculation Surface List

No.	Designation	Type	Grid	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
1	Typical Calculation - Parking Single Row	perpendicular	128 x 32	6.55	2.12	9.50	0.324	0.224
2	Typical Calculation - Parking Double Row	perpendicular	32 x 16	6.64	2.48	10	0.373	0.247
3	Typical Calculation - Parking Double Row Interior/Under the Deck	perpendicular	128 x 64	75	31	143	0.415	0.218
4	Typical Calculation - Parking Single Row Interior/Under the Deck	perpendicular	128 x 32	85	41	130	0.486	0.318
5	Typical Calculation - Traffic Lane Interior/Under the Deck	perpendicular	128 x 32	85	47	132	0.558	0.360

Summary of Results

Type	Quantity	Average [lx]	Min [lx]	Max [lx]	u0	E_{min} / E_{max}
perpendicular	5	49	2.12	143	0.04	0.01

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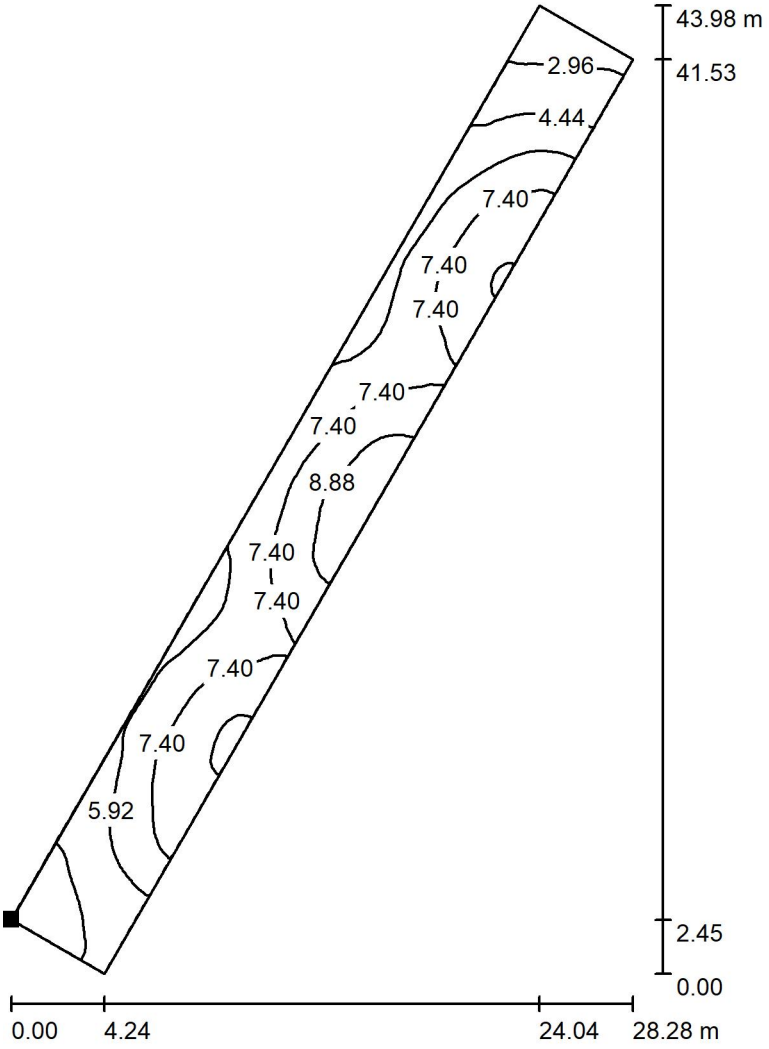
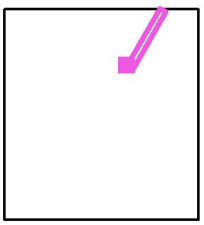
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Single Row / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 344

Position of surface in external scene:
Marked point:
(489.675 m, 416.319 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
6.55	2.12	9.50	0.324	0.224

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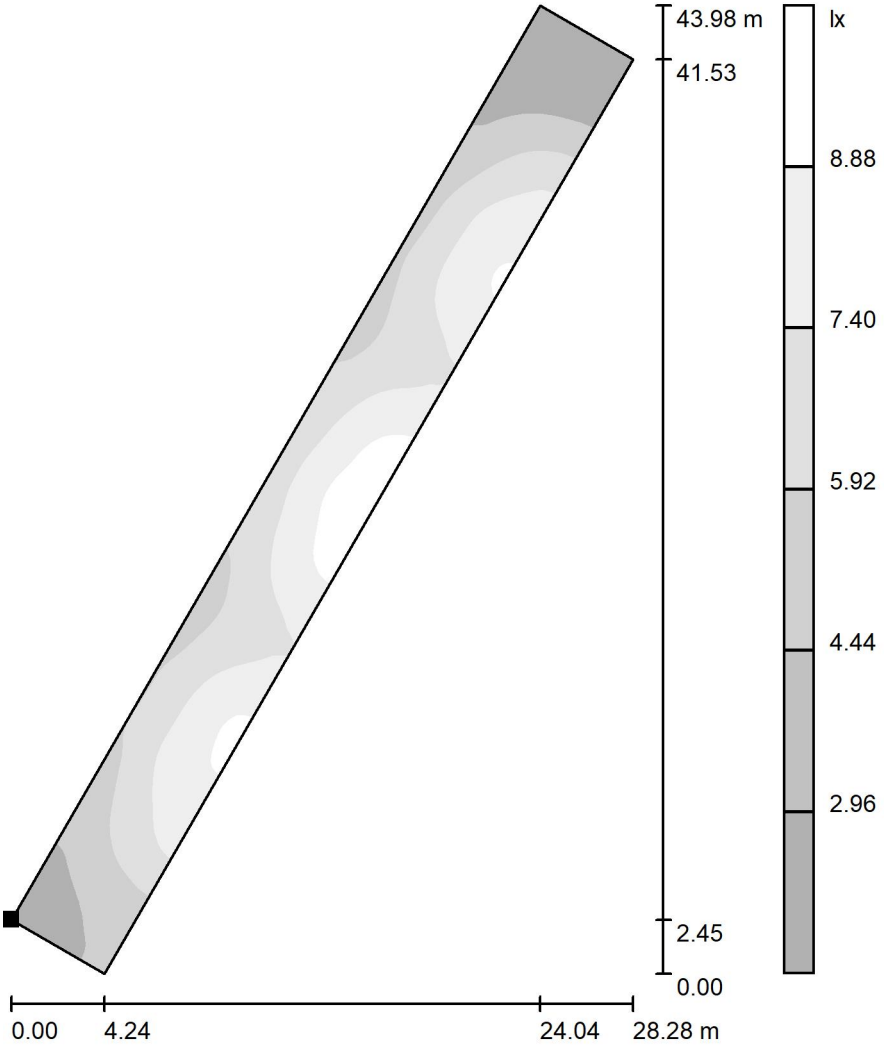
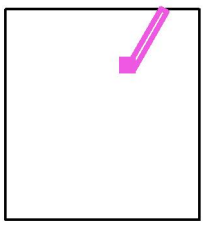
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Single Row / Greyscale (E, Perpendicular)



Scale 1 : 344

Position of surface in external scene:
Marked point:
(489.675 m, 416.319 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
6.55	2.12	9.50	0.324	0.224

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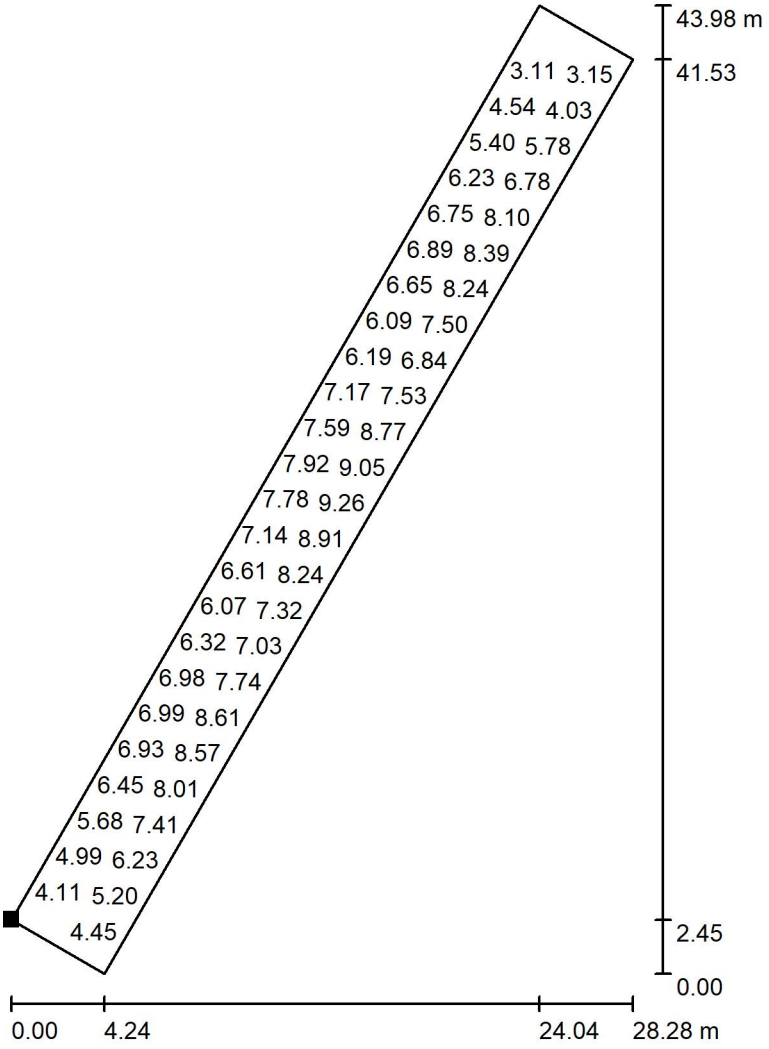
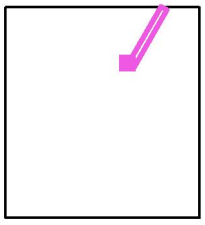
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Single Row / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 344

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(489.675 m, 416.319 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
6.55	2.12	9.50	0.324	0.224

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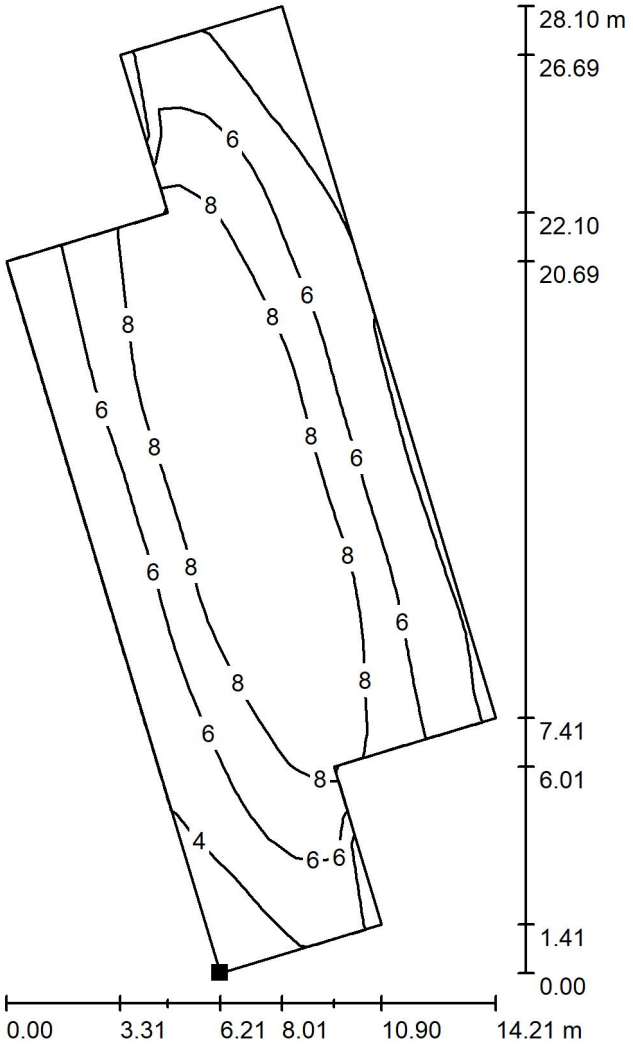
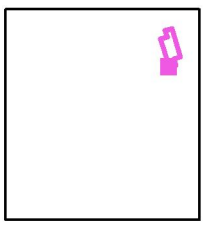
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Double Row / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 220

Position of surface in external scene:
Marked point:
(519.624 m, 414.941 m, 0.000 m)



Grid: 32 x 16 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
6.64	2.48	10	0.373	0.247

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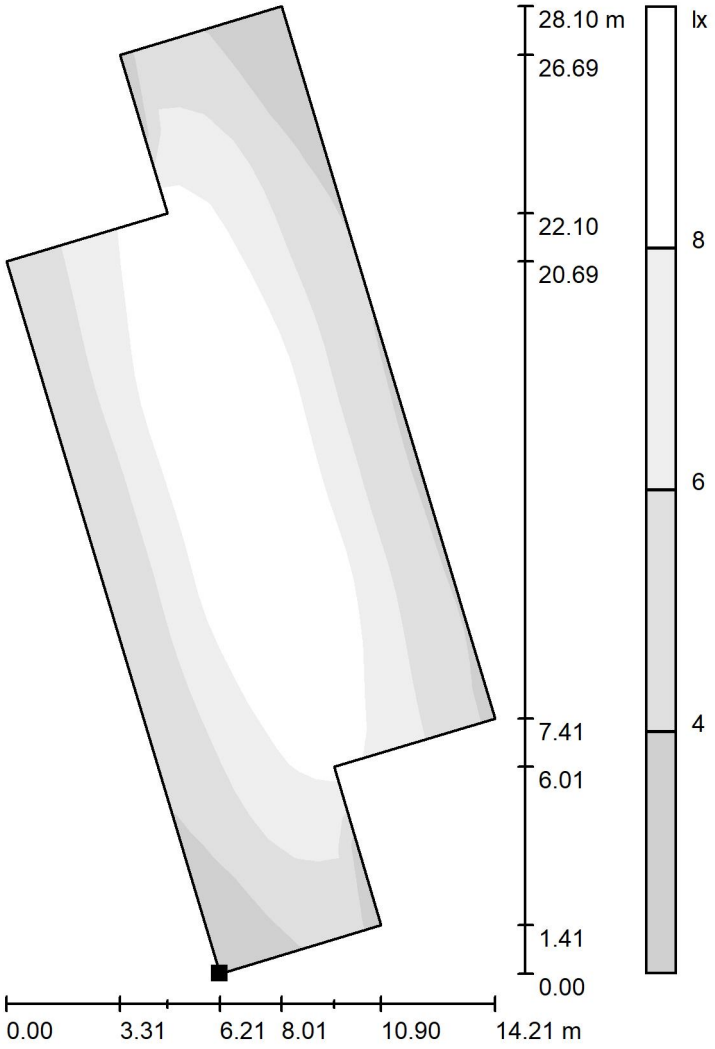
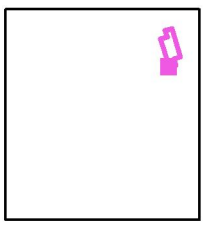
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Double Row / Greyscale (E, Perpendicular)



Scale 1 : 220

Position of surface in external scene:
Marked point:
(519.624 m, 414.941 m, 0.000 m)



Grid: 32 x 16 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
6.64	2.48	10	0.373	0.247

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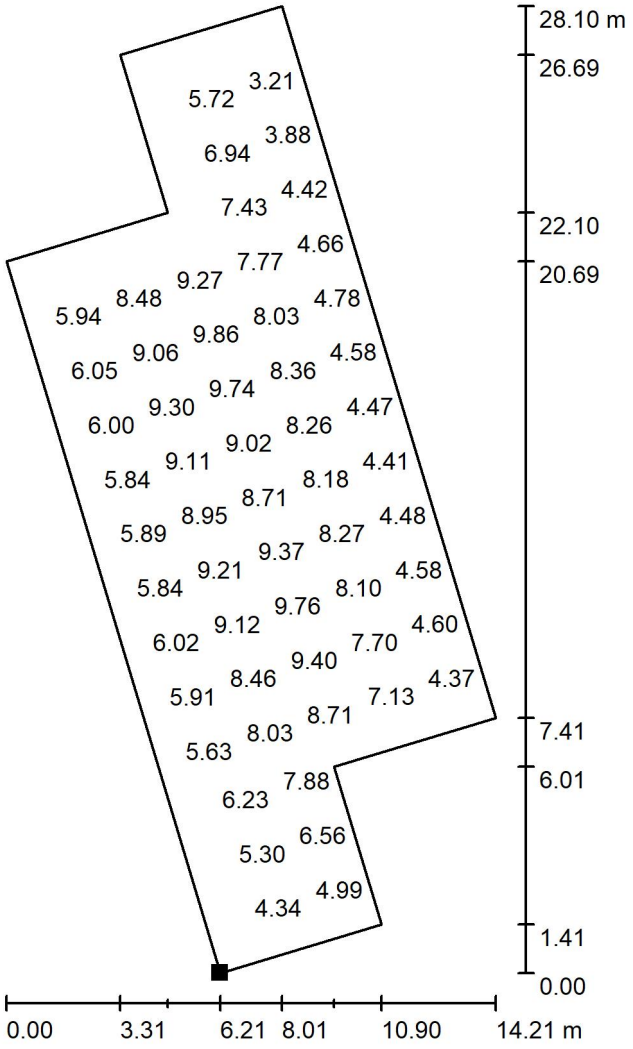
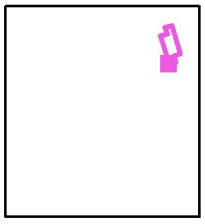
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Double Row / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 220

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(519.624 m, 414.941 m, 0.000 m)



Grid: 32 x 16 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
6.64	2.48	10	0.373	0.247

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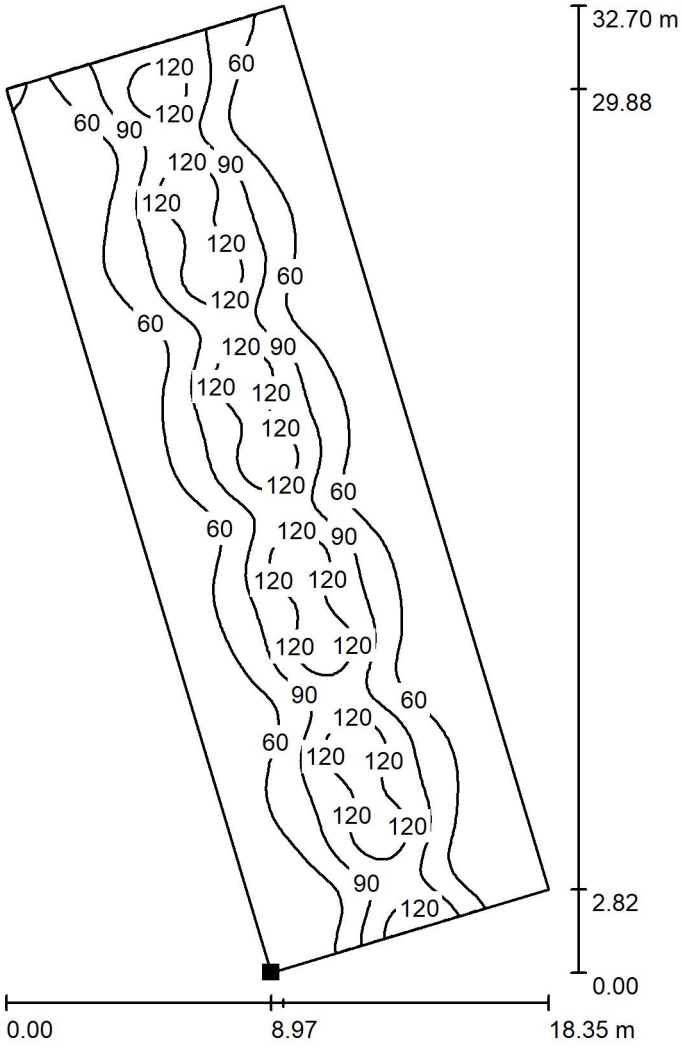
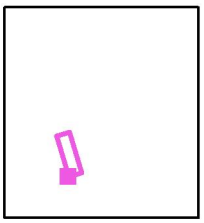
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Double Row Interior/Under the Deck / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 256

Position of surface in external scene:
Marked point:
(446.918 m, 333.545 m, 0.000 m)



Grid: 128 x 64 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
75	31	143	0.415	0.218

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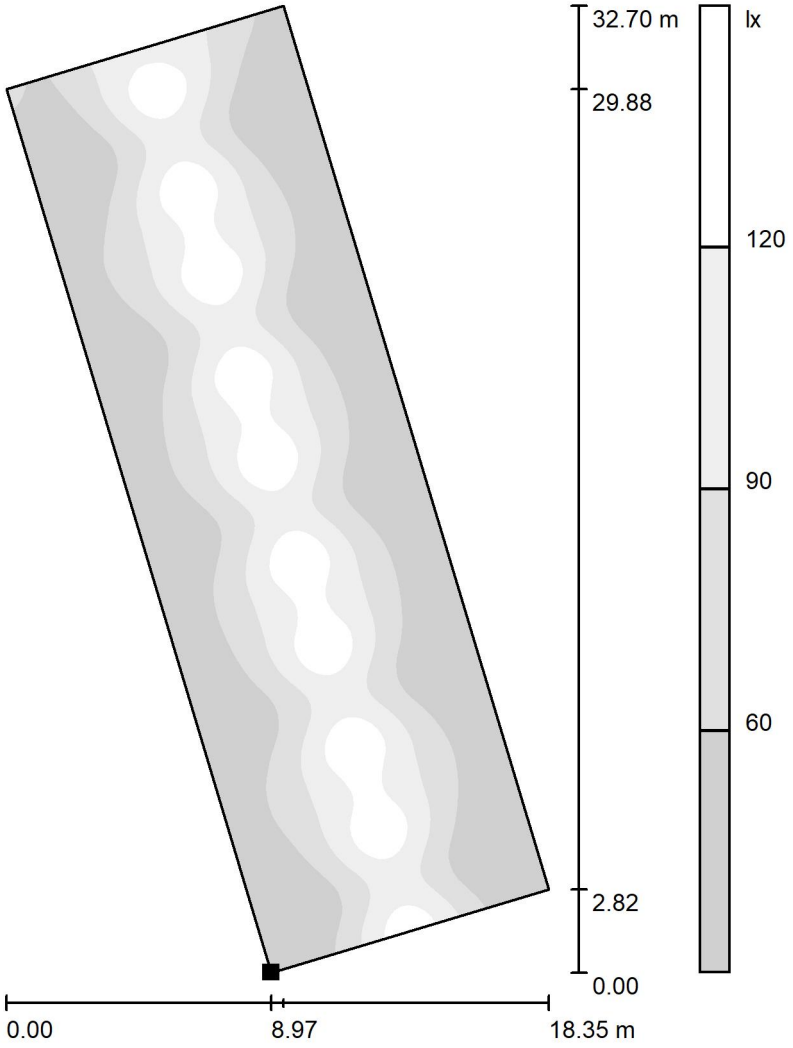
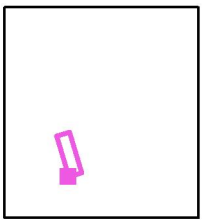
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Double Row Interior/Under the Deck / Greyscale (E, Perpendicular)



Scale 1 : 256

Position of surface in external scene:
Marked point:
(446.918 m, 333.545 m, 0.000 m)



Grid: 128 x 64 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
75	31	143	0.415	0.218

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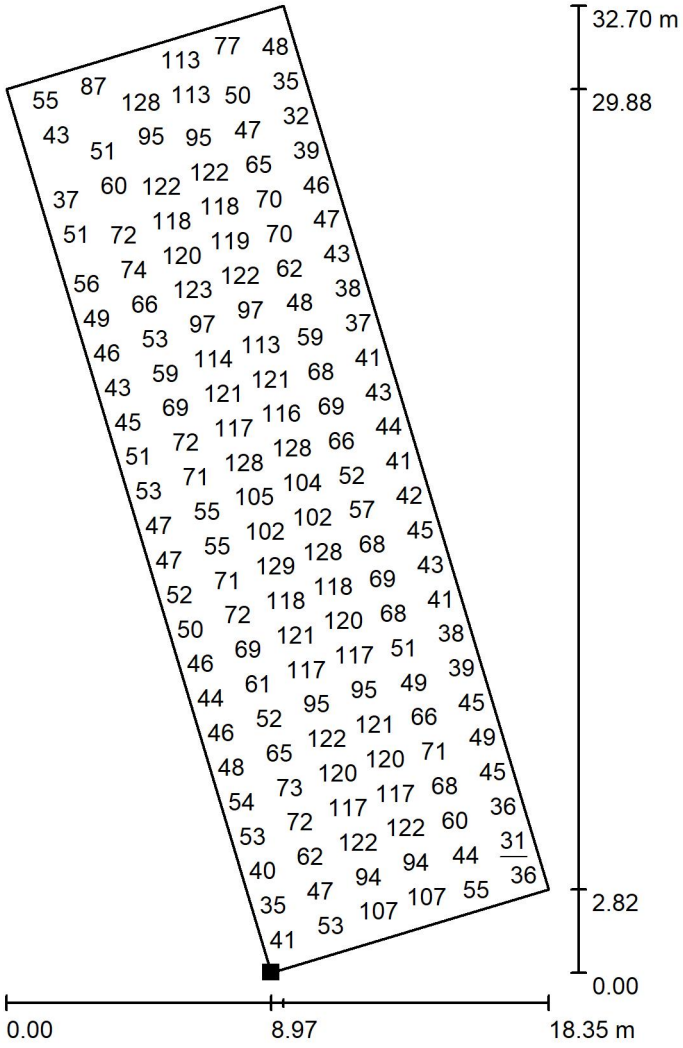
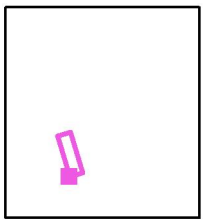
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Double Row Interior/Under the Deck / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 256

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(446.918 m, 333.545 m, 0.000 m)



Grid: 128 x 64 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
75	31	143	0.415	0.218

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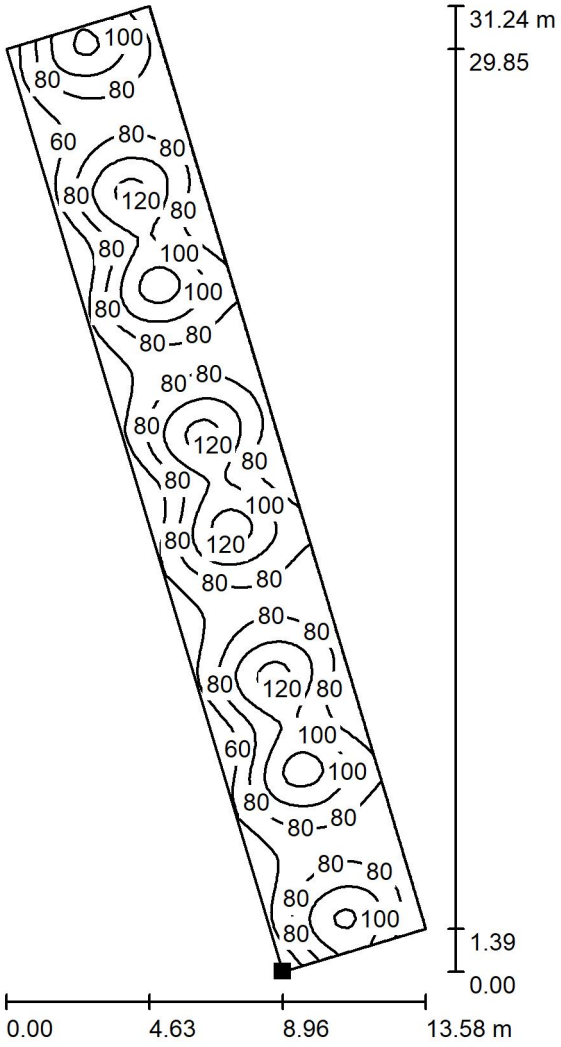
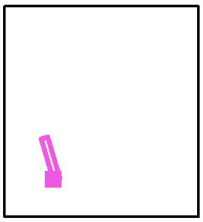
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Single Row Interior/Under the Deck / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 245

Position of surface in external scene:
Marked point:
(436.016 m, 330.665 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
85	41	130	0.486	0.318

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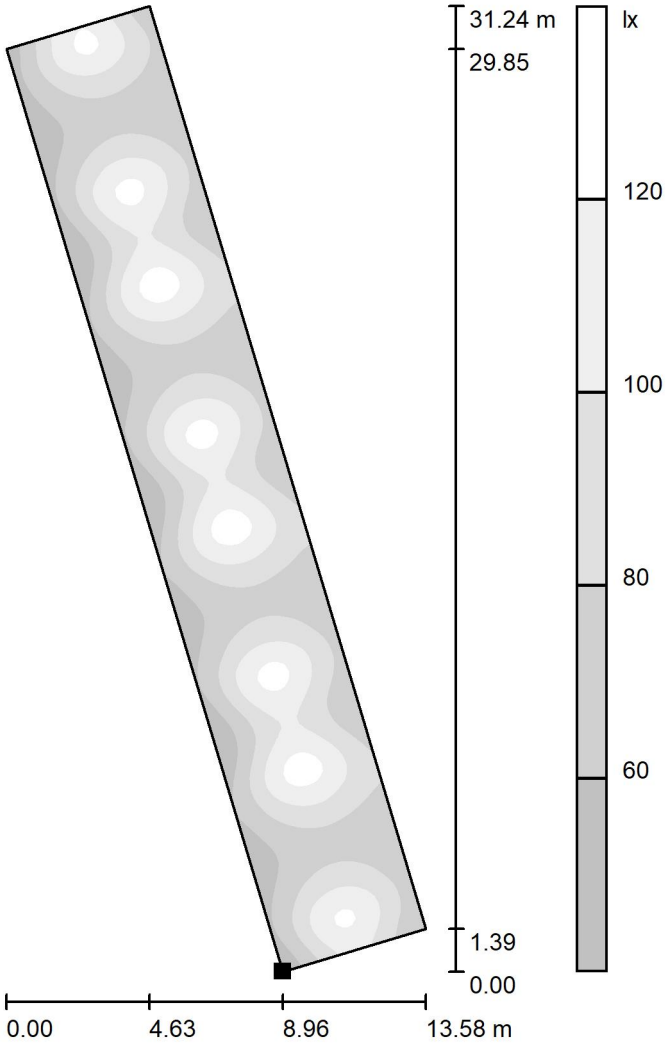
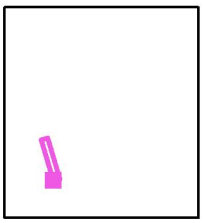
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Single Row Interior/Under the Deck / Greyscale (E, Perpendicular)



Scale 1 : 245

Position of surface in external scene:
Marked point:
(436.016 m, 330.665 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
85	41	130	0.486	0.318

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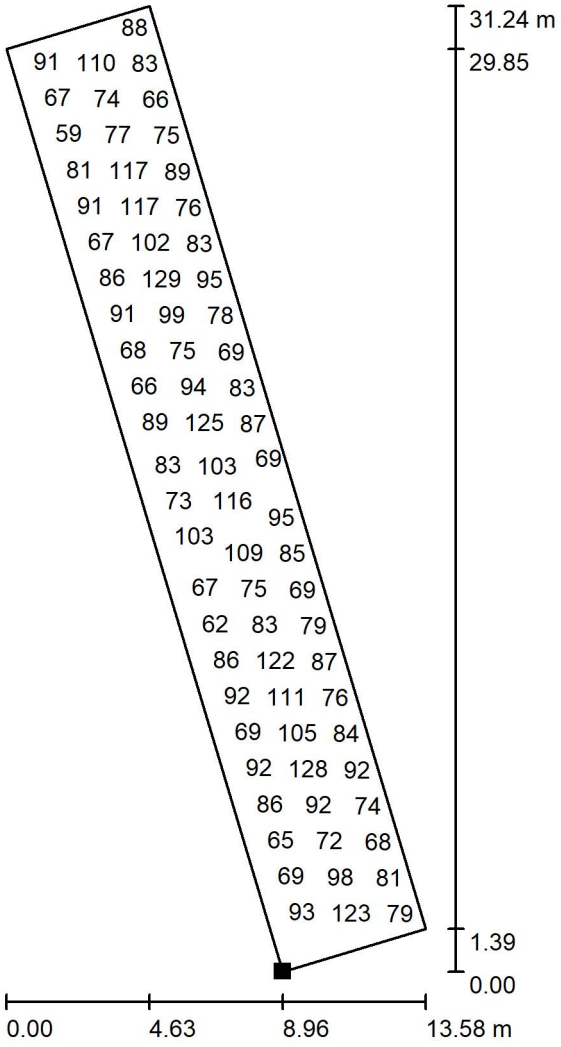
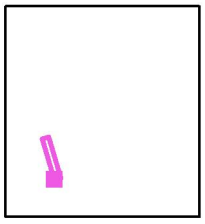
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Parking Single Row Interior/Under the Deck / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 245

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(436.016 m, 330.665 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
85	41	130	0.486	0.318

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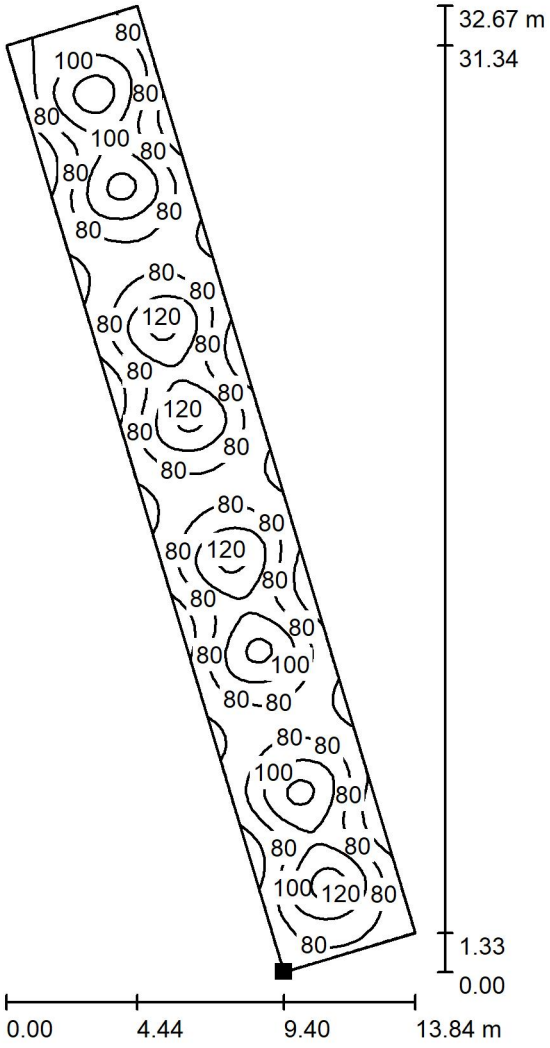
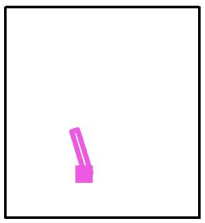
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Traffic Lane Interior/Under the Deck / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 256

