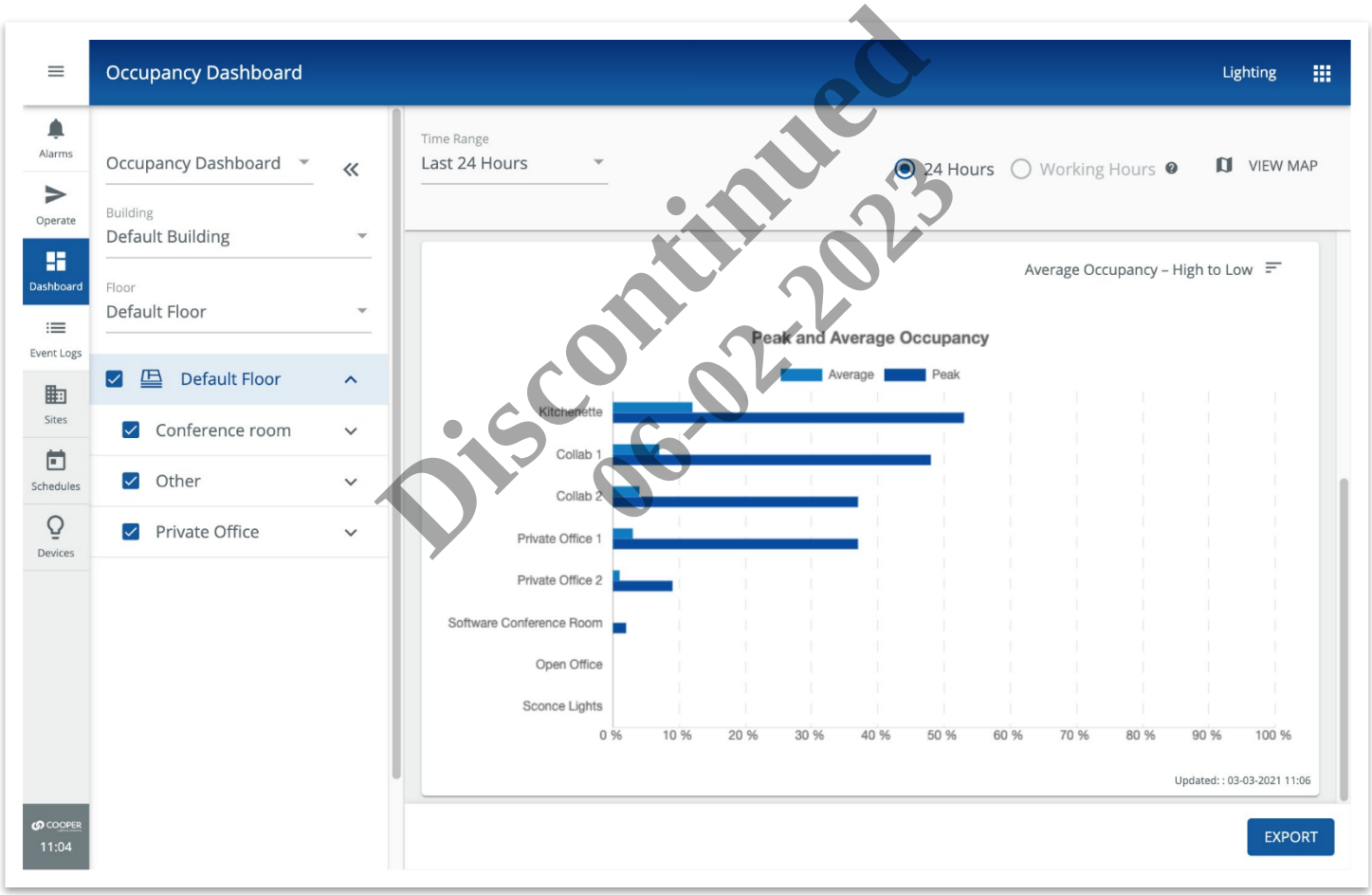
Lighting User Manual **Trellix**

This document is intended for installers, set-up technicians and IT professionals of Trellix products.

Important: Engage appropriate network security professionals to ensure all lighting control system hardware and servers are secure for access. Ensure IT professionals review the WaveLinx network architecture document found at the end of this manual.

Network security is an important issue. Typically, the IT organization must approve configurations that expose networks to the Internet. Be sure to fully read and understand customer IT Compliance documentation.



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COOPER Lighting Solutions

⚠ WARNING

Read all the instructions thoroughly before installing this product.

This manual provided information on the installation and operation of Trellix Lighting. For proper operation it is important to follow the instructions.

The purpose of this document is to provide sufficient instructions for installation and basic troubleshooting.

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1 – About this Document

This document describes how to configure, monitor, and control the health of connected devices with the Trellix Smart Lighting IoT platform and associated applications.

Important

This document does not cover the initial Trellix Core installation and setup. Please refer to the Trellix Core Quick Start Guide if you are installing Trellix platform for the first time.

1.1 – Assumptions

The information and procedures in this document assume the following:

- One or more WaveLinx Wireless Area Controllers and/or WaveLinx Wired Ethernet Gateways have been installed and configured on your site
- You are familiar with the *WaveLinx Mobile Application User Manual* and *WaveLinx System Network/IT Planning Guide*, and/or the WaveLinx Wired *Installation Guide*
- You know the Trellix Core IP address and have a login account

1.2 – Using This Manual

Use the table below to quickly identify the kinds of the tasks you need to perform.

If you are…	Then…
New to Trellix Lighting	See *Overview*.
Ready to login to Trellix as a new user	See *Trellix Lighting Login and Authentication*.
Working with Alarms and Events	See *Managing Alarms and Events*.
Controlling the Lighting System	See *Operating the Lighting System*.
Viewing the Energy Dashboard	See *Using the Energy Dashboard*.
Viewing the Occupancy Dashboard	See *Using the Occupancy Dashboard.*
Exporting data	See *Exporting Alarm, Energy, Occupancy, and Event Data.*
Working with Schedules	See *Managing Schedules*.

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1.3 – Key Terms

The terms listed below are used in this document.

- **Alarm** – An error notification that requires an action
- **Application Programming Interface (API)** – A set of clearly defined methods of communication between various software components
- **BACnet** -- A communications protocol for Building Automation and Control (BAC) networks
- **EG** – Ethernet Gateway, used to connect WaveLinx Wired to Trellix
- **Event** – A notification, such as a cleared alarm or system event, that does not require any action
- **WaveLinx Wired** – Single lighting control solution for all traditional wired control application needs
- **Internet of Things (IoT)** – The extension of Internet connectivity into physical devices, enabling them to communicate and interact with over the Internet for remote monitoring and control
- **Lighting Control System (LCS)** – A computer-based control system installed in a building to control and monitor lighting equipment such as controllers, ballasts, drivers, keypads, and sensors (consists of hardware and software)
- **WaveLinx Low Voltage** – Distributed Low Voltage power (formerly nDLVP)
- **Trellix Core (TC)** – A gateway that aggregates Wireless Area Controller device data
- **Wireless Area Controller (WAC)** – An application that coordinates the WaveLinx Mobile App with various WaveLinx devices to provide lighting zone configuration, monitoring, and control (also referred to as “Controller” or “Area Controller”)

- **Real Time Locating System (RTLS)** – A system that automatically identifies and tracks the location of objects or people in real time, usually within a building or other contained area
- **Wireless Area Controller (WAC)** – An application that coordinates the WaveLinx Mobile App with various WaveLinx devices to provide lighting zone configuration, monitoring, and control (also referred to as “Controller” or “Area Controller”)

1.4 – Related Documentation

Document	Description
Trellix Core Quick Start Guide	This guide covers the initial installation and setup of Trellix platform.
Trellix Lighting System Configuration Guide	This guide covers the configuration and administration of an installed Trellix system.
Trellix Lighting API Reference	This manual describes the Trellix Lighting developer API.
WaveLinx System Network/IT Planning Guide	This guide covers the planning, design, set up, and configuration of a WaveLinx System.
WaveLinx Mobile Application User Manual	This manual covers the use of the WaveLinx Mobile Application to configure the Wireless Area Controllers.
WaveLinx Wired Installation Guide	This guide covers the installation of WaveLinx Wired.
Cyber Infrastructure Security Tips	Tips and advice about common security issues for non-technical computer users.

1.5 – What’s New

The key changes in this release are listed and described below.

Change	Description
Controller Configuration	The new Sites interface (formerly Buildings) now offers editing of WAC Area, Zone, Occupancy, Daylight, and Demand Response configuration.
Live data cards	When relevant Building and Device elements are selected, such as Areas, Sensors, or Wallstations, live data is prominently displayed in a separate card.

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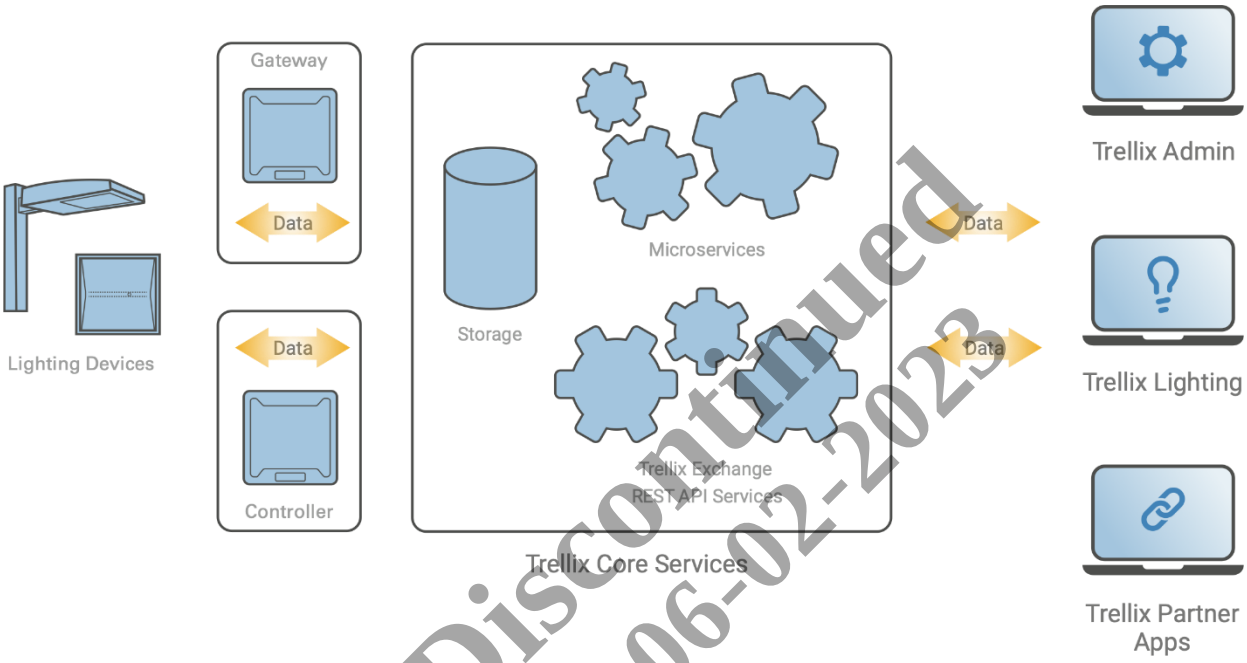
2 – Overview

Trellix is an on-premise smart lighting IoT platform that moves real-time monitoring and processing to the edge of the network. The Trellix platform accelerates insight around your building operations and business processes, unlocking efficiency and enabling more effective decision-making with apps from Trellix and our partners.

