interact

Design

Architecture PRF/PRA

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1. Design a parking project

This topic is intended to support the specification and design of parking project with PRF/PRA.

Important

Before designing a parking project with PRF/PRA, see the System overview to better understand the concepts used and how it works.

To design a parking project with PRF/PRA, use the following steps:

- Plan the location of the lights and Wireless Gateways (only applicable for Advanced and Enterprise tiers)
- Define the routes of traffic cars and individuals
- Define the lighting groups and/or groups
- Plan the sensor placement for each group and/or group

1.1. Plan the lights and Wireless Gateways

Luminaires and sensors must be placed at the correct position, to enable the communication with other luminaires. Use the following guidelines when planning the amount of lights and Wireless Gateways:

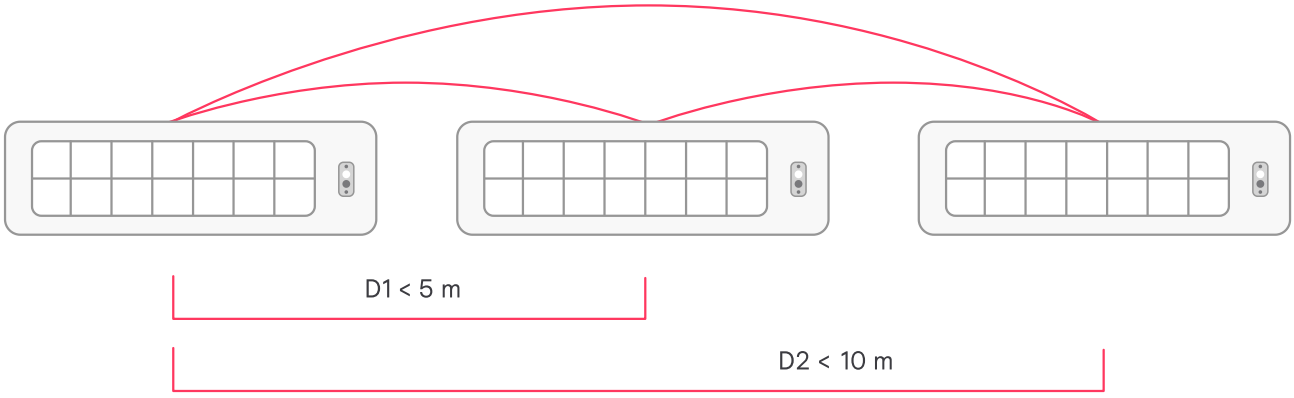
Maximum number of components

See the maximum number of components for:

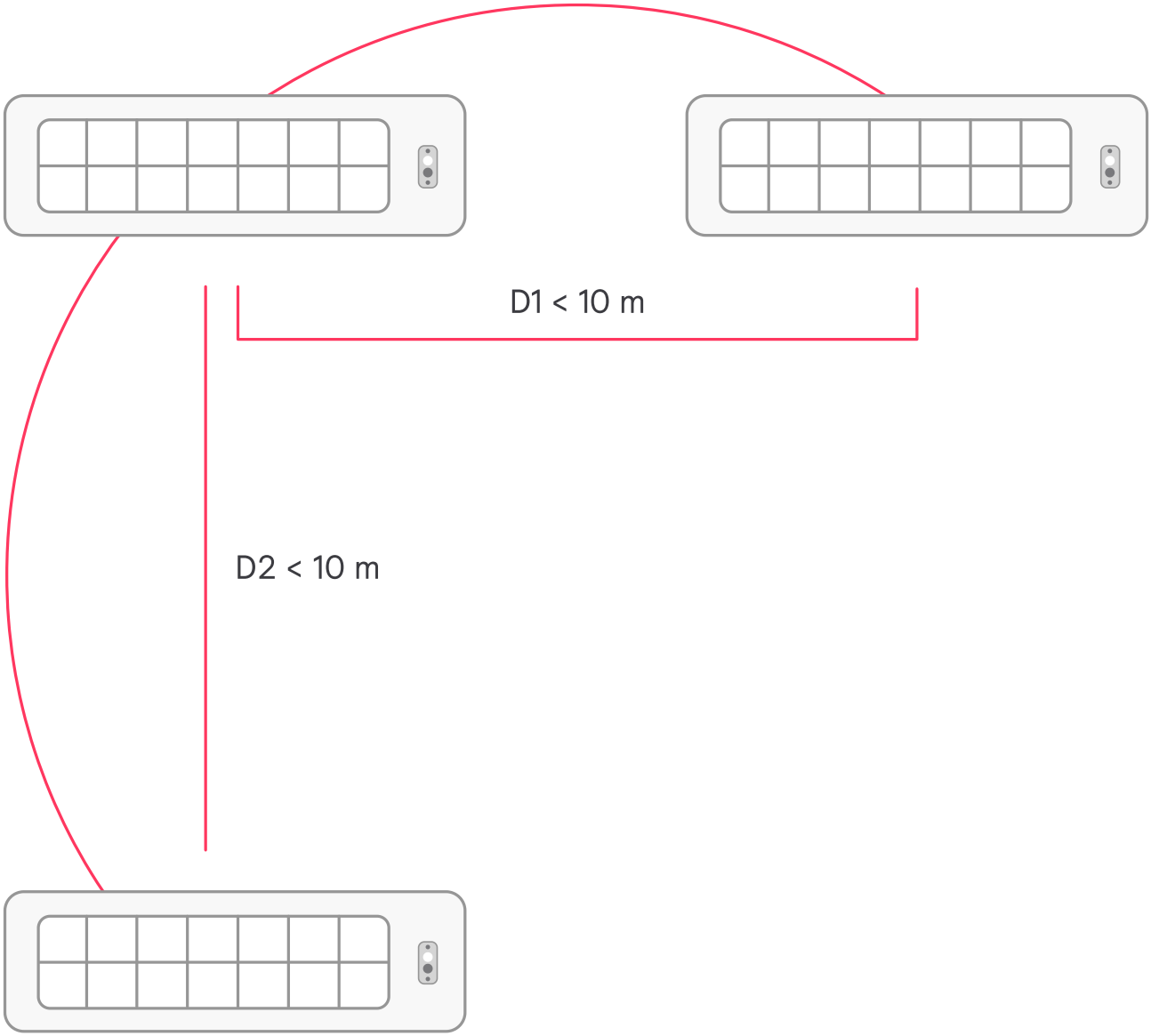
- PRF/PRA system properties and limitations

Distance between luminaires

- The maximum distance in a corridor (D1) is 5 m (16.4 ft).
  The maximum distance to the next luminaire (D2) is 10 m (32.8 ft), offering an extra communication possibility.

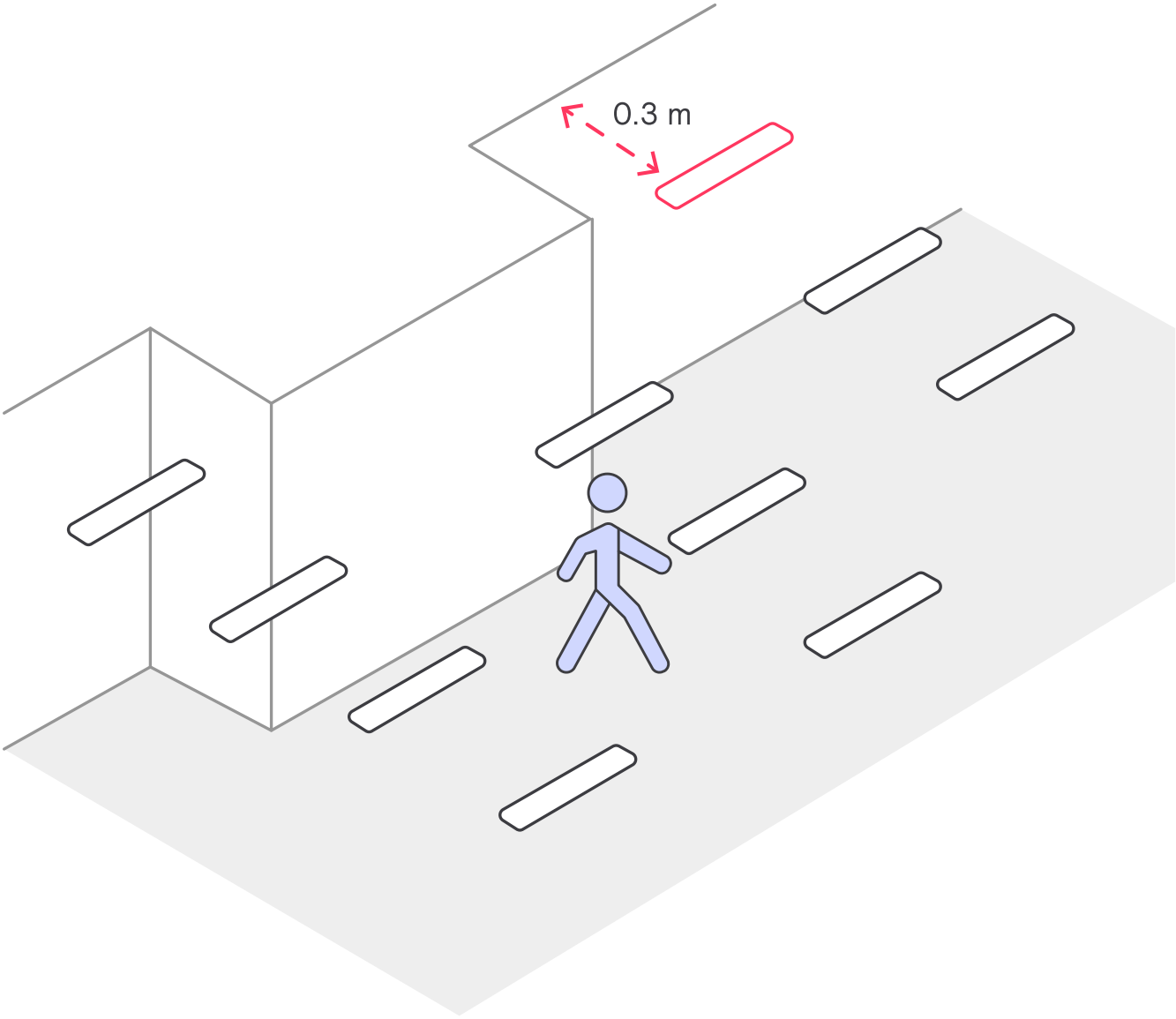


- The maximum between luminaires in an open plan is 10 m (32.8 ft)