Position of surface in external scene:
Marked point:
(457.905 m, 335.174 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
85	47	132	0.558	0.360

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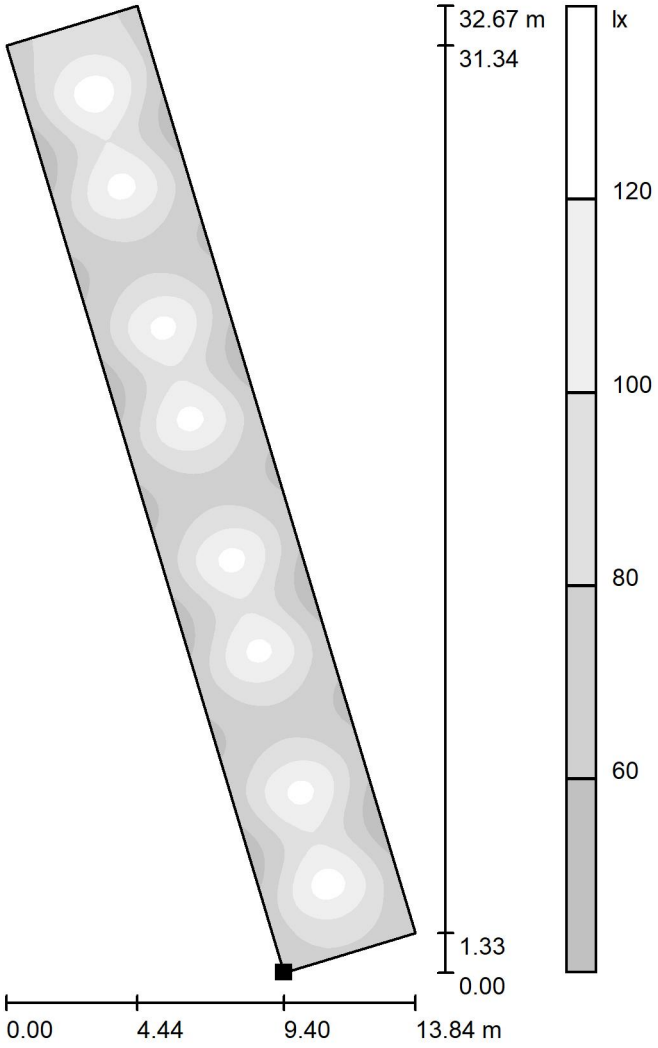
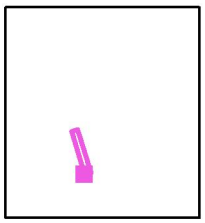
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Traffic Lane Interior/Under the Deck / Greyscale (E, Perpendicular)



Scale 1 : 256

Position of surface in external scene:
Marked point:
(457.905 m, 335.174 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
85	47	132	0.558	0.360

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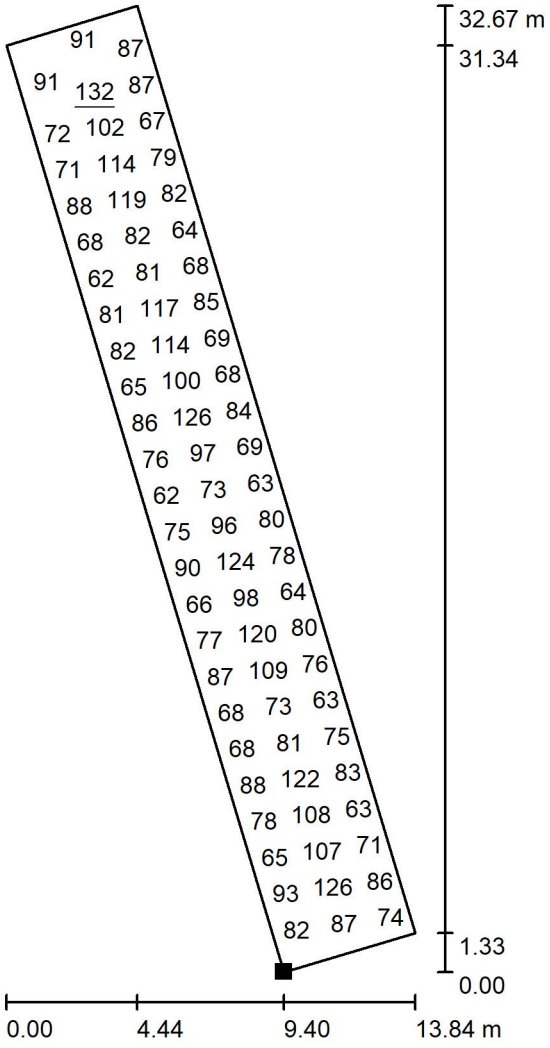
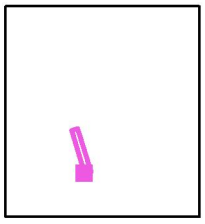
Long Stay Single Level Deck Car Park 967 Spaces - Surface Level / Typical Calculation - Traffic Lane Interior/Under the Deck / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 256

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(457.905 m, 335.174 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
85	47	132	0.558	0.360

Luton Airport Expansion

Pedestrian Crossings

Date: 28.06.2019
Operator: Katerina Konsta

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Table of contents

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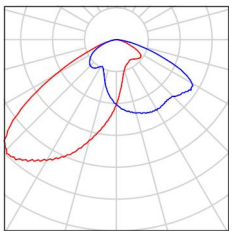
Luton Airport Expansion / Luminaire parts list

2 Pieces WE-EF 108-1984 VFL540 [P45L] IP66:LED-36/72W/4K
Article No.: 108-1984
Luminous flux (Luminaire): 7741 lm
Luminous flux (Lamps): 8854 lm
Luminaire Wattage: 81.0 W
Luminaire classification according to CIE: 100
CIE flux code: 38 79 97 100 88
Fitting: 36 x LED-36/72W/840 - 4000K
(Correction Factor 1.000).



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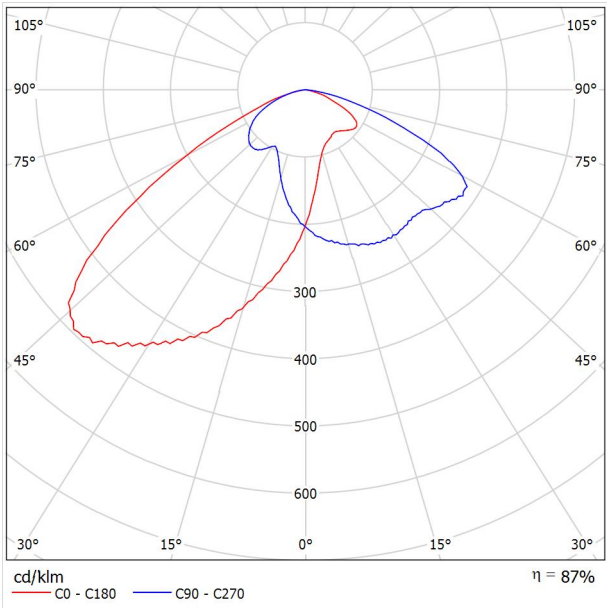
WE-EF 108-1984 VFL540 [P45L] IP66:LED-36/72W/4K / Luminaire Data Sheet

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 38 79 97 100 88

IP66, Class I or Class II. IK08. Marine-grade die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. UV stabilised acrylic panel in RFC® technology. Integrated heat sinks. Easy removal and replacement of LED board. CAD optimised OLC® PMMA lens for superior illumination and glare control. The luminaire is factory- sealed and does not need to be opened during the installation.
Spigot D = 60 x 80 mm or D = 76 x 80 mm (to be specified at order placement).
Recommended mounting height 2.5-8.0 m, depending on lamp type selected.

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

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Pedestrian Crossings / Planning data

Maintenance factor: 0.80, ULR (Upward Light Ratio): 0.0%

Scale 1:121

Average horizontal illuminance on pedestrian crossing at ground level: E ≥ 52.5 lux
Uniformity of horizontal illuminance (Uo): 0.60
Rear grid: 22.5 lux
Kerb grid: 30 lux
Middle grid: 30 lux

Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	2	WE-EF 108-1984 VFL540 [P45L] IP66:LED-36/72W/4K (1.000)	7741	8854	81.0
			Total: 15482	Total: 17708	162.0

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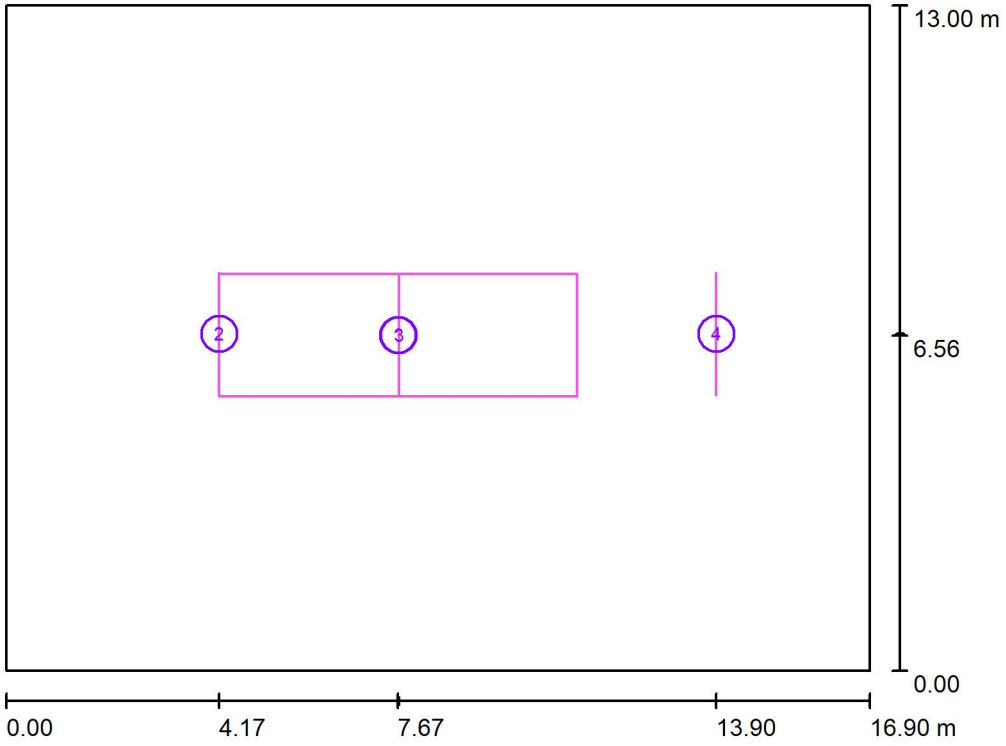
Pedestrian Crossings / Calculation surfaces (results overview)



Scale 1 : 148

Calculation Surface List

No.	Designation	Type	Grid	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
1	Horizontal at ground level	perpendicular	16 x 32	95	81	110	0.853	0.741
2	Along the kerb edge	perpendicular	8 x 8	34	27	39	0.810	0.693
3	At the centre of the crossing	perpendicular	16 x 16	42	29	61	0.682	0.476
4	At the rear of the waiting area	perpendicular	8 x 8	32	30	34	0.931	0.865

Summary of Results

Type	Quantity	Average [lx]	Min [lx]	Max [lx]	u0	E_{min} / E_{max}
perpendicular	4	72	27	110	0.38	0.25

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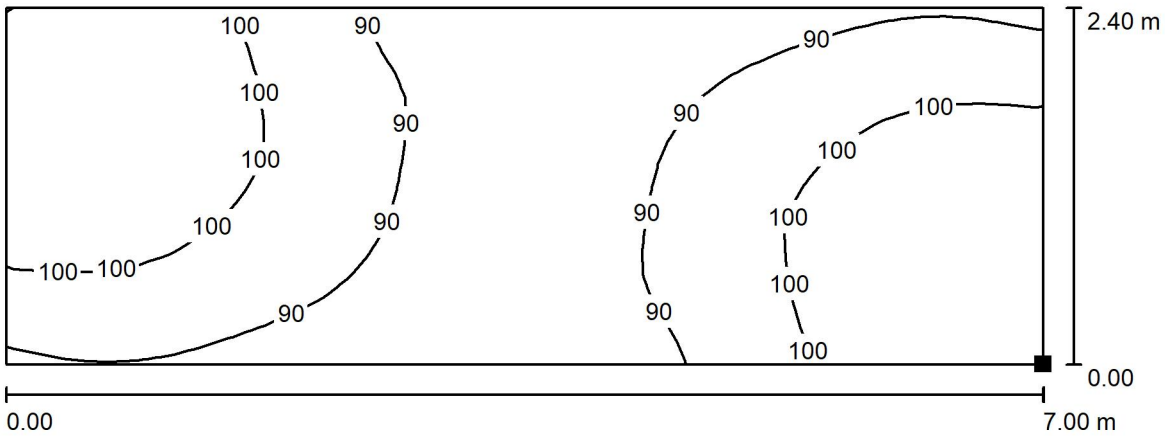
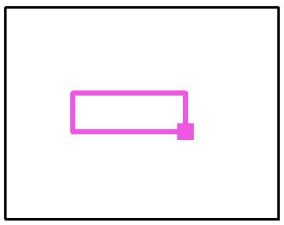
Pedestrian Crossings / Horizontal at ground level / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 51

Position of surface in external scene:
Marked point:
(11.170 m, 5.356 m, 1.000 m)



Grid: 16 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
95	81	110	0.853	0.741

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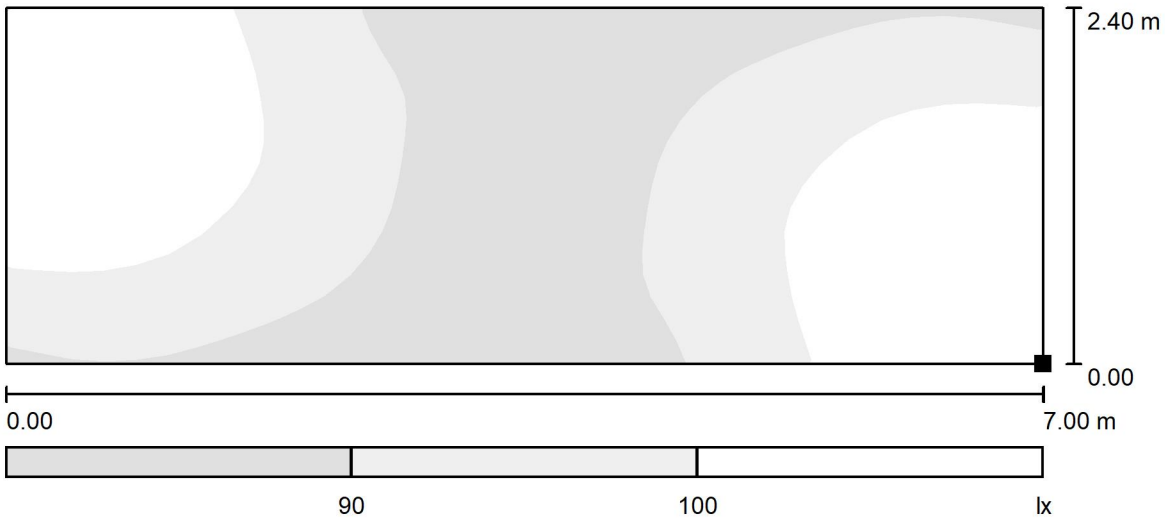
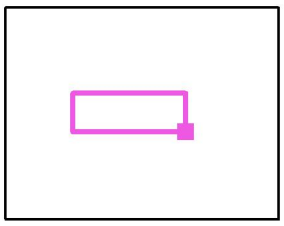
Pedestrian Crossings / Horizontal at ground level / Greyscale (E, Perpendicular)



Scale 1 : 51

Position of surface in external scene:
Marked point:
(11.170 m, 5.356 m, 1.000 m)



Grid: 16 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
95	81	110	0.853	0.741

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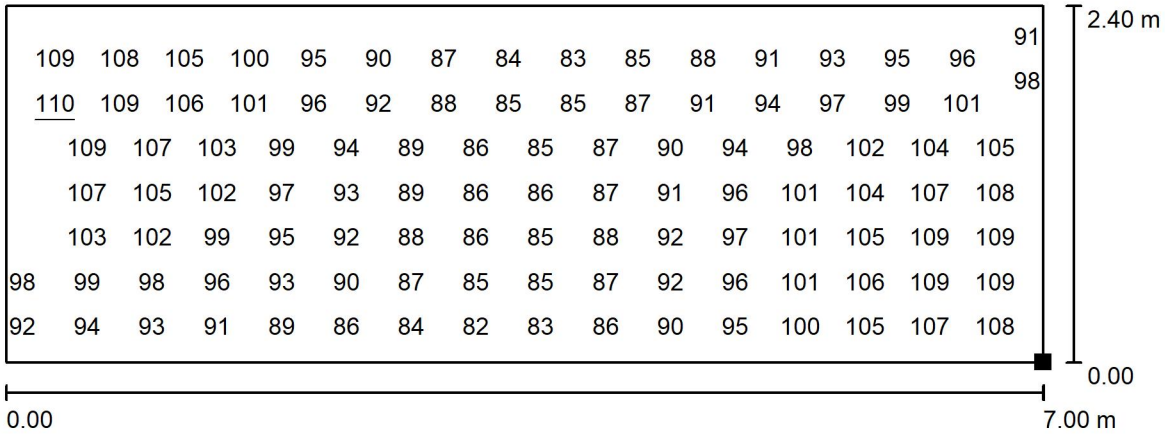
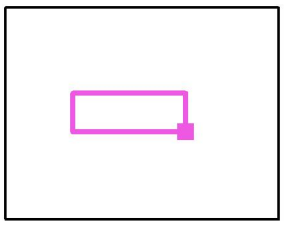
Pedestrian Crossings / Horizontal at ground level / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 51

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(11.170 m, 5.356 m, 1.000 m)



Grid: 16 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
95	81	110	0.853	0.741

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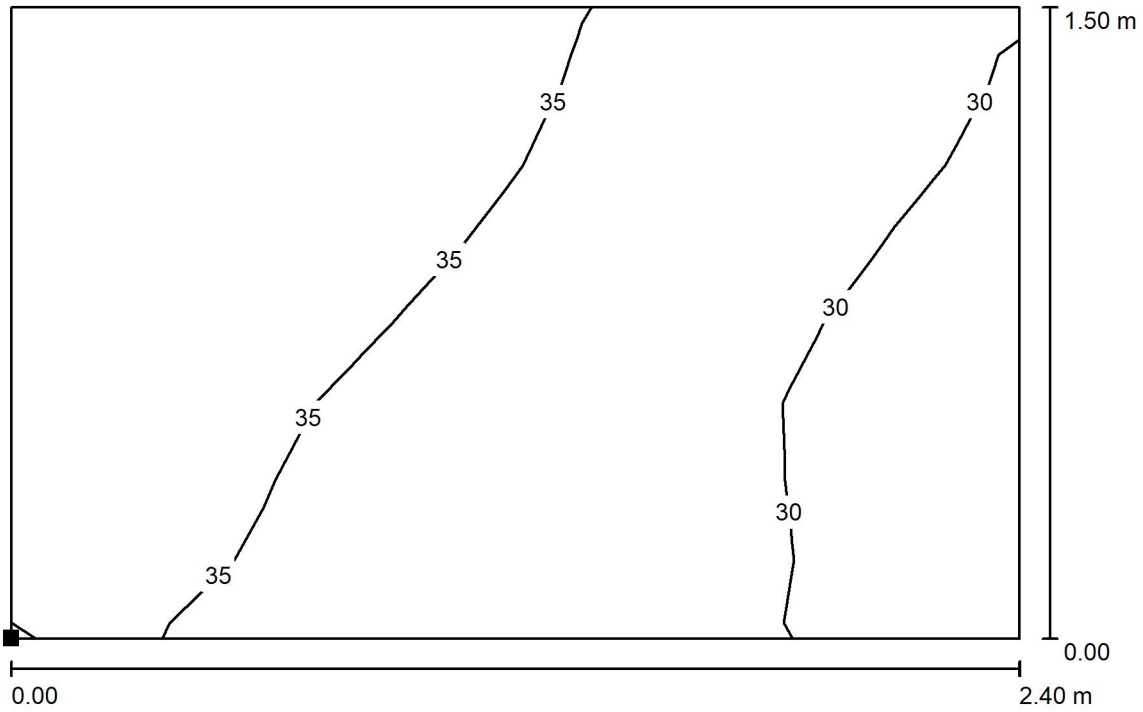
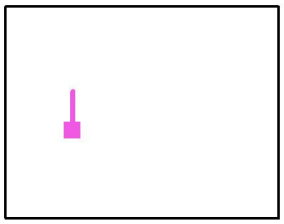
Pedestrian Crossings / Along the kerb edge / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 18

Position of surface in external scene:
Marked point:
(4.173 m, 5.381 m, 0.000 m)



Grid: 8 x 8 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
34	27	39	0.810	0.693

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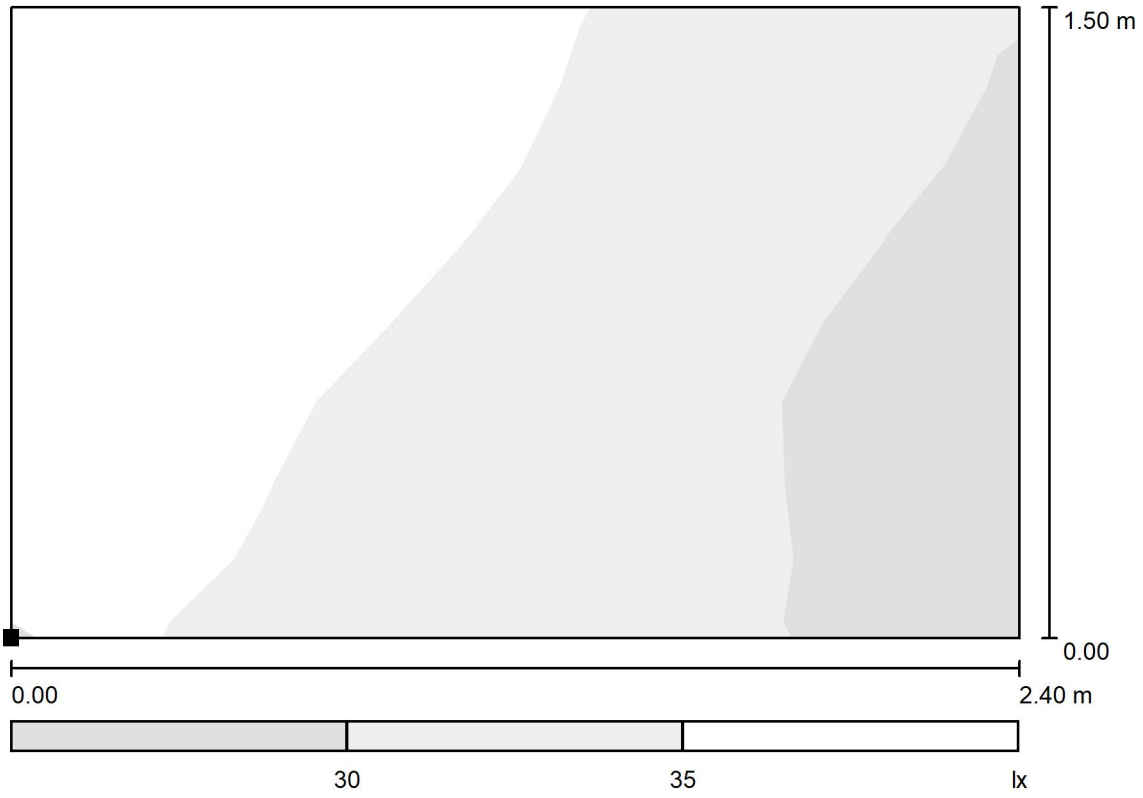
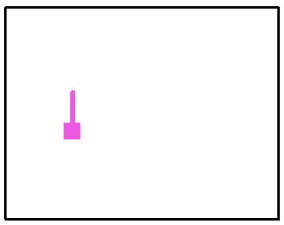
Pedestrian Crossings / Along the kerb edge / Greyscale (E, Perpendicular)



Scale 1 : 18

Position of surface in external scene:
Marked point:
(4.173 m, 5.381 m, 0.000 m)



Grid: 8 x 8 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
34	27	39	0.810	0.693

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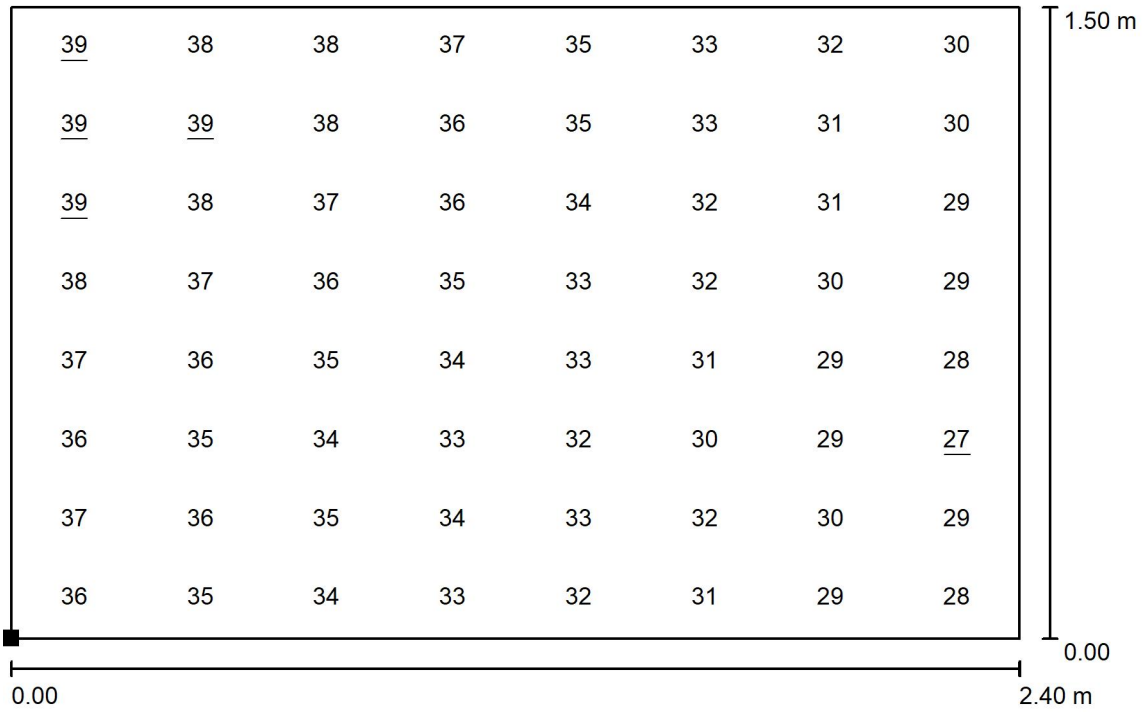
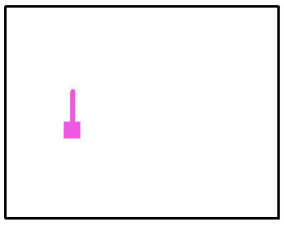
Pedestrian Crossings / Along the kerb edge / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 18

Position of surface in external scene:
Marked point:
(4.173 m, 5.381 m, 0.000 m)



Grid: 8 x 8 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
34	27	39	0.810	0.693

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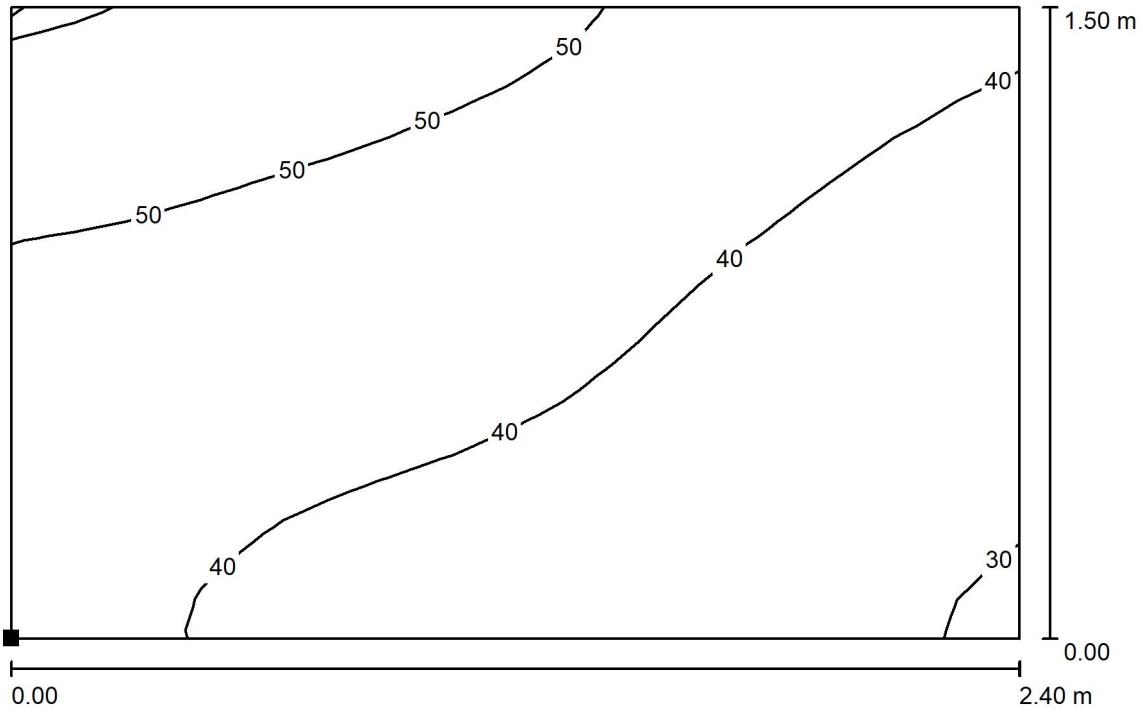
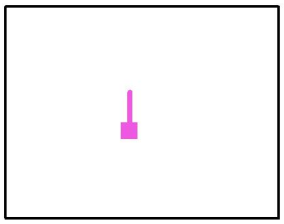
Pedestrian Crossings / At the centre of the crossing / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 18

Position of surface in external scene:
Marked point:
(7.688 m, 5.357 m, 0.000 m)



Grid: 16 x 16 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
42	29	61	0.682	0.476

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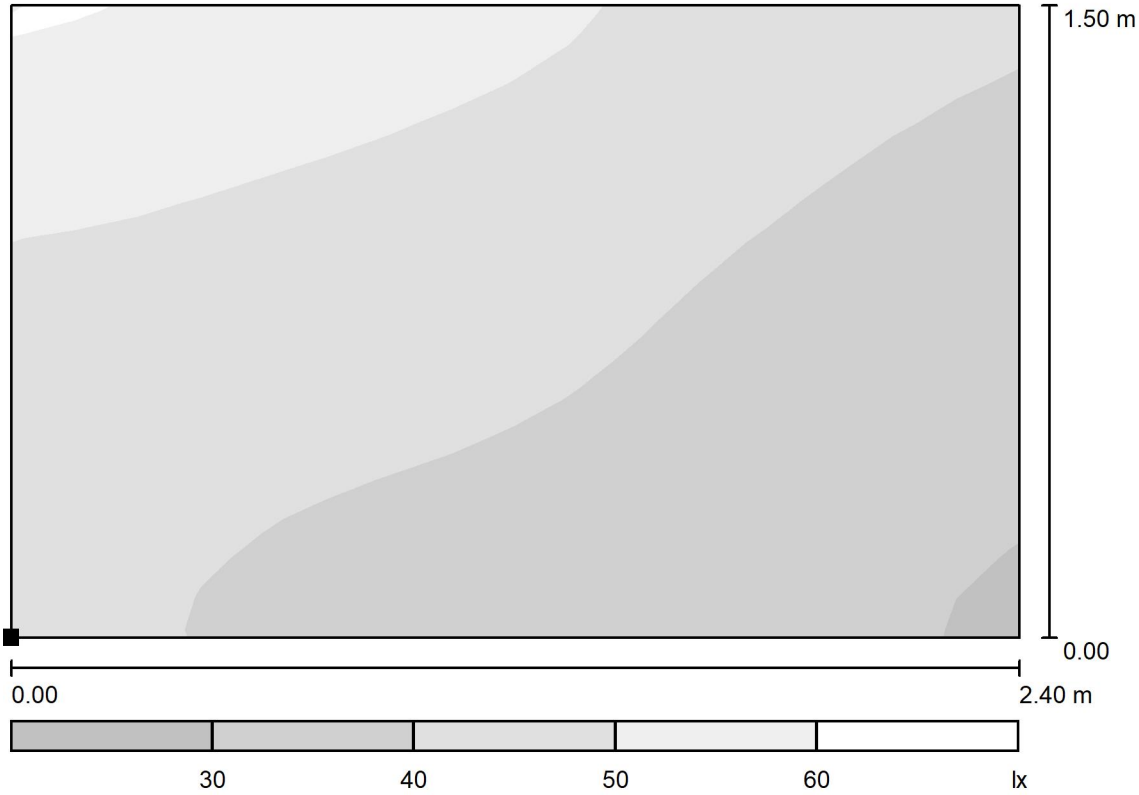
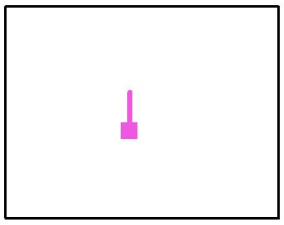
Pedestrian Crossings / At the centre of the crossing / Greyscale (E, Perpendicular)



Scale 1 : 18

Position of surface in external scene:
Marked point:
(7.688 m, 5.357 m, 0.000 m)



Grid: 16 x 16 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
42	29	61	0.682	0.476

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Pedestrian Crossings / At the centre of the crossing / Value Chart (E, Perpendicular)