The platform manages the trellis of digital sensors embedded in your connected LED lighting, collects the data gathered by the sensors, and analyzes the data to provide meaningful insights to users.

This on-premise platform hosts *Trellix Core Services*, a set of microservices required for fully functional IoT solutions; *Trellix Sense*, a set of interfaces to allow data exchange with third-party apps; and *Trellix Apps*, a set of Cooper-developed Apps designed to serve connected buildings and sport facilities.



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2.1 – System Components

The components of a Trellix system are described below.

Component	Description
Trellix Core Services	A set of microservices required for fully functional IoT solutions which facilitates device communication, device management, data upload, data aggregation and storage, data interfaces as well as robust user and device authentication and authorization.
Trellix Exchange	A set of REST APIs that enable third-party applications to unlock the value of the data being gathered by Cooper's connected lighting system.
Trellix Admin	The Admin application lets users perform the administrative tasks required to manage the Trellix Core services such as: enabling/disabling interfaces; creating/editing/deleting users and roles; backing up and restoring configuration databases; and upgrading the platform.
Trellix Lighting	The Lighting application lets users configure and monitor a code-compliant connected lighting system designed to create an energy-efficient space. With this application, you can perform high level supervisory tasks such as making changes to the light levels, creating lighting schedules and viewing your lighting system's energy usage. It is also the foundation for the sensing network and other advanced applications that leverage the data gathered by the system.

Component	Description
Trellix Locate	The Locate application lets users monitor the location of objects or people in real time within a building or other contained area. ***NOTE*** *The use of the Locate application covered in the **Trellix Locate User Manual** and **Trellix Locate API Reference**. Please refer to those documents for further details.*

2.2 – Managing a Lighting System: Key Concepts

This section explains the key concepts used by Trellix Lighting to organize and manage the lights in a building. Trellix Lighting uses the natural and obvious concepts of a *Building* and a *Floor*. The concept of *Devices* covers all the sensing and control equipment, which are then organized into *Areas* and *Zones*. The lighting automation features are extended further with *Scenes*, *Occupancy Sets*, *Daylight Sets*, and *Demand Response*.

Devices

A *Device* is a piece of equipment that senses or controls some aspect of the lighting. Examples include ambient, industrial, and outdoor integrated sensors; tile-mount sensors; WaveLinx wireless fixtures; WaveLinx switchpacks; outdoor lighting control modules; and receptacles.

Areas

An *Area* is a collection of Devices that work together. Typically, an Area will be a room or space that occupies part of a Floor. Each Area will usually operate independently. Devices are assigned to Areas when a Trellix system is set up and configured. A WaveLinx WAC can manage up to 15 Areas, along with a default construction Area, and Trellix can manage multiple WaveLinx WACs and WaveLinx Wired EGs.

Zones

A *Zone* is a group of Devices that are controlled the same way. For example, a set dimmable light fixtures installed in a row can be placed in a Zone so their light level can be raised and lower together. A group of controlled receptacles in a room could be placed in a receptacle Zone, allowing them to be switched on and off in unison. Zones are also used to separate the color temperature control of tunable white lighting from the on, off, and dimming control.

Scenes

A *Scene* is a collection of settings that can be applied with a single command. For example, take a conference room with the lighting organized into two Zones, Main and Display. The Display Zone controls the lighting at the end of the room where a large digital display is built into the wall. The Main Zone controls all the other lighting. A Scene for meetings could set the lighting for both Zones to a consistent 80% with a single command, while the Scene for presentations might turn the Display Zone off altogether and dim the Main Scene to 25%.

Occupancy Sets

An *Occupancy Set* is a group of occupancy (motion detection) sensors that operate together to control a collection of Devices. When an Occupancy Set has no occupied signals from any of its sensors, the Zones connected to that Occupancy Set will transition through a configured hold time to the unoccupied level. Motion detected by any single sensor in the Occupancy Set will take the Zones to the occupied light level, however, all sensors in the Occupancy Set must be reporting no motion before a transition to the unoccupied light level will be initiated.

Daylight Sets

A *Daylight Set* is a group of daylight sensors that operate together to modulate the lighting levels according to the amount of natural light detected. For example, a wallstation command sets the electric light level to 100% in the morning. As the day goes on, more sunlight is admitted, and less electric light is needed to achieve the desired light level in this space. By detecting the contribution of the natural light, a Daylight Set can constrain the 100% signal from the wallstation to what is needed, say 50%. The wallstation is still requesting 100%, but what that represents at the light fixture is reduced to 50% by the Daylight Set.

Demand Response

Demand Response is a feature that allows an external signal to request a reduction in lighting levels. When received, all dimmable Zones will reduce their light level by 20%. Commands from other controls will operate within the reduced range until the demand response signal is cleared. Demand Response signals have no effect on switched loads, receptacles, and tunable white zones/devices.

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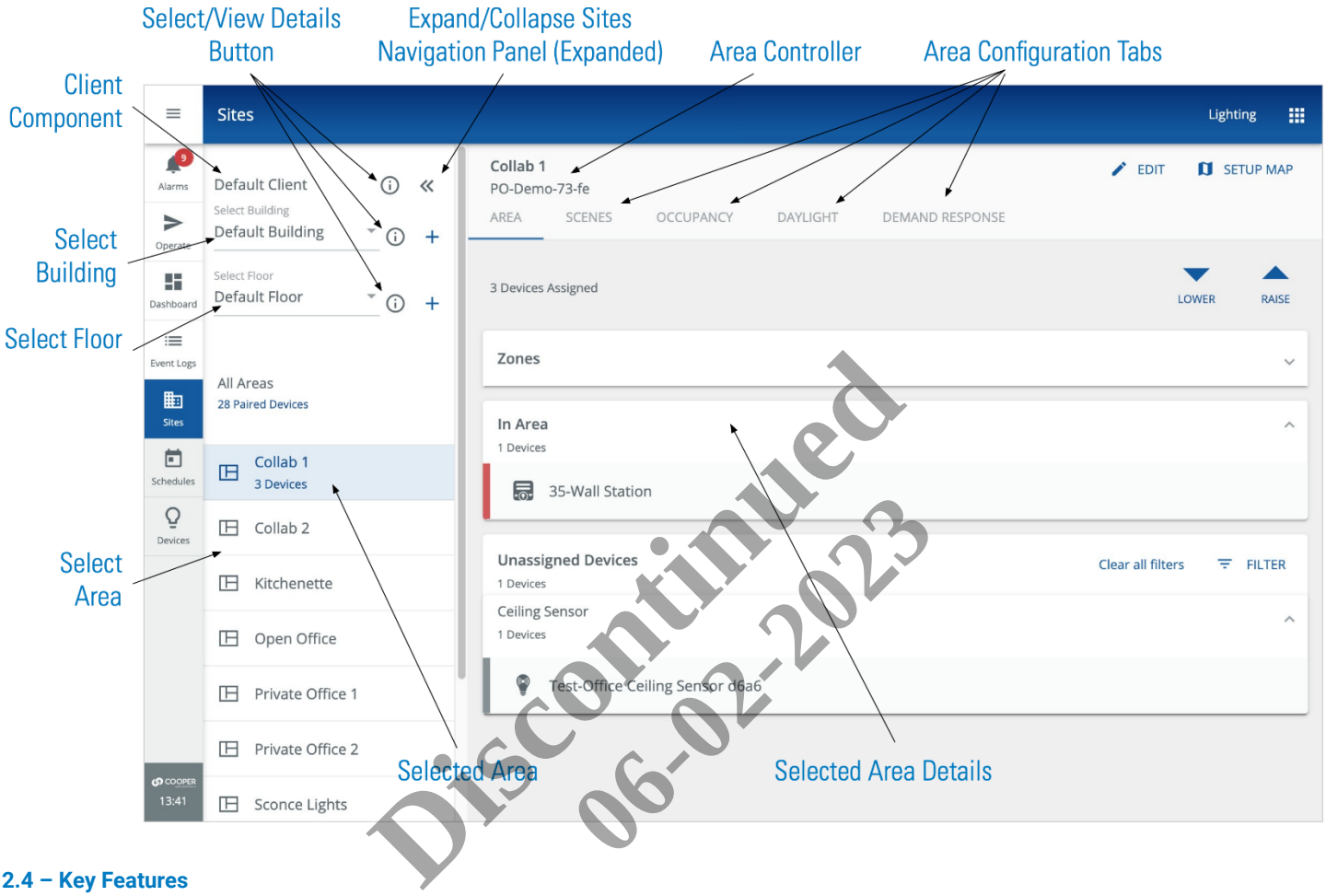
2.3 – Web Interface

Trellix Lighting is accessed with a Web browser on a desktop or tablet that is connected to the lighting system network. A desktop view of the Area Details tab on the Sites page is shown below.