Distance to the wall

The minimum distance of a luminaire from the wall is 0.3 m (0.98 ft)

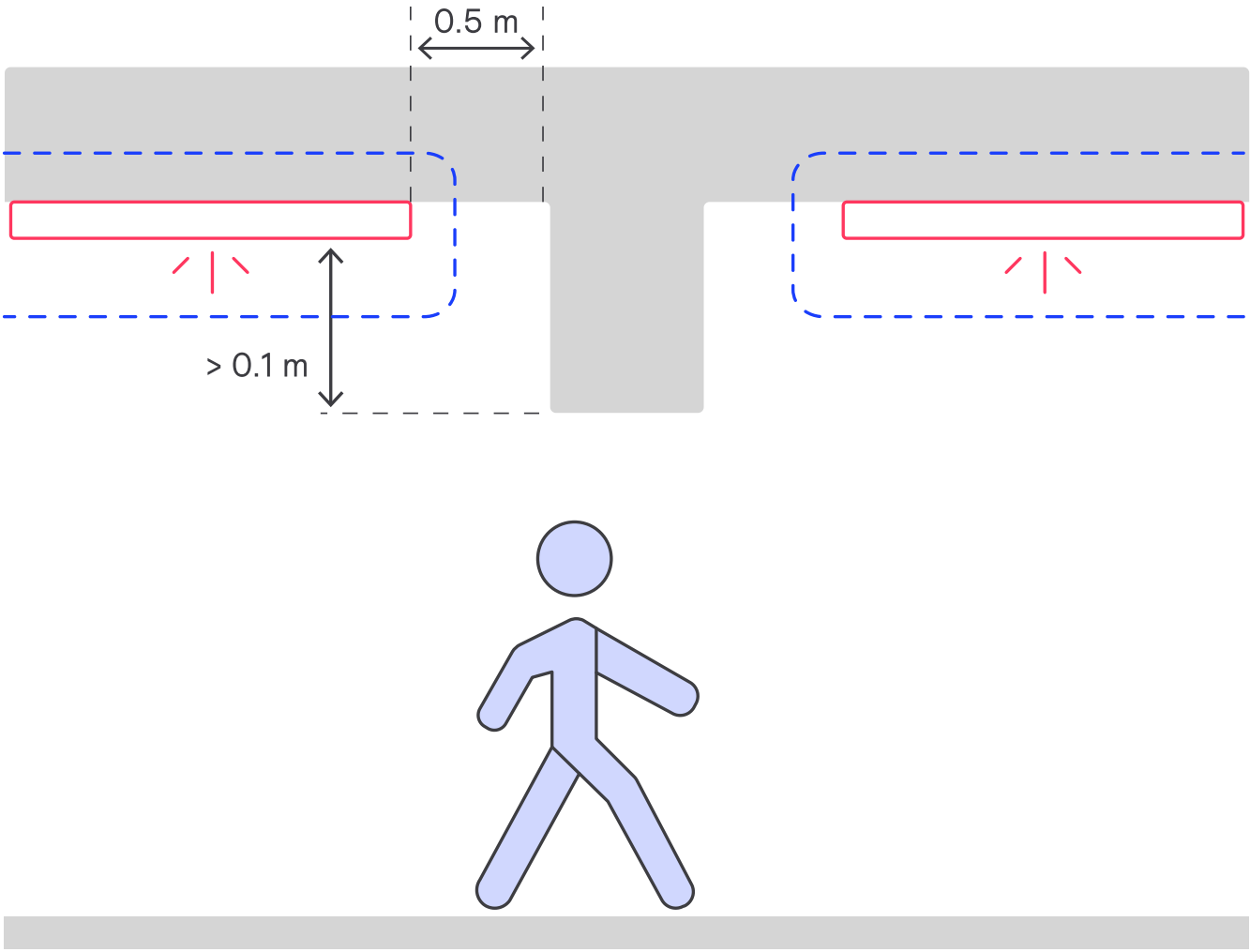


1.1.1. Blocking objects

The following recommendations are made regarding blocking objects:

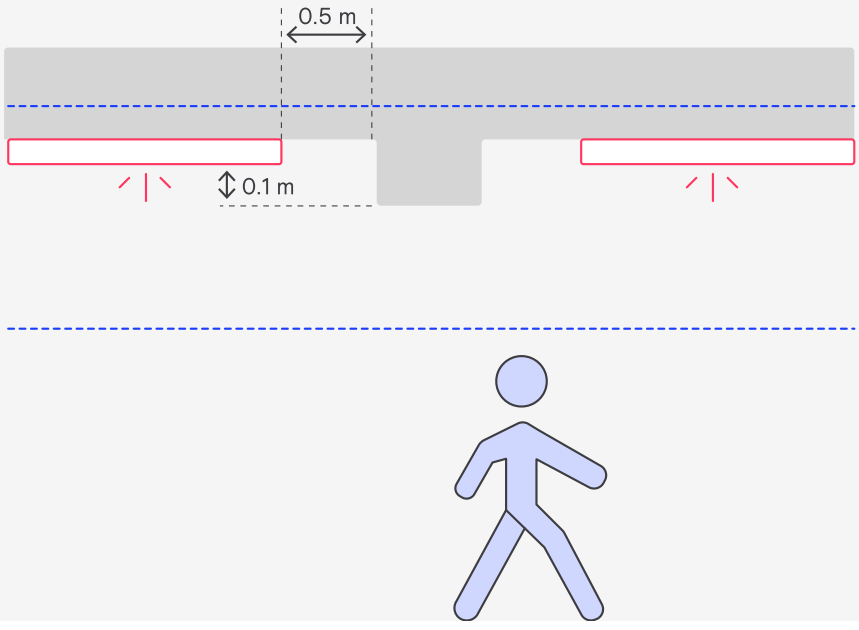
Uneven ceilings

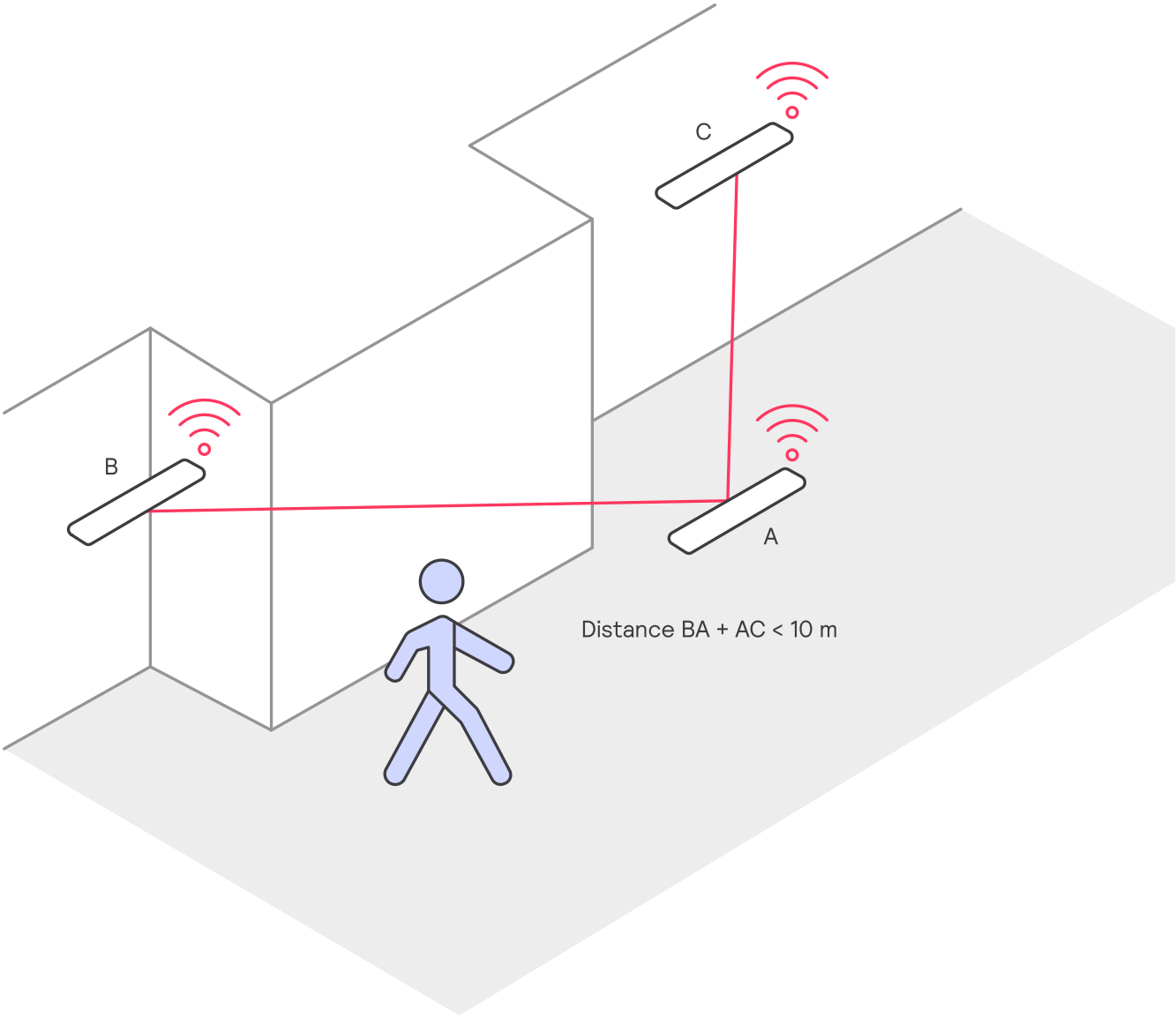
If the blocking object is between two groups and there is a different communication path to the Wireless Gateway(s), then the luminaires can be installed.