61	60	59	58	56	56	54	53	50	50	48	48	44	44	41	41
59	58	57	56	55	54	53	52	50	50	48	48	44	44	41	41
56	55	54	54	52	52	50	50	47	47	45	45	42	42	39	39
55	54	53	52	51	51	50	50	47	47	45	45	42	42	39	39
51	51	50	50	48	48	47	47	44	44	42	42	39	39	36	36
51	51	50	50	48	48	47	47	44	44	42	42	39	39	36	36
48	48	47	47	45	45	44	44	42	42	40	40	37	37	35	35
48	48	47	47	45	45	44	44	42	42	40	40	37	37	35	35
47	47	45	45	44	44	43	43	41	41	39	39	36	36	34	34
47	47	45	45	44	44	43	43	41	41	39	39	36	36	34	34
44	44	43	43	42	42	40	40	39	39	37	37	34	34	32	32
44	44	43	43	42	42	40	40	39	39	37	37	34	34	32	32
42	42	40	40	39	39	38	38	38	38	36	36	33	33	30	30
42	42	40	40	39	39	38	38	38	38	36	36	33	33	30	30
44	44	39	39	39	39	36	36	41	41	35	35	34	34	29	29
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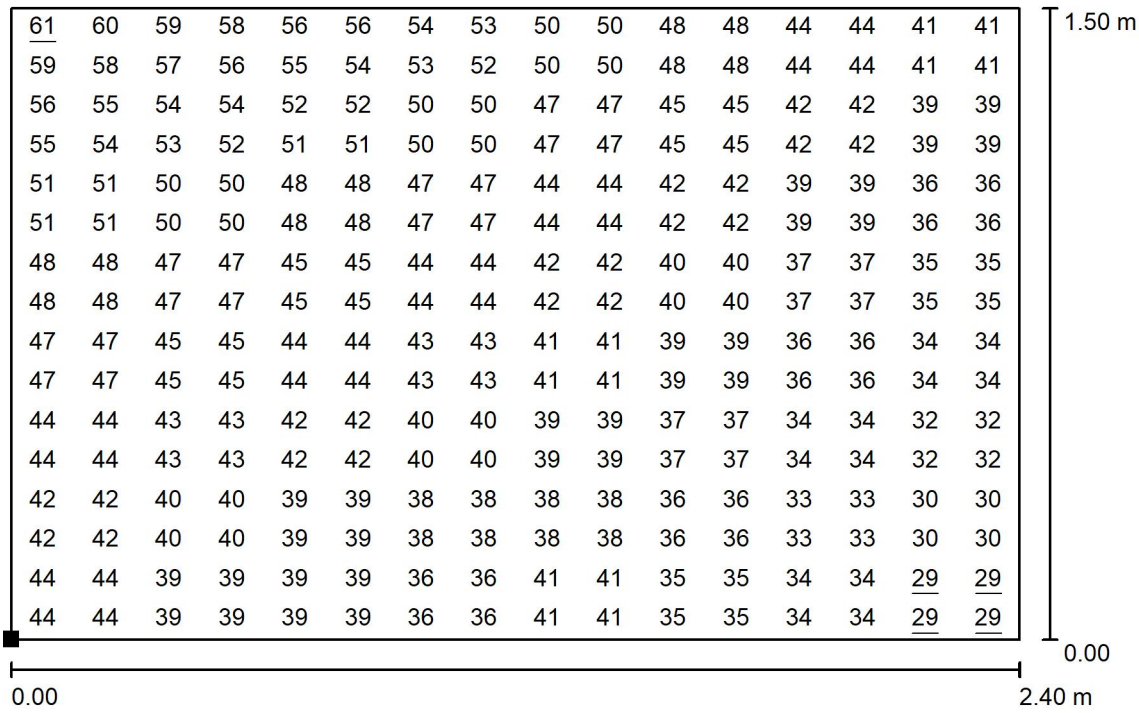
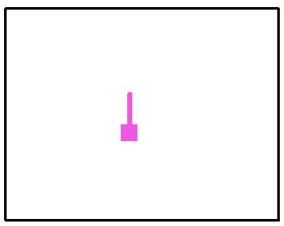


Values in Lux, Scale 1 : 18

Position of surface in external scene:
Marked point:
(7.688 m, 5.357 m, 0.000 m)



Grid: 16 x 16 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
42	29	61	0.682	0.476

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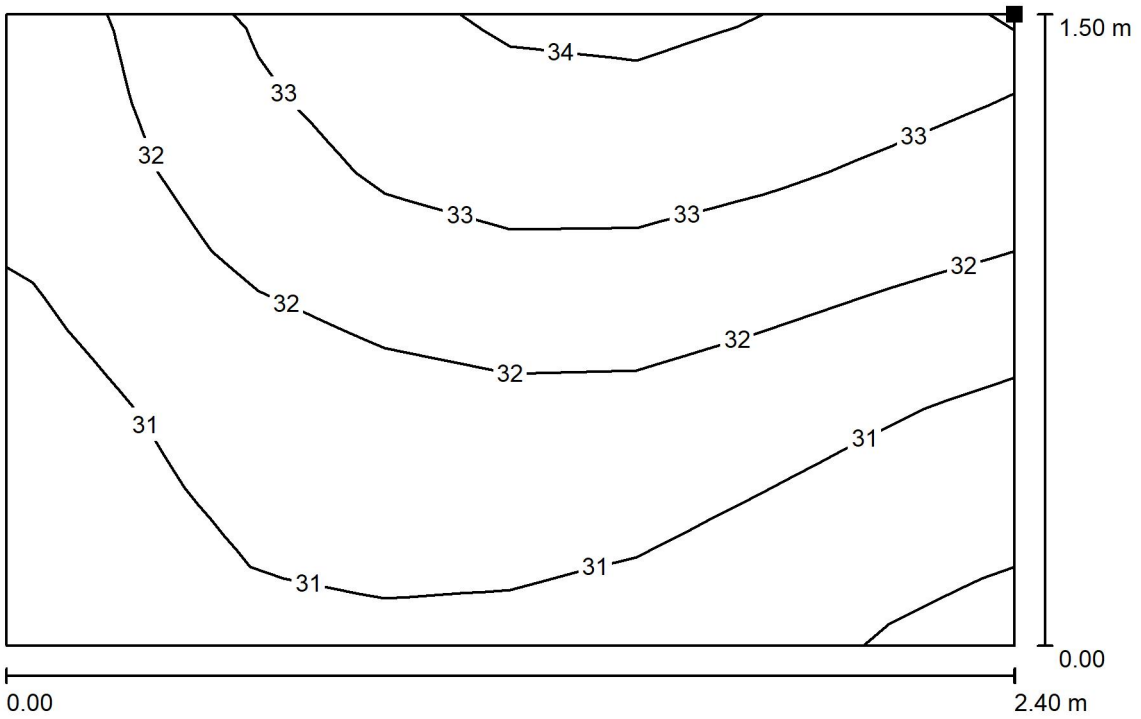
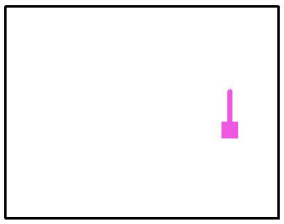
Pedestrian Crossings / At the rear of the waiting area / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 18

Position of surface in external scene:
Marked point:
(13.897 m, 5.378 m, 1.500 m)



Grid: 8 x 8 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
32	30	34	0.931	0.865

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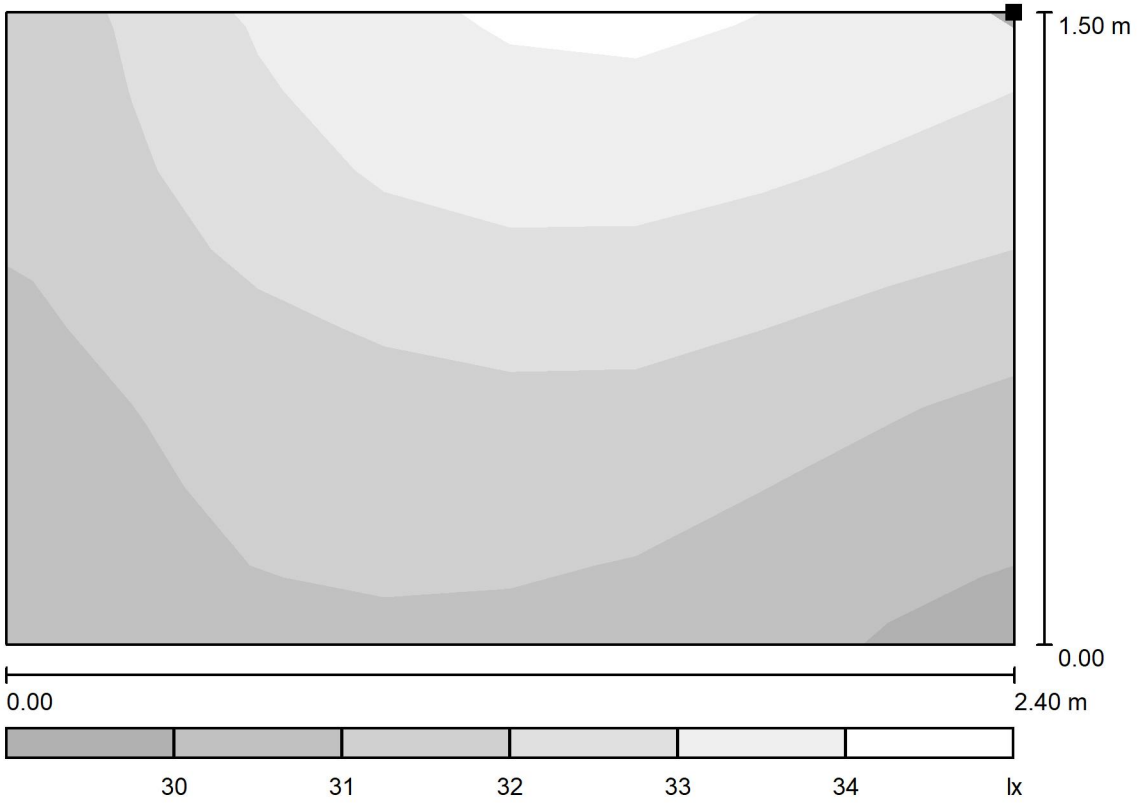
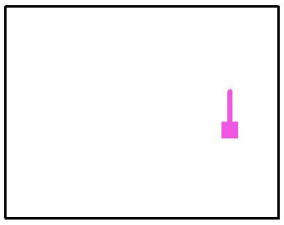
Pedestrian Crossings / At the rear of the waiting area / Greyscale (E, Perpendicular)



Scale 1 : 18

Position of surface in external scene:
Marked point:
(13.897 m, 5.378 m, 1.500 m)



Grid: 8 x 8 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
32	30	34	0.931	0.865

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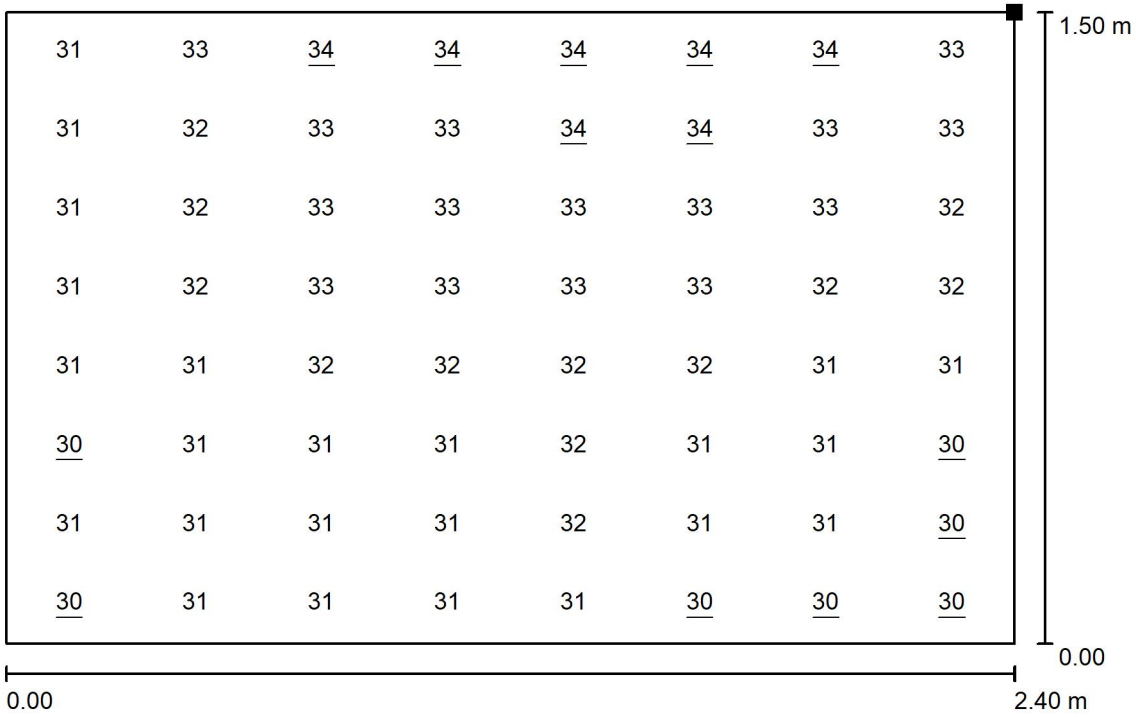
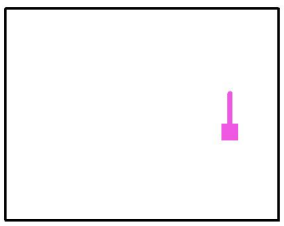
Pedestrian Crossings / At the rear of the waiting area / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 18

Position of surface in external scene:
Marked point:
(13.897 m, 5.378 m, 1.500 m)



Grid: 8 x 8 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
32	30	34	0.931	0.865

Luton Airport Expansion

Short Stay Car Park 4000 Spaces

Date: 28.06.2019
Operator: Katerina Konsta

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Table of contents

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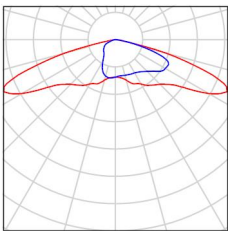
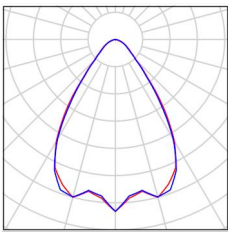
Luton Airport Expansion / Luminaire parts list

27 Pieces WE-EF 108-0975 VFL540 [R65] IP66:LED-36/36W/4K
Article No.: 108-0975
Luminous flux (Luminaire): 4324 lm
Luminous flux (Lamps): 4842 lm
Luminaire Wattage: 42.0 W
Luminaire classification according to CIE: 100
CIE flux code: 27 59 94 100 89
Fitting: 36 x LED-36/36W/840 - 4000K (Correction Factor 1.000).



33 Pieces Zumtobel 42183262 CRAFT S LED7500-840 PM WB LDO WH [STD]
Article No.: 42183262
Luminous flux (Luminaire): 7500 lm
Luminous flux (Lamps): 7500 lm
Luminaire Wattage: 58.0 W
Luminaire classification according to CIE: 100
CIE flux code: 77 95 99 100 100
Fitting: 1 x LED-Z42183262 58W (Correction Factor 1.000).



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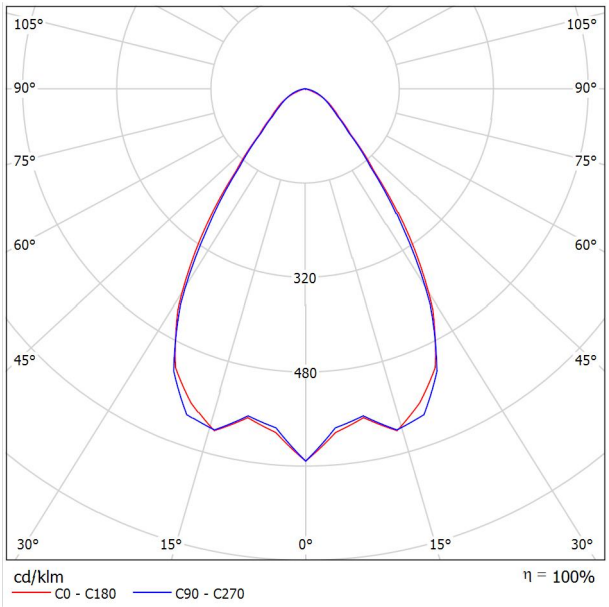
Zumtobel 42183262 CRAFT S LED7500-840 PM WB LDO WH [STD] / Luminaire Data Sheet

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 77 95 99 100 100

LED high-bay luminaire total power: 58 W, includes DALI- and emergency supply-compatible LED converter, die-cast aluminium housing in matt, white. Powder-coated cooling ribs for optimum thermal management and minimal dust accumulation. Cover of clear Polymethylmethacrylate (PM) and a supplementary glass cover (ESG) for challenging industrial applications. Slave luminaire for DALI control (DALI only) with LED converter. LED service life lasts 50000 h before luminous flux is reduced to 85% of the initial value over the entire ambient temperature range. Chromaticity tolerance (initial MacAdam): 4. Luminaire luminous flux: 7500 lm, Luminaire efficacy: 129 lm/W.Colour rendering Ra > 80, colour temperature 4000 K. Sealed, high-efficiency optical lens system, Luminaire with symmetric wide light distribution (wide beam) square, UGR <22. Pre-assembled 5 x 1mm² connecting cable, length 1.5m, with free ends, included in scope of supply (suspension with at least 65 mm distance to ceiling); Luminaire wired with halogen-free and silicone-free leads. Note: please contact your consultant if you are planning to use in ambient atmospheres with chemical load, high or condensing air humidity, large temperature fluctuations or projects with the necessary absence of silicone. Class of protection: SC1; degree of protection: IP65; ambient temperature: -25°C to +45°C; Dimensions: 339 x 165 x 100 mm. Weight: 2.82 kg.

Luminous emittance 1:

Glare Evaluation According to UGR

ρ Ceiling		70	70	50	50	30	70	70	50	50	30
ρ Walls		50	30	50	30	30	50	30	50	30	30
ρ Floor		20	20	20	20	20	20	20	20	20	20
Room Size X	Y	Viewing direction at right angles to lamp axis					Viewing direction parallel to lamp axis				
2H	2H	18.4	19.3	18.7	19.5	19.7	17.7	18.6	18.0	18.8	19.1
	3H	18.9	19.7	19.2	19.9	20.2	18.7	19.5	19.0	19.8	20.0
	4H	18.9	19.6	19.2	19.9	20.2	19.1	19.8	19.4	20.1	20.4
	6H	18.8	19.5	19.1	19.8	20.1	19.3	20.0	19.6	20.3	20.5
	8H	18.8	19.5	19.1	19.8	20.1	19.3	20.0	19.6	20.3	20.6
	12H	18.7	19.4	19.1	19.7	20.0	19.3	20.0	19.7	20.3	20.6
4H	2H	18.7	19.5	19.0	19.7	20.0	18.1	18.9	18.5	19.2	19.4
	3H	19.3	20.0	19.7	20.3	20.6	19.3	20.0	19.7	20.3	20.6
	4H	19.3	19.9	19.7	20.2	20.6	19.8	20.3	20.1	20.7	21.0
	6H	19.3	19.8	19.7	20.1	20.5	20.0	20.5	20.4	20.9	21.3
	8H	19.3	19.7	19.7	20.1	20.5	20.1	20.5	20.5	20.9	21.3
	12H	19.2	19.6	19.7	20.0	20.4	20.1	20.5	20.6	20.9	21.3
8H	4H	19.4	19.8	19.8	20.2	20.6	19.8	20.2	20.2	20.6	21.0
	6H	19.4	19.7	19.8	20.1	20.6	20.1	20.4	20.5	20.9	21.3
	8H	19.3	19.6	19.8	20.1	20.5	20.2	20.5	20.7	20.9	21.4
	12H	19.3	19.6	19.8	20.0	20.5	20.3	20.5	20.7	21.0	21.5
12H	4H	19.4	19.7	19.8	20.1	20.6	19.8	20.1	20.2	20.5	21.0
	6H	19.3	19.6	19.8	20.1	20.5	20.1	20.4	20.5	20.8	21.3
	8H	19.3	19.6	19.8	20.0	20.5	20.2	20.4	20.7	20.9	21.4

Variation of the observer position for the luminaire distances S

S = 1.0H	+2.4 / -2.6	+2.2 / -2.0
S = 1.5H	+3.4 / -3.7	+3.1 / -2.8
S = 2.0H	+5.0 / -5.2	+4.7 / -3.5
Standard table	BK01	BK01
Correction Summand	-2.8	-2.8

Corrected Glare Indices referring to 7500lm Total Luminous Flux

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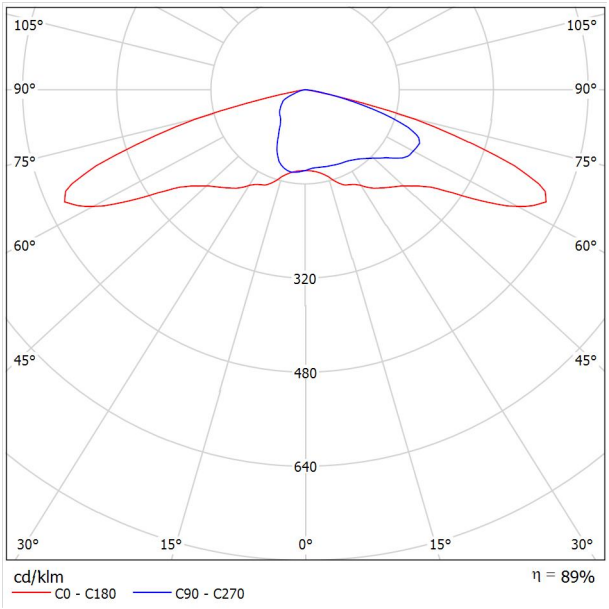
WE-EF 108-0975 VFL540 [R65] IP66:LED-36/36W/4K / Luminaire Data Sheet

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 27 59 94 100 89

IP66, Class I or Class II. IK08. Marine-grade die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. UV stabilised acrylic panel in RFC® technology. Integrated heat sinks. Easy removal and replacement of LED board. CAD optimised OLC® PMMA lens for superior illumination and glare control. The luminaire is factory- sealed and does not need to be opened during the installation.
Spigot D = 60 x 80 mm or D = 76 x 80 mm (to be specified at order placement).
Recommended mounting height 2.5-8.0 m, depending on lamp type selected.

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

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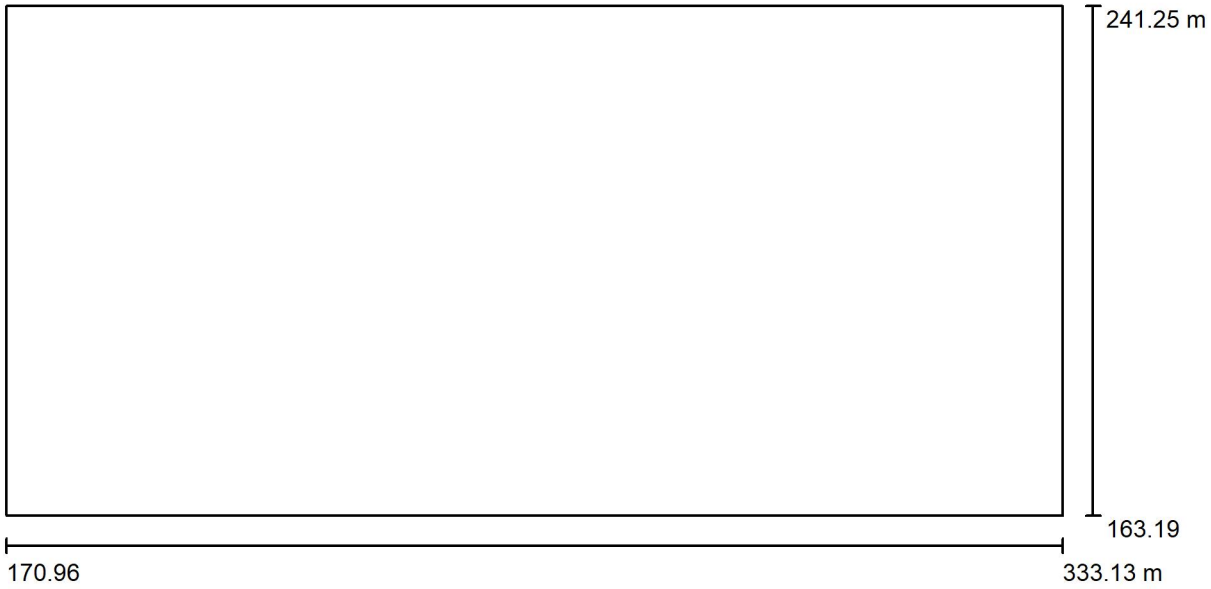
Short Stay Car Park 4000 Spaces / Planning data



Maintenance factor: 0.57, ULR (Upward Light Ratio): 0.0%

Scale 1:1160

Exterior Parking Areas
Average Illuminance: 10lux
Uniformity: 0.25
Interior Parking Areas
Average Illuminance: 75lux
Uniformity: 0.4
Entrance (In/Out) Daytime: 300 lux
Entrance (In/Out) Nightime: 75 lux
(...)

Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	27	WE-EF 108-0975 VFL540 [R65] IP66:LED-36/36W/4K (1.000)	4324	4842	42.0
2	33	Zumtobel 42183262 CRAFT S LED7500-840 PM WB LDO WH [STD] (1.000)	7500	7500	58.0
			Total: 364254	Total: 378234	3048.0

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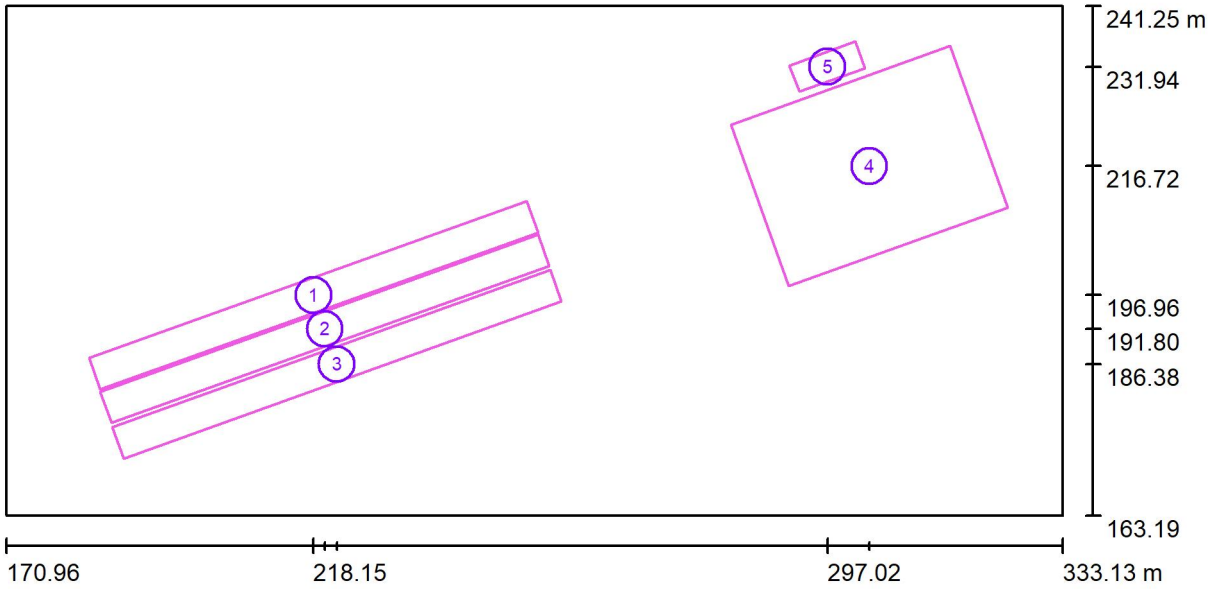
Short Stay Car Park 4000 Spaces / Calculation surfaces (results overview)



Scale 1 : 1160

Calculation Surface List

No.	Designation	Type	Grid	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
1	Typical Calculation - Parking Single Row Area 01	perpendicular	128 x 32	16	7.08	27	0.431	0.263
2	Typical Calculation - Traffic Lane	perpendicular	128 x 32	12	6.74	14	0.564	0.484
3	Typical Calculation - Parking Single Row Area 02	perpendicular	128 x 32	14	6.88	19	0.493	0.369
4	Typical Calculation - Parking Coaches	perpendicular	128 x 32	79	38	219	0.482	0.174
5	Typical Calculation - Parking Coaches - Entrance	perpendicular	32 x 128	323	182	413	0.564	0.440

Summary of Results

Type	Quantity	Average [lx]	Min [lx]	Max [lx]	u0	E_{min} / E_{max}
perpendicular	5	50	6.74	413	0.13	0.02

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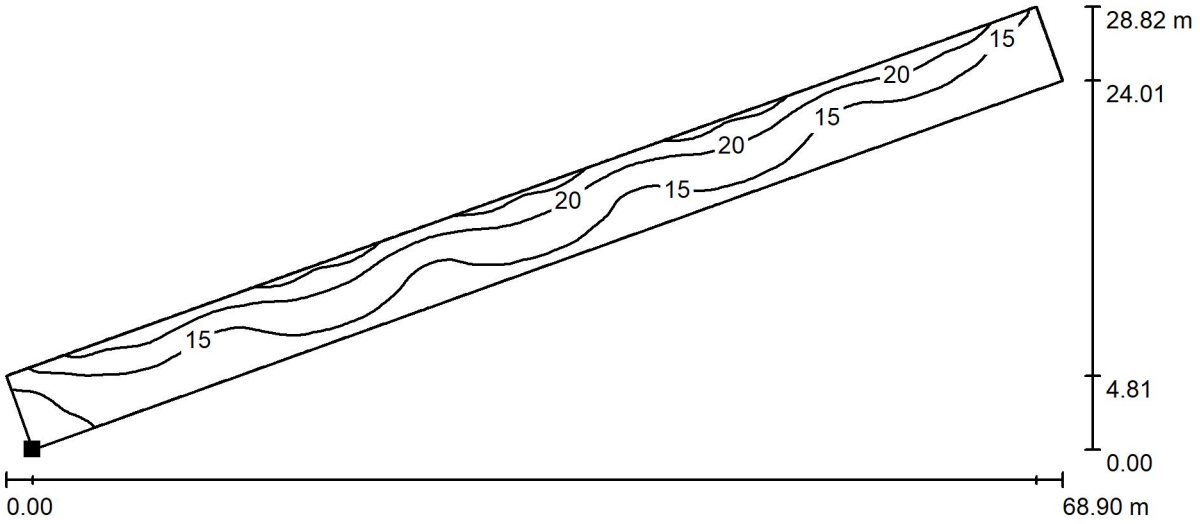
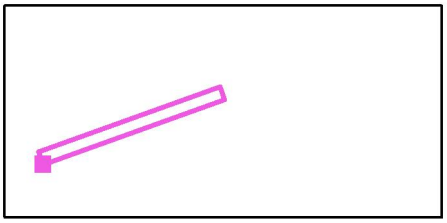
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Single Row Area 01 / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 493

Position of surface in external scene:
Marked point:
(185.421 m, 182.550 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
16	7.08	27	0.431	0.263

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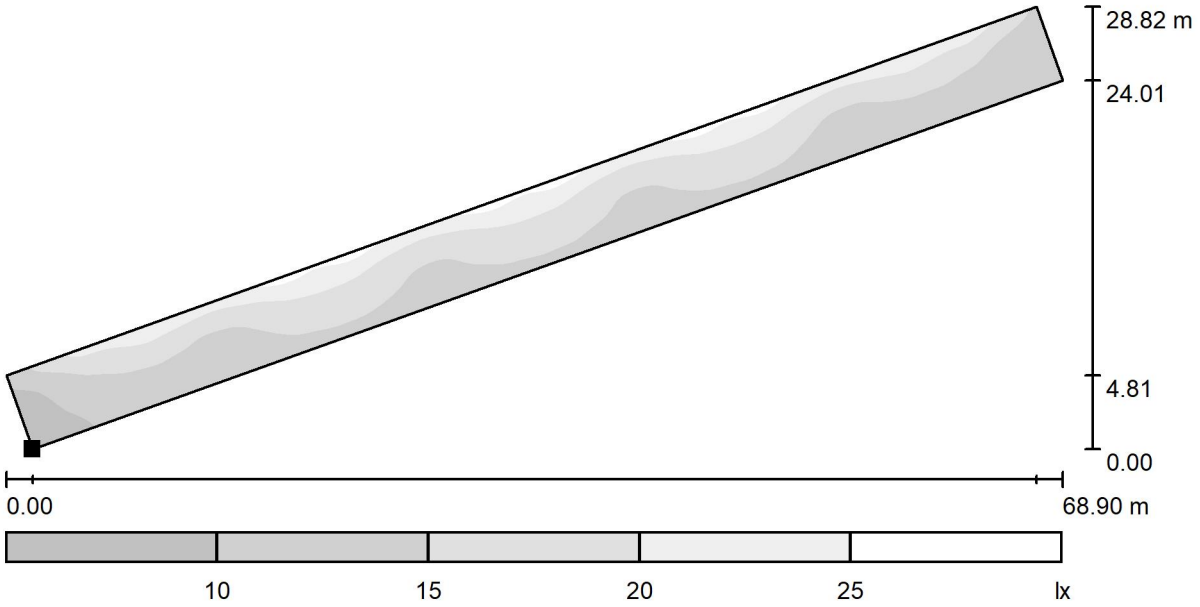
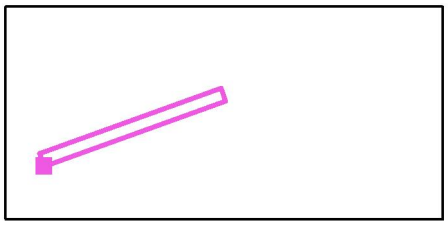
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Single Row Area 01 / Greyscale (E, Perpendicular)



Scale 1 : 493

Position of surface in external scene:
Marked point:
(185.421 m, 182.550 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
16	7.08	27	0.431	0.263

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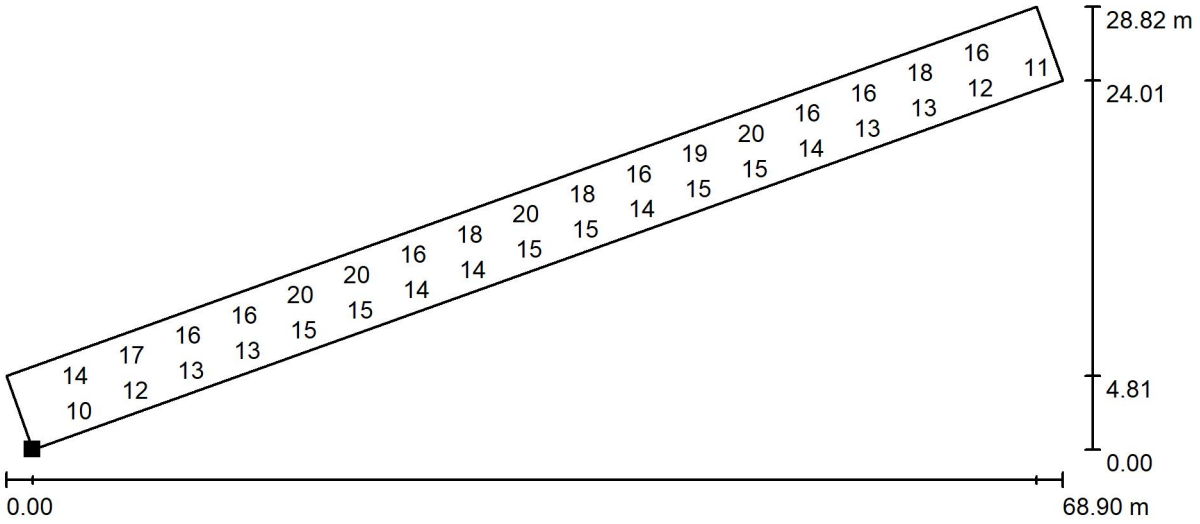
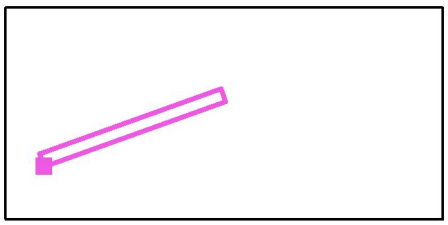
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Single Row Area 01 / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 493