2.4 – Key Features

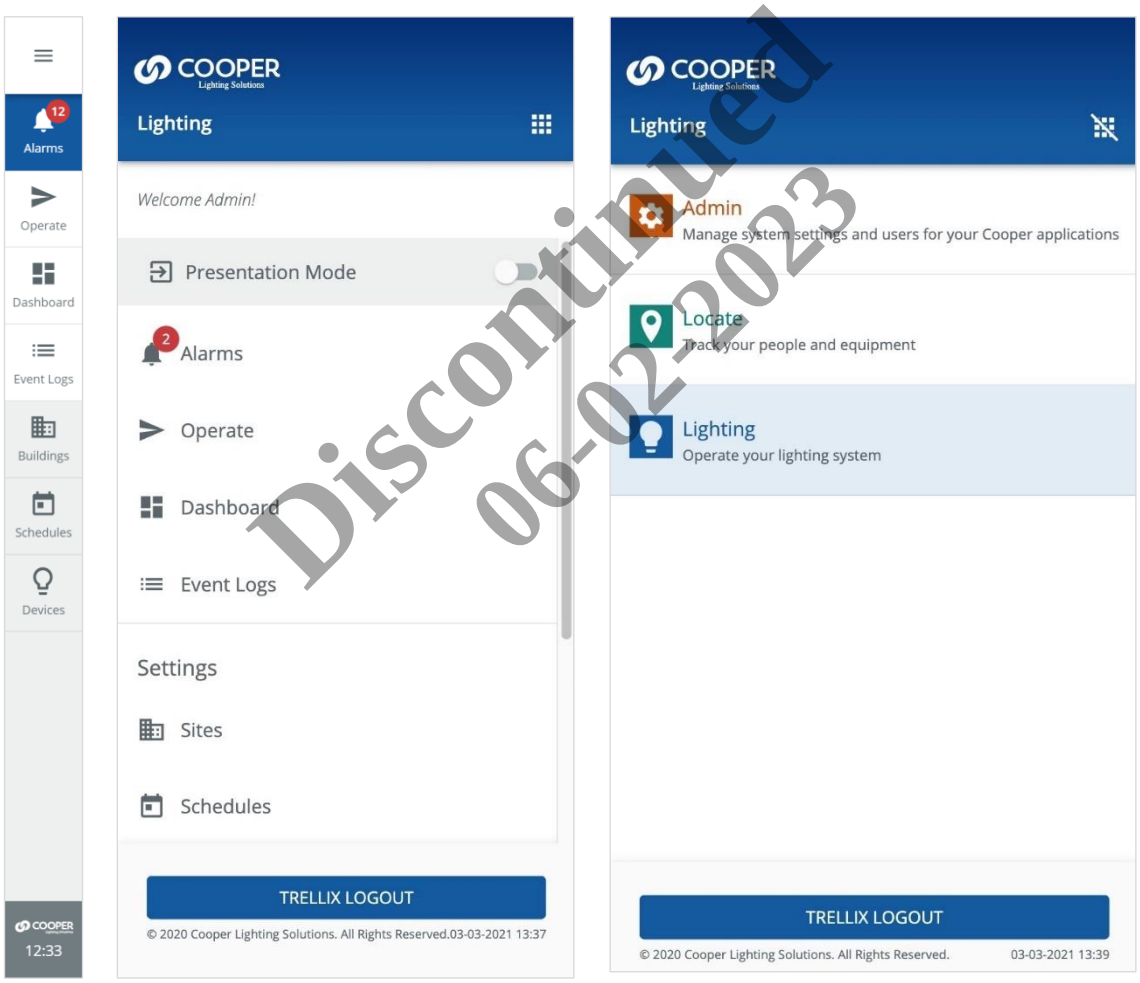
The key facility management features available in Trellix, grouped as they appear in the user interface shown above, are described below.

Feature	Description
	The app menu lets you switch between the Admin, Lighting, and (optionally) Locate apps.
Alarms	Monitor active alarms to see the health of your WaveLinx/iLumin system and quickly address issues. Troubleshooting tips, aggregated from Cooper's insight into its lighting systems, are provided. Alarms can also be emailed.
Operate	Monitor and control the lighting system with a floorplan or using the building hierarchy. A facility manager can control the light levels of a Floor, Area, Zone, or single light fixture. The floorplan can also indicate the status of a Device or an Area (e.g., light on/off, or faulty).
Dashboard	Access important information about how much energy use and savings by the lighting system and how occupants are using the space.
Event Logs	View all system notifications, including past alarms, and perform sequence of events analysis for a better understanding of system behavior.

Feature	Description
Devices	Discover WACs and WaveLinx Wired Ethernet Gateways (EGs), associate them with Trellix Core, and view all devices associated with those WACs and EGs.
Schedules	Automate Zone, Scene, Occupancy, and Wallstation behaviors with flexible custom schedules.
Sites	Configure a building hierarchy as well as create and edit floorplans.

2.5 – Cooper Menu

The Cooper menu, shown below left, is collapsed by default and runs vertically along the left edge of every page. It provides access to the top-level feature sets such as Dashboard and Sites. This menu can be expanded, as shown in the center below, to scroll and display other options such as the software version, a link to this manual, and the **Logout** button. As shown below on the right, the ⠿ appears inside the expanded menu to provide access to the installed Trellix apps.



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2.6 – Trellix Admin: System and User Management

The Admin application lets users perform the administrative tasks required to manage the Trellix Core services, such as: enabling and disabling interfaces; creating, editing and deleting users and roles; backing up and restoring configuration databases; and upgrading the platform. For example:

- **Users** lets the system administrator create, edit, and delete users, create custom roles, and associate roles and areas of responsibility with each user.

- **Published API** lets system integrators integrate networked WaveLinx WACs with other enterprise systems using the Cooper REST API. Please refer to the *Trellix Lighting API Reference* for details.
- **BACnet/IP** lets system integrators easily combine networked WaveLinx WACs with a Building Automation System (BAS). The BAS can read and write to the WaveLinx Areas/Zones via the BACnet interface. Please refer to the Trellix Lighting *BACnet Protocol Implementation Conformance Statement* (PICS) for details.
- **Demand Response** lets facility managers participate in a Demand Response market by enabling Trellix Lighting to receive demand response signals via its OpenADR, BACnet or Published API, and then broadcast it to WaveLinx WACs.

2.7 – Requirements

Trellix Lighting has been tested with **Safari 11+** for iOS devices, **Chrome 53+** for Android devices, and **Chrome 53+** or **Edge** for Windows laptops/tablets.

2.8 – Trellix Lighting Login and Authentication

Trellix Lighting provides a standard set of user accounts, roles, and permissions. Each role has a specific set of permissions, and each user account is assigned to one role. New user accounts, and new roles with custom permissions, can be created when logged into the Trellix Admin app under the Administrator role. The Facility Manager role allows the creation new user accounts and the assignment of existing roles.

2.9 – Changing Default Account Passwords

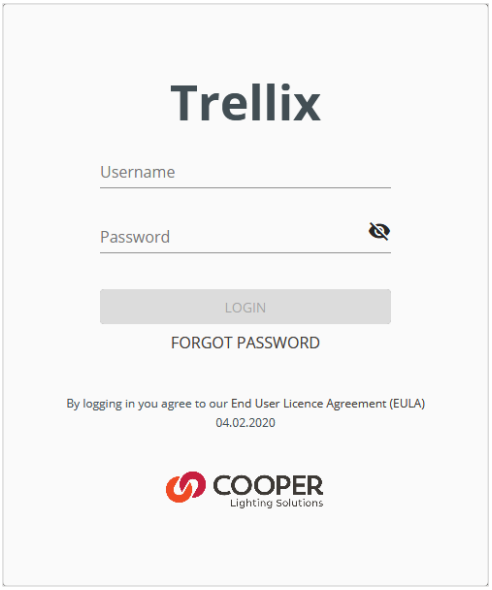
Changing the passwords provided by Cooper Lighting Solutions for all default accounts is critical for the security of your system. Refer to the *Trellix Lighting System Configuration Guide* for instructions on how to do this.

NOTE
You will need the Trellix Core IP address, and a login account with System Administrator permissions to follow these procedures.

2.10 – Logging into Trellix Lighting

Follow the steps below to login to Trellix Lighting. See *Default Accounts, Roles, and Permissions* for more information about the default accounts provided.

NOTE
The first time the Admin account is used to login to Trellix Core, a Setup Wizard guides the user through the initial system configuration. Refer to the Trellix Core Quick Start Guide for step-by-step instructions if you are installing Trellix for the first time.

Step	Action
1	Browse to `https://<ipaddress>`, where `<ipaddress>` is the IP address of the Trellix Core host (`192.168.2.100`, by default). ***RESULT*** 

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Step	Action
2	Enter your Username and Password, and then click **Login**. ***NOTES*** • After 10 failed attempts to log in, you will be locked out for 15 minutes • If you cannot locate your username or password, contact your Facility Manager to reset the password
3	To log out, click ≡ to expand the main menu, and then click **Log Out**.