Warning

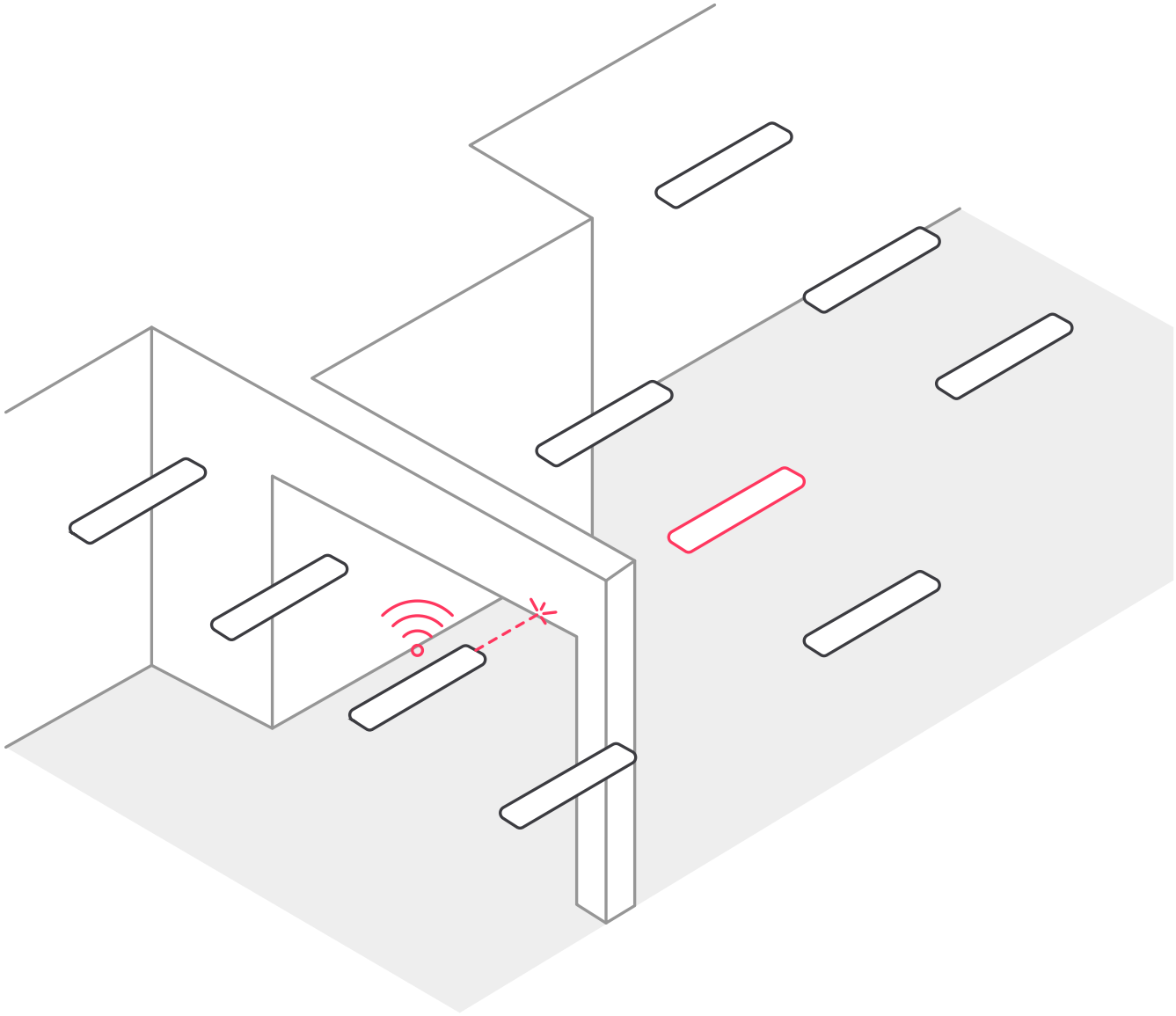
Do not install the luminaires close to concrete or metal constructions





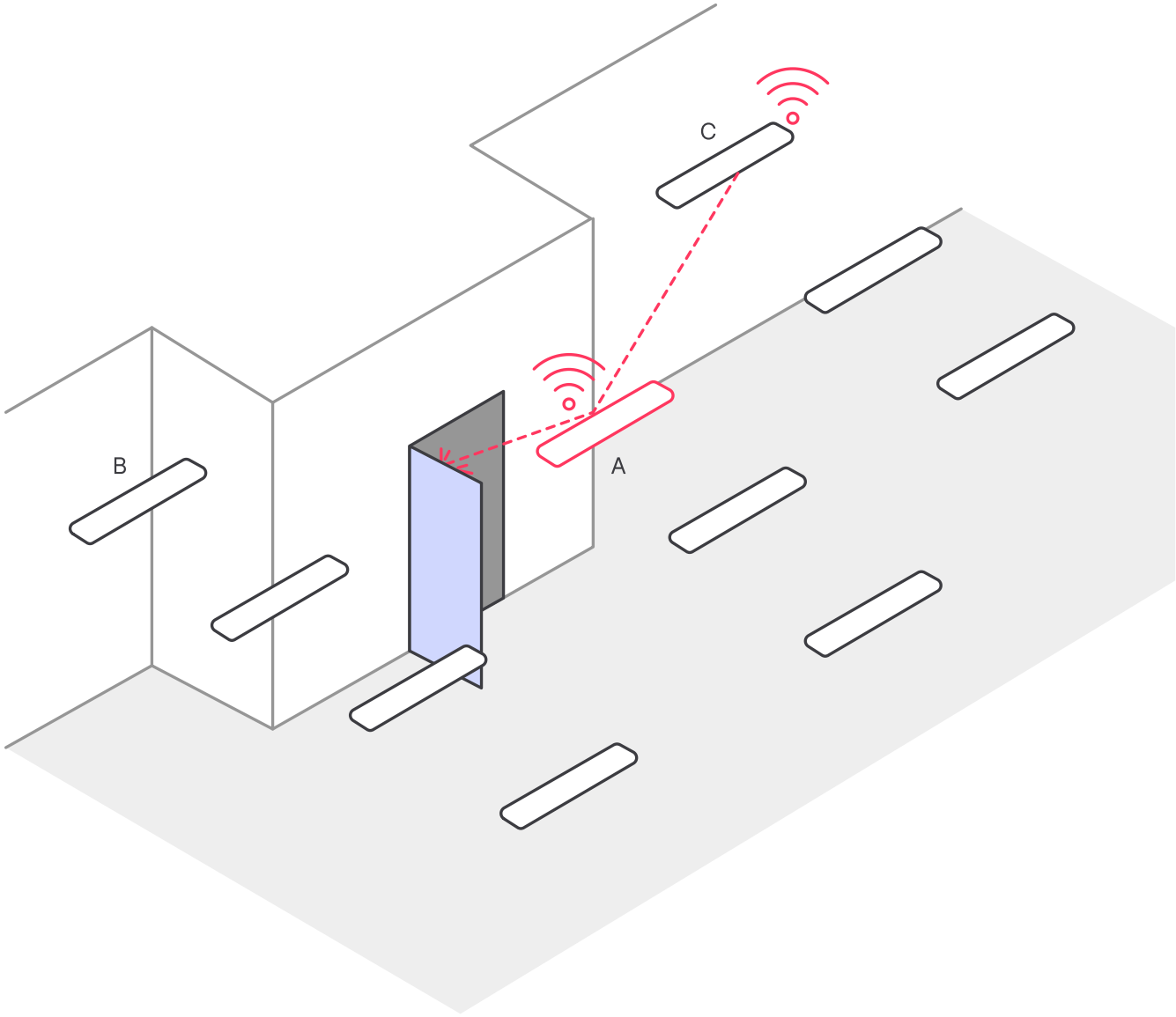
Concrete construction wall

Lights B and C can communicate with each other if the distance between B – A and C – A is less than 10 m (32.8 ft) and there is no blockage present.