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(185.421 m, 182.550 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
16	7.08	27	0.431	0.263

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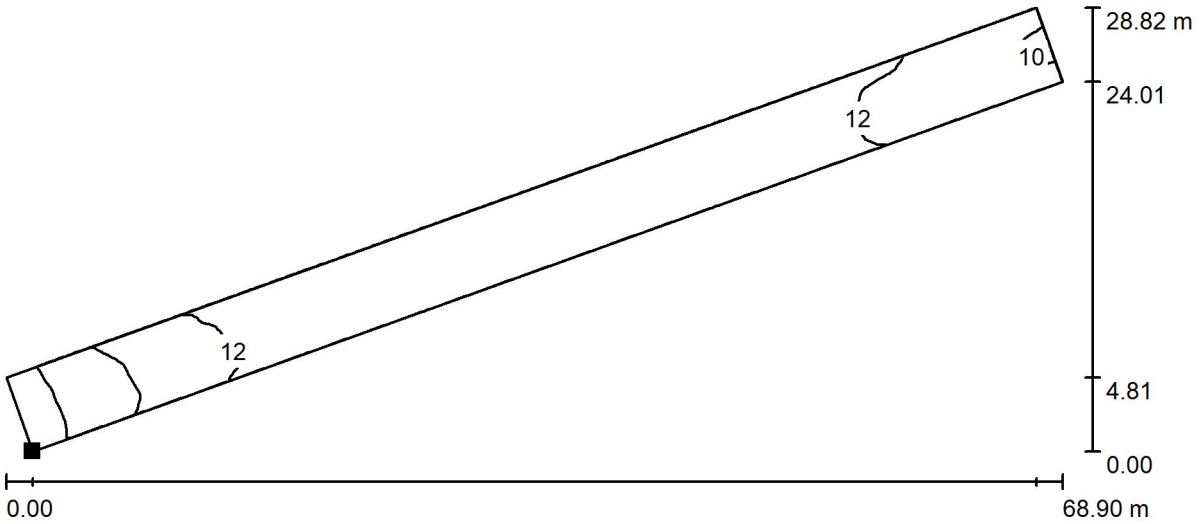
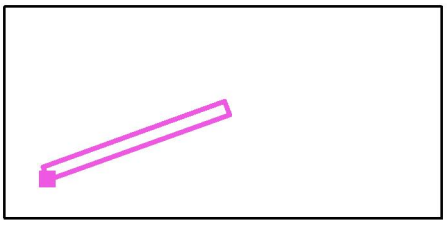
Short Stay Car Park 4000 Spaces / Typical Calculation - Traffic Lane / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 493

Position of surface in external scene:
Marked point:
(187.128 m, 177.388 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
12	6.74	14	0.564	0.484

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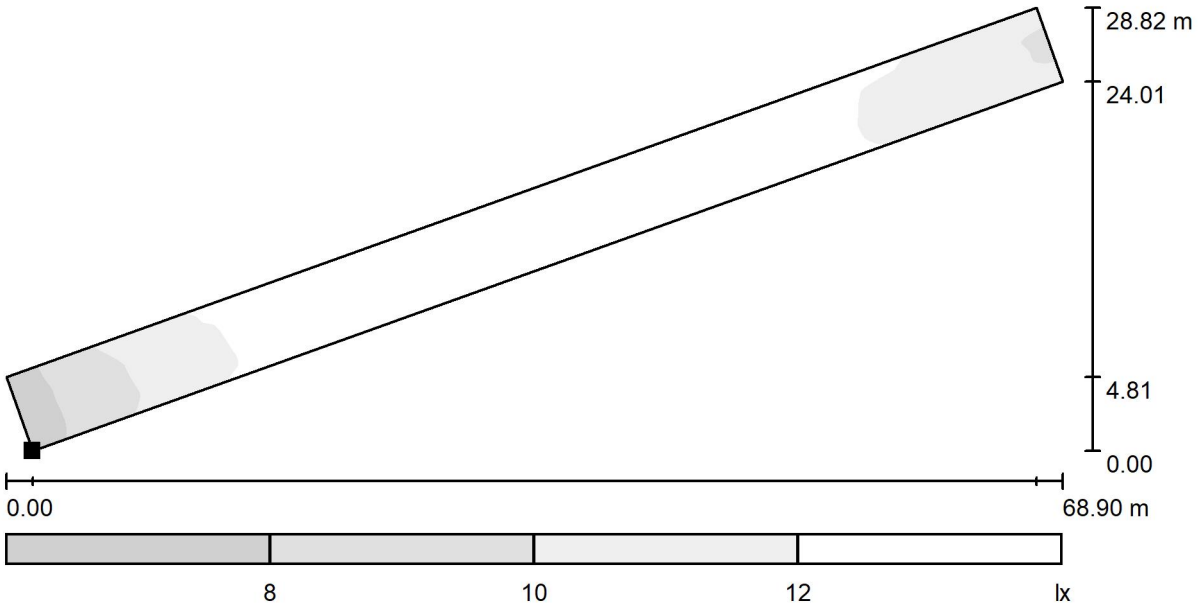
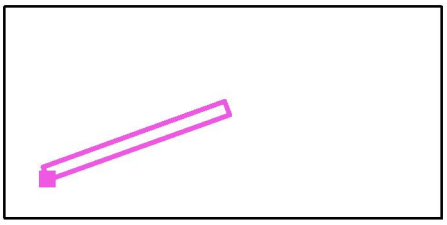
Short Stay Car Park 4000 Spaces / Typical Calculation - Traffic Lane / Greyscale (E, Perpendicular)



Scale 1 : 493

Position of surface in external scene:
Marked point:
(187.128 m, 177.388 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
12	6.74	14	0.564	0.484

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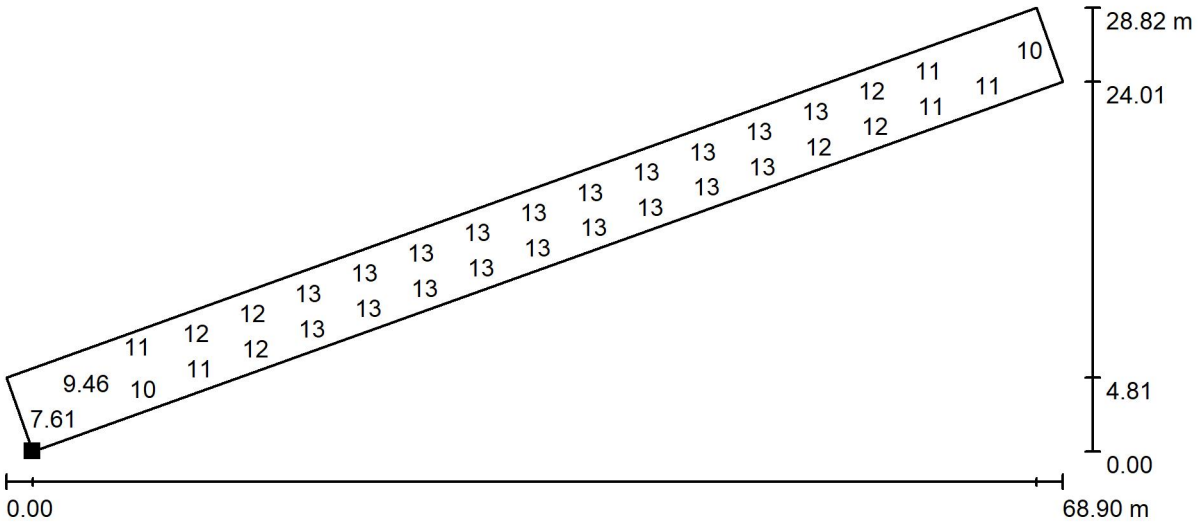
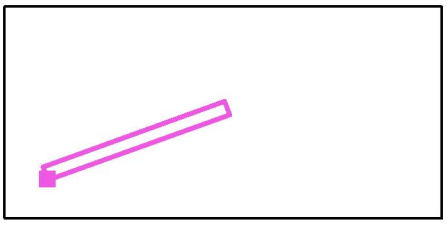
Short Stay Car Park 4000 Spaces / Typical Calculation - Traffic Lane / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 493

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(187.128 m, 177.388 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
12	6.74	14	0.564	0.484

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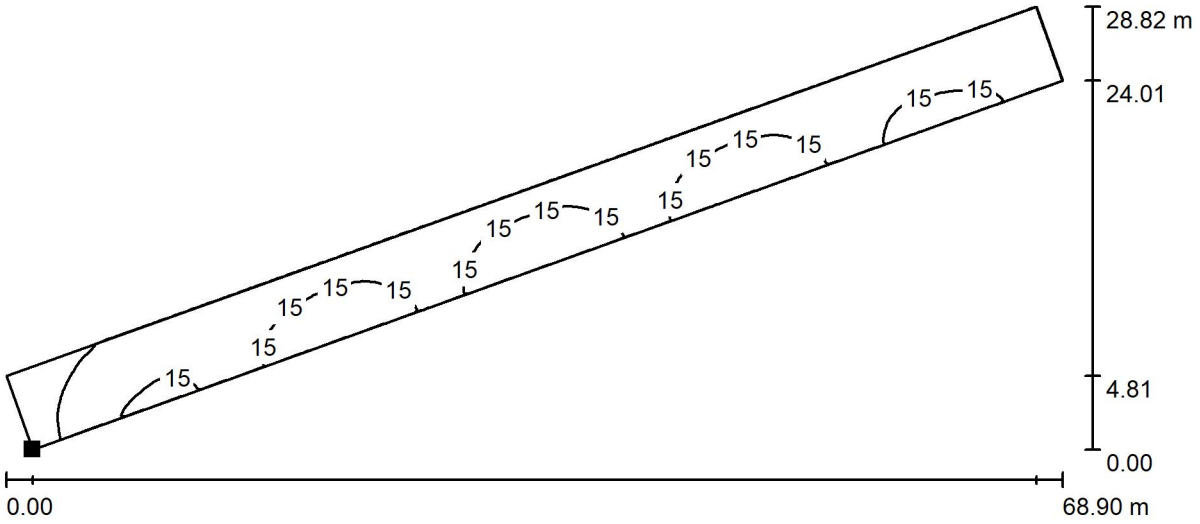
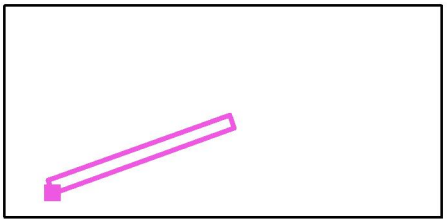
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Single Row Area 02 / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 493

Position of surface in external scene:
Marked point:
(189.000 m, 171.970 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
14	6.88	19	0.493	0.369

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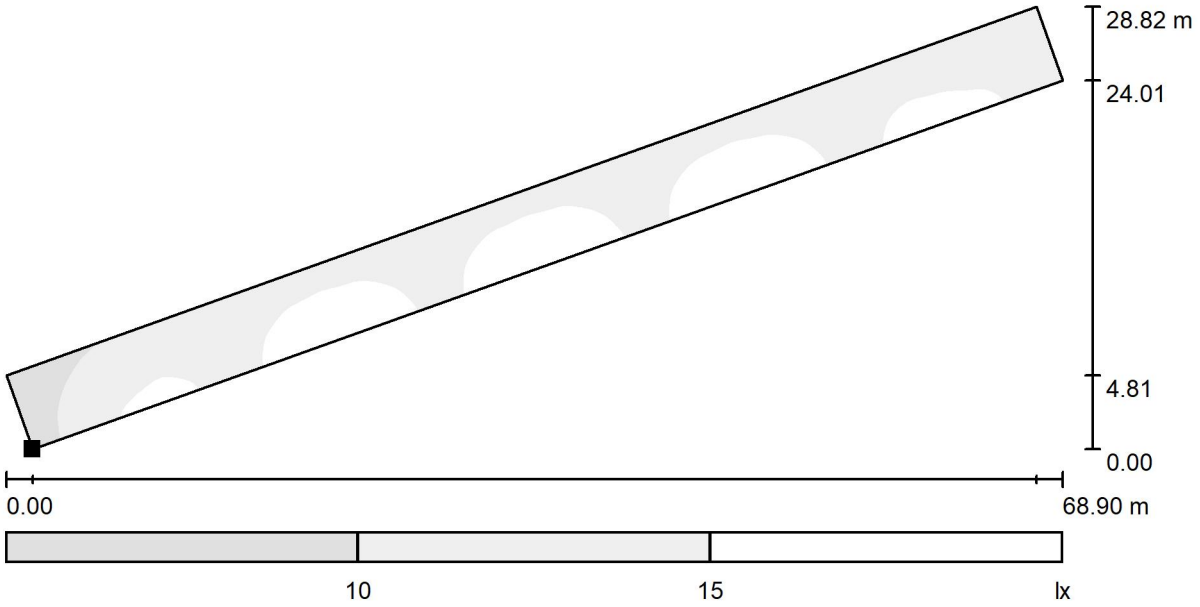
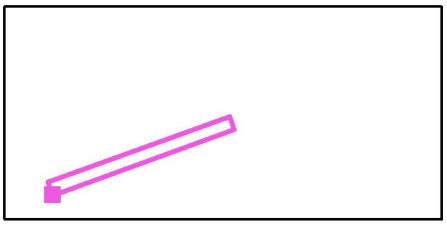
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Single Row Area 02 / Greyscale (E, Perpendicular)



Scale 1 : 493

Position of surface in external scene:
Marked point:
(189.000 m, 171.970 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
14	6.88	19	0.493	0.369

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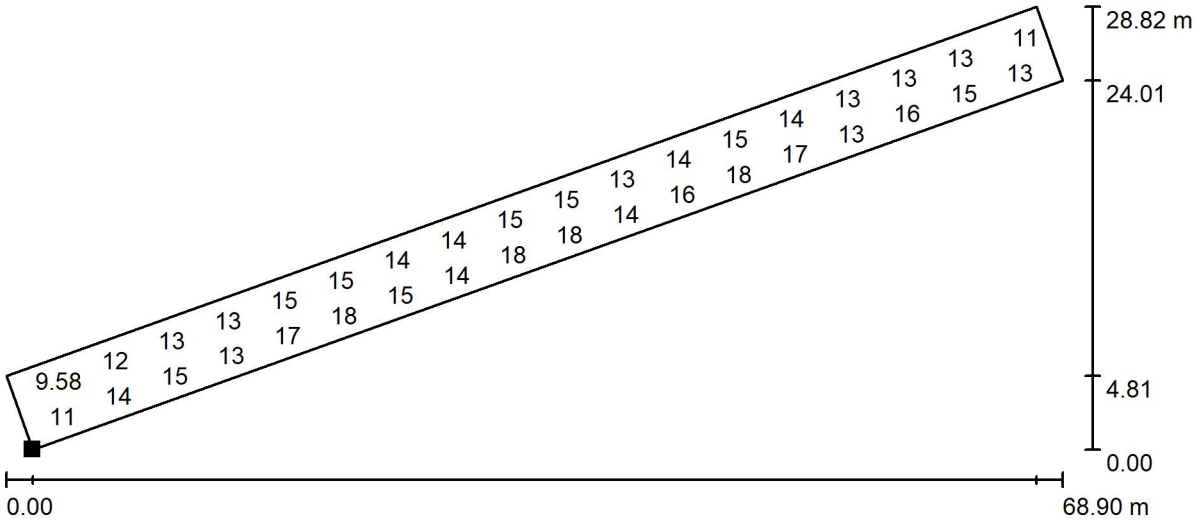
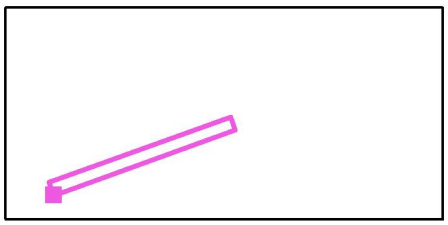
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Single Row Area 02 / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 493

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(189.000 m, 171.970 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
14	6.88	19	0.493	0.369

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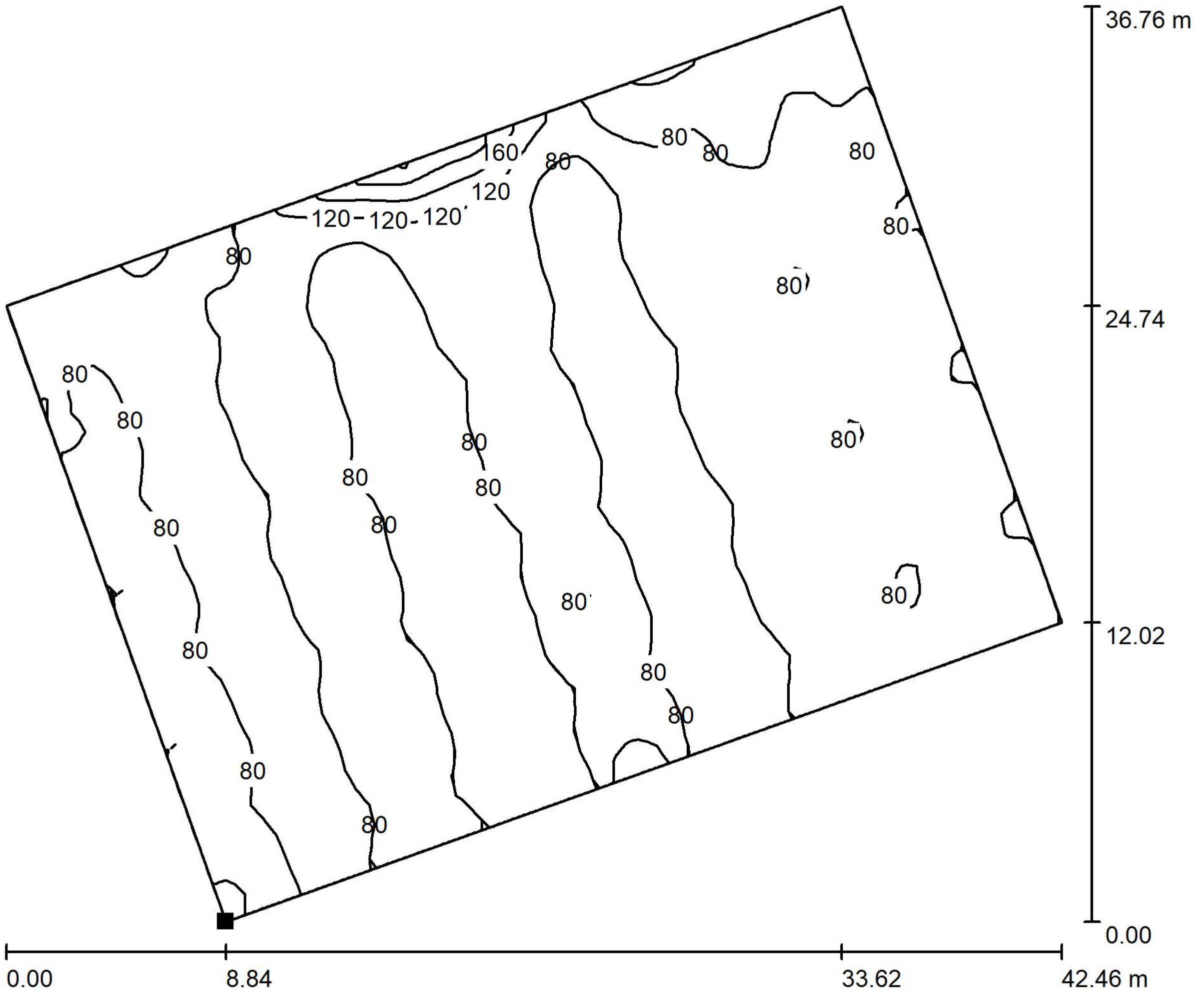
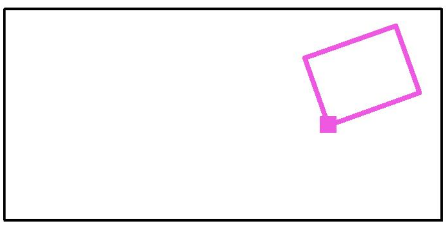
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Coaches / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 304

Position of surface in external scene:
Marked point:
(291.083 m, 198.337 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
79	38	219	0.482	0.174

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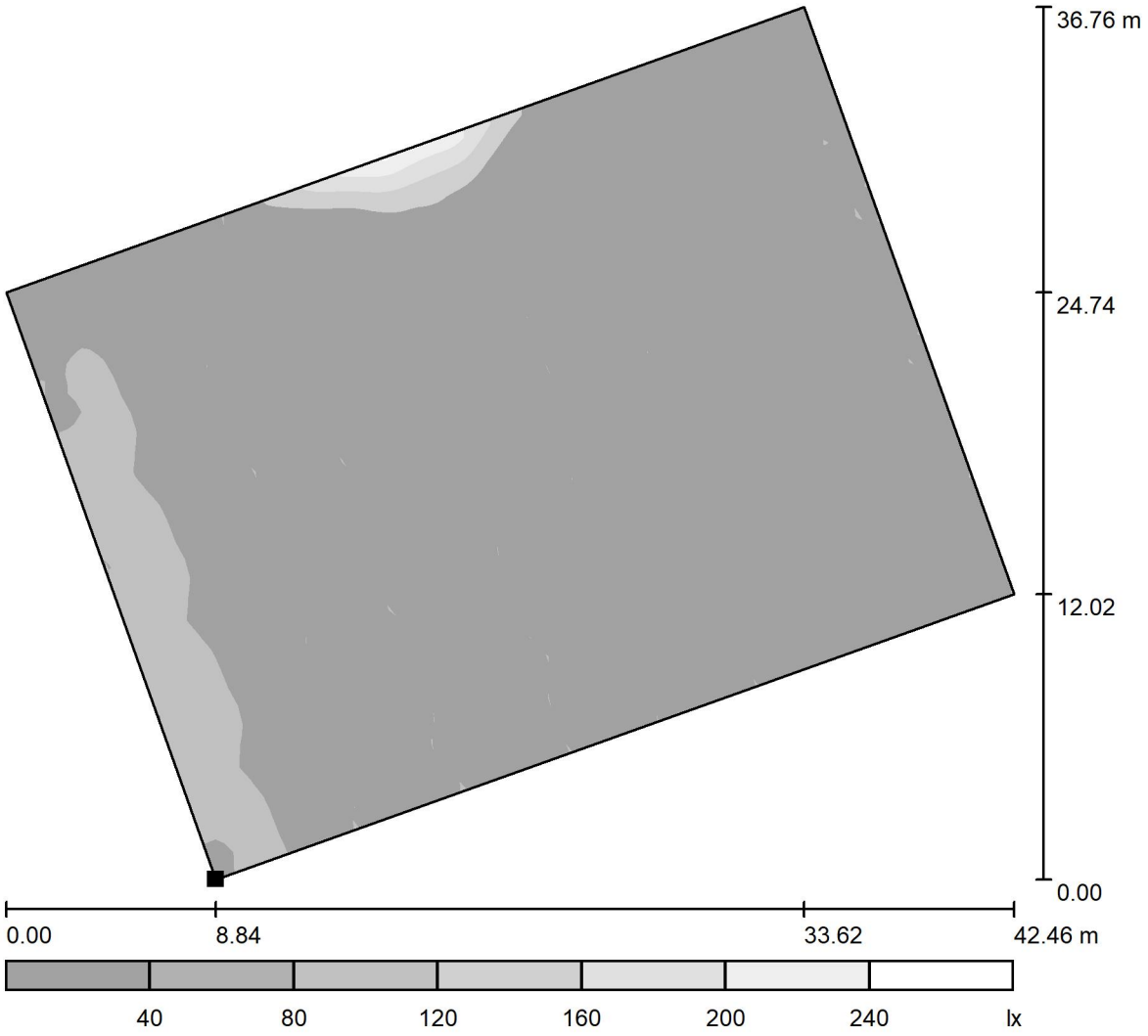
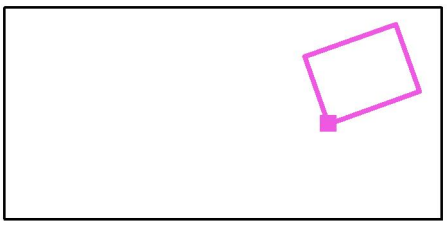
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Coaches / Greyscale (E, Perpendicular)



Scale 1 : 312

Position of surface in external scene:
Marked point:
(291.083 m, 198.337 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
79	38	219	0.482	0.174

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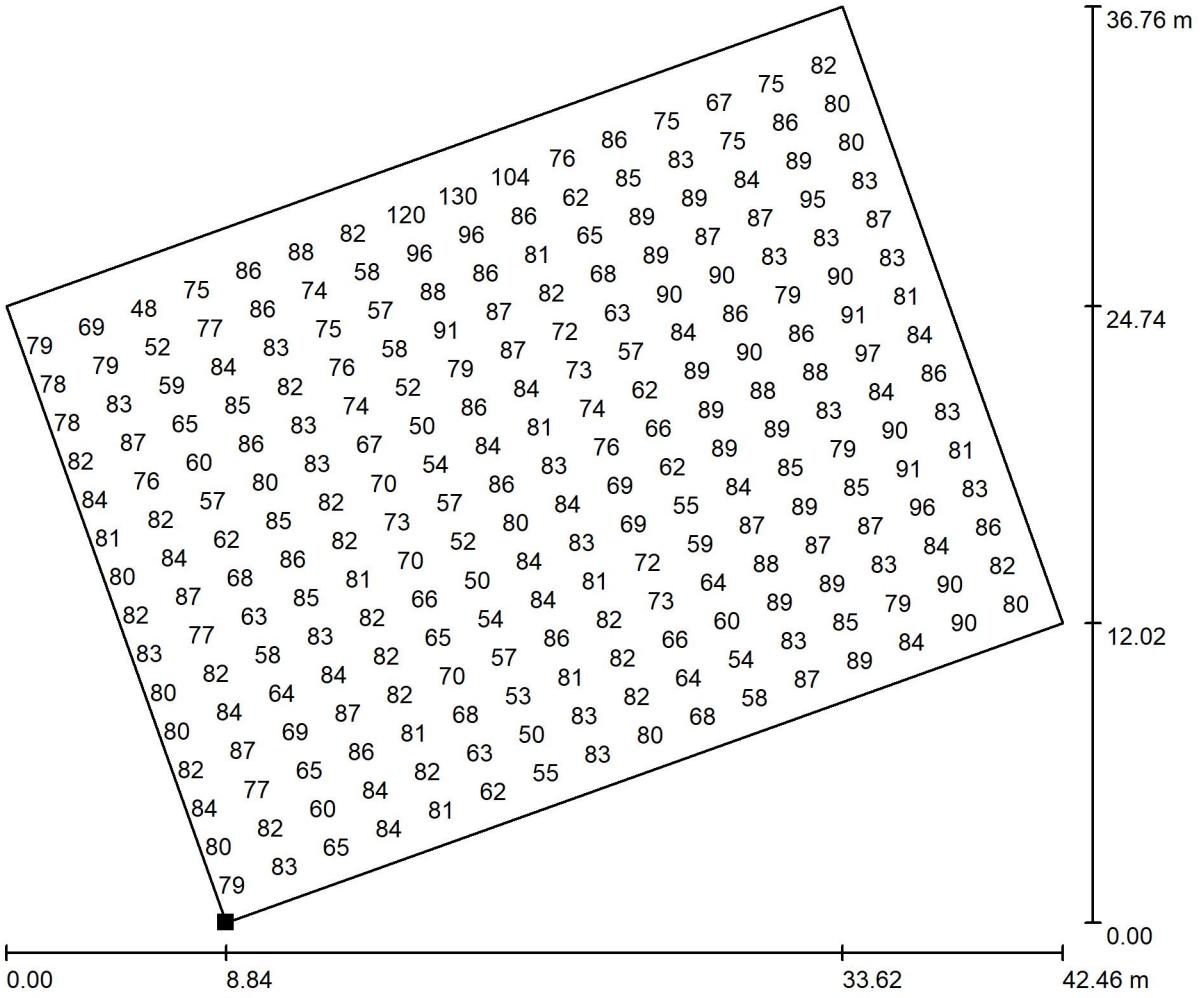
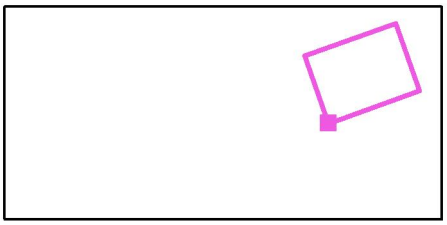
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Coaches / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 304

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(291.083 m, 198.337 m, 0.000 m)



Grid: 128 x 32 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
79	38	219	0.482	0.174

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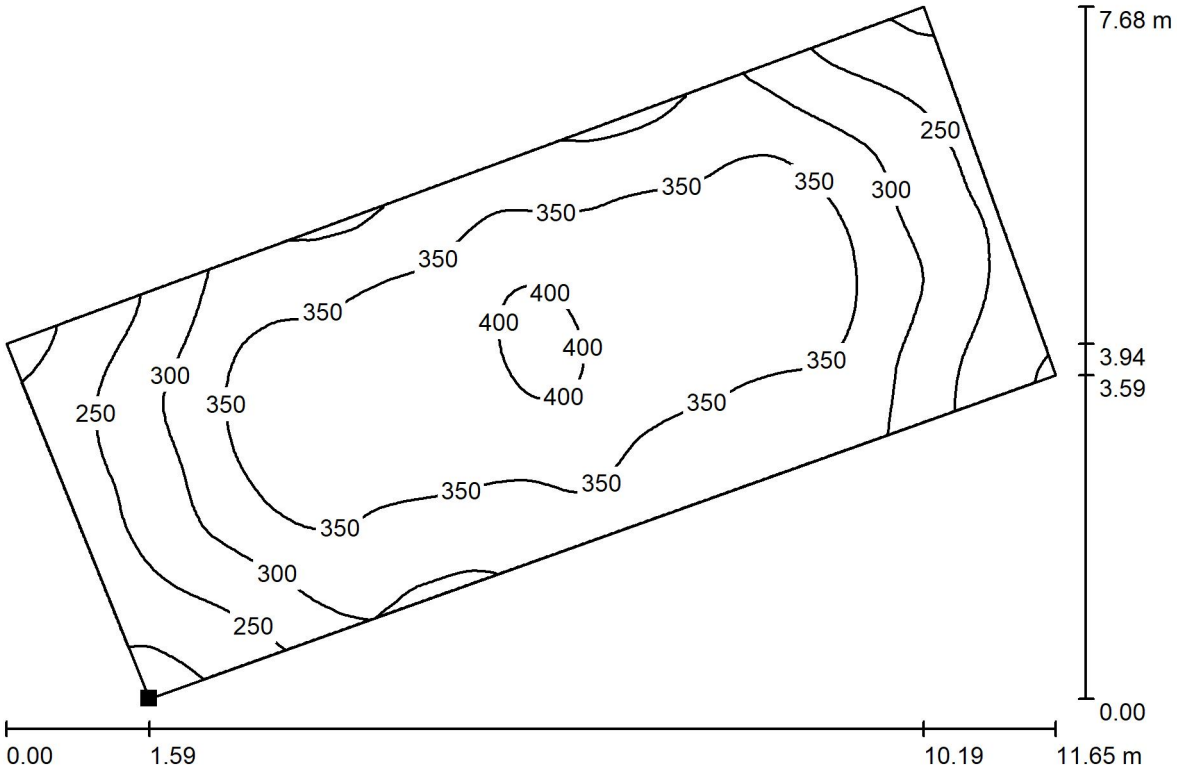
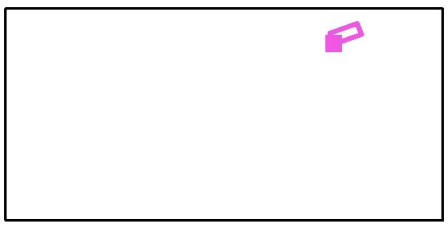
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Coaches - Entrance / Isolines (E, Perpendicular)



Values in Lux, Scale 1 : 84

Position of surface in external scene:
Marked point:
(292.733 m, 228.126 m, 0.750 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
323	182	413	0.564	0.440

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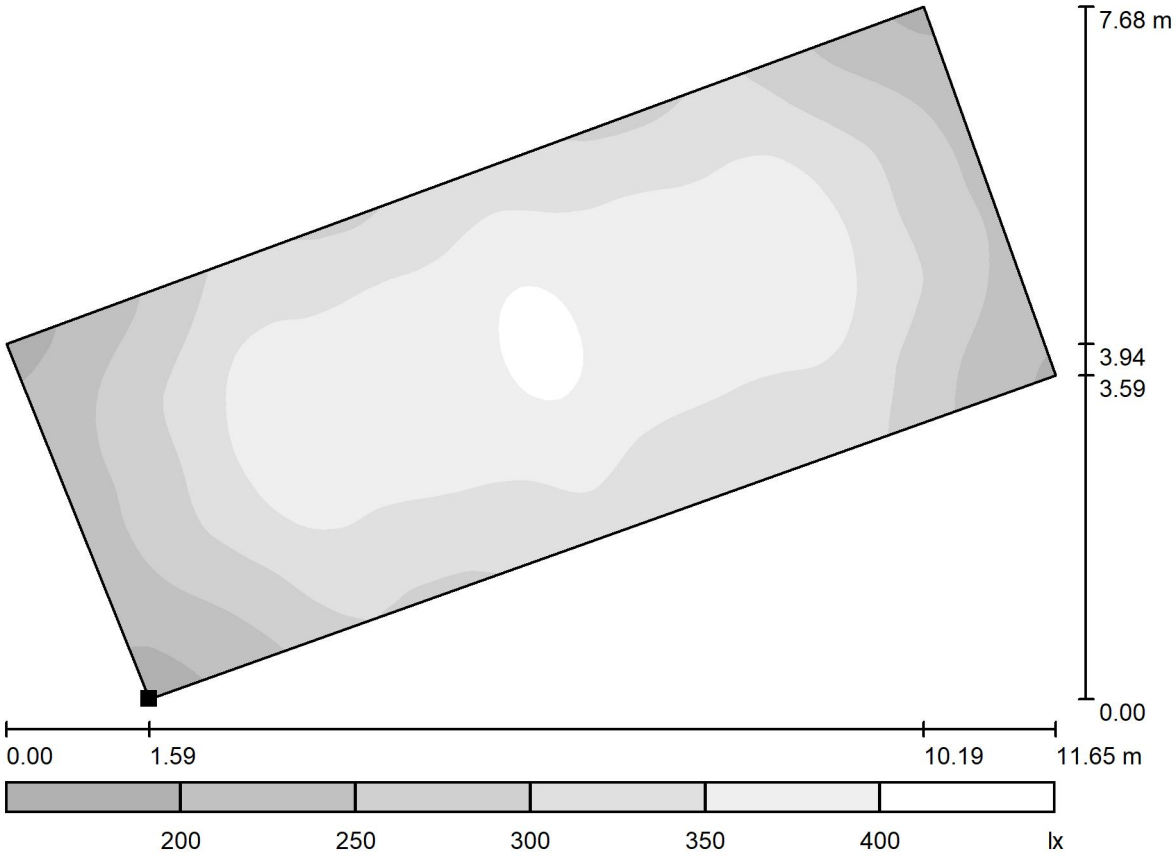
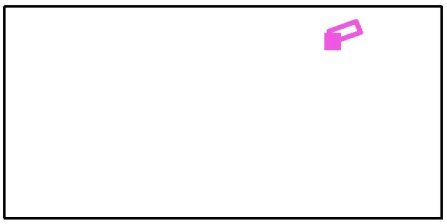
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Coaches - Entrance / Greyscale (E, Perpendicular)