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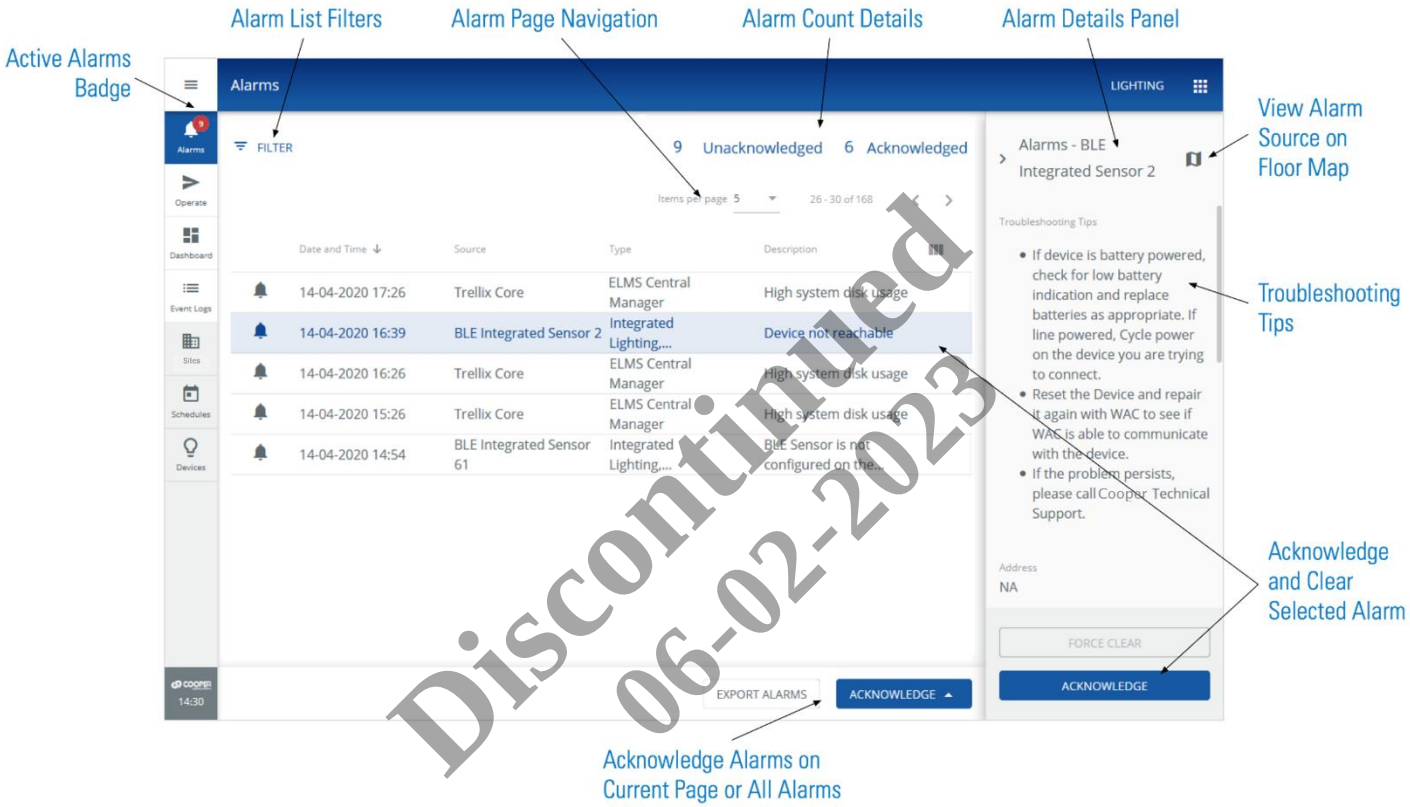
3 – Managing Alarms and Events

This chapter describes how to view and manage Alarms, Events, and Schedules, and how Alarm and Event data is exported, with Trellix Lighting.

NOTE
See Logging into Trellix Lighting *if you are not familiar with accessing Trellix Lighting.*

3.1 – Alarms Page

The layout of the Trellix Lighting Alarms page is shown below. The Events page is similar but does not include a Details panel or provide acknowledgement features.



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3.2 – Alarm States

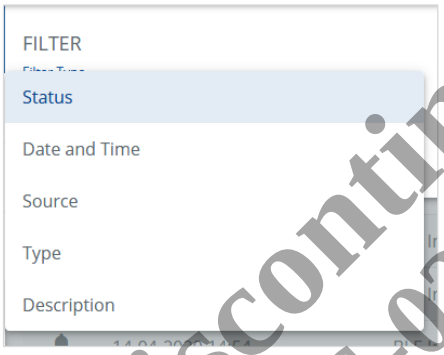
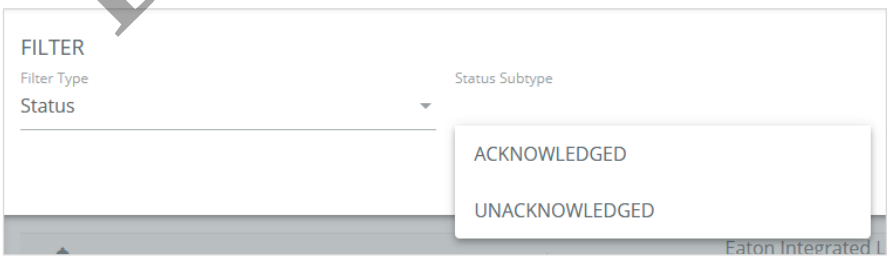
In Trellix Lighting, an alarm can be in one of the following three states:

- **Unacknowledged Alarm** – An error notification that has not been acknowledged by the user
- **Acknowledged Alarm** – An error notification that has been acknowledged, but is still in the error state and has not yet been moved to the Events list
- **Pre-Cleared Alarm** – An error notification that has returned to normal before acknowledged by the user

3.3 – Procedure

The following procedure describes how to view, filter, acknowledge, force clear, comment, and display details for alarms and events.

If you want to…	Then…
Display the Alarms page	Click **Alarms** in the main menu.
Display the Events page	Click **Event Logs** in the main menu.

If you want to…	Then…
Sort alarm or event data	1. Click the column header that you want to sort with. 2. To reverse the order, click the column header again. ***EXAMPLE – DESCENDING SORT BY DATE AND TIME***
Filter alarm or event data	1. Click **Filter** (upper left, not shown), then click **Filter Type**, and then choose a specific filter (e.g., Status). ***EXAMPLE – PICK FILTER***  2. Select a status to limit the list to rows with that value (e.g., **ACKNOWLEDGED**), and then click **Apply**. ***EXAMPLE – PICK STATUS ACKNOWLEDGED*** 

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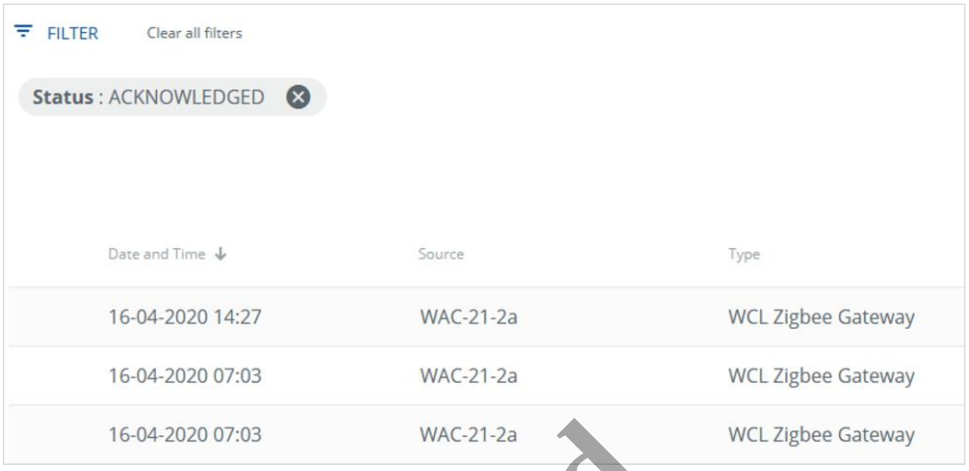
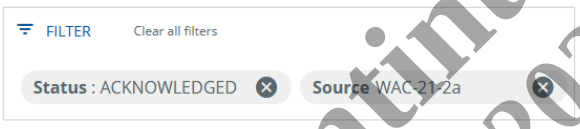
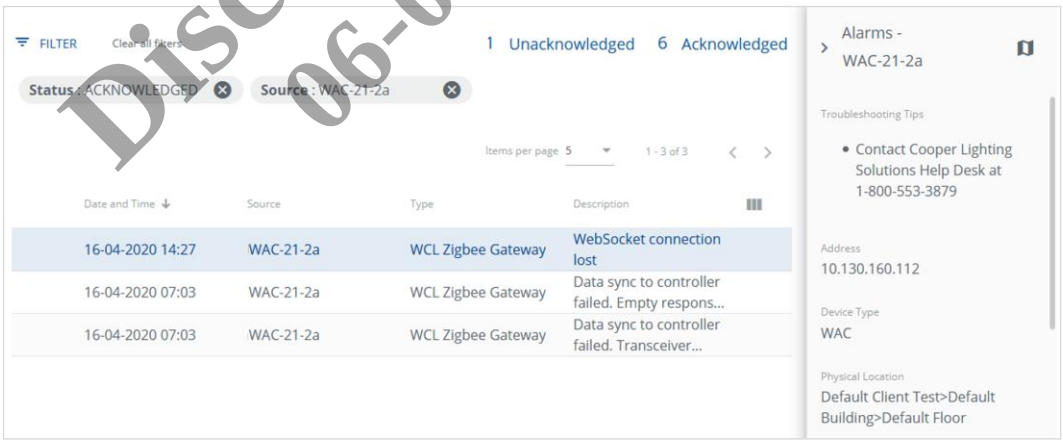
If you want to…	Then…
(cont'd)	3. View the list of alarms or events that correspond to the selected filter. ***EXAMPLE – EVENTS FILTERED BY ACKNOWLEDGE STATUS*** 
Add another filter	Repeat Steps 1 to 3 in the preceding procedure.
Remove a filter	Click the **X** to the right of the filter name. ***EXAMPLE*** 
View alarm details	Click an alarm row to display a sidebar containing Device, Troubleshooting, and Event details, along with any Comments that have been saved. ***EXAMPLE*** 