Concrete construction ceiling

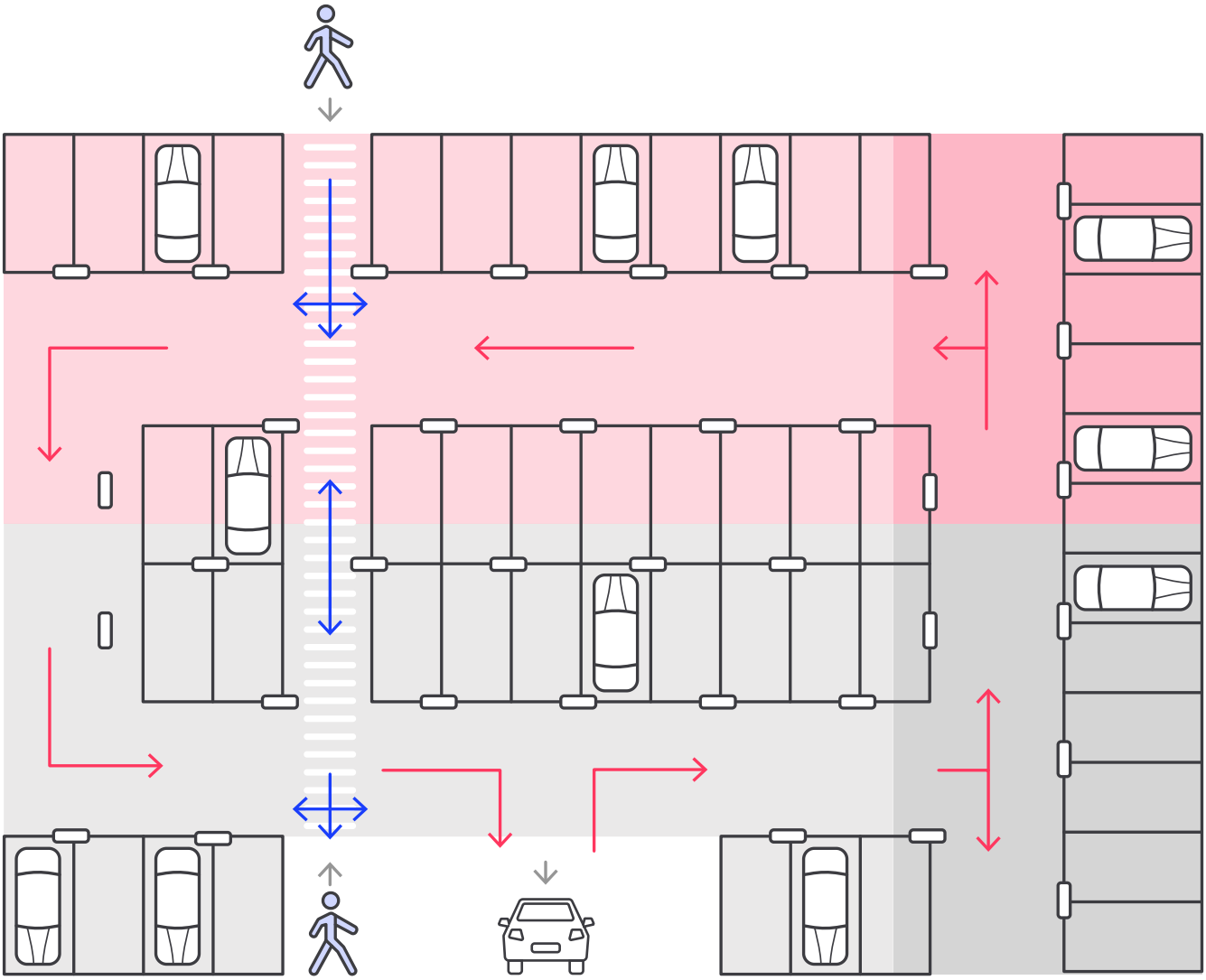
A concrete beam can block the communication of the luminaire.



Metal door

A metal door can block the communication of the luminaire.

1.1.2. Map the traffic



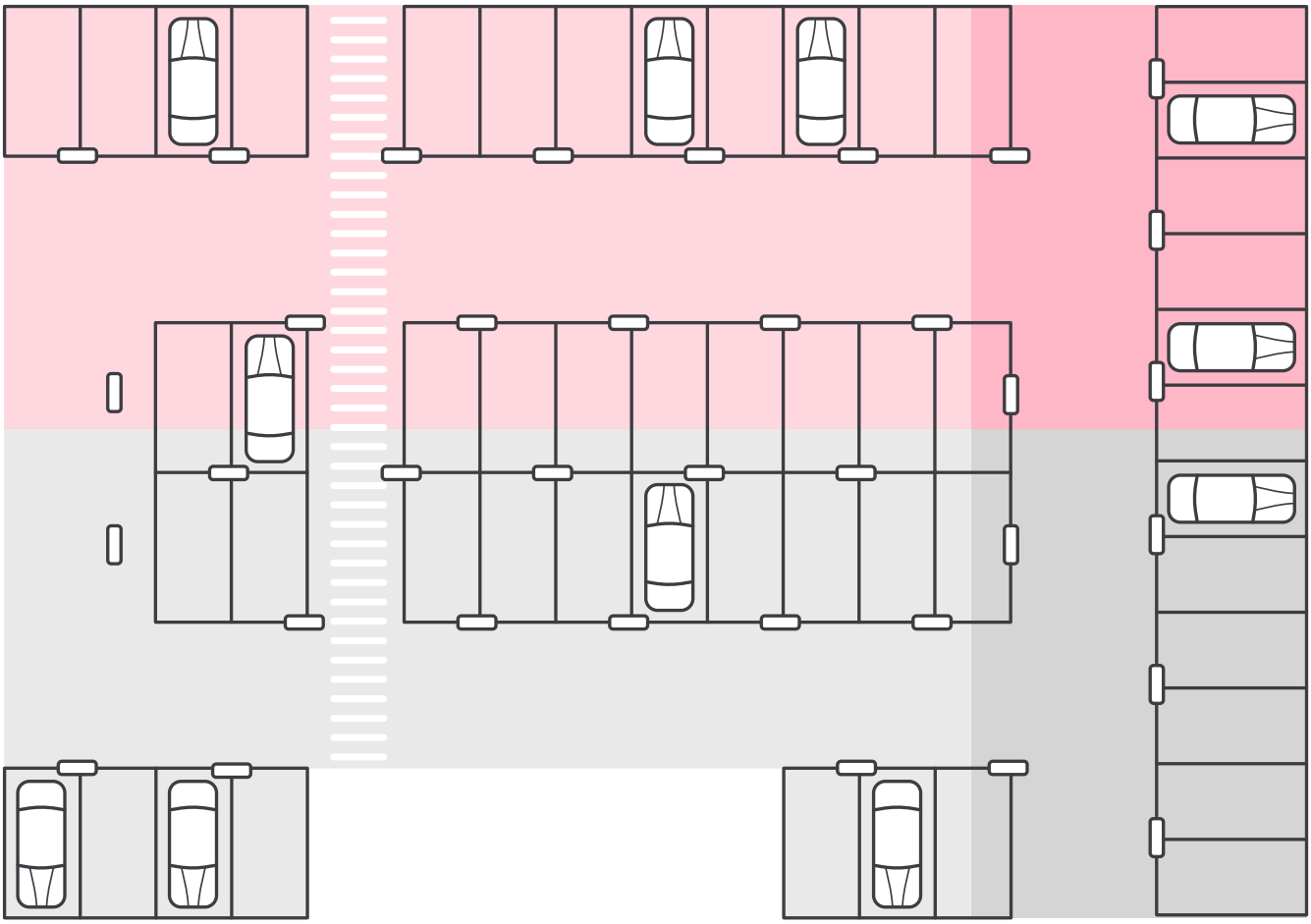
For people walking:

- Start by mapping the formal routes people use
- include alternative routes that are frequently used

For cars:

- Start by mapping the formal routes cars use

1.1.3. Define the lighting groups



- At the entry of a lighting group sufficiently illuminate all directions (> 10 m).
- Lighting groups follow the official routes in the garage, priority on cars.
- Lighting groups follow logical interior shapes, such as isles, walls, etc.
- group length can be between 20 m (65.6 ft) and 40 m (131 ft) length.
- Lighting group width should include the aisle and bordering parking spaces.

1.1.4. Define the sensor plan for each group

Project the routings on the groups. For each group identify the points of entry for cars and people.

There are different spaces on a parking garage depending on the intended use:

- routing corridors for cars
- parking spots
- routing of people including entrance and exit routes

Smaller groups can provide higher energy savings, while larger groups can provide the conform of light.

Determine the group size based on the environmental conditions and customer preference.

Place battery-powered motion sensors

Place a sensor at each point of entry for people:

- when entering the car park at the edge of the group
- the detection group should overlap the adjacent group by 1-3 m