Scale 1 : 84

Position of surface in external scene:
Marked point:
(292.733 m, 228.126 m, 0.750 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
323	182	413	0.564	0.440

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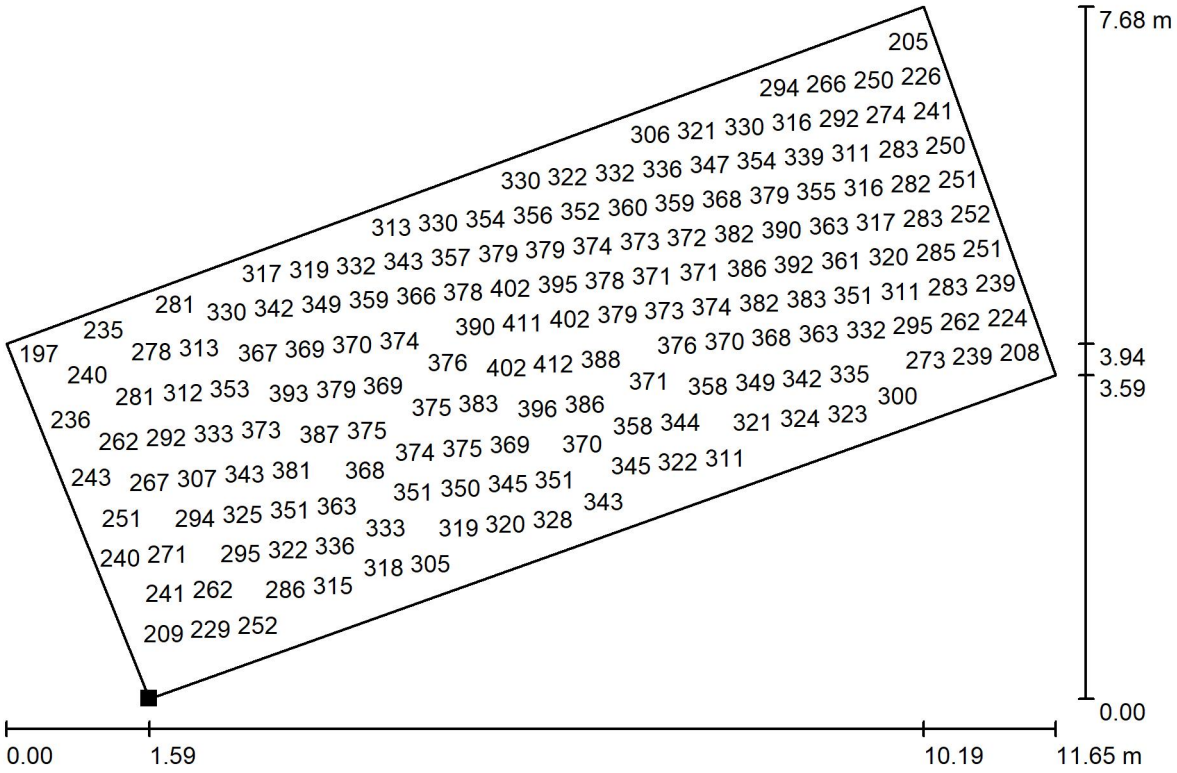
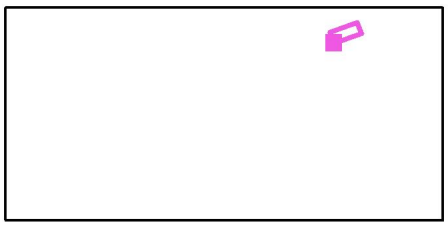
Short Stay Car Park 4000 Spaces / Typical Calculation - Parking Coaches - Entrance / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 84

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point:
(292.733 m, 228.126 m, 0.750 m)



Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
323	182	413	0.564	0.440

Luton Airport Expansion

Street Lighting

Date: 28.06.2019
Operator: Katerina Konsta

Arup

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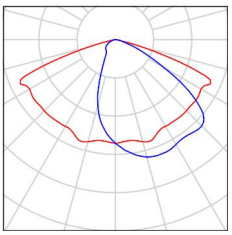
Luton Airport Expansion / Luminaire parts list

37 Pieces WE-EF 108-0907 VFL540 [S60] IP66:LED-36/72W/4K
Article No.: 108-0907
Luminous flux (Luminaire): 7973 lm
Luminous flux (Lamps): 8854 lm
Luminaire Wattage: 81.0 W
Luminaire classification according to CIE: 100
CIE flux code: 40 74 97 100 90
Fitting: 36 x LED-36/72W/840 - 4000K
(Correction Factor 1.000).



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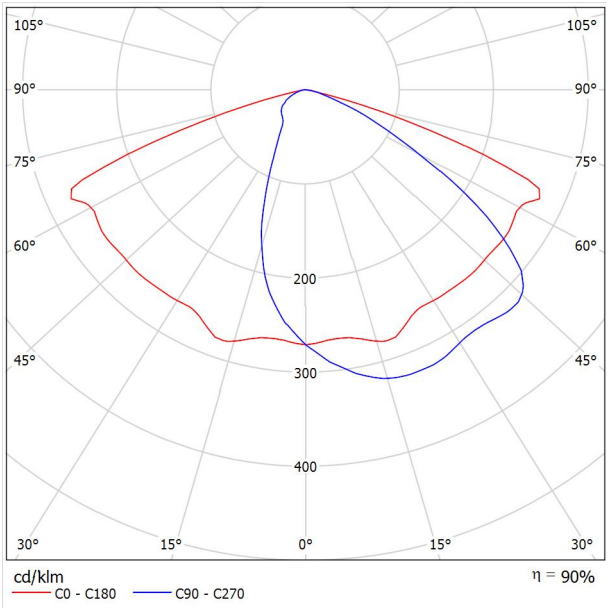
WE-EF 108-0907 VFL540 [S60] IP66:LED-36/72W/4K / Luminaire Data Sheet

Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 40 74 97 100 90

IP66, Class I or Class II. IK08. Marine-grade die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. UV stabilised acrylic panel in RFC® technology. Integrated heat sinks. Easy removal and replacement of LED board. CAD optimised OLC® PMMA lens for superior illumination and glare control. The luminaire is factory- sealed and does not need to be opened during the installation.
Spigot D = 60 x 80 mm or D = 76 x 80 mm (to be specified at order placement).
Recommended mounting height 2.5-8.0 m, depending on lamp type selected.

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

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Class M3 - (two lanes) / Planning data

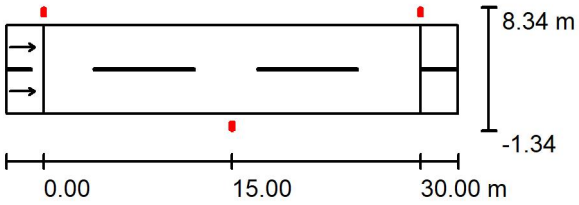
Road width: 7 meters
Lanes: 2
Column height: 8 meters
Arrangement: Double row with offset
Column spacing: 30 meters

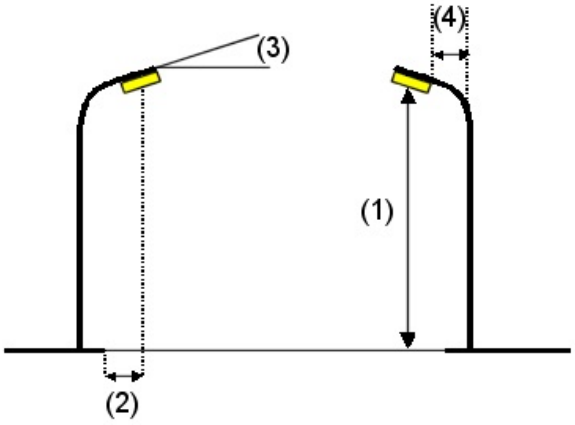
Street Profile

Roadway 1 (Width: 7.000 m, Number of lanes: 2, tarmac: R3, q0: 0.070)

Maintenance factor: 0.60

Luminaire Arrangements





Luminaire:	WE-EF 108-0907 VFL540 [S60] IP66:LED-36/72W/4K		
Luminous flux (Luminaire):	7973 lm	Maximum luminous intensities	
Luminous flux (Lamps):	8854 lm	at 70°:	413 cd/klm
Luminaire Wattage:	81.0 W	at 80°:	66 cd/klm
Arrangement:	Double row, with offset	at 90°:	0.00 cd/klm
Pole Distance:	30.000 m	Any direction forming the specified angle from the downward vertical, with the luminaire installed for use.	
Mounting Height (1):	8.000 m		
Height:	8.000 m	No luminous intensities above 90°.	
Overhang (2):	-0.650 m	Arrangement complies with luminous intensity class G4.	
Boom Angle (3):	0.0 °		
Boom Length (4):	0.000 m	Arrangement complies with glare index class D.5.	

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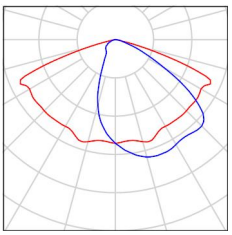
Class M3 - (two lanes) / Luminaire parts list

WE-EF 108-0907 VFL540 [S60] IP66:LED-36/72W/4K
Article No.: 108-0907
Luminous flux (Luminaire): 7973 lm
Luminous flux (Lamps): 8854 lm
Luminaire Wattage: 81.0 W
Luminaire classification according to CIE: 100
CIE flux code: 40 74 97 100 90
Fitting: 36 x LED-36/72W/840 - 4000K (Correction Factor 1.000).



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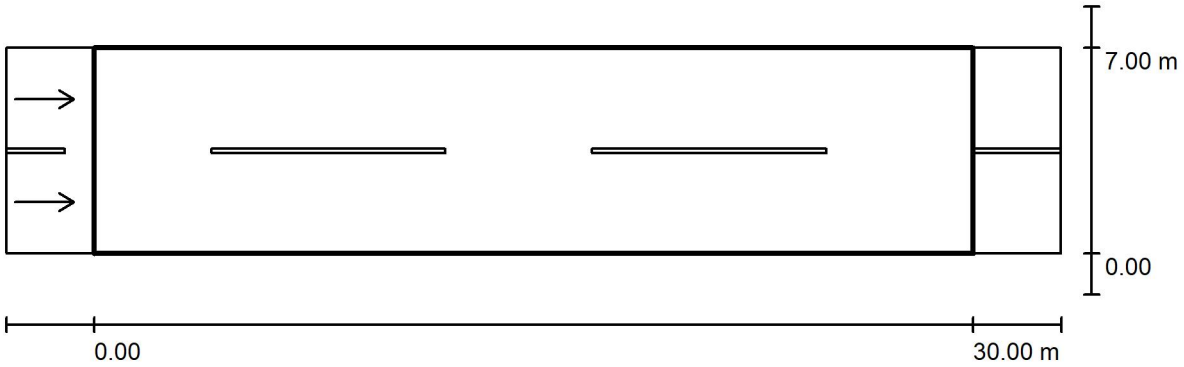
Class M3 - (two lanes) / Valuation Field Roadway 1 / Results overview



Maintenance factor: 0.60

Scale 1:258

Grid: 10 x 6 Points
Accompanying Street Elements: Roadway 1.
tarmac: R3, q0: 0.070
Selected Lighting Class: ME3a

(All lighting performance requirements are met.)

	L_{av} [cd/m²]	U0	Ul	TI [%]	SR
Calculated values:	1.12	0.90	0.86	5	0.72
Required values according to class:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15	≥ 0.50
Fulfilled/Not fulfilled:	✓	✓	✓	✓	✓

Assigned Observer (2 Pieces):

No.	Observer	Position [m]	L_{av} [cd/m²]	U0	Ul	TI [%]
1	Observer 1	(-60.000, 1.750, 1.500)	1.12	0.90	0.86	5
2	Observer 2	(-60.000, 5.250, 1.500)	1.12	0.90	0.86	5

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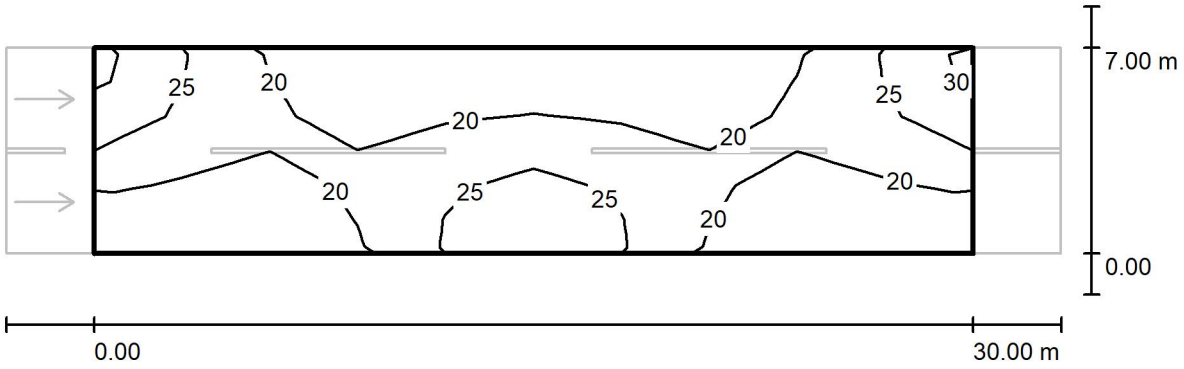
Class M3 - (two lanes) / Valuation Field Roadway 1 / Isolines (E)



Values in Lux, Scale 1 : 258

Grid: 10 x 6 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
21	16	29	0.750	0.547

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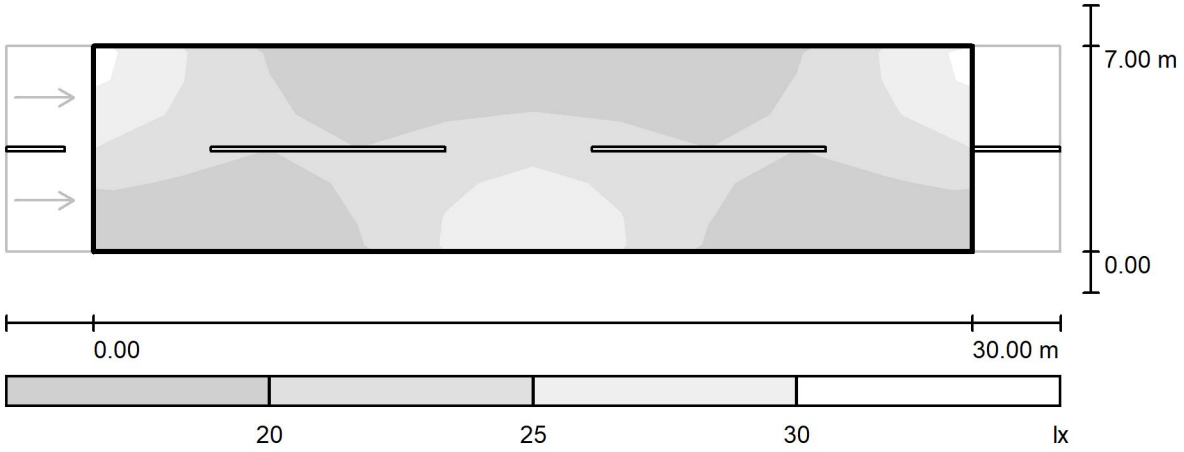
Class M3 - (two lanes) / Valuation Field Roadway 1 / Greyscale (E)



Scale 1 : 258

Grid: 10 x 6 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
21	16	29	0.750	0.547

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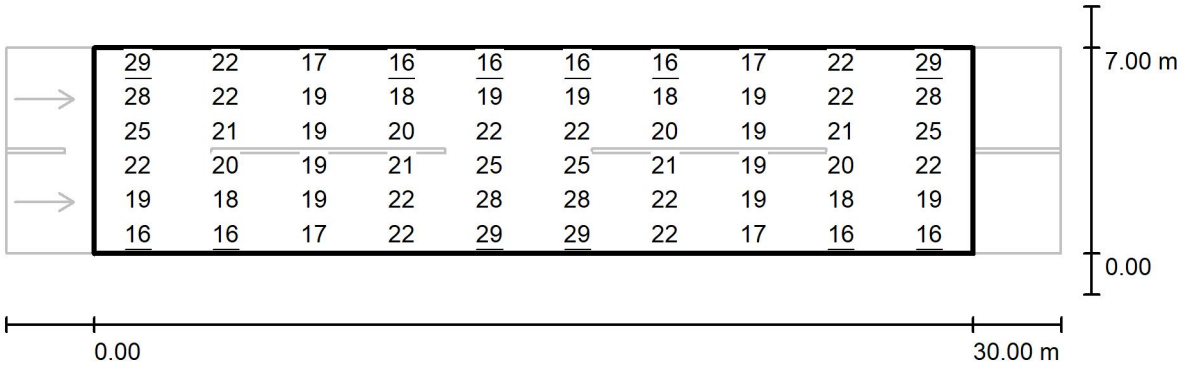
Class M3 - (two lanes) / Valuation Field Roadway 1 / Value Chart (E)



Values in Lux, Scale 1 : 258

Grid: 10 x 6 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
21	16	29	0.750	0.547

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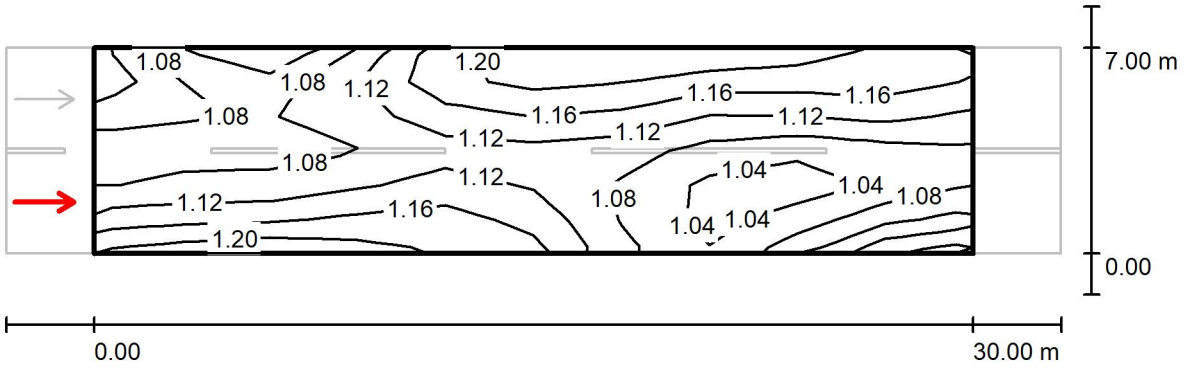
Class M3 - (two lanes) / Valuation Field Roadway 1 / Observer 1 / Isolines (L)



Values in Candela/m², Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 1.750 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME3a:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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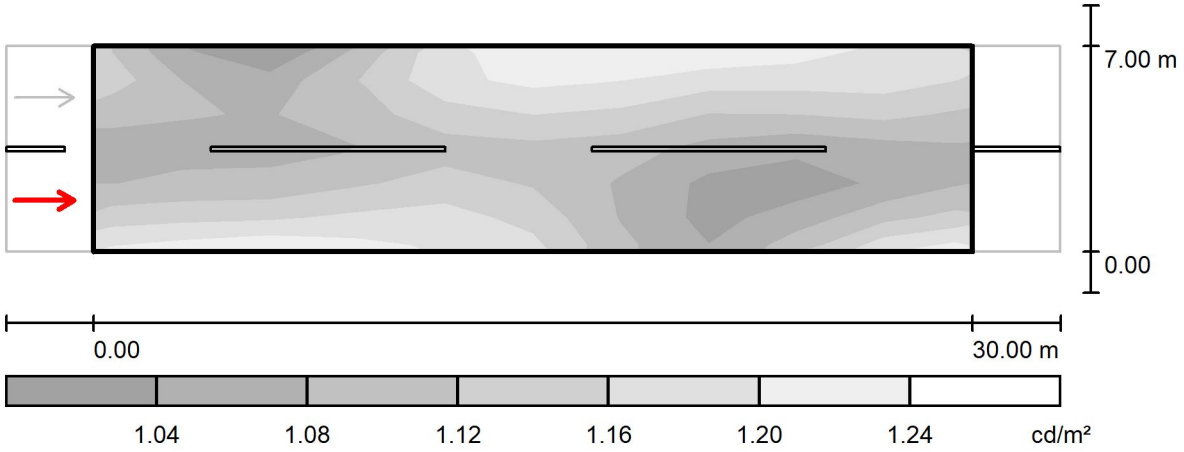
Class M3 - (two lanes) / Valuation Field Roadway 1 / Observer 1 / Greyscale (L)



Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 1.750 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	Ul	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME3a:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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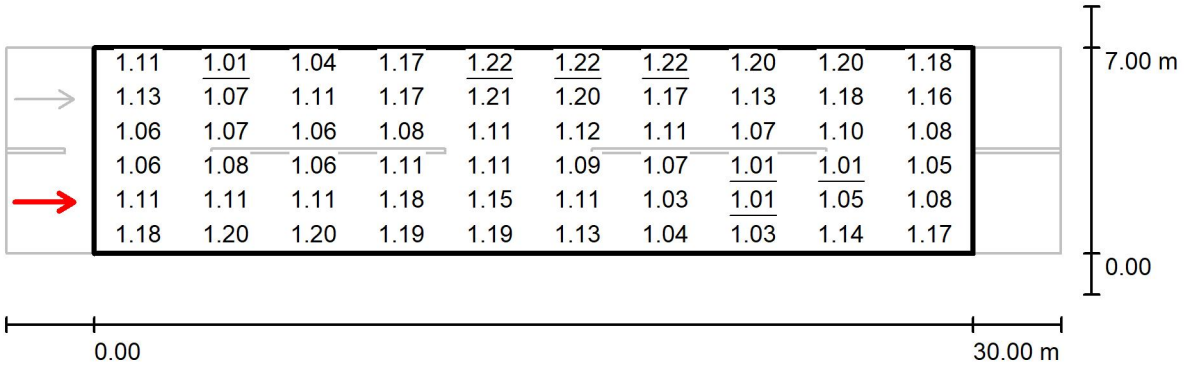
Class M3 - (two lanes) / Valuation Field Roadway 1 / Observer 1 / Value Chart (L)



Values in Candela/m², Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 1.750 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME3a:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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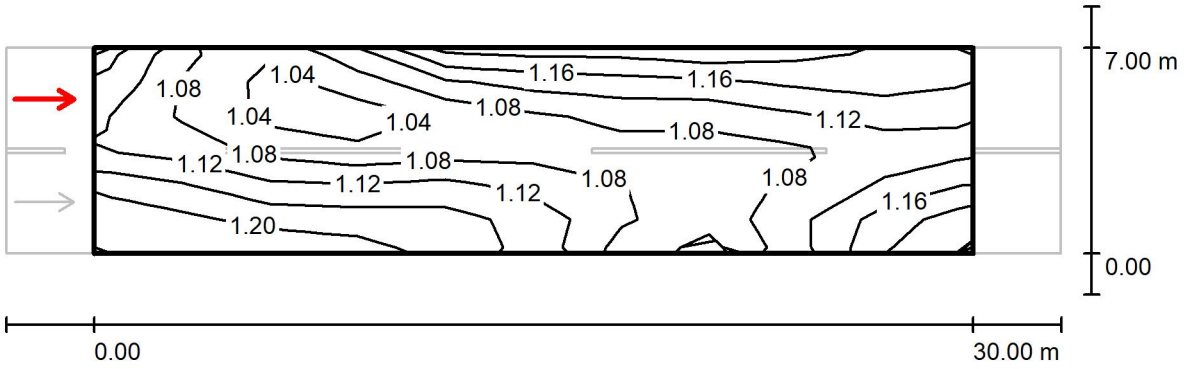
Class M3 - (two lanes) / Valuation Field Roadway 1 / Observer 2 / Isolines (L)



Values in Candela/m², Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 5.250 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME3a:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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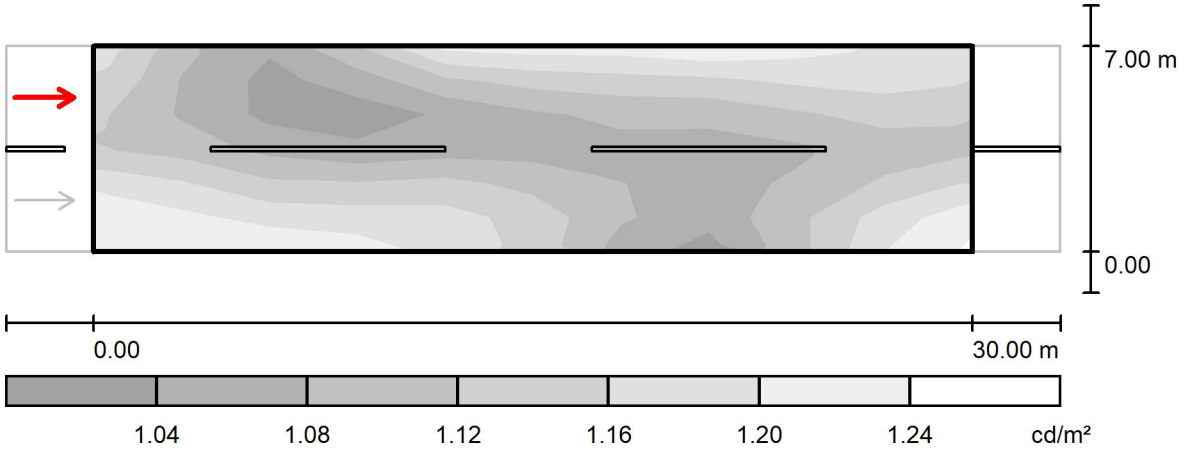
Class M3 - (two lanes) / Valuation Field Roadway 1 / Observer 2 / Greyscale (L)



Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 5.250 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	Ul	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME3a:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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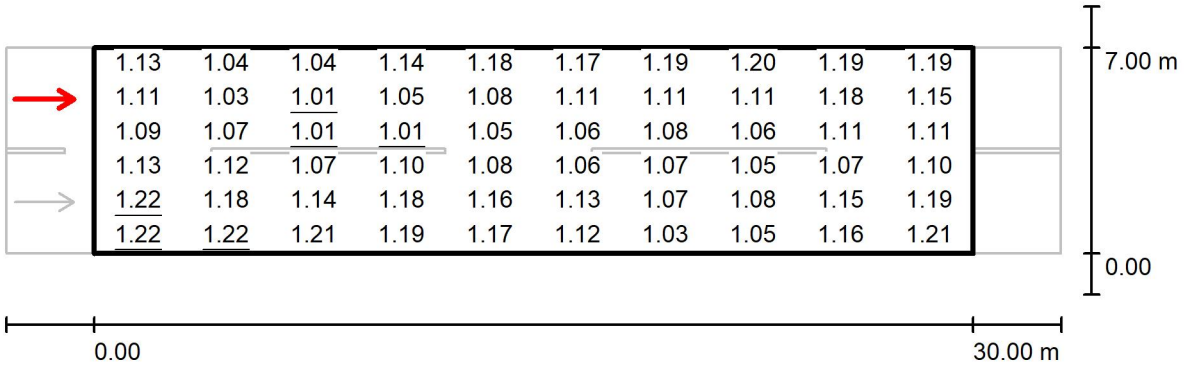
Class M3 - (two lanes) / Valuation Field Roadway 1 / Observer 2 / Value Chart (L)



Values in Candela/m², Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 5.250 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME3a:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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Class M4 / Planning data

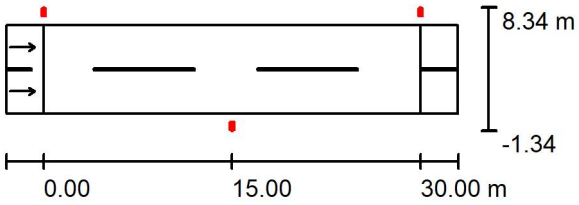
Road width: 7 meters
Lanes: 2
Column height: 8 meters
Arrangement: Double row with offset
Column spacing: 30 meters

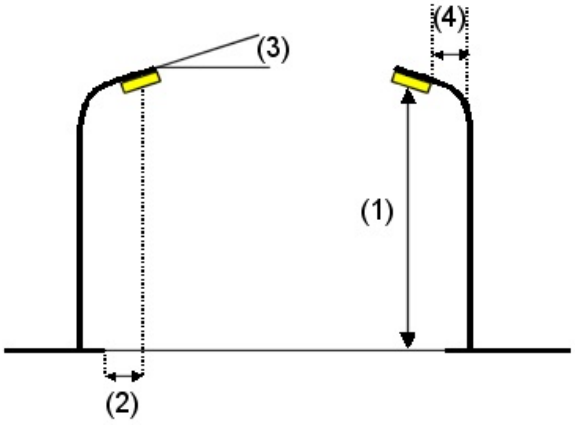
Street Profile

Roadway 1 (Width: 7.000 m, Number of lanes: 2, tarmac: R3, q0: 0.070)

Maintenance factor: 0.60

Luminaire Arrangements





Luminaire:	WE-EF 108-0907 VFL540 [S60] IP66:LED-36/72W/4K		
Luminous flux (Luminaire):	7973 lm	Maximum luminous intensities	
Luminous flux (Lamps):	8854 lm	at 70°:	413 cd/klm
Luminaire Wattage:	81.0 W	at 80°:	66 cd/klm
Arrangement:	Double row, with offset	at 90°:	0.00 cd/klm
Pole Distance:	30.000 m	Any direction forming the specified angle from the downward vertical, with the luminaire installed for use.	
Mounting Height (1):	8.000 m		
Height:	8.000 m	No luminous intensities above 90°.	
Overhang (2):	-0.650 m	Arrangement complies with luminous intensity class G4.	
Boom Angle (3):	0.0 °		
Boom Length (4):	0.000 m	Arrangement complies with glare index class D.5.	

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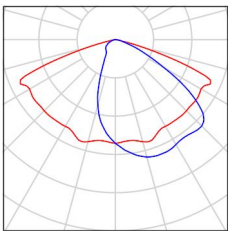
Class M4 / Luminaire parts list

WE-EF 108-0907 VFL540 [S60] IP66:LED-36/72W/4K
Article No.: 108-0907
Luminous flux (Luminaire): 7973 lm
Luminous flux (Lamps): 8854 lm
Luminaire Wattage: 81.0 W
Luminaire classification according to CIE: 100
CIE flux code: 40 74 97 100 90
Fitting: 36 x LED-36/72W/840 - 4000K (Correction Factor 1.000).



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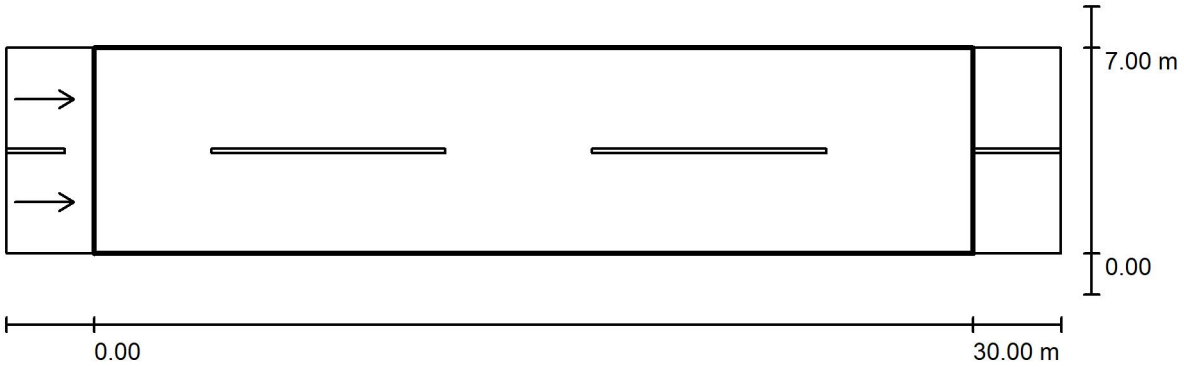
Class M4 / Valuation Field Roadway 1 / Results overview



Maintenance factor: 0.60

Scale 1:258

Grid: 10 x 6 Points
Accompanying Street Elements: Roadway 1.
tarmac: R3, q0: 0.070
Selected Lighting Class: ME4a (All lighting performance requirements are met.)