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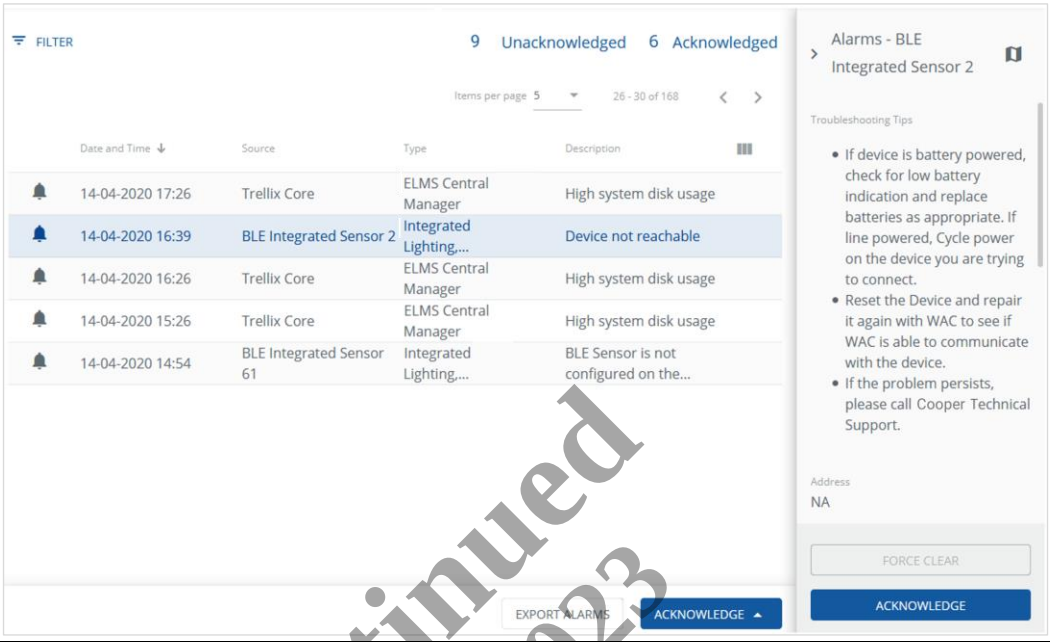
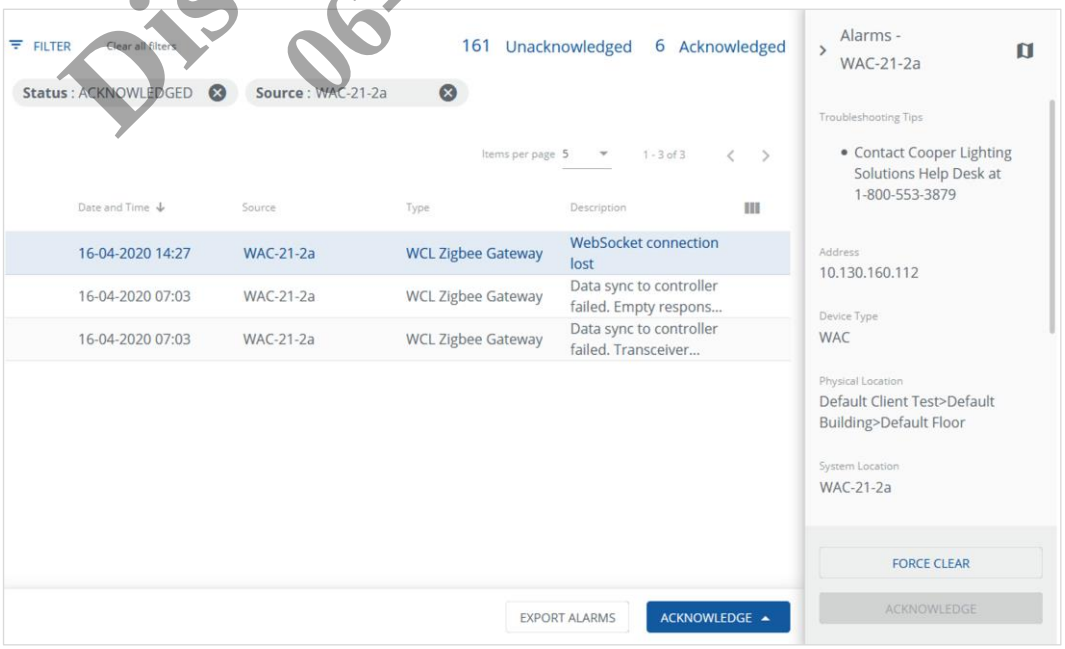
If you want to…	Then…
Acknowledge a single alarm	1. Select the row of an unacknowledged alarm. 2. Click **Acknowledge** in the Details panel. ***EXAMPLE*** 
Force clear a single alarm	1. Select the row of an acknowledged alarm. 2. Click **Force Clear** in the Details panel. ***NOTE*** *You must be logged in with System Administrator permissions for this action.* ***EXAMPLE*** 

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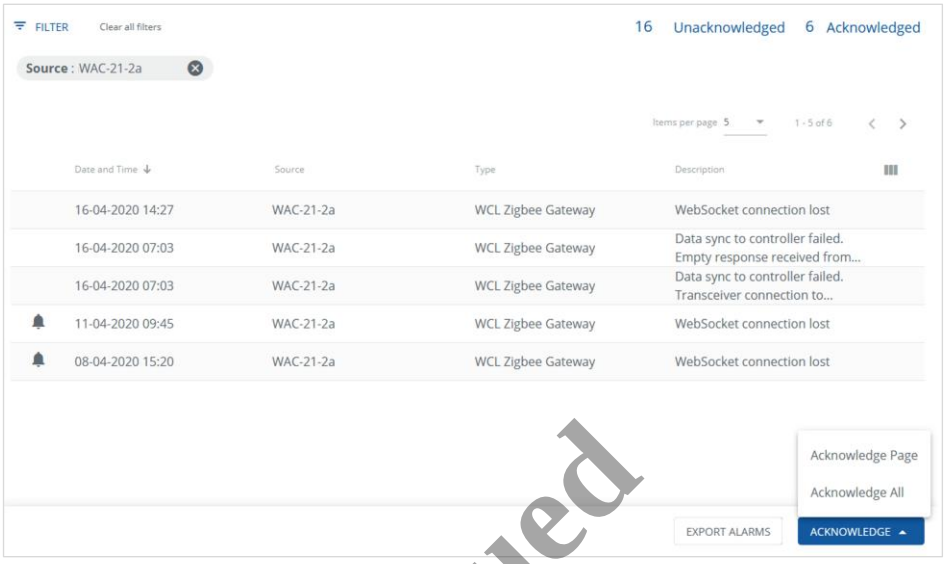
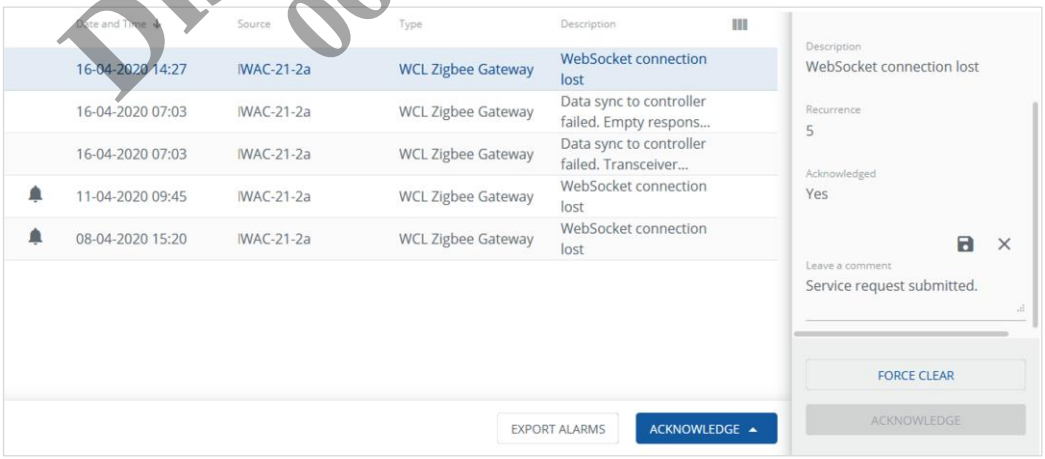
If you want to…	Then…
Acknowledge all alarms on the current page	Click **Acknowledge** below the alarm data row, and then click **Acknowledge Page**. ***EXAMPLE***  ***NOTE*** *If there is more than one page of alarms, only alarms on the page currently being viewed will be acknowledged.*
Acknowledge all alarms	Click **Acknowledge** below the alarm data row, and then click **Acknowledge All**.
Add a comment to an alarm	1. Select the row of an unacknowledged alarm. 2. Scroll down in the sidebar to reveal the Leave a Comment field. 3. Click ✎. 4. Enter your comment text, and then click 💾 to save it or click **X** to cancel. ***EXAMPLE*** 

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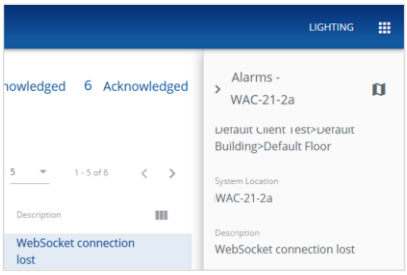
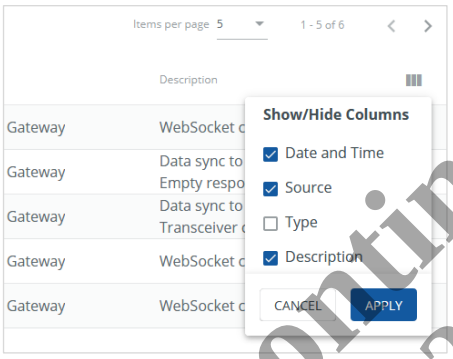
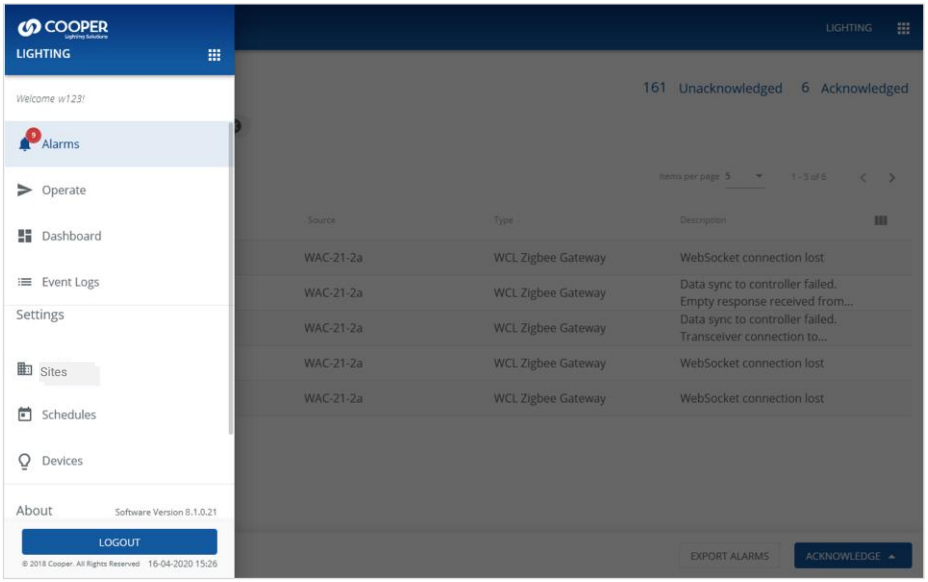
If you want to…	Then…
Hide alarm or event details	Click **>** in the upper left corner of the Details panel. ***EXAMPLE*** 
Show or hide columns in the alarms or events list	1. Click ▮▮▮ at the right end of the column headings. 2. Select the columns you want displayed, and then deselect the columns you want hidden. 3. Click **Apply**. ***EXAMPLE*** 
Load new alarms	Click **Reload** when it appears at the top of the Alarms page. ***EXAMPLE*** *Be sure to use the **Reload** button provided in the message area. The Web browser's refresh feature, by design, will send you back to the login screen.*
Check the Trellix Lighting software version	Click ☰ to expand the main navigation, and then scroll down to the About section. ***RESULT*** 