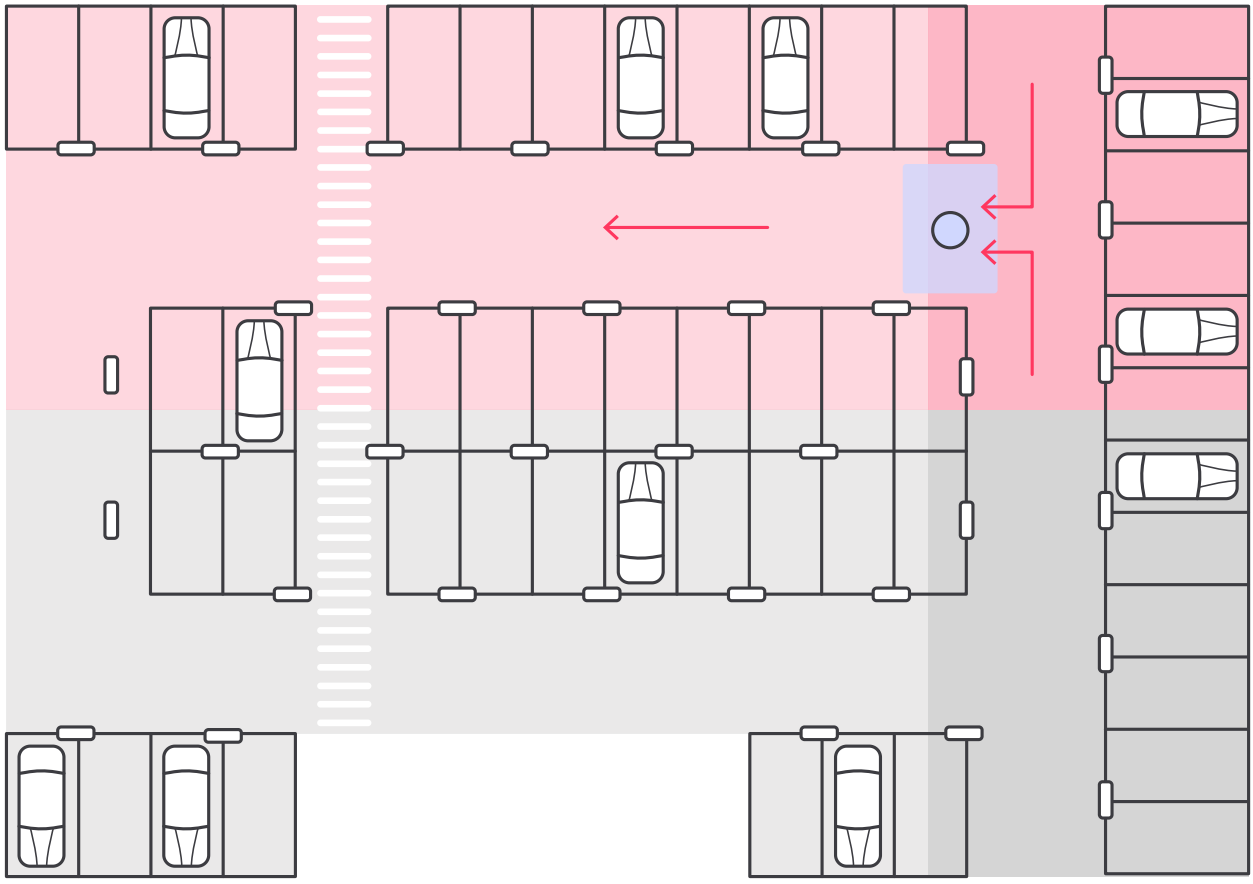
Place a sensor at each point of entry for cars:

- the detection group should overlap the adjacent group by 2-5 m

Optimizing sensors for cars

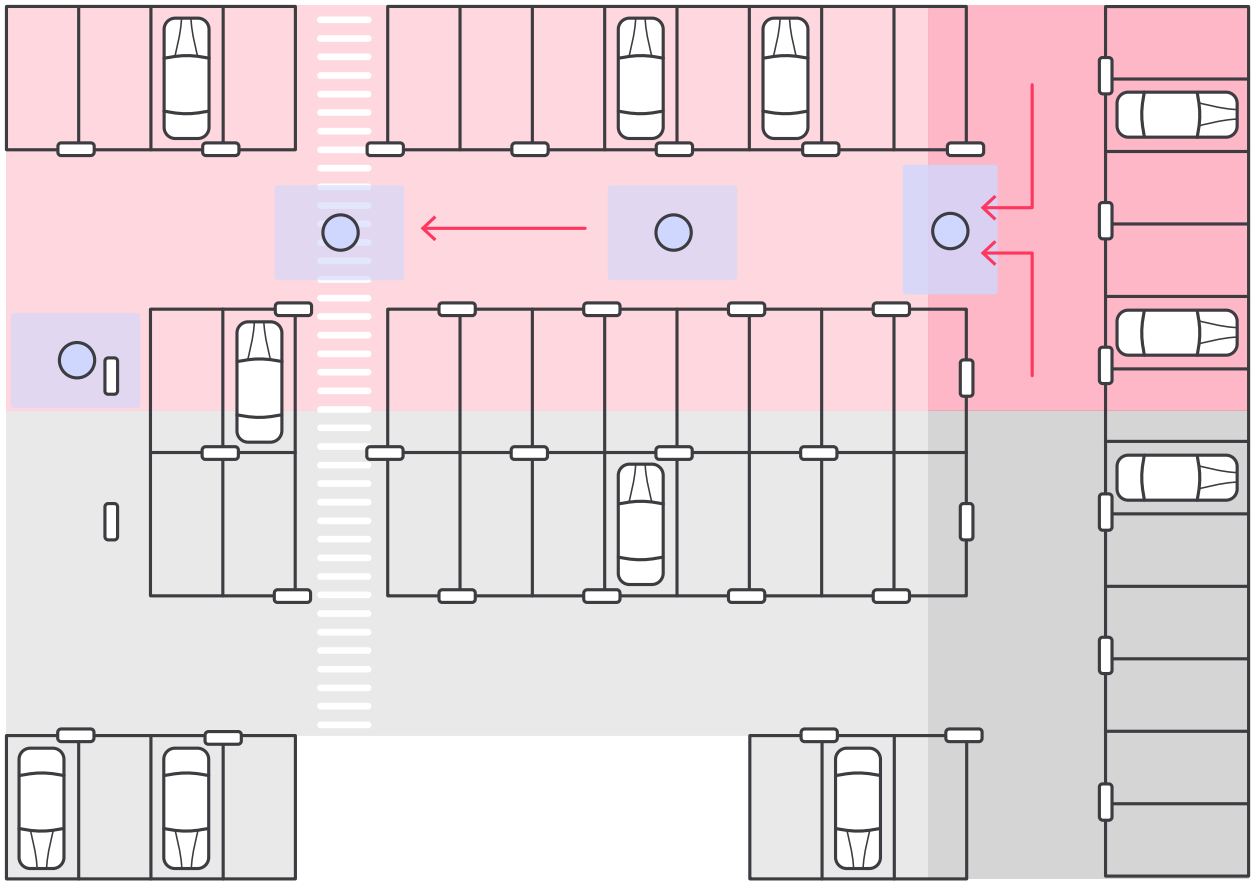
In case cars approach an group from more than one direction, different strategies can be applied:

1. Place a sensor right at the entrance of the lighting group
    - late response to presence
    - low coverage



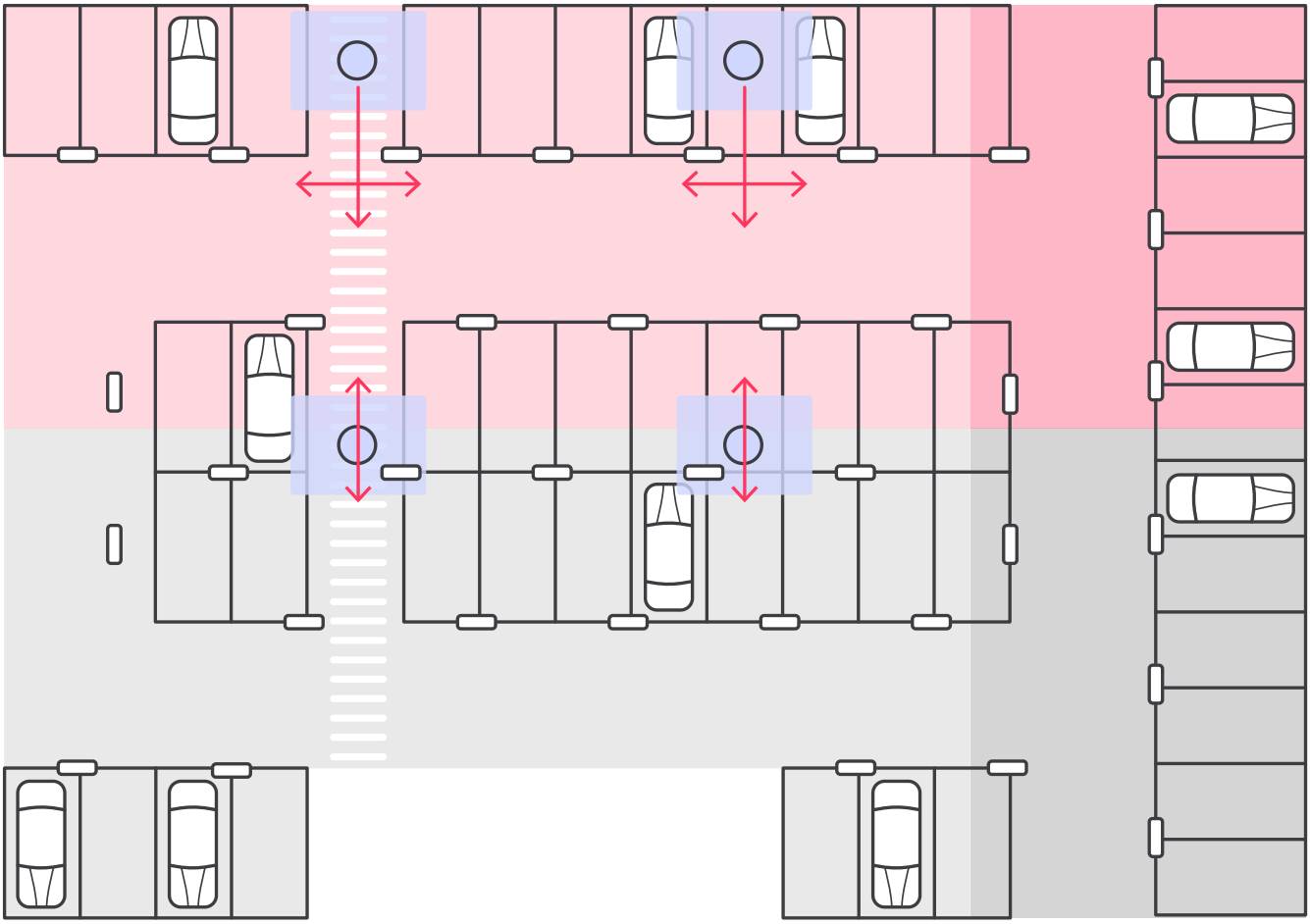
2. Place sensors at each route
    - in time response

- more costly
- good coverage



Optimizing sensors for people

Place sensors above each route as shown below:



Note

In case an group can only be entered from one direction, the light can dim before people have left the group. This can be prevented by placing supporting sensors.