	L_{av} [cd/m²]	U0	Ul	TI [%]	SR
Calculated values:	1.12	0.90	0.86	5	0.72
Required values according to class:	≥ 0.75	≥ 0.40	≥ 0.60	≤ 15	≥ 0.50
Fulfilled/Not fulfilled:	✓	✓	✓	✓	✓

Assigned Observer (2 Pieces):

No.	Observer	Position [m]	L_{av} [cd/m²]	U0	Ul	TI [%]
1	Observer 1	(-60.000, 1.750, 1.500)	1.12	0.90	0.86	5
2	Observer 2	(-60.000, 5.250, 1.500)	1.12	0.90	0.86	5

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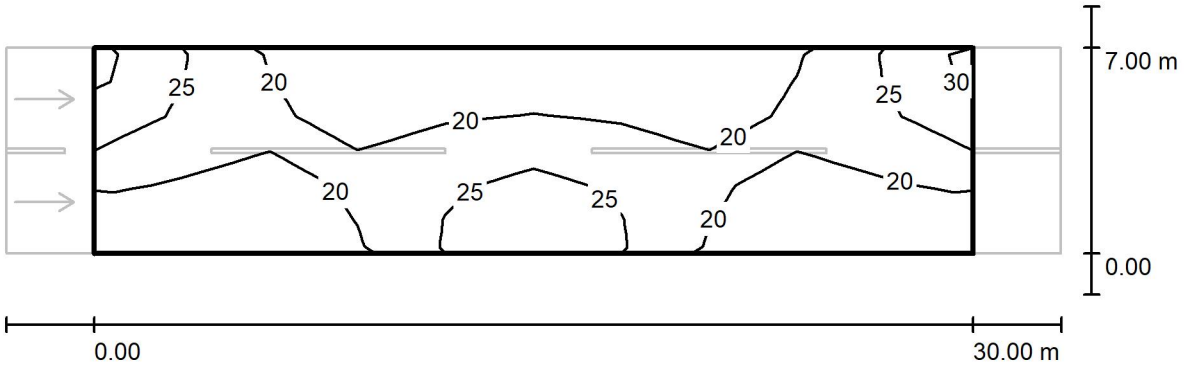
Class M4 / Valuation Field Roadway 1 / Isolines (E)



Values in Lux, Scale 1 : 258

Grid: 10 x 6 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
21	16	29	0.750	0.547

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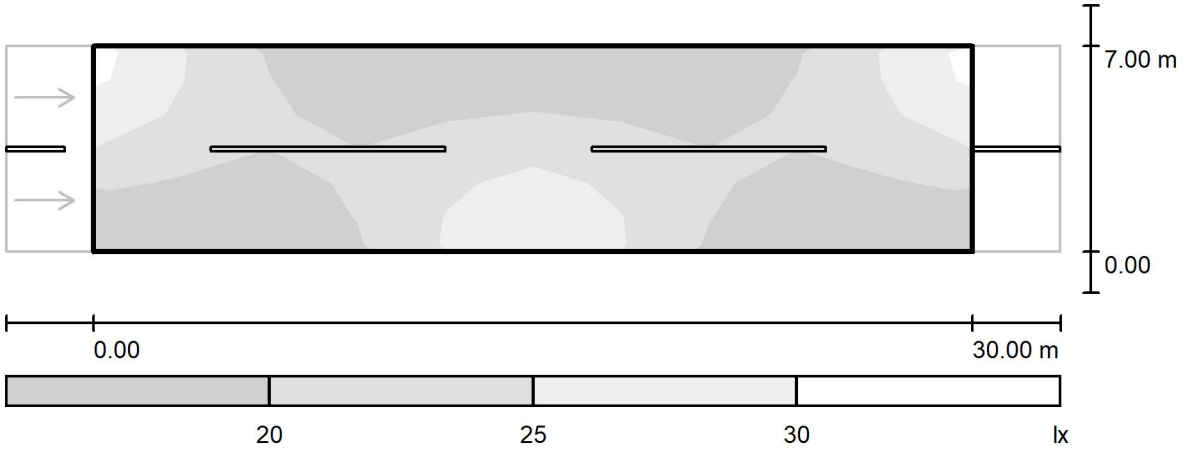
Class M4 / Valuation Field Roadway 1 / Greyscale (E)



Scale 1 : 258

Grid: 10 x 6 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
21	16	29	0.750	0.547

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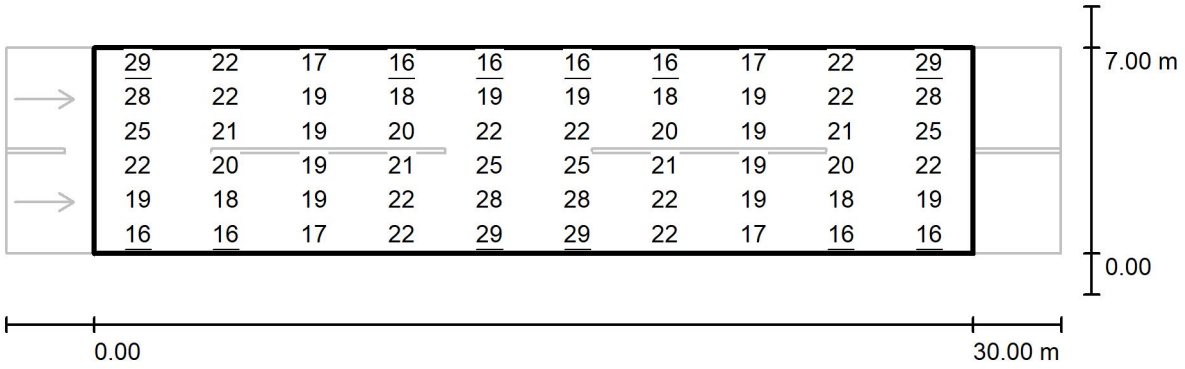
Class M4 / Valuation Field Roadway 1 / Value Chart (E)



Values in Lux, Scale 1 : 258

Grid: 10 x 6 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
21	16	29	0.750	0.547

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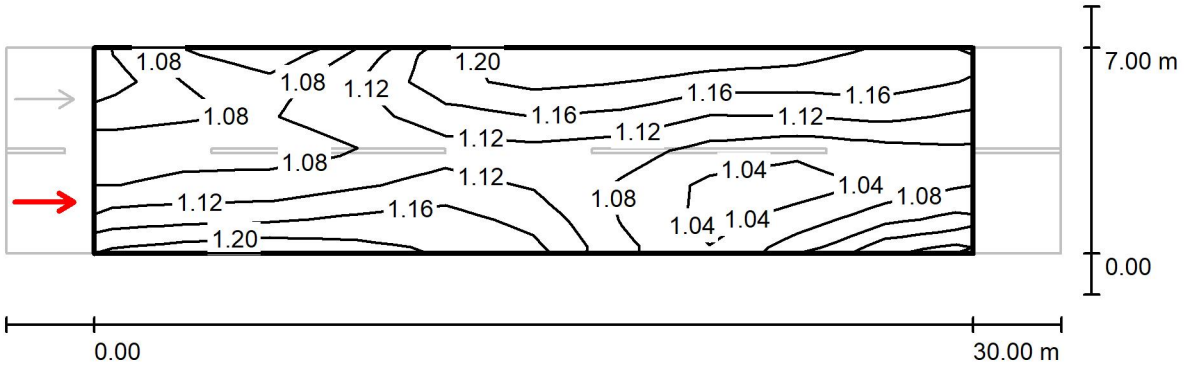
Class M4 / Valuation Field Roadway 1 / Observer 1 / Isolines (L)



Values in Candela/m², Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 1.750 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME4a:	≥ 0.75	≥ 0.40	≥ 0.60	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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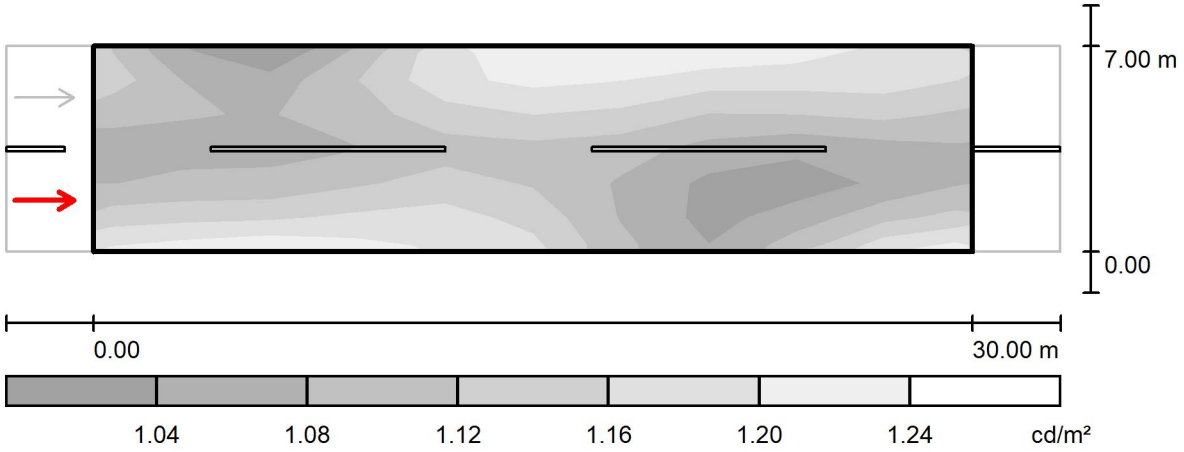
Class M4 / Valuation Field Roadway 1 / Observer 1 / Greyscale (L)



Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 1.750 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	Ul	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME4a:	≥ 0.75	≥ 0.40	≥ 0.60	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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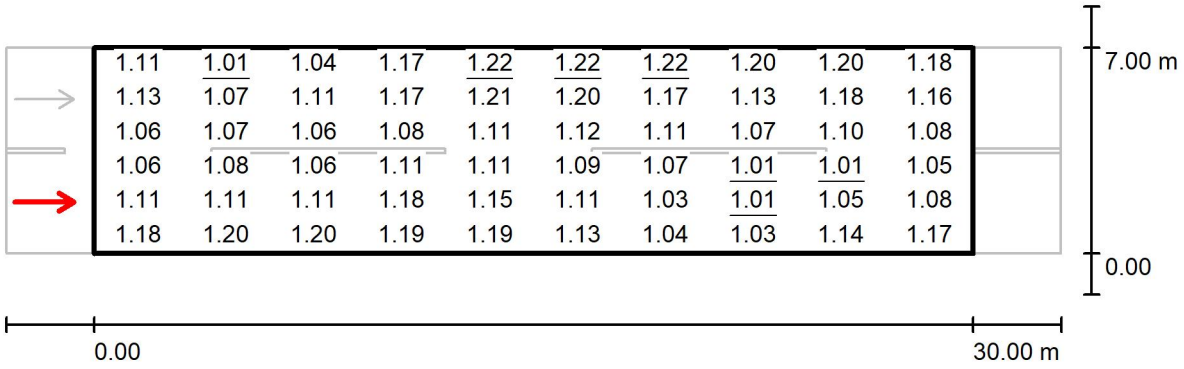
Class M4 / Valuation Field Roadway 1 / Observer 1 / Value Chart (L)



Values in Candela/m², Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 1.750 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME4a:	≥ 0.75	≥ 0.40	≥ 0.60	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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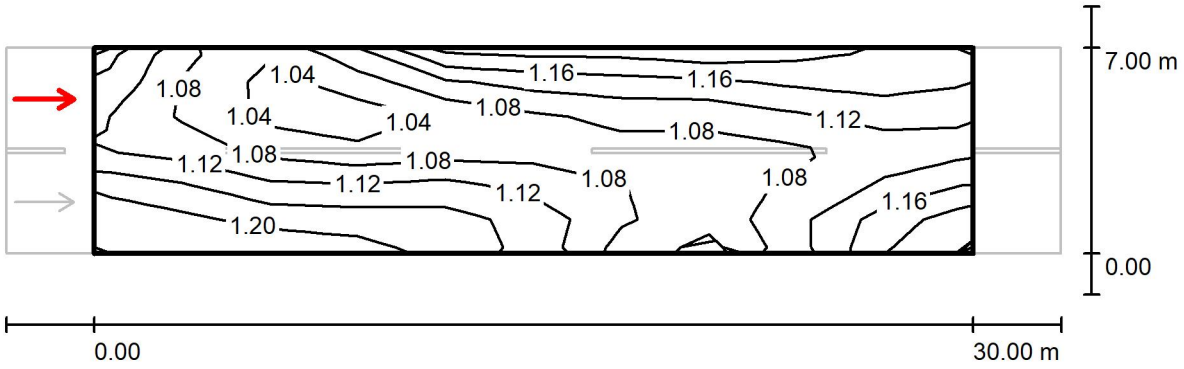
Class M4 / Valuation Field Roadway 1 / Observer 2 / Isolines (L)



Values in Candela/m², Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 5.250 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME4a:	≥ 0.75	≥ 0.40	≥ 0.60	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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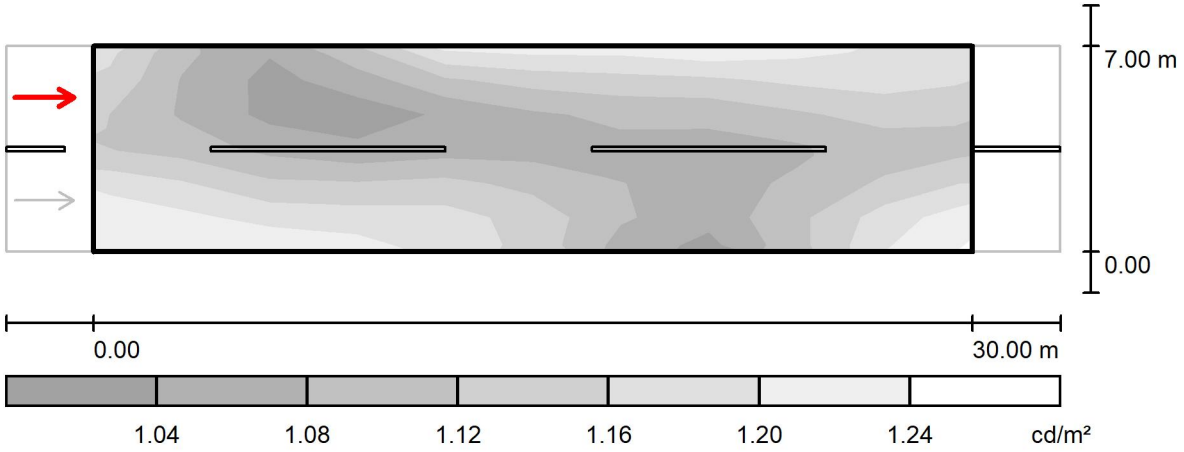
Class M4 / Valuation Field Roadway 1 / Observer 2 / Greyscale (L)



Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 5.250 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME4a:	≥ 0.75	≥ 0.40	≥ 0.60	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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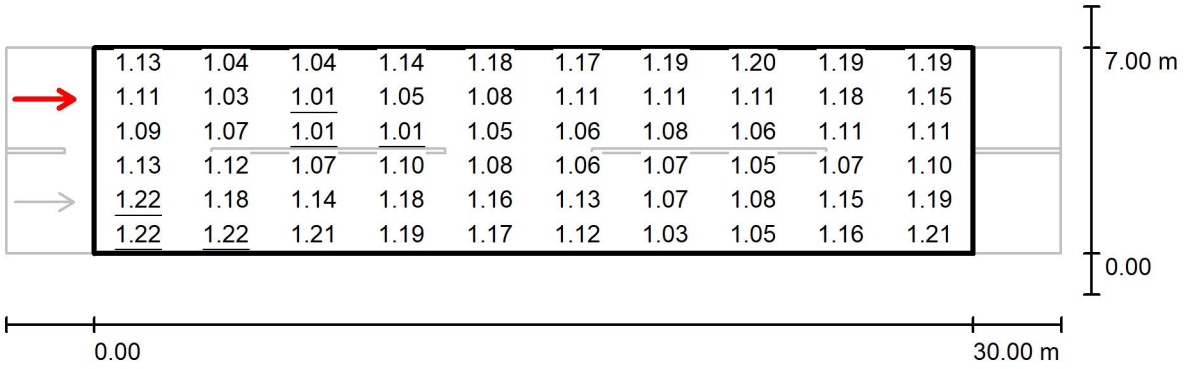
Class M4 / Valuation Field Roadway 1 / Observer 2 / Value Chart (L)



Values in Candela/m², Scale 1 : 258

Grid: 10 x 6 Points
Observer Position: (-60.000 m, 5.250 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
Calculated values:	1.12	0.90	0.86	5
Required values according to class ME4a:	≥ 0.75	≥ 0.40	≥ 0.60	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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Class M3 (four lanes) / Planning data

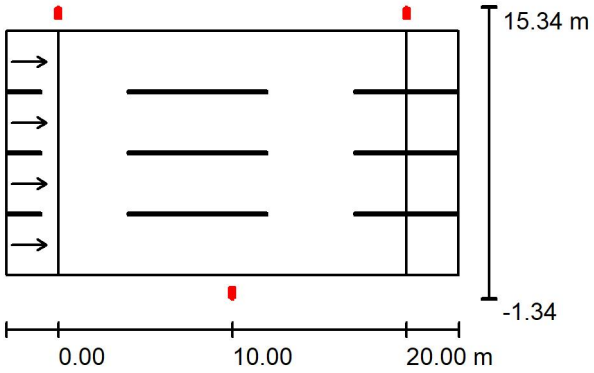
Road width: 14 meters
Lanes: 4
Column height: 8 meters
Arrangement: Double row with offset
Column spacing: 20 meters

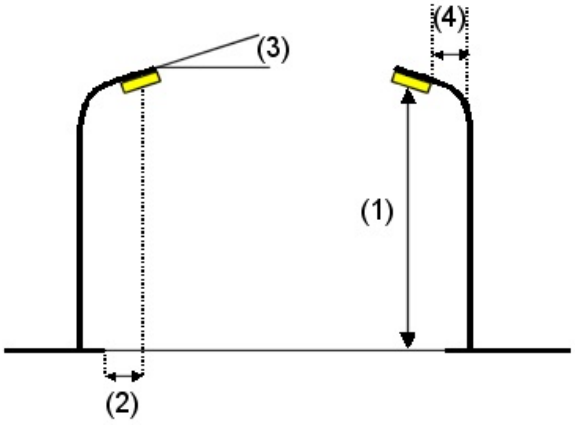
Street Profile

Roadway 1 (Width: 14.000 m, Number of lanes: 4, tarmac: R3, q0: 0.070)

Maintenance factor: 0.60

Luminaire Arrangements





Luminaire:	WE-EF 108-0907 VFL540 [S60] IP66:LED-36/72W/4K		
Luminous flux (Luminaire):	7973 lm	Maximum luminous intensities	
Luminous flux (Lamps):	8854 lm	at 70°:	413 cd/klm
Luminaire Wattage:	81.0 W	at 80°:	66 cd/klm
Arrangement:	Double row, with offset	at 90°:	0.00 cd/klm
Pole Distance:	20.000 m	Any direction forming the specified angle from the downward vertical, with the luminaire installed for use.	
Mounting Height (1):	8.000 m		
Height:	8.000 m	No luminous intensities above 90°.	
Overhang (2):	-0.650 m	Arrangement complies with luminous intensity class G4.	
Boom Angle (3):	0.0 °		
Boom Length (4):	0.000 m	Arrangement complies with glare index class D.5.	

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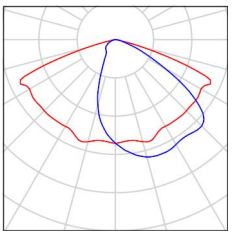
Class M3 (four lanes) / Luminaire parts list

WE-EF 108-0907 VFL540 [S60] IP66:LED-36/72W/4K
Article No.: 108-0907
Luminous flux (Luminaire): 7973 lm
Luminous flux (Lamps): 8854 lm
Luminaire Wattage: 81.0 W
Luminaire classification according to CIE: 100
CIE flux code: 40 74 97 100 90
Fitting: 36 x LED-36/72W/840 - 4000K (Correction Factor 1.000).



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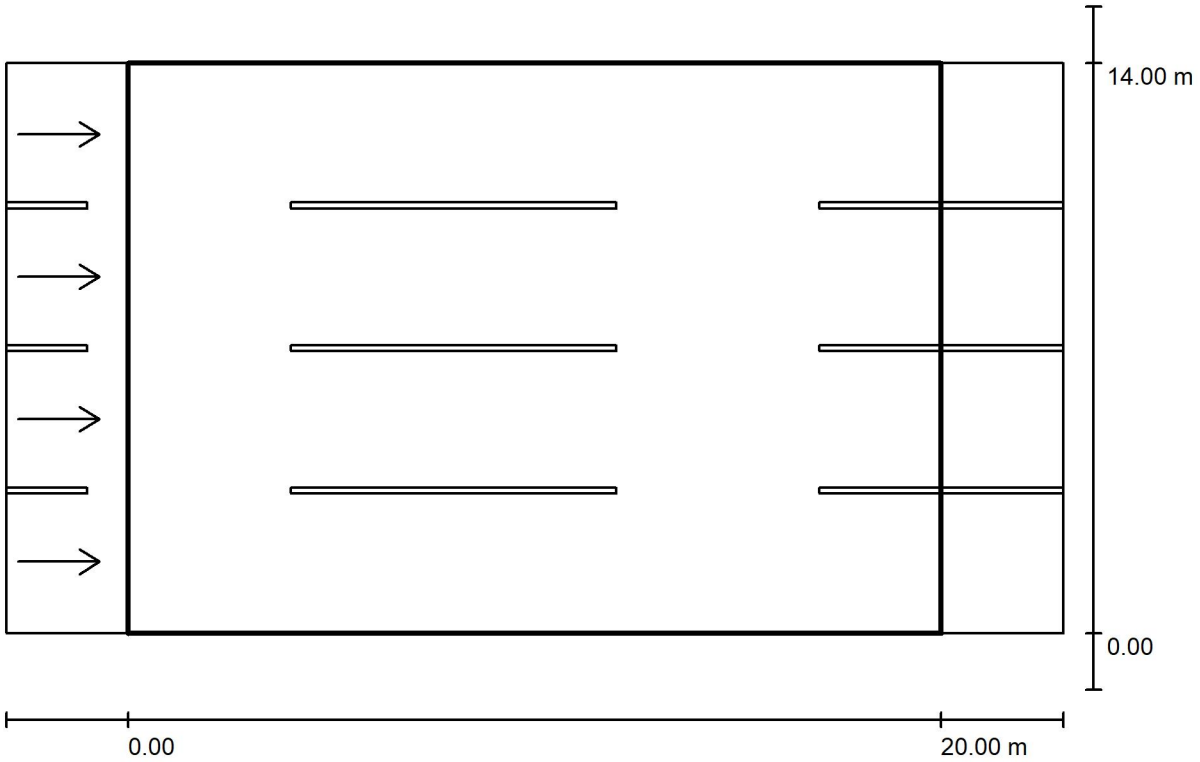
Class M3 (four lanes) / Valuation Field Roadway 1 / Results overview



Maintenance factor: 0.60

Scale 1:186

Grid: 10 x 12 Points
Accompanying Street Elements: Roadway 1.
tarmac: R3, q0: 0.070
Selected Lighting Class: ME3a

(All lighting performance requirements are met.)

	L_{av} [cd/m²]	U0	Ul	TI [%]	SR
Calculated values:	1.18	0.78	0.83	5	0.59
Required values according to class:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15	≥ 0.50
Fulfilled/Not fulfilled:	✓	✓	✓	✓	✓

Assigned Observer (4 Pieces):

No.	Observer	Position [m]	L_{av} [cd/m²]	U0	Ul	TI [%]
1	Observer 1	(-60.000, 1.750, 1.500)	1.18	0.79	0.83	5
2	Observer 2	(-60.000, 5.250, 1.500)	1.19	0.78	0.91	4
3	Observer 3	(-60.000, 8.750, 1.500)	1.19	0.78	0.91	4
4	Observer 4	(-60.000, 12.250, 1.500)	1.18	0.79	0.83	5

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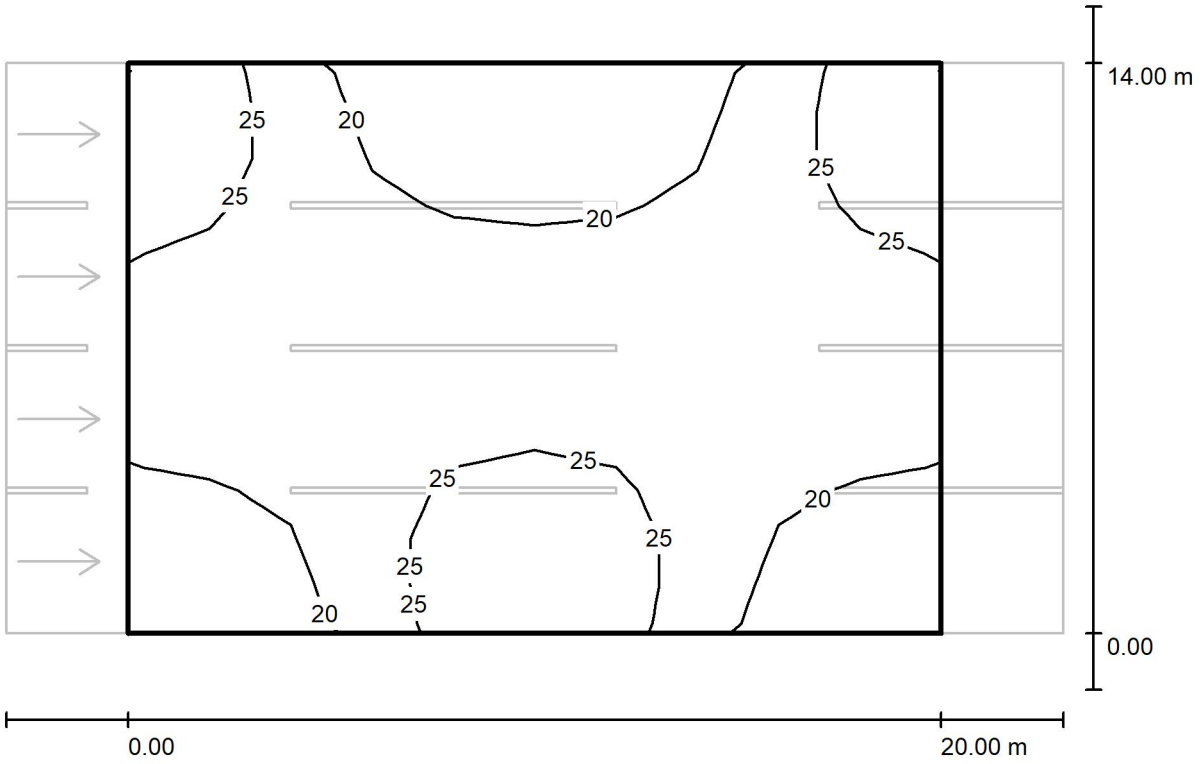
Class M3 (four lanes) / Valuation Field Roadway 1 / Isolines (E)



Values in Lux, Scale 1 : 186

Grid: 10 x 12 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
22	15	29	0.678	0.521

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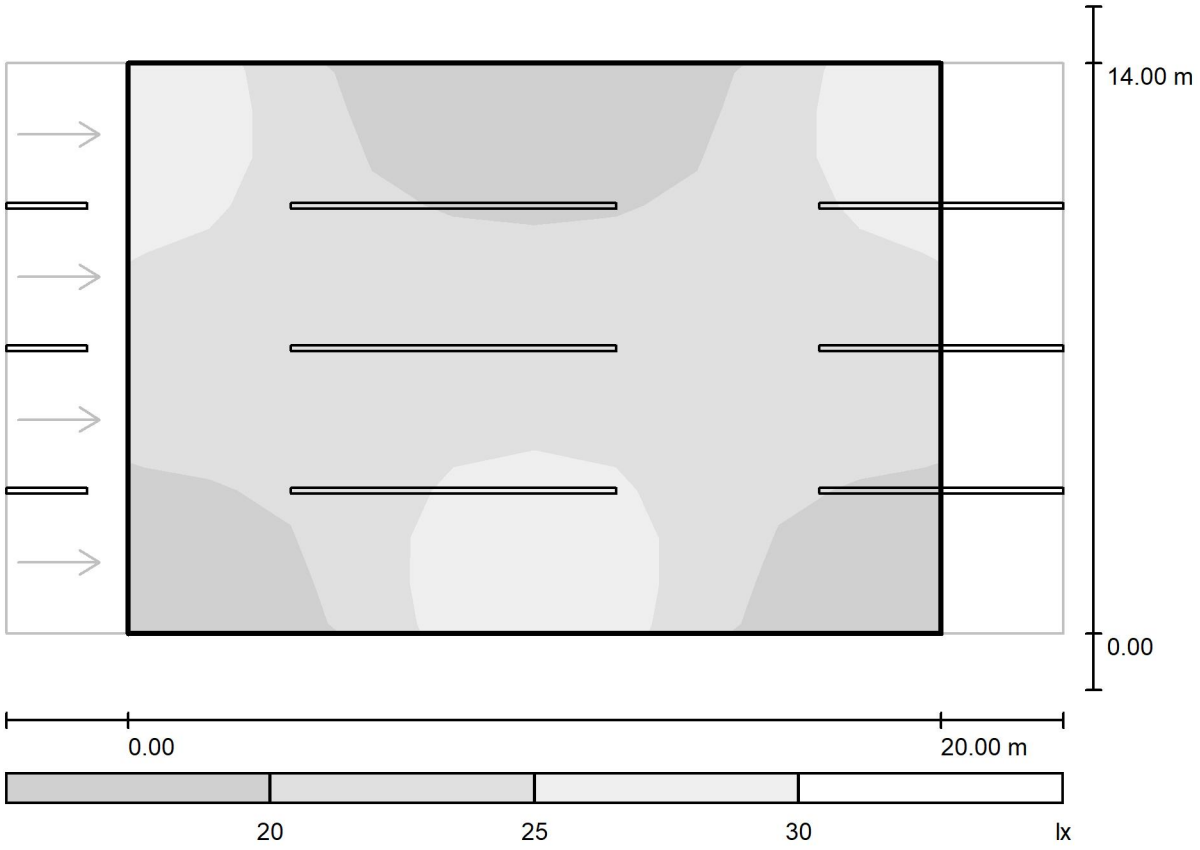
Class M3 (four lanes) / Valuation Field Roadway 1 / Greyscale (E)



Scale 1 : 186

Grid: 10 x 12 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
22	15	29	0.678	0.521

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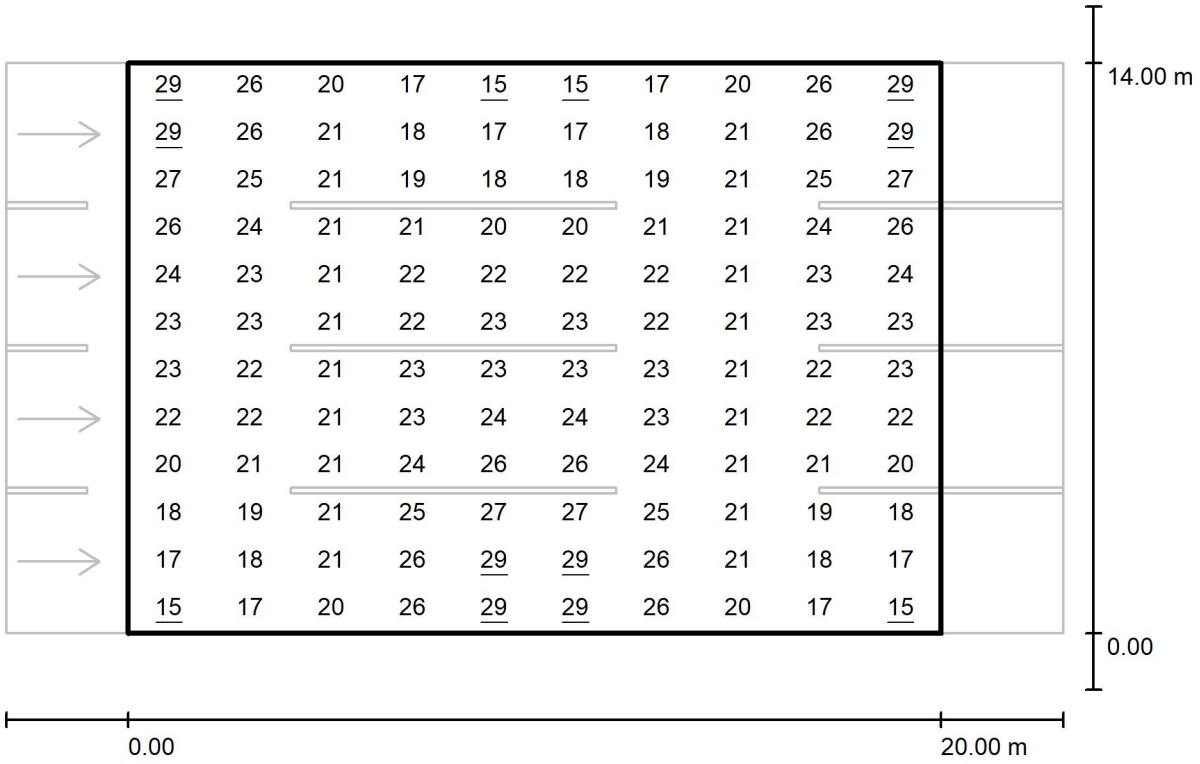
Class M3 (four lanes) / Valuation Field Roadway 1 / Value Chart (E)



Values in Lux, Scale 1 : 186

Grid: 10 x 12 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
22	15	29	0.678	0.521

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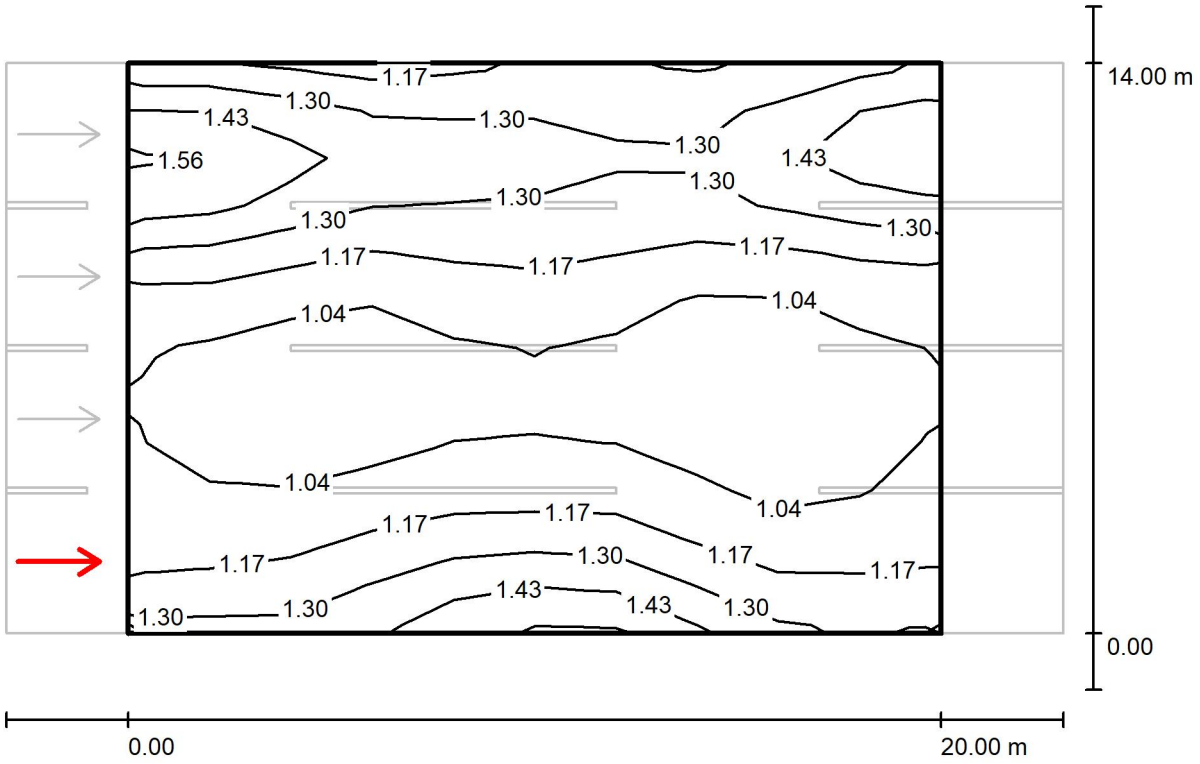
Class M3 (four lanes) / Valuation Field Roadway 1 / Observer 1 / Isolines (L)