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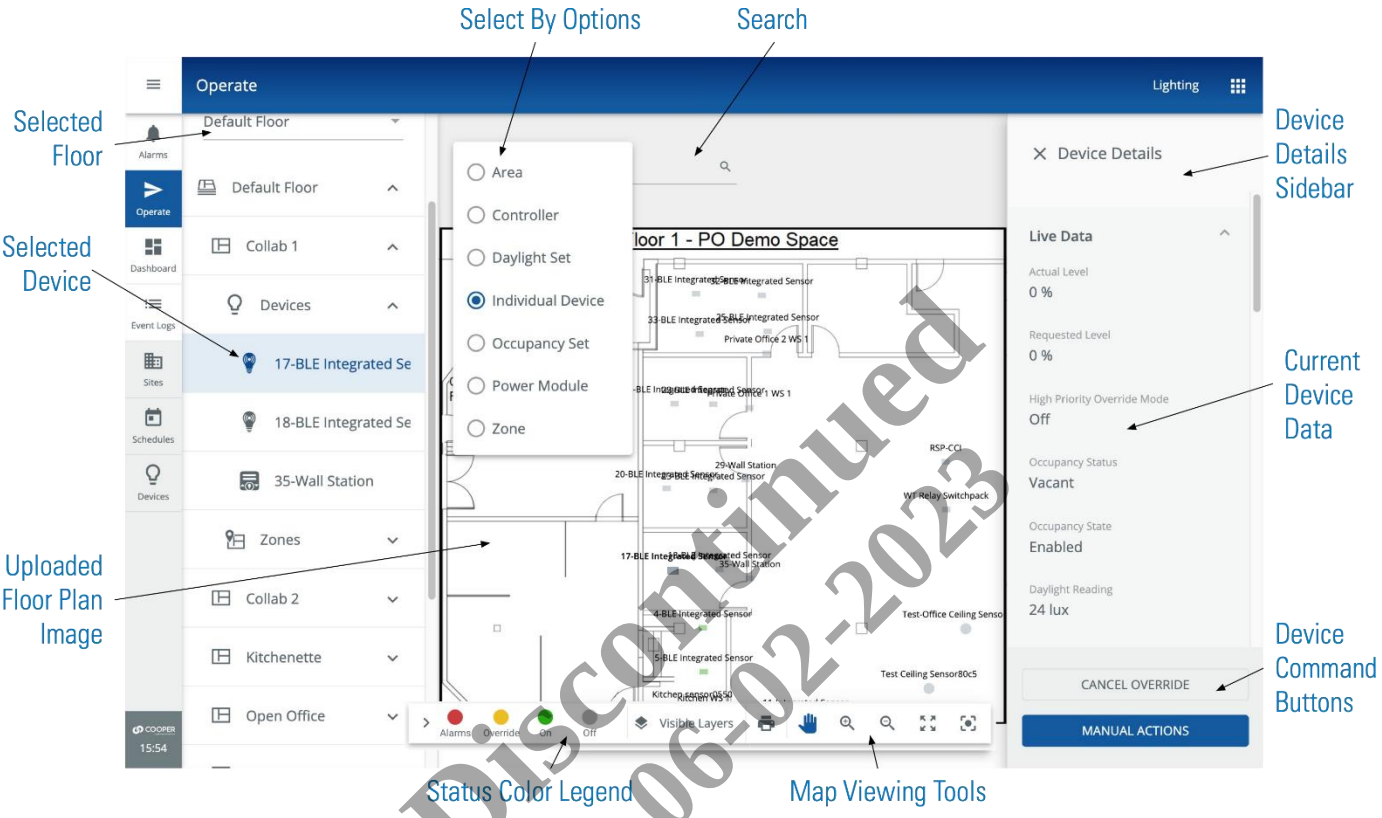
4 – Operating the Lighting System

This section describes the operation of Trellix Lighting components, such as raising and lower Area light levels or overriding Zone status.

4.1 – Viewing a Floor Map

Trellix Lighting shows relationship between your Building floor plan and the configured Areas, Zones, and Devices (Refer to the *Trellix System Configuration Guide* for details on how this is done.) The image below shows a Floor Map with a Device selected.



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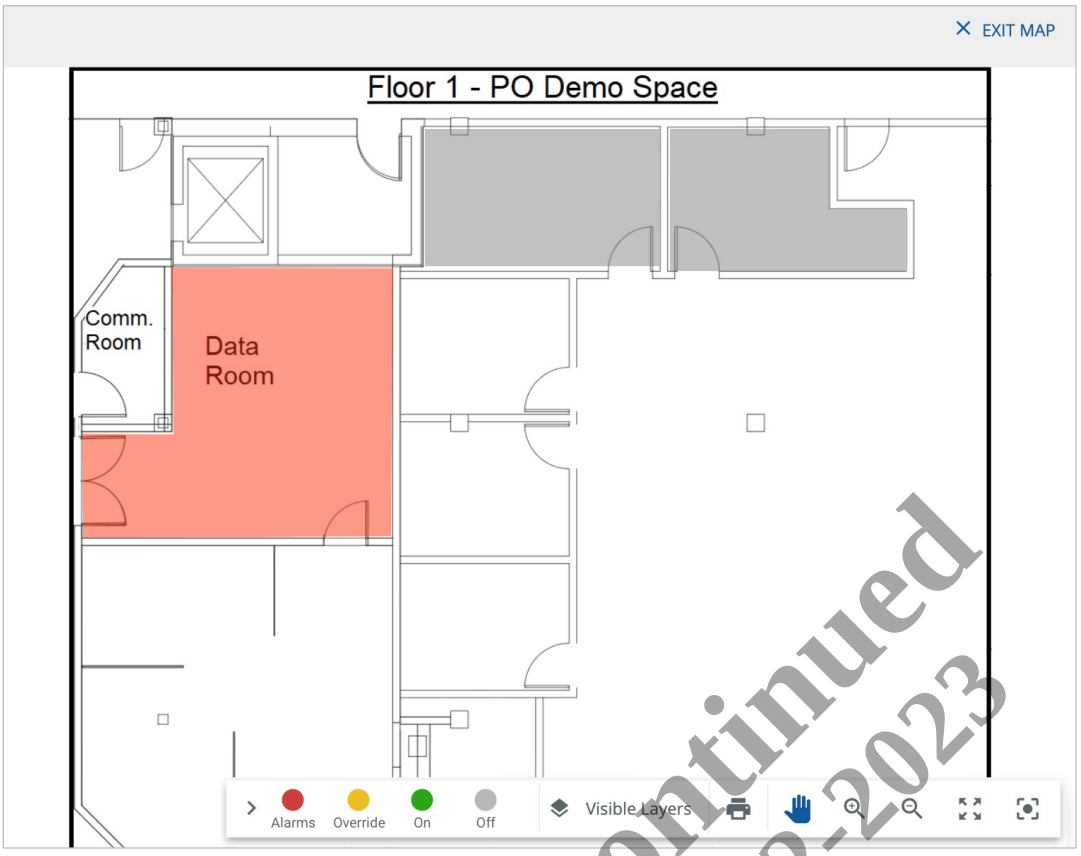
Status Color Legend

The Status Color Legend below shows the colors that indicate Alarm, Override, On, and Off states. These are displayed on the Floor Map and the Building hierarchy that appears on the left. When more than one status applies, the highest priority will be used. For example, if a Device goes into alarm on a Floor that is overridden, the Alarm color (red) will be used.

The example on the right shows a Floor Map with one Area in alarm (red) and two others with no Alarms or Overrides in effect (grey).



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Procedure

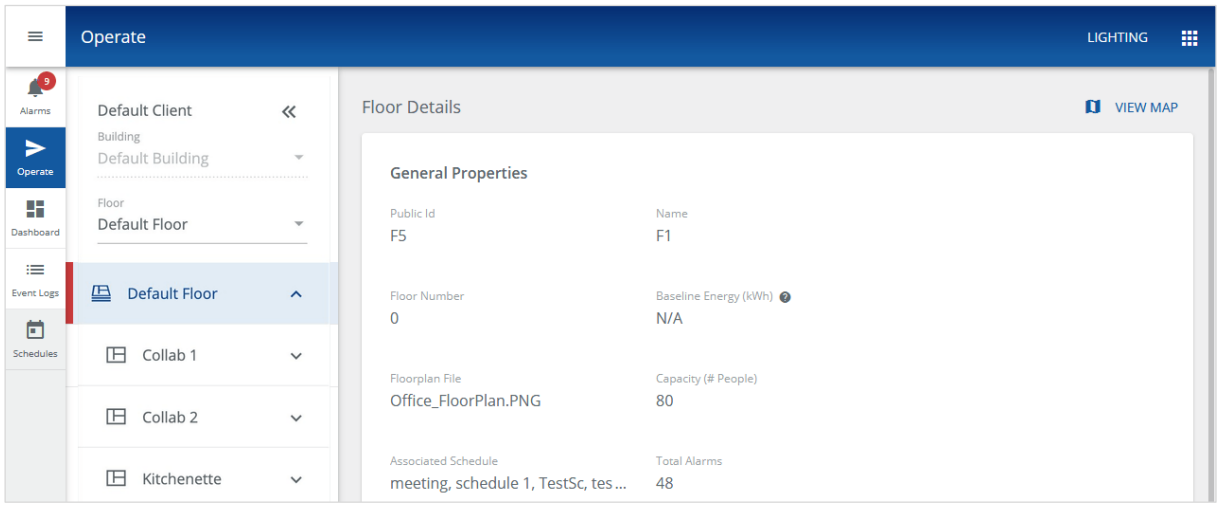
Follow the steps below to view a Floor Map.