1.1.5. Daylight harvesting

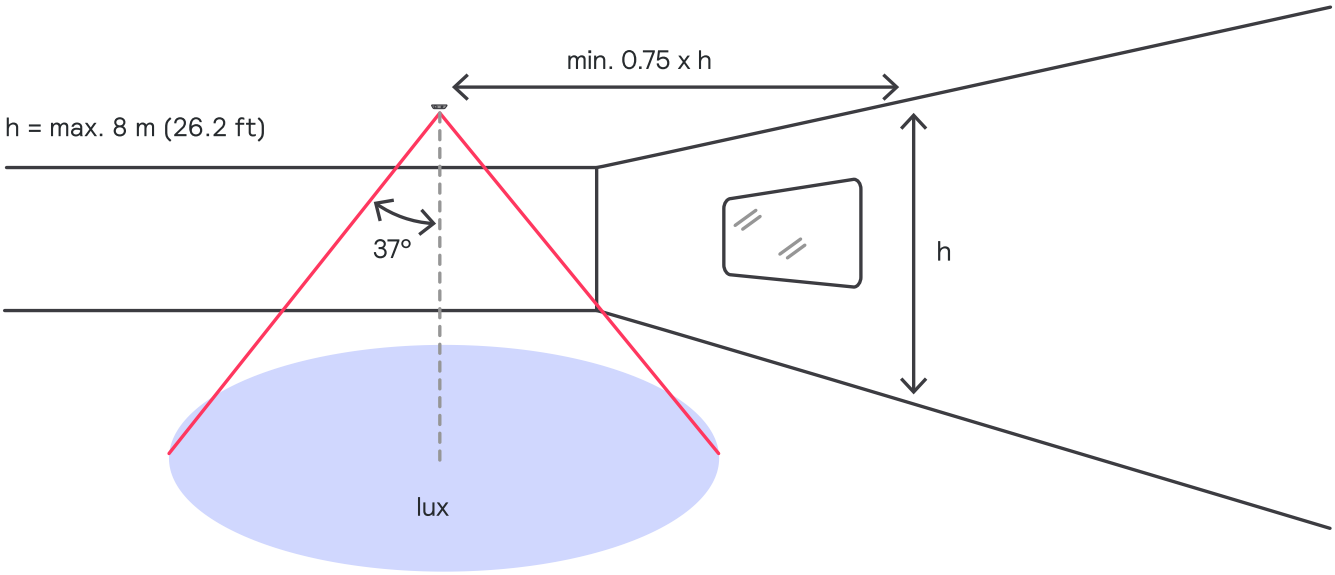
When daylight harvesting is used, place the sensors as instructed in the specification sheet. See more:

- Daylight harvesting for PRF/PRA

Note

Only one daylight harvesting ZGP sensor can be used for per group. Choose the best position for this sensor which represents a good average for the full group.

Field of view daylight



1.2. Guidelines for external battery powered motion sensor

1.2.1. Secure contact between sensors and luminaires

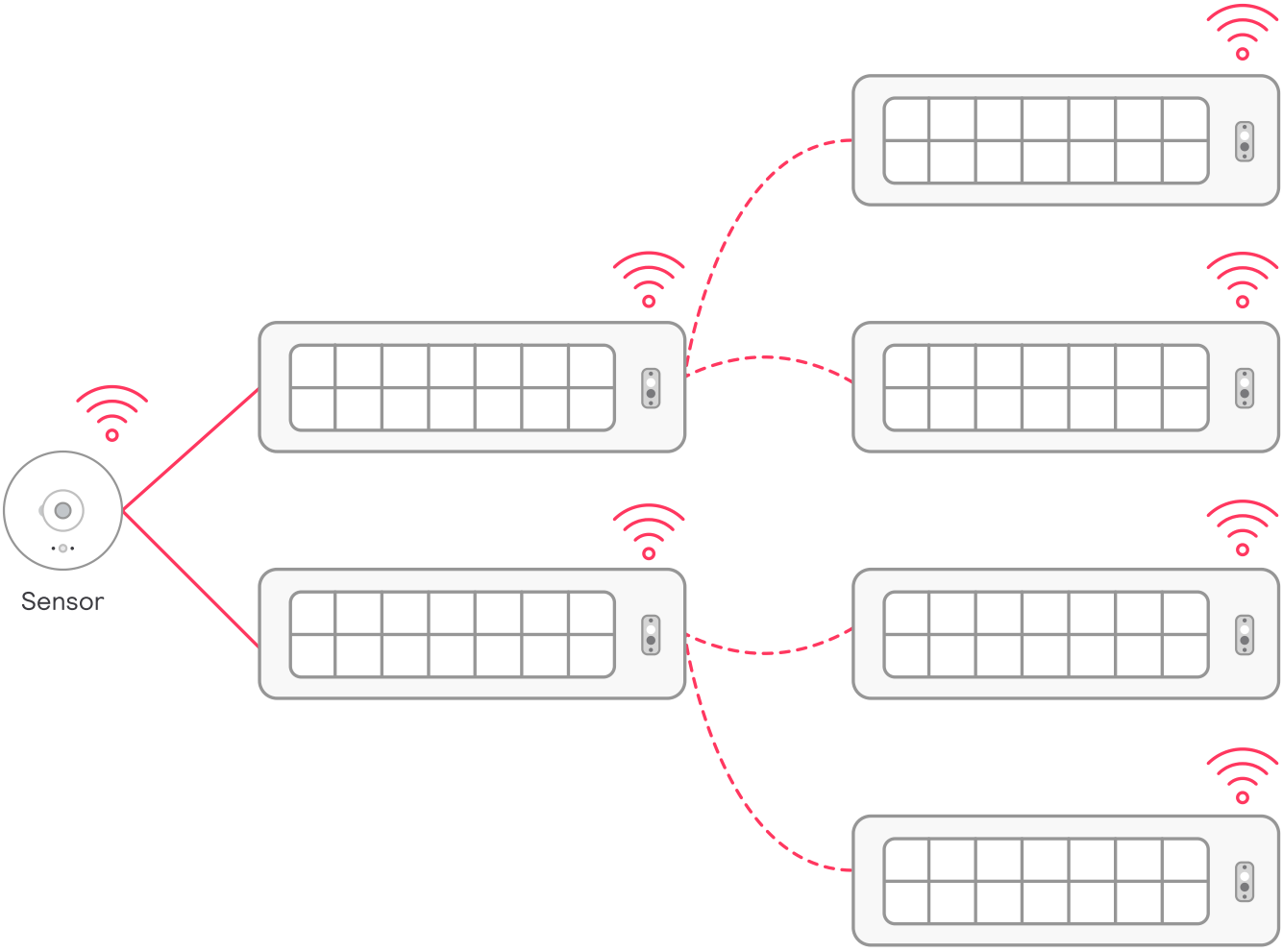
The following practices must be applied to secure contact between sensors and luminaires:

- Every sensor must be capable of establishing a connection with at least two luminaires
- Every luminaire must be capable of establishing a connection with at least two other luminaires

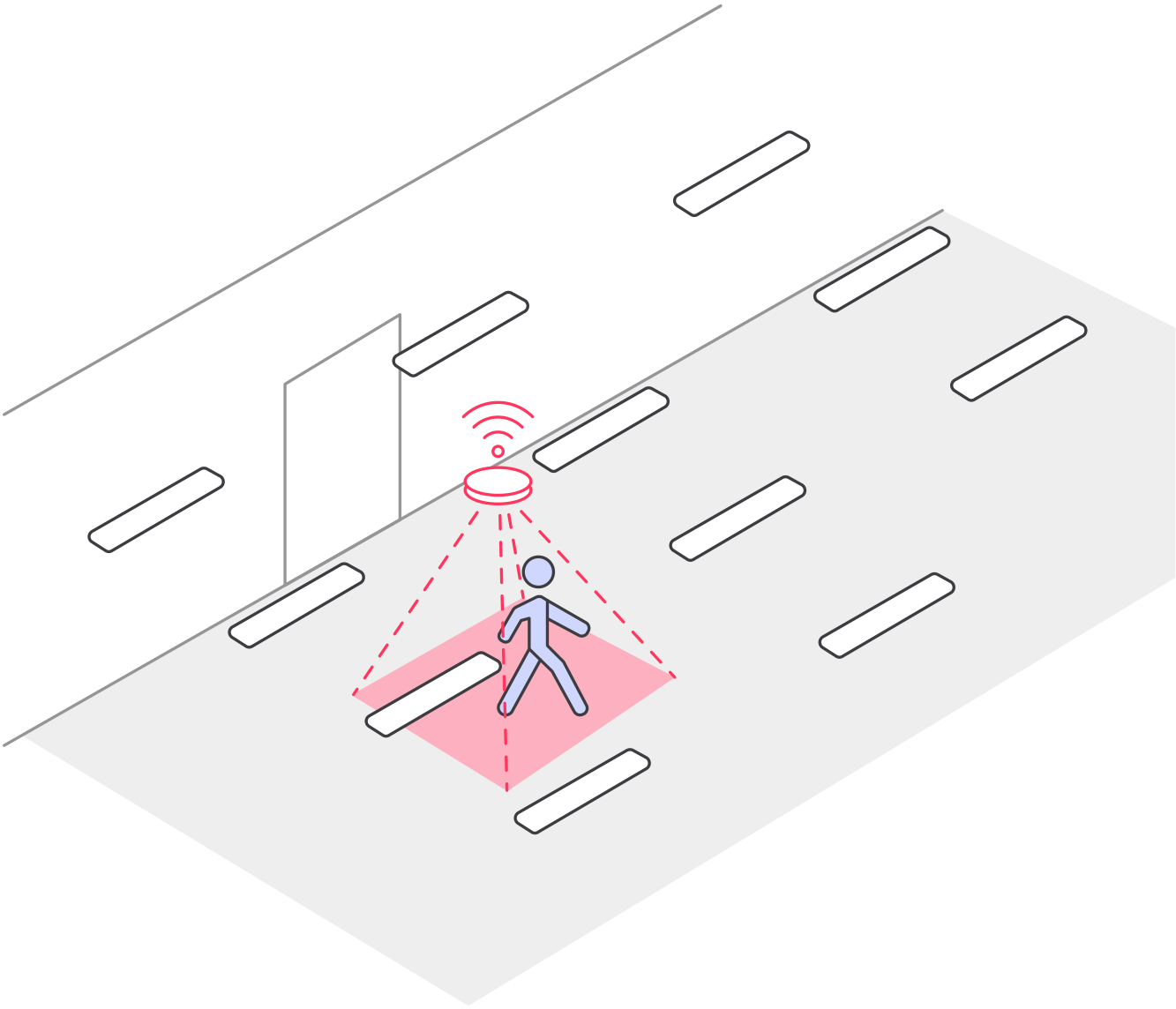
By implementing the above practices, the sensor can relay data to an alternative luminaire when it is unable to contact one.