Values in Candela/m², Scale 1 : 186

Grid: 10 x 12 Points
Observer Position: (-60.000 m, 1.750 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
Calculated values:	1.18	0.79	0.83	5
Required values according to class ME3a:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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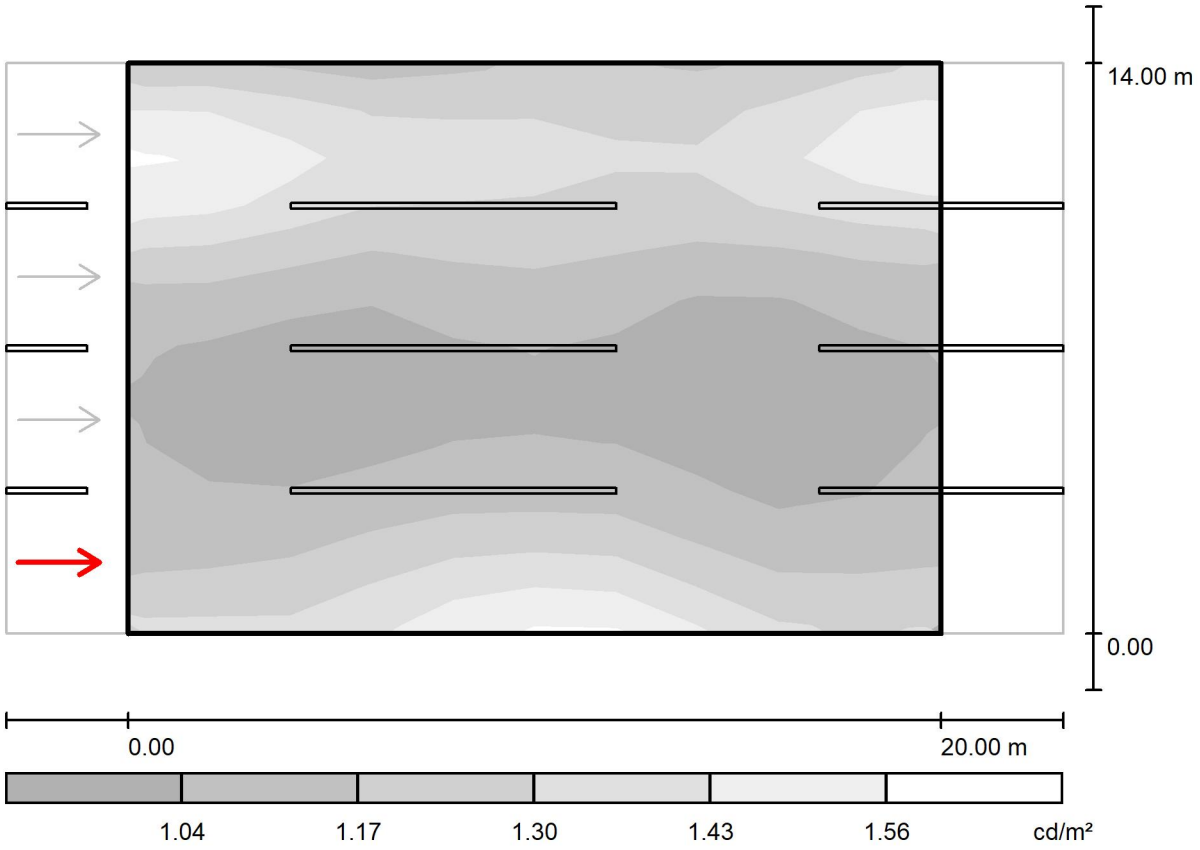
Class M3 (four lanes) / Valuation Field Roadway 1 / Observer 1 / Greyscale (L)



Scale 1 : 186

Grid: 10 x 12 Points
Observer Position: (-60.000 m, 1.750 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
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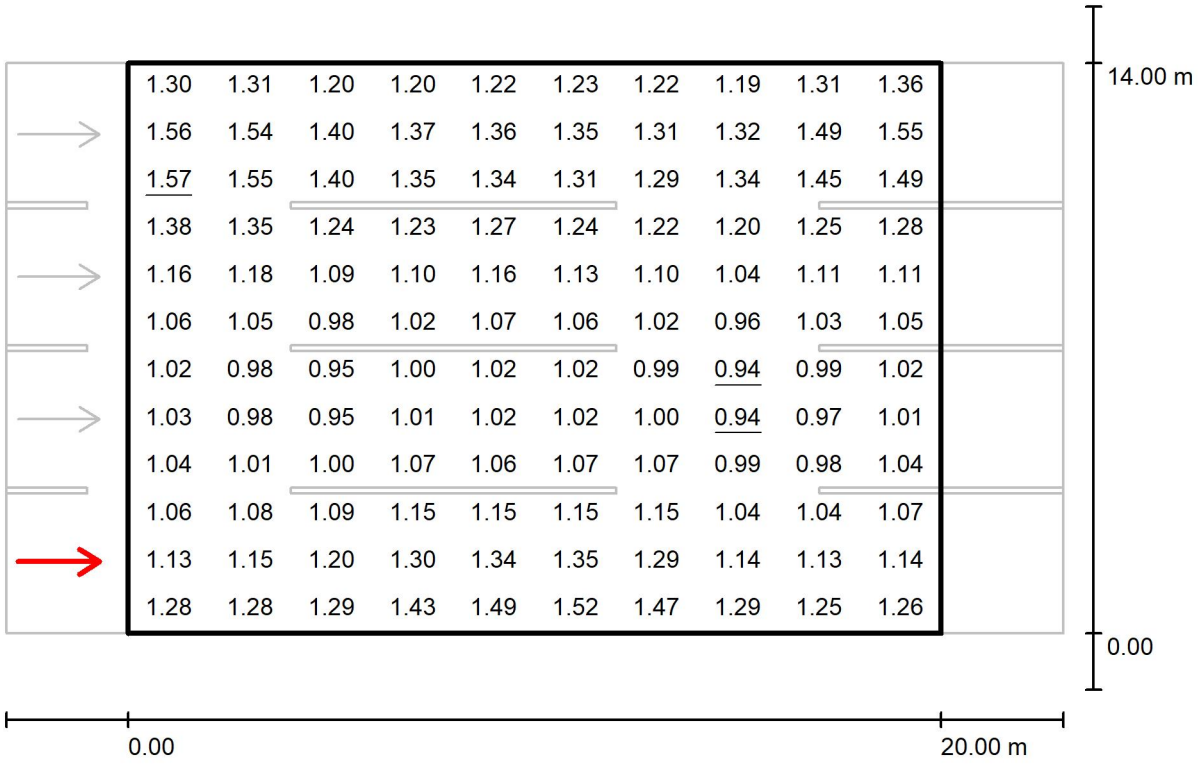
Class M3 (four lanes) / Valuation Field Roadway 1 / Observer 1 / Value Chart (L)



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tarmac: R3, q0: 0.070

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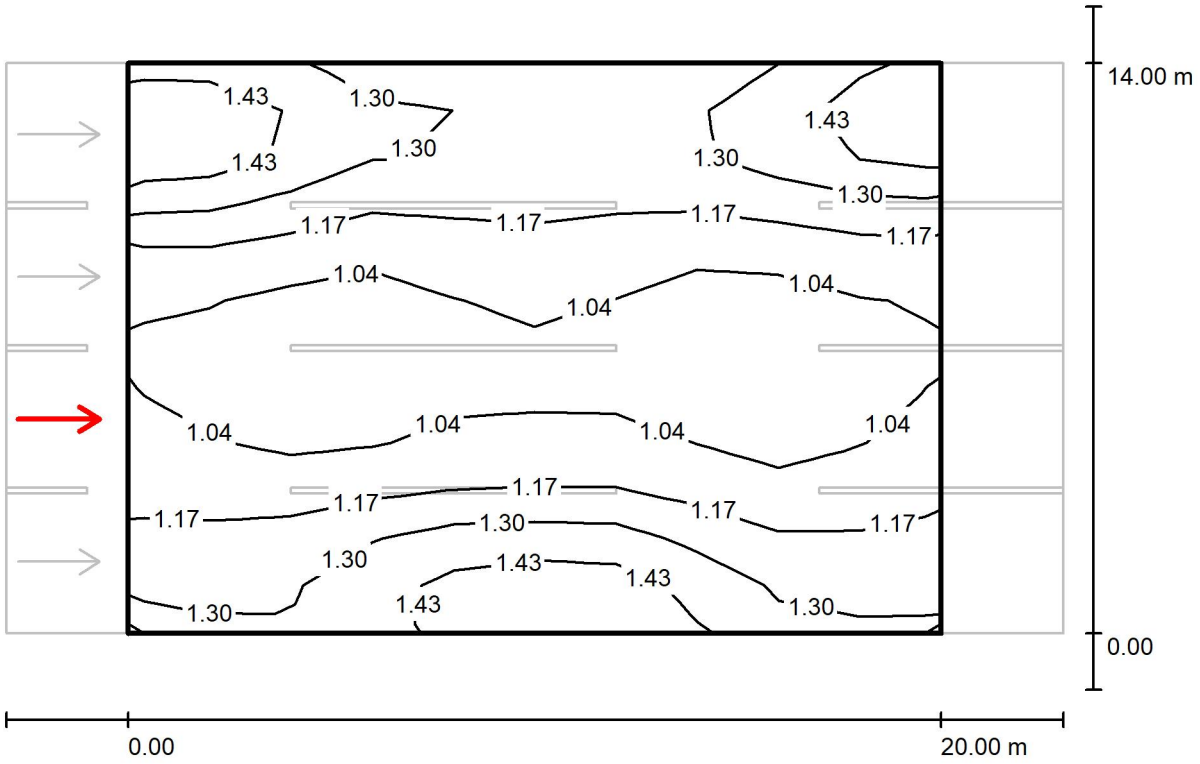
Class M3 (four lanes) / Valuation Field Roadway 1 / Observer 2 / Isolines (L)



Values in Candela/m², Scale 1 : 186

Grid: 10 x 12 Points
Observer Position: (-60.000 m, 5.250 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
Calculated values:	1.19	0.78	0.91	4
Required values according to class ME3a:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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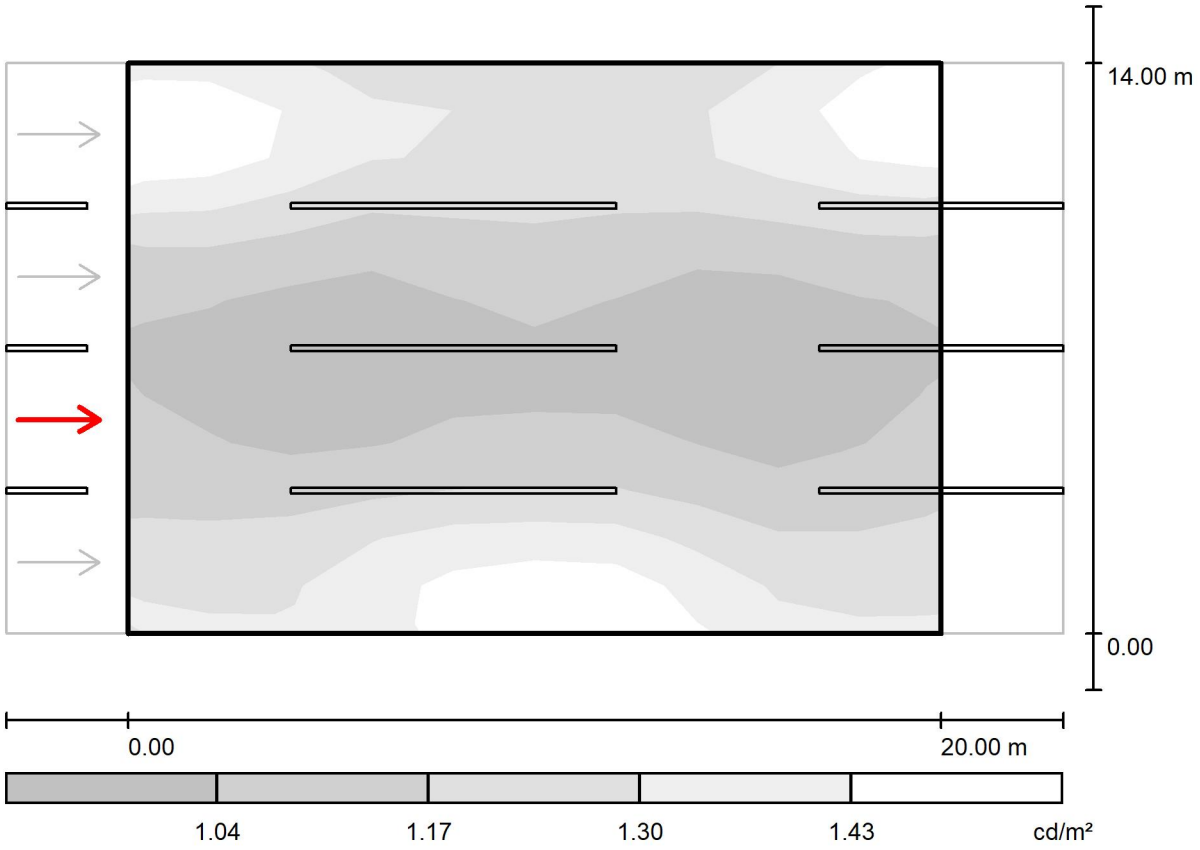
Class M3 (four lanes) / Valuation Field Roadway 1 / Observer 2 / Greyscale (L)



Scale 1 : 186

Grid: 10 x 12 Points
Observer Position: (-60.000 m, 5.250 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	Ul	TI [%]
Calculated values:	1.19	0.78	0.91	4
Required values according to class ME3a:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15
Fulfilled/Not fulfilled:	✓	✓	✓	✓

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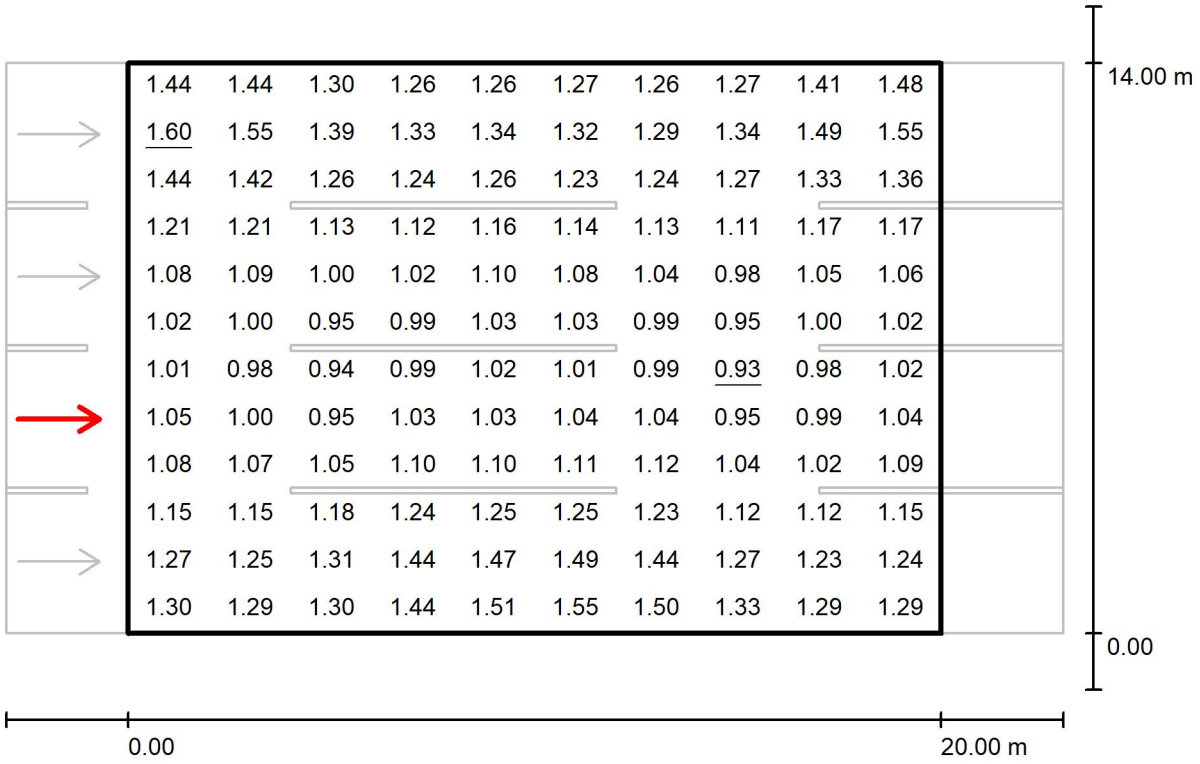

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Grid: 10 x 12 Points
Observer Position: (-60.000 m, 5.250 m, 1.500 m)
tarmac: R3, q0: 0.070

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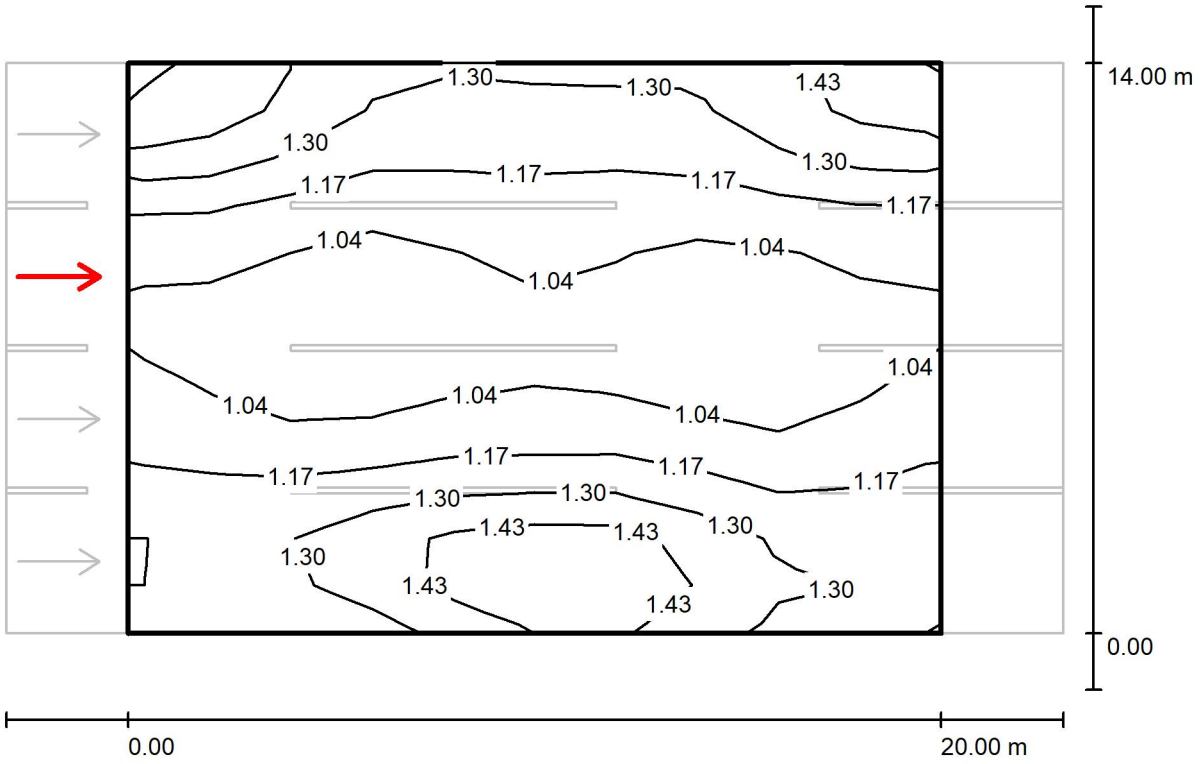

Values in Candela/m², Scale 1 : 186

Grid: 10 x 12 Points
Observer Position: (-60.000 m, 8.750 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	Ul	TI [%]
Calculated values:	1.19	0.78	0.91	4
Required values according to class ME3a:	≥ 1.00	≥ 0.40	≥ 0.70	≤ 15
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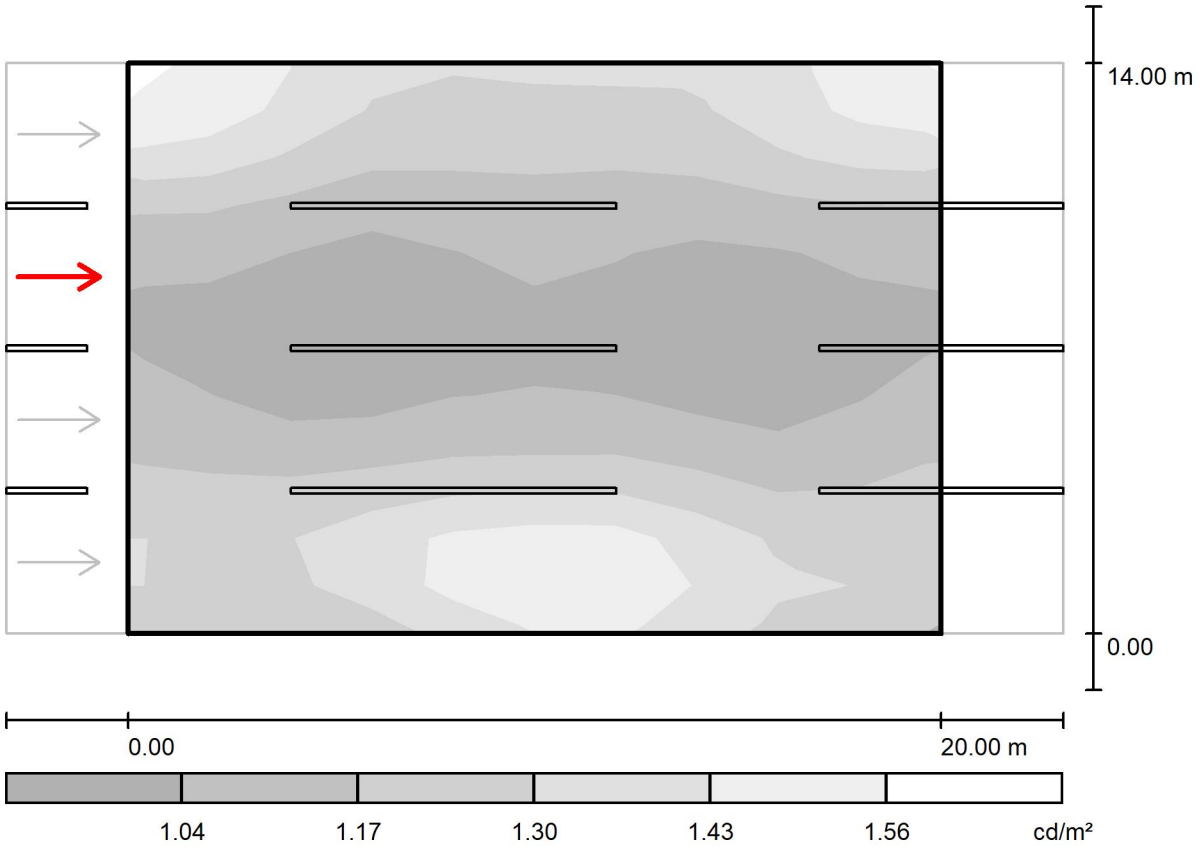

Scale 1 : 186

Grid: 10 x 12 Points
Observer Position: (-60.000 m, 8.750 m, 1.500 m)
tarmac: R3, q0: 0.070

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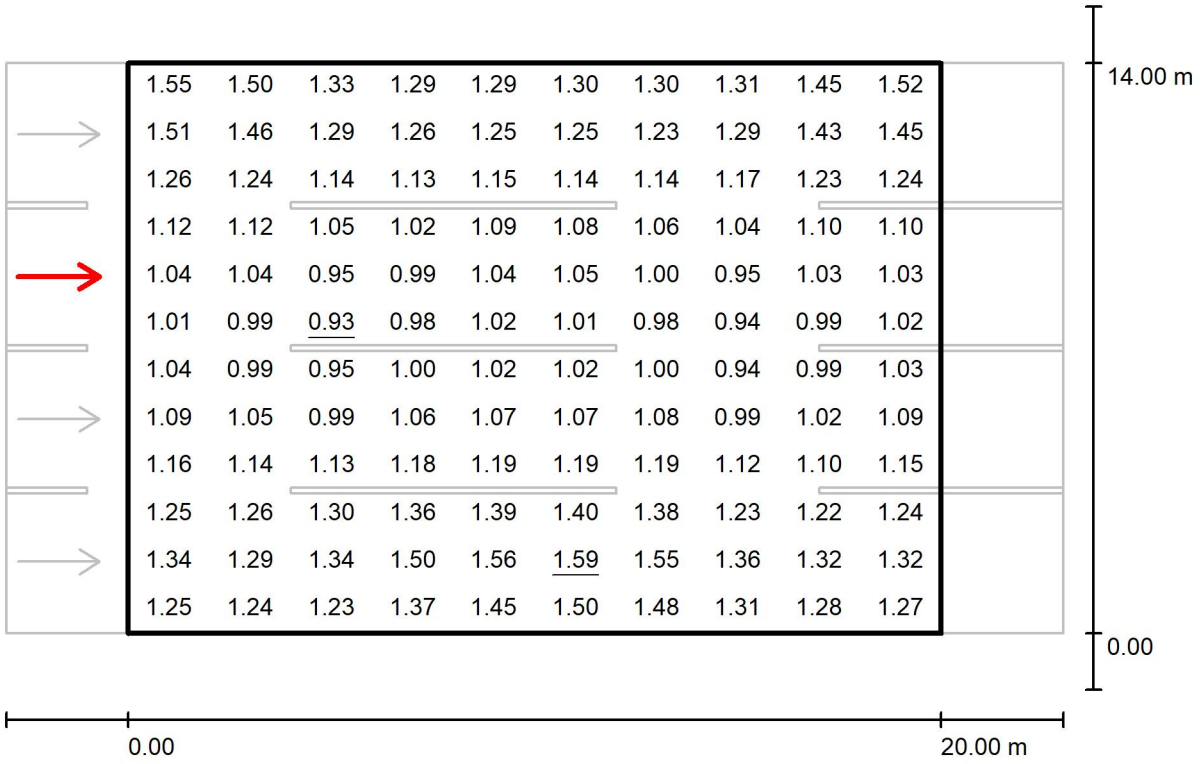

Values in Candela/m², Scale 1 : 186

Grid: 10 x 12 Points
Observer Position: (-60.000 m, 8.750 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	Ul	Tl [%]
Calculated values:	1.19	0.78	0.91	4
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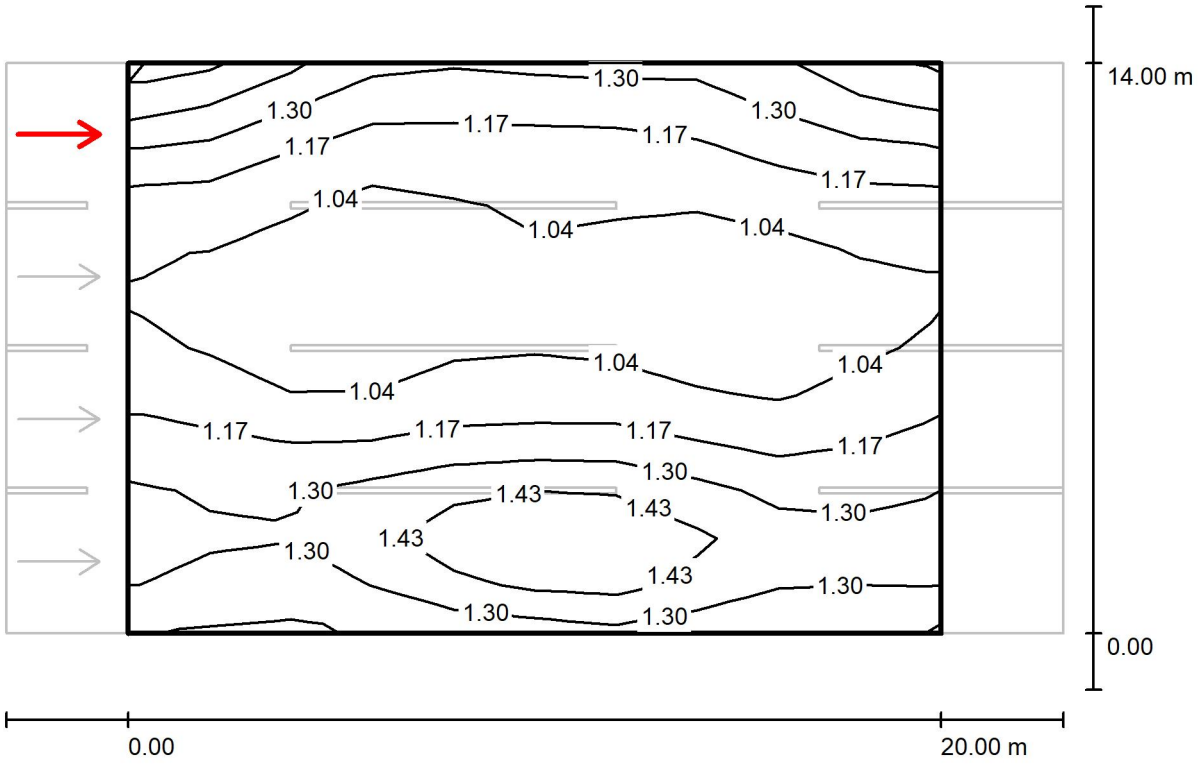

Values in Candela/m², Scale 1 : 186

Grid: 10 x 12 Points
Observer Position: (-60.000 m, 12.250 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	Ul	Tl [%]
Calculated values:	1.18	0.79	0.83	5
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Fulfilled/Not fulfilled:	✓	✓	✓	✓

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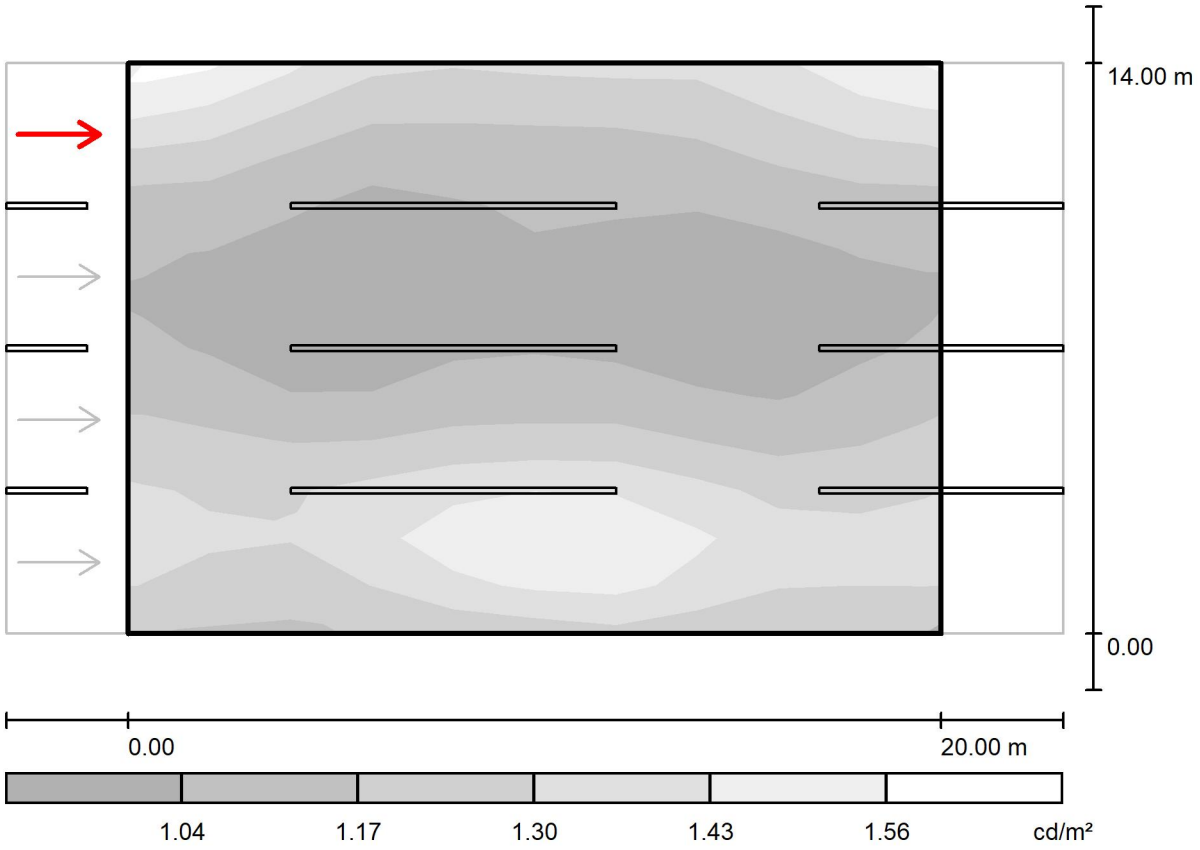

Scale 1 : 186

Grid: 10 x 12 Points
Observer Position: (-60.000 m, 12.250 m, 1.500 m)
tarmac: R3, q0: 0.070

	L_{av} [cd/m²]	U0	UI	TI [%]
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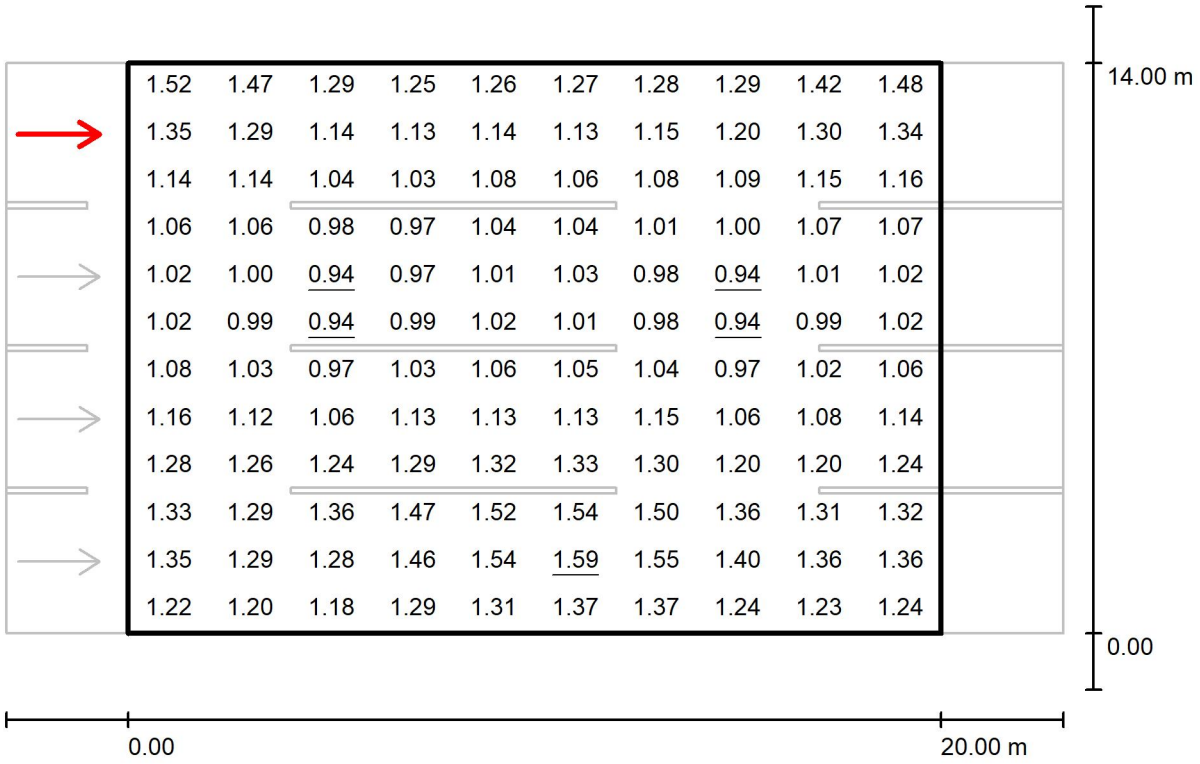

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Grid: 10 x 12 Points
Observer Position: (-60.000 m, 12.250 m, 1.500 m)
tarmac: R3, q0: 0.070

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Fulfilled/Not fulfilled:	✓	✓	✓	✓

Appendix G

G1 Apron Lighting Design

The lighting drawings below define the strategy for the apron lighting and have been incorporated within the light obtrusion assessment.