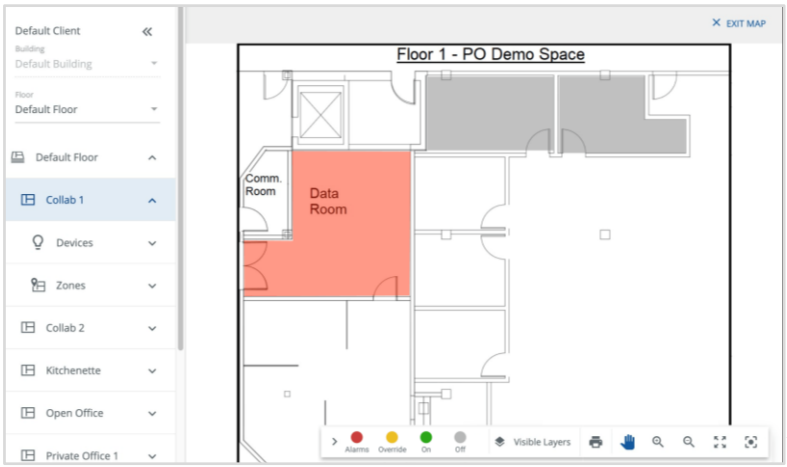
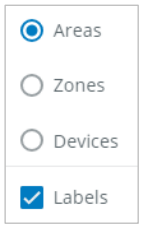
Step	Action
1	Click **Operate** in the main menu, and then select a Building in the navigation panel, and then select a Floor.

NOTE

A ⓘ button indicates the selected component with details displayed. Clicking ⓘ beside the floor will make it active (selected).

EXAMPLE



Step	Action
2	Click **View Map**. ***EXAMPLE*** 
3	To filter what is shown, click ◆ in the Viewing Tools, then enable or disable **Labels**, and then select **Areas**, **Zones**, or **Devices**. ***RESULT*** 
4	To reveal the color legend, click **<** in the Viewing Tools (Click **>** to hide the legend.) ***RESULT***
5	The view of the floor plan can be adjusted as follows: • To zoom in, click 🔍, or double-click the background image, or use your computers scroll-to-zoom feature with the cursor over the map • To zoom out, click 🔍, or hold down the Shift key while double-clicking the image, or use your computers scroll-to-zoom feature with the cursor over the map • To fit the image to the window, click ⛶ • To center the Floor Map in a new location, click ✋ and then click and drag the background image

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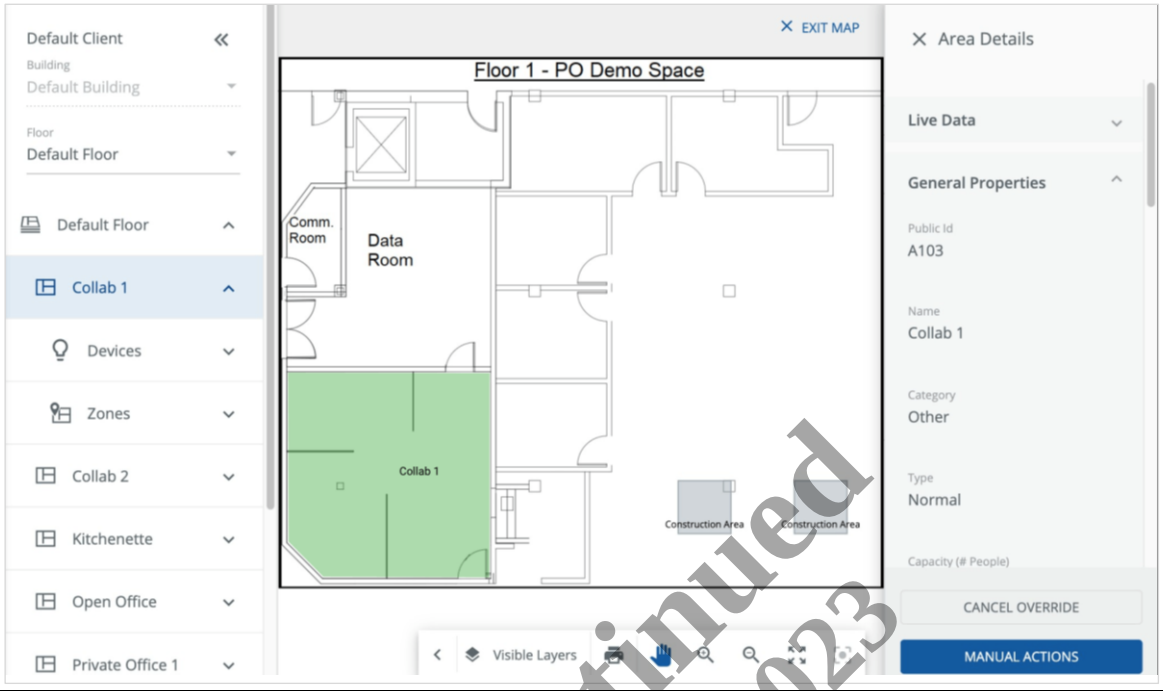
Step	Action
6	To highlight an Area, Zone, or Device, click it in the navigation panel or on the map.

EXAMPLE



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4.2 – About Manual Override Commands

A manual override is a command issued from Trellix Lighting to a Floor, Area, Zone, or Device. An override can be *normal* and *high priority*. The difference between these priorities is as follows:

- A *normal priority* command will only override a command that came before it if that command was also normal priority
- A *high priority* command will override any normal or high priority command that came before it
- A *high priority* command can be cancelled

Permission

Trellix Lighting limits the use of manual overrides with the *normal priority override* and *high priority override* permissions. The default Admin and Facman accounts have both, while the Tenant account has only *normal priority override*.

Commands

The override commands and priority levels that are available, assuming the appropriate permissions, are listed below:

- **Floor (Light Level)** – Normal Priority
- **Area (Scene)** - Normal Priority
- **Area (Light Level)** – Normal or High Priority
- **Zone (Dimmable)** – Normal or High Priority
- **Zone (On/Off)** - Normal or High Priority
- **Device (all except standalone Sensor)** – High Priority

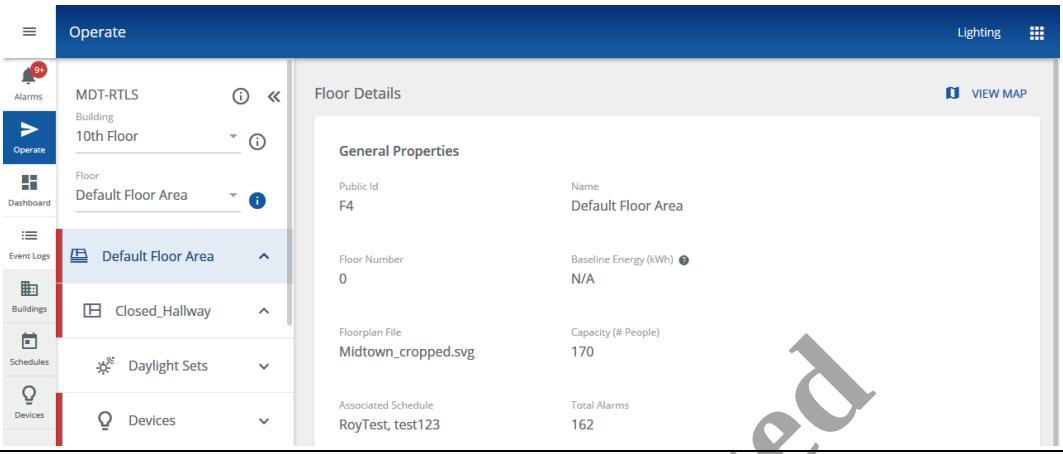
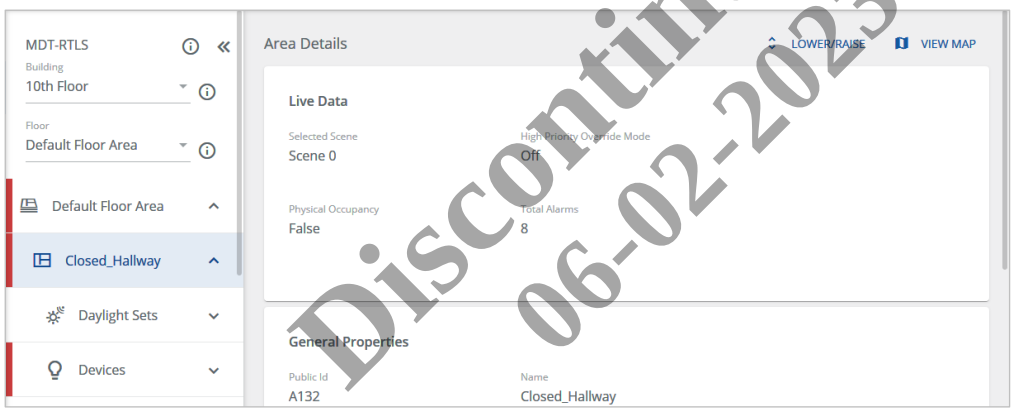
Occupancy Sets, Controllers, and standalone Sensors do not support overrides.

Area Light Level Controls

Trellix Lighting provides quick access to controls for raising and lowering the light level of an Area. These are normal priority commands and behave like a physical dimmer control. These controls do not require the Normal Priority Override or High Priority Override permission.

4.3 – Raising and Lowering Area Light Levels

Follow the steps below to raise or lower Area light levels.

Step	Action
1	Click **Operate** in the main menu, then select a Building in the navigation panel, and then select a Floor. ***EXAMPLE*** 
2	Select an Area on the chosen Floor to display the Area Details. ***EXAMPLE*** 
3	Click **Lower/Raise**, and then click the raise or lower button to send that command to the selected Area. ***NOTES*** • *Light level is changed by 1%, with a 6 second fade rate, each time the button is clicked* • *Light level is changed by 4% every 250 milliseconds, with a 6 second fade rate, if the button is clicked and held* • *You can access the light level controls below on the Area Details panel of a Floor Map (if configured)* ***EXAMPLE***
4	Click **Close** to exit.