Note

Depending on the size and nature of present obstacles, each location must be individually verified.


Sensor

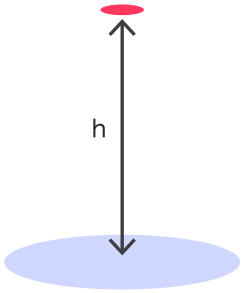
1.2.2. Position motion sensors



Add a ceiling sensor at every entrance/exit rout, both for people and cars.

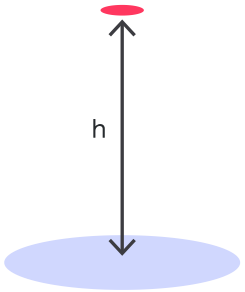
Field-of-View

Field of view motion



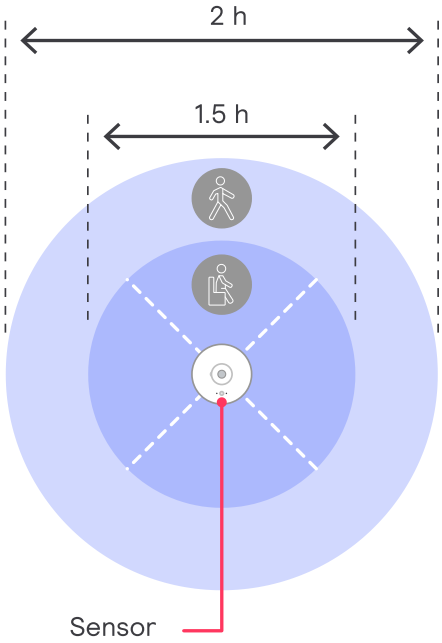
major motion

h = 2.4 to 8.0 m
(7.87 to 26.2 ft)



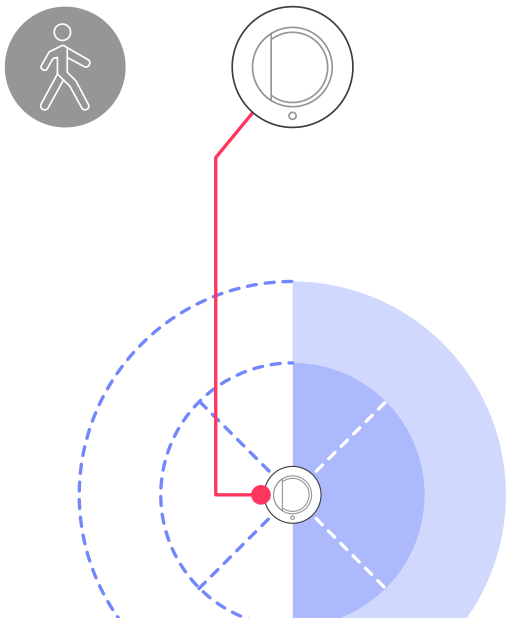
minor motion

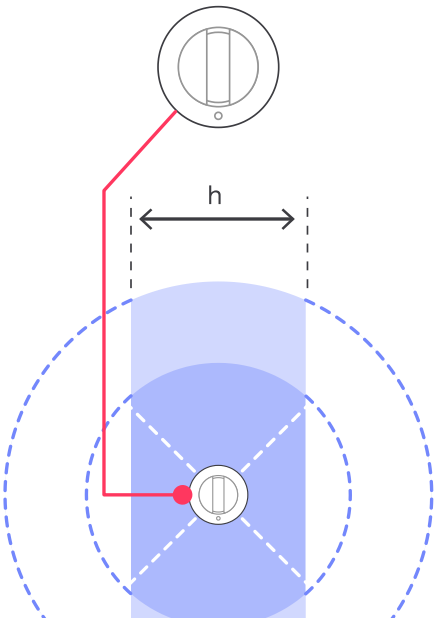
h = 2.4 to 5.0 m
(7.87 to 16.4 ft)



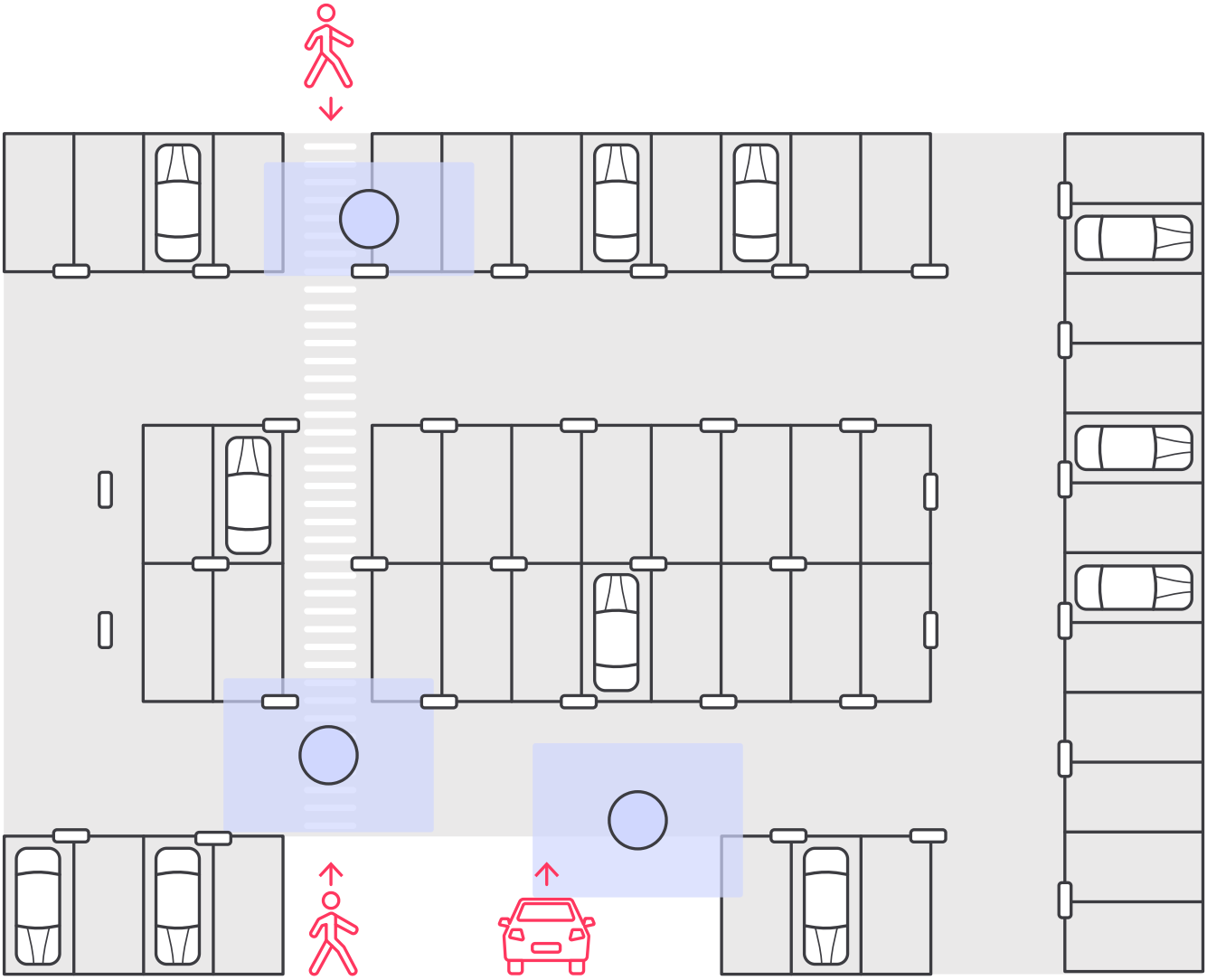
Valid at 25 °C with NEMA standard

Motion field of view can be reduced using the plastic shield on top of the lens.





Sensor detection group



For example, ceiling sensors are installed at the entrance of the parking lot. The luminaires connected to it, switch on to task level as soon as the sensor detects a car or pedestrian entering the field of view. Now the driver or pedestrian has a clear view ahead.

1.2.3. General rules for external battery-powered sensors

Warning

ZGP battery-powered sensors do not report the battery level or when it is depleted.
It is only possible to check if the sensor fails by verifying the LED indicators on the device.

Important

Replace the ZGP sensor's battery before the end of life.