All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

Referenced Models:

LLADCO-3C-ACM-AIR-FLG-M2-CE-0001
LLADCO-3C-ACM-WHS-GEN-IM-IM-0002
LLADCO-3C-CAP-WHS-GEN-M2-IN-0001

NOTES

1. The information within this drawing has been provided by CU-Phosco Lighting and must not be reproduced without the permission of CU Phosco Lighting.
2. Flood light design by CU Phosco Lighting, drawing number LS14770-3-5, titled "London Luton Airport T2 West Phase 3", dated 16-JUNE-2022.
3. This drawing is a photometric design on a horizontal plane unless stated otherwise.
4. Lighting levels may deviate from those shown due to tolerances in lit area geometry, surface reflectance, luminaire installation position, luminaire and light source performance, and electrical supply and any obstructions within the area.
5. Illuminance, glare and floodlights schedules are shown on LLADCO-3C-ACM-AIR-FLG-DR-CE-0002.
6. For airfield layout drawing refer to LLADCO-3C-ACM-AIR-PRA-DR-CE-0001.
7. This is a preliminary design until a site survey is completed to fully assess the hazards and risks, e.g. from overhead and underground services, equipment positions or mounting heights, and any necessary revisions included to eliminate these.
8. Lighting of the airside roads is not included in this design and shall be developed in conjunction with the pier design.
9. Illumination requirements in accordance with EASA CS-ADR-DSN.
10. Minimum luminance level demonstrated to be always above 5 lux.
11. Minimum average luminance level demonstrated to be always above 20 lux.
12. Height of high masts (25m) are below obstacle limitation surface.
13. For fire training ground lighting design refer to drawing LLADCO-3C-ACM-AIR-FLG-0004.

KEY

Obs 15 — Glare observation point and reference

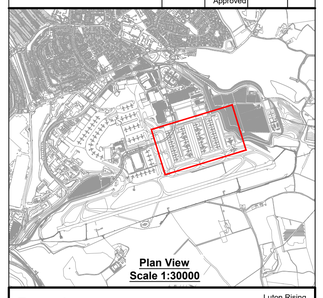
Lux Levels (Contour)

- Lux level = 1
- Lux level = 2
- Lux level = 5
- Lux level = 10
- Lux level = 20

Luminaire type and reference

- 16 — FL800R-2-B7-CW-F800-328W
- 15 — FL800R-2-B8-CW-F800-328W
- 15 — FL800R-2-F8-CW-F800-328W
- 15 — FL800R-3-F8-CW-F800-492W

Revision History	Drawn	Checked / Approved	Date	Rev.
Second Issue	CZ	AM / SR	25/03/20	P01
For information	CZ	SR / AE	09/10/20	P02
			04/07/22	P03.1



Plan View
Scale 1:30000

0 31.25 62.5 m
1:1250 SCALE @A1

Luton Rising
Hart House Business Centre
Kimpton Road, Luton, LU2 0LA
www.lutonrising.org.uk

London Luton Airport Development Consent Order

Drawing Title

PROPOSED FLOOD LIGHTING
PHASE 2B - 32 MPPA

Purpose of issue	Suitability
INITIAL STATUS OR WIP	S0

Drawn	Checked	Approved	Date	Scale	Size
				1:1000	A1

DCO Application Ref.	APFP Regulation	DCO Document Ref.
TR020001		

Drawing Number	Revision
LLADCO-3C-ACM-AIR-FLG-DR-CE-0001	P03.1

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

Luminaire Summary				
Symbol	Qty	Luminaire	LLF	Lumens
	5	FL810-1-LS8-740-FGF-L0625	0.820	75921
	54	FL810-1-LS8-740-FGF-L0350	0.850	48924
	10	FL810-1-KS6-740-FGF-L0350	0.850	45032

Illuminance Calculation					
Label	Avg	Max	Min	Min/Avg	Min/Max
Stand 11	22.56	57	8	0.35	0.14
Stand 12	22.86	43	10	0.44	0.23
Stand 13	25.64	45	9	0.35	0.20
Stand 14	23.64	44	10	0.42	0.23
Stand 15	25.86	45	10	0.39	0.22
Stand 16	24.50	46	8	0.33	0.17
Stand 17	20.03	38	7	0.35	0.18
Stand 21	24.96	51	8	0.32	0.16
Stand 21L	25.36	47	8	0.32	0.17
Stand 21R	26.00	48	9	0.35	0.19
Stand 22	23.45	48	8	0.34	0.17
Stand 22L	22.61	45	8	0.35	0.18
Stand 22R	24.44	47	8	0.33	0.17
Stand 23	21.68	44	8	0.37	0.18
Stand 23L	22.37	44	8	0.36	0.18
Stand 23R	21.17	38	9	0.43	0.24
Stand 24	26.66	54	9	0.34	0.17
Stand 31	26.67	54	9	0.34	0.17
Stand 32	21.68	44	8	0.37	0.18
Stand 32L	21.17	38	9	0.43	0.24
Stand 32R	22.50	44	8	0.36	0.18
Stand 33	23.57	48	8	0.34	0.17
Stand 33L	24.43	47	8	0.33	0.17
Stand 33R	22.81	45	8	0.35	0.18
Stand 34	24.50	55	8	0.33	0.15
Stand 34L	28.38	54	10	0.35	0.19
Stand 34R	24.13	47	9	0.37	0.19
Stand 41	20.31	39	7	0.34	0.18
Stand 42	24.27	46	8	0.33	0.17
Stand 43	26.03	45	9	0.35	0.20
Stand 44	23.61	43	10	0.42	0.23
Stand 45	25.62	45	9	0.35	0.20
Stand 46	22.86	43	10	0.44	0.23
Stand 47	22.55	57	8	0.35	0.14
Stand 51	29.52	73	10	0.34	0.14

Luminaire Schedule						
No	Luminaire	X	Y	Height	Orient	Tilt
1	FL810-1-KS6-740-FGF-L0350	417.162	583.463	25	215	0
2	FL810-1-KS6-740-FGF-L0350	417.162	538.463	25	190	0
3	FL810-1-KS6-740-FGF-L0350	417.162	448.463	25	190	0
4	FL810-1-KS6-740-FGF-L0350	417.161	358.463	25	190	0
5	FL810-1-KS6-740-FGF-L0350	504.334	583.465	25	345	0
6	FL810-1-KS6-740-FGF-L0350	696.515	583.464	25	195	0
7	FL810-1-KS6-740-FGF-L0350	785.818	358.463	25	350	0
8	FL810-1-KS6-740-FGF-L0350	785.818	448.463	25	350	0
9	FL810-1-KS6-740-FGF-L0350	785.818	538.463	25	350	0
10	FL810-1-KS6-740-FGF-L0350	785.818	583.465	25	325	0
11	FL810-1-LS8-740-FGF-L0350	417.162	538.463	25	135	0
12	FL810-1-LS8-740-FGF-L0350	417.162	538.463	25	240	0
13	FL810-1-LS8-740-FGF-L0350	417.162	448.463	25	100	0
14	FL810-1-LS8-740-FGF-L0350	417.162	448.463	25	135	0
15	FL810-1-LS8-740-FGF-L0350	417.162	448.463	25	240	0
16	FL810-1-LS8-740-FGF-L0350	417.161	358.463	25	100	0
17	FL810-1-LS8-740-FGF-L0350	417.161	358.463	25	135	0
18	FL810-1-LS8-740-FGF-L0350	417.161	358.463	25	235	0
19	FL810-1-LS8-740-FGF-L0350	481.33	358.464	25	290	0
20	FL810-1-LS8-740-FGF-L0350	481.33	358.464	25	330	0
21	FL810-1-LS8-740-FGF-L0350	481.33	358.464	25	0	0
22	FL810-1-LS8-740-FGF-L0350	481.33	358.464	25	30	0
23	FL810-1-LS8-740-FGF-L0350	481.33	358.464	25	70	0
24	FL810-1-LS8-740-FGF-L0350	481.331	448.465	25	290	0
25	FL810-1-LS8-740-FGF-L0350	481.331	448.465	25	330	0
26	FL810-1-LS8-740-FGF-L0350	481.331	448.465	25	0	0
27	FL810-1-LS8-740-FGF-L0350	481.331	448.465	25	30	0
28	FL810-1-LS8-740-FGF-L0350	481.331	448.465	25	70	0
29	FL810-1-LS8-740-FGF-L0350	481.333	538.464	25	290	0
30	FL810-1-LS8-740-FGF-L0350	481.333	538.464	25	330	0
31	FL810-1-LS8-740-FGF-L0350	481.333	538.464	25	25	0
32	FL810-1-LS8-740-FGF-L0350	504.334	583.465	25	305	0
33	FL810-1-LS8-740-FGF-L0350	696.515	583.464	25	235	0
34	FL810-1-LS8-740-FGF-L0350	719.513	538.466	25	155	0
35	FL810-1-LS8-740-FGF-L0350	719.513	538.466	25	210	0
36	FL810-1-LS8-740-FGF-L0350	719.513	538.466	25	250	0
37	FL810-1-LS8-740-FGF-L0350	719.512	448.465	25	110	0
38	FL810-1-LS8-740-FGF-L0350	719.512	448.465	25	150	0
39	FL810-1-LS8-740-FGF-L0350	719.512	448.465	25	180	0
40	FL810-1-LS8-740-FGF-L0350	719.512	448.465	25	210	0
41	FL810-1-LS8-740-FGF-L0350	719.512	448.465	25	250	0
42	FL810-1-LS8-740-FGF-L0350	719.51	358.466	25	110	0
43	FL810-1-LS8-740-FGF-L0350	719.51	358.466	25	150	0
44	FL810-1-LS8-740-FGF-L0350	719.51	358.466	25	180	0
45	FL810-1-LS8-740-FGF-L0350	785.818	358.463	25	45	0
46	FL810-1-LS8-740-FGF-L0350	785.818	358.463	25	80	0
47	FL810-1-LS8-740-FGF-L0350	785.818	448.463	25	300	0
48	FL810-1-LS8-740-FGF-L0350	785.818	448.463	25	45	0
49	FL810-1-LS8-740-FGF-L0350	785.818	448.463	25	80	0
50	FL810-1-LS8-740-FGF-L0350	785.818	538.463	25	300	0
51	FL810-1-LS8-740-FGF-L0350	785.818	538.463	25	45	0
52	FL810-1-LS8-740-FGF-L0350	482.565	277.682	25	70	0
53	FL810-1-LS8-740-FGF-L0350	786.64	277.626	25	80	0
54	FL810-1-LS8-740-FGF-L0350	416.121	277.043	25	155	0
55	FL810-1-LS8-740-FGF-L0350	416.121	277.043	25	105	0
56	FL810-1-LS8-740-FGF-L0350	482.565	277.682	25	30	0
57	FL810-1-LS8-740-FGF-L0350	482.565	277.682	25	5	0
58	FL810-1-LS8-740-FGF-L0350	720.243	277.626	25	175	0
59	FL810-1-LS8-740-FGF-L0350	719.51	358.466	25	230	0
60	FL810-1-LS8-740-FGF-L0350	720.243	277.626	25	155	0
61	FL810-1-LS8-740-FGF-L0350	719.51	358.466	25	200	0
62	FL810-1-LS8-740-FGF-L0350	720.243	277.626	25	105	0
63	FL810-1-LS8-740-FGF-L0350	785.818	358.463	25	300	0
64	FL810-1-LS8-740-FGF-L0350	786.64	277.626	25	30	0
65	FL810-1-LS8-740-FGF-L0625	927.437	355.429	25	315	0
66	FL810-1-LS8-740-FGF-L0625	968.897	355.291	25	295	0
67	FL810-1-LS8-740-FGF-L0625	927.437	355.429	25	245	5
68	FL810-1-LS8-740-FGF-L0625	927.437	355.429	25	270	5
69	FL810-1-LS8-740-FGF-L0625	968.897	355.291	25	265	0

Calculation Summary		
Label	Obs Label	Max
Stand 11	Obs 11	30
Stand 12	Obs 12	31
Stand 13	Obs 13	28
Stand 14	Obs 14	31
Stand 15	Obs 15	28
Stand 16	Obs 16	31
Stand 17	Obs 17	40
Stand 21	Obs 21	23
Stand 21L	Obs 21L	38
Stand 21R	Obs 21R	36
Stand 22	Obs 22	22
Stand 22L	Obs 22L	35
Stand 22R	Obs 22R	36
Stand 23	Obs 23	22
Stand 23L	Obs 23L	35
Stand 23R	Obs 23R	31
Stand 24	Obs 24	32
Stand 31	Obs 31	32
Stand 32	Obs 32	21
Stand 32L	Obs 32L	31
Stand 32R	Obs 32R	35
Stand 33	Obs 33	24
Stand 33L	Obs 33L	36
Stand 33R	Obs 33R	36
Stand 34	Obs 34	26
Stand 34L	Obs 34L	38
Stand 34R	Obs 34R	38
Stand 41	Obs 41	30
Stand 42	Obs 42	27
Stand 43	Obs 43	24
Stand 44	Obs 44	30
Stand 45	Obs 45	28
Stand 46	Obs 46	31
Stand 47	Obs 47	30
Stand 51	Obs 51	40

All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

Referenced Models:

LLADCO-3C-ACM-WHS-GEN-IM-IM-0002
LLADCO-3C-ACM-AIR-FLG-M2-CE-0001

NOTES

1. Flood light design by CU Phosco Lighting, drawing number LS14770-3-5, titled "London Luton Airport T2 West Phase 3", dated 16-JUNE-2022.
2. Lighting levels may deviate from those shown due to tolerances in lit area geometry, surface reflectance, luminaire installation position, luminaire and light source performance, and electrical supply and any obstructions within the area.
3. For airfield layout drawing refer to LLADCO-3C-ACM-AIR-PRA-DR-CE-0001.
4. The information within this drawing has been provided by CU-Phosco Lighting and must not be reproduced without the permission of CU Phosco Lighting.
5. Lighting of the airside roads is not included in this design and shall be developed in conjunction with the pier design.
6. Illumination requirements in accordance with EASA CS-ADR-DSN.
7. Minimum luminance level demonstrated to be always above 5 lux.
8. Minimum average luminance level demonstrated to be always above 20 lux.
9. Height of high masts (25m) below obstacle limitation surface.

Revision History	Drawn	Checked Approved	Date	Rev.
Second Issue	CZ	SR	25/03/20	P01
For information	CZ	AE	09/10/20	P02
			04/07/22	P03.1

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Drawing Title

PROPOSED FLOOD LIGHTING
PHASE 2B - 32 MPPA SCHEDULE

Purpose of issue	Suitability
INITIAL STATUS OR WIP	S0

Drawn	Checked	Approved	Date	Scale	Size
				N/A	A1

DCO Application Ref.	APFP Regulation	DCO Document Ref.
TR020001		

Drawing Number	Revision
LLADCO-3C-ACM-AIR-FLG-DR-CE-0002	P03.1

Project – Phase – Originator – AssetZone – Sub Asset – Type – Discp. – Number

All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

Referenced Models:

LLADCO-3C-ACM-WHS-GEN-IM-IM-0002
LLADCO-3C-ACM-AIR-FLG-M2-CE-0002
LLADCO-3C-ACM-AIR-APR-M2-CE-0002
LLADCO-3C-CAP-WHS-GEN-M2-IN-0002

NOTES

1. The information within this drawing has been provided by CU-Phosco Lighting and must not be reproduced without the permission of CU Phosco Lighting.
2. Flood light design by CU Phosco Lighting, drawing number LS14770-2-6, titled "London Luton Airport T2 West Phase 2", dated 27-JUN-2022.
3. This drawing is a photometric design on a horizontal plane unless stated otherwise.
4. Lighting levels may deviate from those shown due to tolerances in lit area geometry, surface reflectance, luminaire installation position, luminaire and light source performance, and electrical supply and any obstructions within the area.
5. For airfield layout drawing refer to LLADCO-3C-ACM-AIR-PRA-DR-CE-0002.
6. This is a preliminary design until a site survey is completed to fully assess the hazards and risks, e.g. from overhead and underground services, equipment positions or mounting heights, and any necessary revisions included to eliminate these.
7. Lighting of the airside roads is not included in this design and shall be developed in conjunction with the pier design.
8. Illumination requirements in accordance with EASA CS-ADR-DSN.
9. Minimum luminance level demonstrated to be always above 5 lux.
10. Minimum average luminance level demonstrated to be always above 20 lux.
11. Height of high masts (25m) are below obstacle limitation surface.

KEY

Obs 15 — Glare observation point and reference

Lux Levels (Contour)	Lux Levels (Spot)
Lux level = 1	Stand head
Lux level = 2	Stand tail
Lux level = 5	Code C stand
Lux level = 10	Code E stand
Lux level = 20	

Luminaire type and reference

- FL800R-2-B7-CW-F800-328W
- FL800R-2-B8-CW-F800-328W
- FL800R-2-F8-CW-F800-328W
- FL800R-3-F8-CW-F800-492W

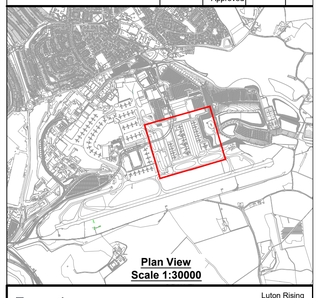
Luminaire Summary				
Symbol	Qty	Luminaire	LLF	Lumens
	35	FL810-1-LSB-740-FGF-L0350	0.850	48924
	7	FL810-1-KS6-740-FGF-L0350	0.850	45032

Illuminance Calculation					
Label	Avg	Max	Min	Min/Avg	Min/Max
Stand 13	20.89	43	9	0.43	0.21
Stand 14	25.41	45	8	0.31	0.18
Stand 15	24.81	47	8	0.32	0.17
Stand 16	20.10	39	7	0.35	0.18
Stand 21	24.23	59	7	0.29	0.12
Stand 21L	26.16	58	8	0.31	0.14
Stand 21R	25.47	47	8	0.31	0.17
Stand 22	23.30	48	7	0.30	0.15
Stand 22L	22.41	44	8	0.36	0.18
Stand 22R	24.40	47	8	0.33	0.17
Stand 23	21.34	44	7	0.33	0.16
Stand 23L	21.64	44	7	0.32	0.16
Stand 23R	21.19	42	7	0.33	0.17
Stand 24	22.89	46	7	0.31	0.15
Stand 31	21.35	49	7	0.33	0.14
Stand 32	23.85	50	7	0.29	0.14
Stand 33	26.11	61	7	0.27	0.11
Stand 34	24.44	48	7	0.29	0.15
Stand 35	23.82	47	8	0.34	0.17
Stand 36	25.29	63	7	0.28	0.11

Glare Rating			
Label	Observer	Obs Ht	Max
Stand 13	Obs 13	4	31
Stand 14	Obs 14	4	28
Stand 15	Obs 15	4	30
Stand 16	Obs 16	4	40
Stand 21	Obs 21	6	25
Stand 21L	Obs 21L	4	40
Stand 21R	Obs 21R	4	36
Stand 22	Obs 22	6	22
Stand 22L	Obs 22L	4	35
Stand 22R	Obs 22R	4	36
Stand 23	Obs 23	6	22
Stand 23L	Obs 23L	4	35
Stand 23R	Obs 23R	4	34
Stand 24	Obs 24	4	37
Stand 31	Obs 31	4	30
Stand 32	OBS 32	4	27
Stand 33	Obs 33	4	23
Stand 34	Obs 34	4	27
Stand 35	Obs 35	4	30
Stand 36	Obs 36	6	21
Stand 36L	Obs 36L	4	37
Stand 36R	Obs 36R	4	39

Luminaire Schedule						
No	Luminaire	X	Y	Height	Orient	Tilt
1	FL810-1-KS6-740-FGF-L0350	417,162	448,463	25	190	0
2	FL810-1-LSB-740-FGF-L0350	417,162	448,463	25	240	0
3	FL810-1-LSB-740-FGF-L0350	417,161	358,463	25	100	0
4	FL810-1-LSB-740-FGF-L0350	417,161	358,463	25	135	0
5	FL810-1-KS6-740-FGF-L0350	417,161	358,463	25	195	0
6	FL810-1-LSB-740-FGF-L0350	417,161	358,463	25	240	0
7	FL810-1-LSB-740-FGF-L0350	416,856	277,958	25	100	0
8	FL810-1-LSB-740-FGF-L0350	416,856	277,958	25	155	0
9	FL810-1-LSB-740-FGF-L0350	480,958	278,635	25	0	0
10	FL810-1-LSB-740-FGF-L0350	480,958	278,635	25	15	0
11	FL810-1-LSB-740-FGF-L0350	480,958	278,635	25	60	0
12	FL810-1-LSB-740-FGF-L0350	481,33	358,464	25	290	0
13	FL810-1-LSB-740-FGF-L0350	481,33	358,464	25	330	0
14	FL810-1-LSB-740-FGF-L0350	481,33	358,464	25	0	0
15	FL810-1-LSB-740-FGF-L0350	481,33	358,464	25	30	0
16	FL810-1-LSB-740-FGF-L0350	481,33	358,464	25	70	0
17	FL810-1-LSB-740-FGF-L0350	481,331	448,465	25	290	0
18	FL810-1-LSB-740-FGF-L0350	481,331	448,465	25	330	0
19	FL810-1-LSB-740-FGF-L0350	481,331	448,465	25	0	0
20	FL810-1-LSB-740-FGF-L0350	481,331	448,465	25	30	0
21	FL810-1-LSB-740-FGF-L0350	481,331	448,465	25	70	0
22	FL810-1-LSB-740-FGF-L0350	481,333	538,464	25	290	0
23	FL810-1-LSB-740-FGF-L0350	481,333	538,464	25	335	0
24	FL810-1-LSB-740-FGF-L0350	481,333	538,464	25	15	0
25	FL810-1-LSB-740-FGF-L0350	481,444	593,798	25	310	0
26	FL810-1-LSB-740-FGF-L0350	481,444	593,798	25	345	0
27	FL810-1-KS6-740-FGF-L0350	696,515	583,464	25	195	0
28	FL810-1-LSB-740-FGF-L0350	696,515	583,464	25	245	0
29	FL810-1-LSB-740-FGF-L0350	696,514	503,856	25	115	0
30	FL810-1-KS6-740-FGF-L0350	696,514	503,856	25	180	0
31	FL810-1-LSB-740-FGF-L0350	696,514	503,856	25	245	0
32	FL810-1-LSB-740-FGF-L0350	696,515	448,465	25	115	0
33	FL810-1-KS6-740-FGF-L0350	696,515	448,465	25	180	0
34	FL810-1-LSB-740-FGF-L0350	696,515	448,465	25	240	0
35	FL810-1-LSB-740-FGF-L0350	696,515	368,858	25	115	0
36	FL810-1-KS6-740-FGF-L0350	696,515	368,858	25	170	0
37	FL810-1-LSB-740-FGF-L0350	696,515	368,858	25	245	0
38	FL810-1-LSB-740-FGF-L0350	696,515	368,858	25	260	0
39	FL810-1-KS6-740-FGF-L0350	696,515	368,858	25	275	0
40	FL810-1-LSB-740-FGF-L0350	726,727	355,868	25	305	0
41	FL810-1-LSB-740-FGF-L0350	726,727	355,868	25	280	0
42	FL810-1-LSB-740-FGF-L0350	726,727	355,868	25	250	0

Revision History	Drawn	Checked / Approved	Date	Rev.
Second Issue	CZ	SR	25/03/20	P01
For information	CZ	AE	09/10/20	P02
For information	CSS	AE	20/08/21	P03
			04/07/22	P04.1



Plan View
Scale 1:30000

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Drawing Title

PROPOSED FLOODLIGHTING PHASE 2A - 27MPPA

Purpose of issue	Suitability
INITIAL STATUS OR WIP	S0

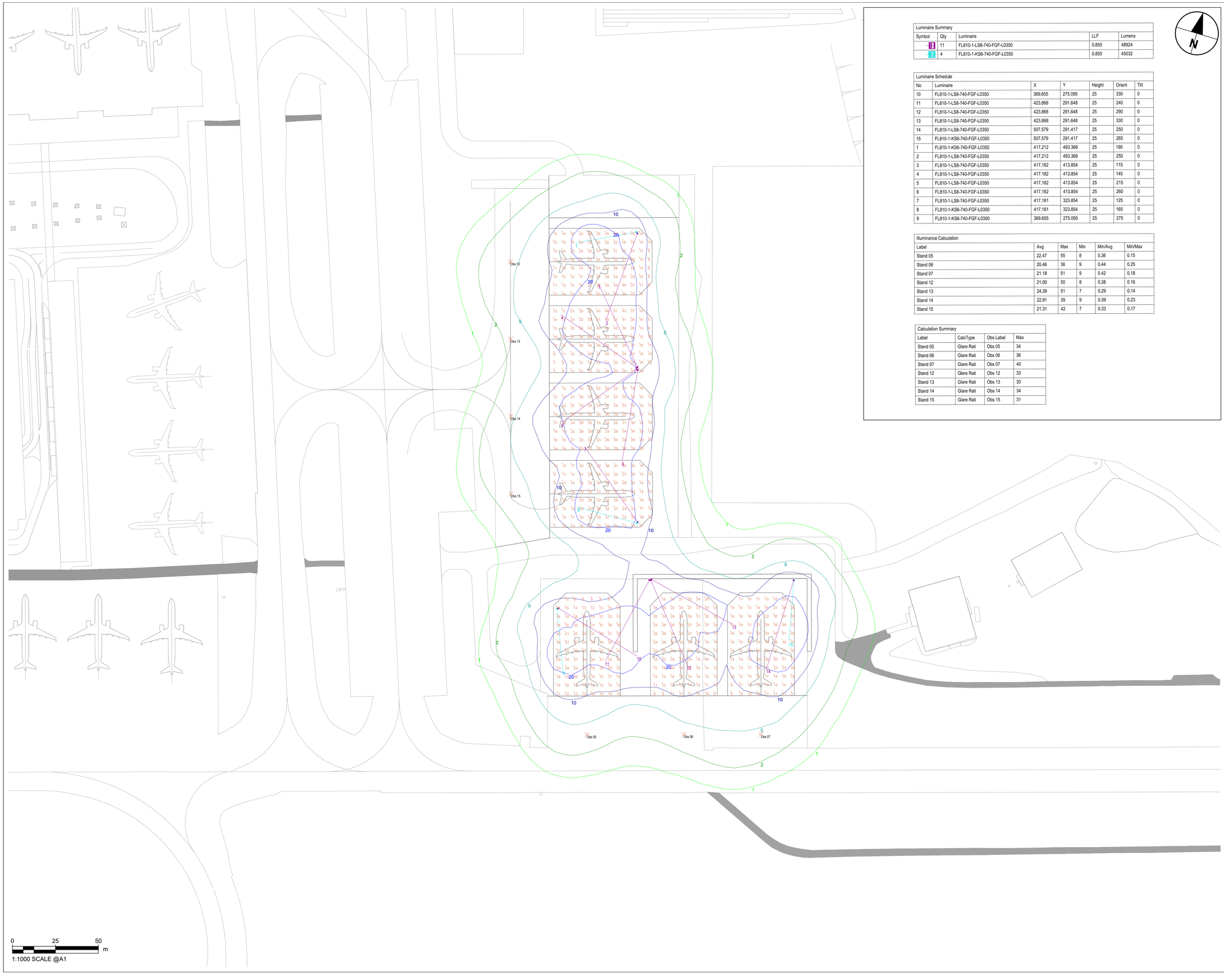
Drawn	Checked	Approved	Date	Scale	Size
				1:1000	A1

DCO Application Ref.	APFP Regulation	DCO Document Ref.
TR020001		

Drawing Number	Revision
LLADCO-3C-ACM-AIR-FLG-DR-CE-0003	P04.1

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

0 25 50 m
1:1000 SCALE @A1



Luminaire Summary				
Symbol	Qty	Luminaire	LLF	Lumens
	11	FL810-1-LS8-740-FGF-L0350	0.850	48924
	4	FL810-1-KS8-740-FGF-L0350	0.850	45032

Luminaire Schedule						
No	Luminaire	X	Y	Height	Orient	Tilt
10	FL810-1-LS8-740-FGF-L0350	369.655	275.095	25	330	0
11	FL810-1-LS8-740-FGF-L0350	423.868	291.648	25	240	0
12	FL810-1-LS8-740-FGF-L0350	423.868	291.648	25	290	0
13	FL810-1-LS8-740-FGF-L0350	423.868	291.648	25	330	0
14	FL810-1-LS8-740-FGF-L0350	507.579	291.417	25	250	0
15	FL810-1-KS6-740-FGF-L0350	507.579	291.417	25	265	0
1	FL810-1-KS6-740-FGF-L0350	417.212	493.368	25	190	0
2	FL810-1-LS8-740-FGF-L0350	417.212	493.368	25	250	0
3	FL810-1-LS8-740-FGF-L0350	417.162	413.854	25	115	0
4	FL810-1-LS8-740-FGF-L0350	417.162	413.854	25	145	0
5	FL810-1-LS8-740-FGF-L0350	417.162	413.854	25	215	0
6	FL810-1-LS8-740-FGF-L0350	417.162	413.854	25	260	0
7	FL810-1-LS8-740-FGF-L0350	417.161	323.854	25	125	0
8	FL810-1-KS6-740-FGF-L0350	417.161	323.854	25	165	0
9	FL810-1-KS6-740-FGF-L0350	369.655	275.095	25	275	0

Illuminance Calculation					
Label	Avg	Max	Min	Min/Avg	Min/Max
Stand 05	22.47	55	8	0.36	0.15
Stand 06	20.46	36	9	0.44	0.25
Stand 07	21.18	51	9	0.42	0.18
Stand 12	21.00	50	8	0.38	0.16
Stand 13	24.39	51	7	0.29	0.14
Stand 14	22.91	39	9	0.39	0.23
Stand 15	21.31	42	7	0.33	0.17

Calculation Summary			
Label	CalcType	Obs Label	Max
Stand 05	Glare Rati	Obs 05	34
Stand 06	Glare Rati	Obs 06	36
Stand 07	Glare Rati	Obs 07	40
Stand 12	Glare Rati	Obs 12	33
Stand 13	Glare Rati	Obs 13	30
Stand 14	Glare Rati	Obs 14	34
Stand 15	Glare Rati	Obs 15	31

All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

Referenced Models:
LLADCO-3C-ACM-WHS-GEN-IM-IM-0002
LLADCO-3C-CAP-WHS-GEN-M2-IN-0003
LLADCO-3C-ACM-AIR-FLG-M2-CE-0005

NOTES

1. The information within this drawing has been provided by CU-Phosco Lighting and must not be reproduced without the permission of CU Phosco Lighting.
2. Flood light design by CU Phosco Lighting, drawing number LS14770-1-5, titled "London Luton Airport T2 West - Phase 1", dated 15-JUN-2022.
3. This drawing is a photometric design on a horizontal plane unless stated otherwise.
4. Lighting levels may deviate from those shown due to tolerances in lit area geometry, surface reflectance, luminaire installation position, luminaire and light source performance, and electrical supply and any obstructions within the area.
5. For airfield layout drawing refer to LLADCO-3C-ACM-AIR-PRA-DR-CE-0003.
6. This is a preliminary design until a site survey is completed to fully assess the hazards and risks, e.g. from overhead and underground services, equipment positions or mounting heights, and any necessary revisions included to eliminate these.
7. Lighting of the airside roads is not included in this design and shall be developed in conjunction with the pier design.
8. Illumination requirements in accordance with EASA CS-ADR-DSN.
9. Minimum luminance level demonstrated to be always above 5 lux.
10. Minimum average luminance level demonstrated to be always above 20 lux.
11. Height of high masts (25m) are below obstacle limitation surface.

KEY

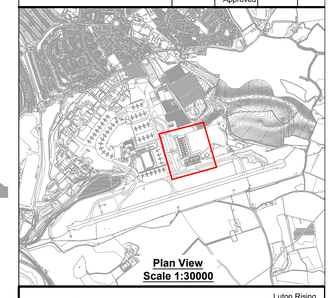
Obs 15 — Glare observation point and reference

Lux Levels (Contour)	Lux Levels (Spot)
Lux level = 1	Stand head
Lux level = 2	Stand tail
Lux level = 5	Code C stand
Lux level = 10	Code E stand
Lux level = 20	

Luminaire type and reference

- FL800R-2-B7-CW-F800-328W
- FL800R-2-B8-CW-F800-328W
- FL800R-2-F8-CW-F800-328W
- FL800R-3-F8-CW-F800-492W

Revision History	Drawn	Checked / Approved	Date	Rev.
For information	CZ	AE	09/10/20	P01
For information	CSS	AE	20/08/21	P02
			04/07/22	P03.1



Plan View
Scale 1:30000

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Drawing Title

PROPOSED FLOODLIGHTING
PHASE 1 - 21.5 MPPA

Purpose of issue	Suitability
INITIAL STATUS OR WIP	S0

Drawn	Checked	Approved	Date	Scale	Size
				1:1000	A1

DCO Application Ref.	APFP Regulation	DCO Document Ref.
TR020001		

Drawing Number	Revision
LLADCO-3C-ACM-AIR-FLG-DR-CE-0005	P03.1
Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number	

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Ref 2 Carlson, T (2003). Light Pollution. International Dark Sky Association. London: HMSO.
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Ref 16 Tulla, A (2019). Factfile No.7 - Design and Assessment of Exterior Lighting Schemes. London: The Society of Light and Lighting.