- Place the sensors at the entrances of the parking lot and groups, based on the defined routes for cars and pedestrians.

- Place supporting sensors only when needed, such as large zones with only one entry or exit point
- It is not required to cover the complete group with sensors
- Take into account that cars and objects can block the sensor's field of view
- Install the sensors away from sources of heat

See more information about PRF/PRA sensors

1.3. System configuration

1.4. Light behavior

See more information about light behavior and parameters:

- PRF/PRA light behavior

Note

The recommended template to be used is Auto On Auto Off.

1.4.1. Light behavior parameters for parking projects

Hold Time

The hold time configuration is a balance between visual comfort and energy savings, when increasing the hold time, it is less possible an group will turn off while there is someone still on the space, but this will result in the lights being turned On for longer periods of time, this balance can also be affected by the density of sensors designed, with a higher density of sensors a lower hold time can be used. For ZGP sensors the minimum supported hold time is 5 minutes, this is good enough for most situations, but when designing for a low density of sensors make sure the hold time is increased to 10 or 15 minutes.

Vacant level

For special situations where visual comfort is important, vacant level can be configured to a low dim level, for example 20%, this will prevent the lights turning off even when there is no presence, it can be combined with schedules to set it back to 0% when off working hours.

Others

Parameters like task level is usually set to 100% unless a lower light level is required than the one installed, the background level and prolong time are optional, but usually not commonly used for parking applications.

2. Design a NatureConnect project

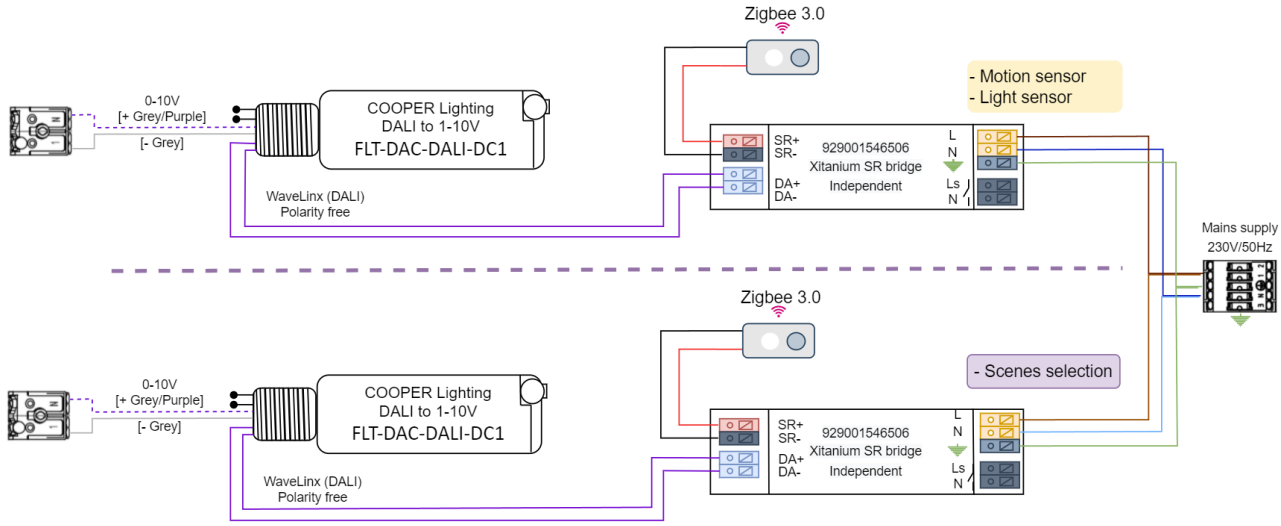
NatureConnect combines various LED luminaires for a fully immersive natural experience. It leverages natural light and content generation luminaires.

The NatureConnect solution integrates with PRF/PRA to control the lighting experience.

Note

NatureConnect doesn't support by default BACNet or PRF/PRA APIs. The integration is facilitated via a DALI to 0-10V analog input.

2.1. Architecture



2.2. Components

The following components are required when designing a NatureConnect integration with PRF/PRA:

- SNS210 IA sensor
- Xitanium Sensor Ready Bridge (SR Bridge)
- Wavelinx Wired Digital to Analog Converter
- NatureConnect gear tray

2.2.1. SNS210 IA

The SNS210 IA sensor is the ideal solution for per-luminaire control of luminaires. It combines occupancy sensing, daylight harvesting and task tuning in a single, compact package for easy luminaire assembly.

The SNS210 IA operates with the Xitanium SR driver standard to make a simple two wire connection between sensor and driver, thus eliminating the need for multiple components and auxiliary devices.

2.2.2. SR Bridge

The SR Bridge can be used with existing drivers to create an SR system. This is useful to connect for example multiple downlights to a single sensor or to use a single sensor for multiple trunking luminaires. The

SR Bridge connects the sensor and, depending on the region, DALI or 1-10 V drivers, integrating the light point into the wireless lighting network.

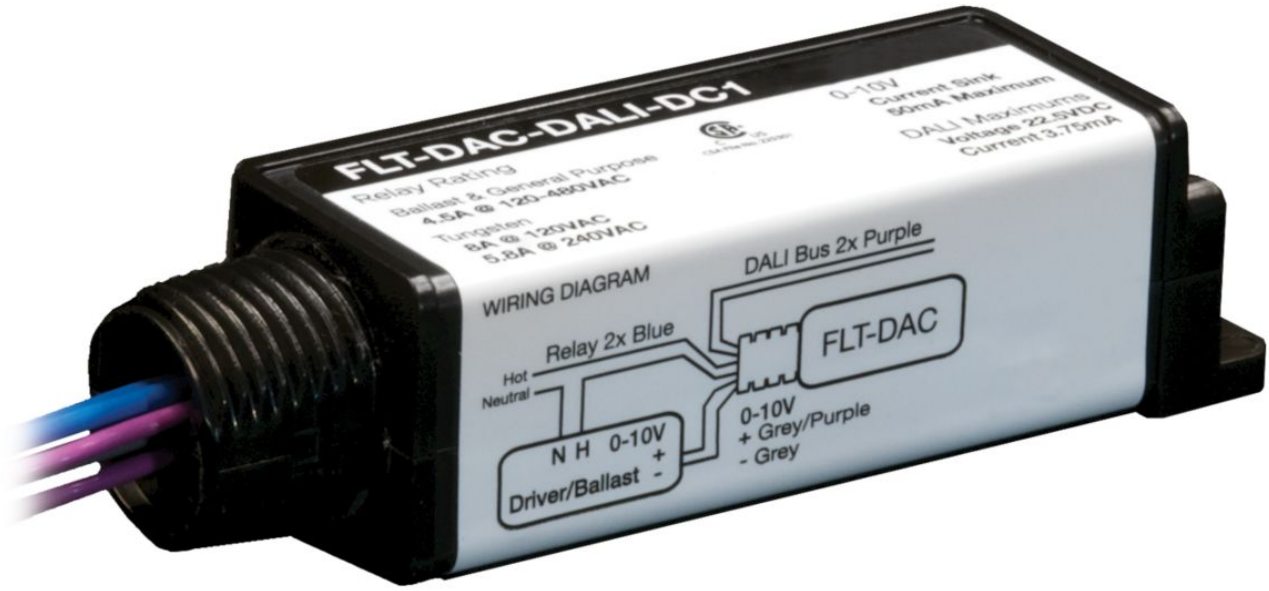
The SR Bridge supports deployment along-side emergency lighting. When using the SR-bridge, the PowerBalance fixture must be selected instead.

Important

On/Off luminaries are only supported for the 0-10V version. If connected to a DALI SR-Bridge, it results in failures reported in LightOperations.

If no luminaire is connected to the SR-Bridge, it always reports a driver failure in LightOperations.

2.2.3. Wavelinx Wired Digital to Analog Converter



The Digital to Analog Converter (DAC) is a lighting control device used to control any standard 0-10V current sourcing dimmable ballast/driver. It allows dimming control by sending 0-10V dimming and on/off commands to the DAC via the Cooper Lighting two wire communications bus.

For more information, see the Wavelinx DALI to 1-10V web page.

Important

Using the DALI to 0-10V interface you can control two aspects independently:

- On/Off and brightness
- Scene selection

There are two options when integrating PRF/PRA with NatureConnect:

- Use PRF/PRA only to control on/off and brightness. In this mode the scene selection is handled by NatureConnect native user interface.

  or

- Use PRF/PRA to control both on/off/brightness and scene selection. This option requires **two PRF/PRA groups** set up in a particular way to control both on/off/brightness and scenes.

2.3. Why two PRF/PRA groups

A NatureConnect system consists of a number of **content groups**, which is similar to an group, as defined by PRF/PRA. A content group shows a consistent natural scene. Integration allows PRF/PRA to control a content group.

The NatureConnect luminaires are controlled by the NatureConnect content generator (a cabinet), which in turn interfaces to the Interact system

Integration is done via the Xitanium SR Bridge, which allows PRF/PRA to control any DALI-based light.

NatureConnect delivers a gear tray which contains all the electronics required to control one content group.

It has two Xitanium SR Bridges connected to two DALI to 0-10V control signals which are routed to the content generation cabinet.

Because it needs to control both on/off/brightness and scene selection, which are independently controlled in NatureConnect, two PRF/PRA groups must be created to control one NatureConnect content group.

One group controls on/off/brightness, set in automatic on/off mode, while the other group controls the scene selection and is set in a fully manual mode.

2.4. NatureConnect Controls integration

For more information contact the NatureConnect support team.

Once the project is specified, you can move to the installation and commissioning part. See Integrate a NatureConnect project with PRF/PRA

Learn more about Interact
www.interact-lighting.com