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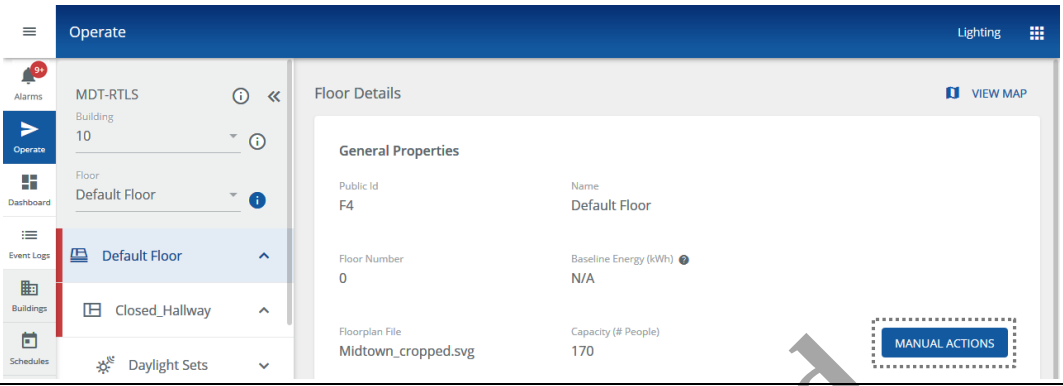
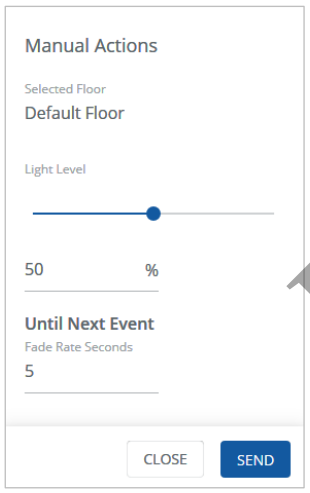
4.4 – Overriding Floors

Follow the steps below to override a Floor.

Step	Action
1	Click **Operate** in the main menu, then select a Building in the navigation panel, and then select a Floor. ***EXAMPLE*** 
2	Click **Manual Actions** (shown inset above), then drag the Light Level slider or enter a percentage value, and then enter a Fade Rate Seconds value for Until Next Event. ***NOTE*** *You can access the Manual Action controls below on the Floor Details panel of a Floor Map (if configured).* ***EXAMPLE*** 
3	Click **Send** to apply the override, and **Close** when you are finished.

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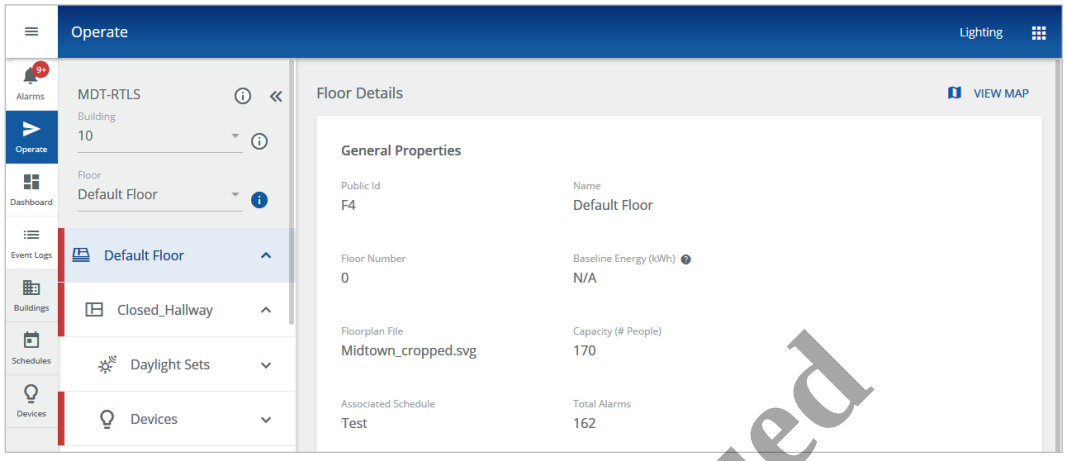
4.5 – Overriding Area Scenes and Light Levels

Follow the steps below to override the Scenes and Light Levels.

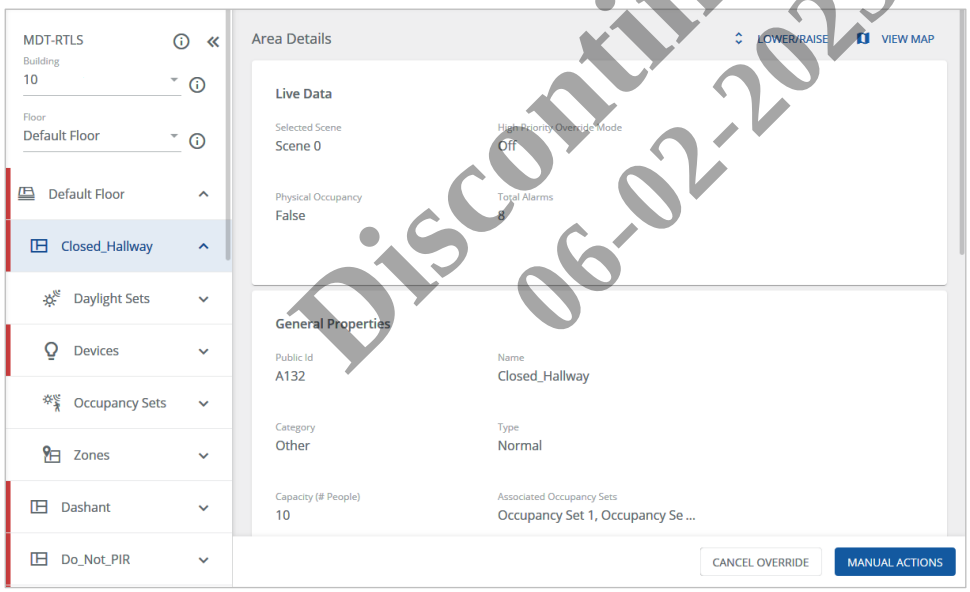
Step	Action
1	Click **Operate** in the main menu, then select a Building in the navigation panel, and then select a Floor.

EXAMPLE



2	Select an Area on the chosen Floor to display the Area Details.

EXAMPLE

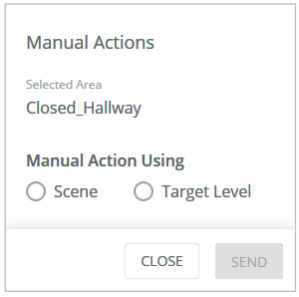


3	Click **Manual Actions** (shown inset above).

NOTE

You can access the override controls below on the Area Details panel of a Floor Map (if configured).

EXAMPLE



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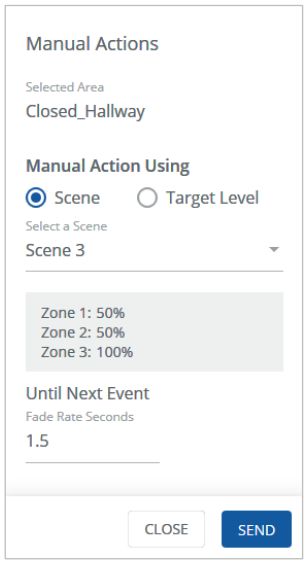
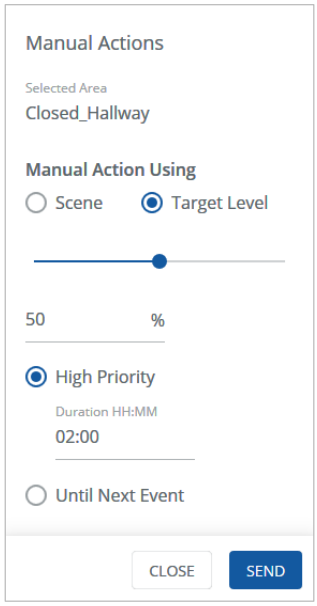
Step	Action
4	To override with a Scene, click **Scene**, then select a Scene from the list, and then enter a Fade Rate Seconds value. Click **Send** to apply the override command. ***NOTE*** *You can access the scene controls below on the Area Details panel of a Floor Map (if configured).* ***EXAMPLE*** 
5	To override with a Target Level, click **Target Level**, then • To dim the light, select the **Dimming Light** check box, and then drag the dimming slider or enter a **%** value • To tune the light color, select the **White Tuning Light** check box, and drag the tuning slider or enter a K value • Click **High Priority** with a **Duration** value, or • Click **Until Next Event** with a **Fade Rate** value ***NOTE*** *You can access the light level controls below on the Area Details panel of a Floor Map (if configured).* ***EXAMPLE*** 
6	Click **Send** to apply the override, and **Close** when you are finished (shown above).
7	To cancel an override, select the overridden Area, and then click **Cancel Override**.

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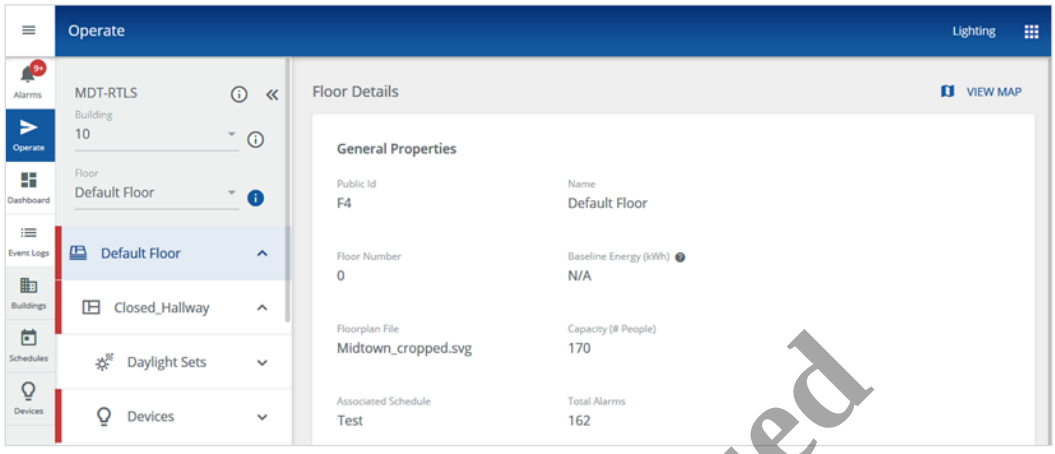
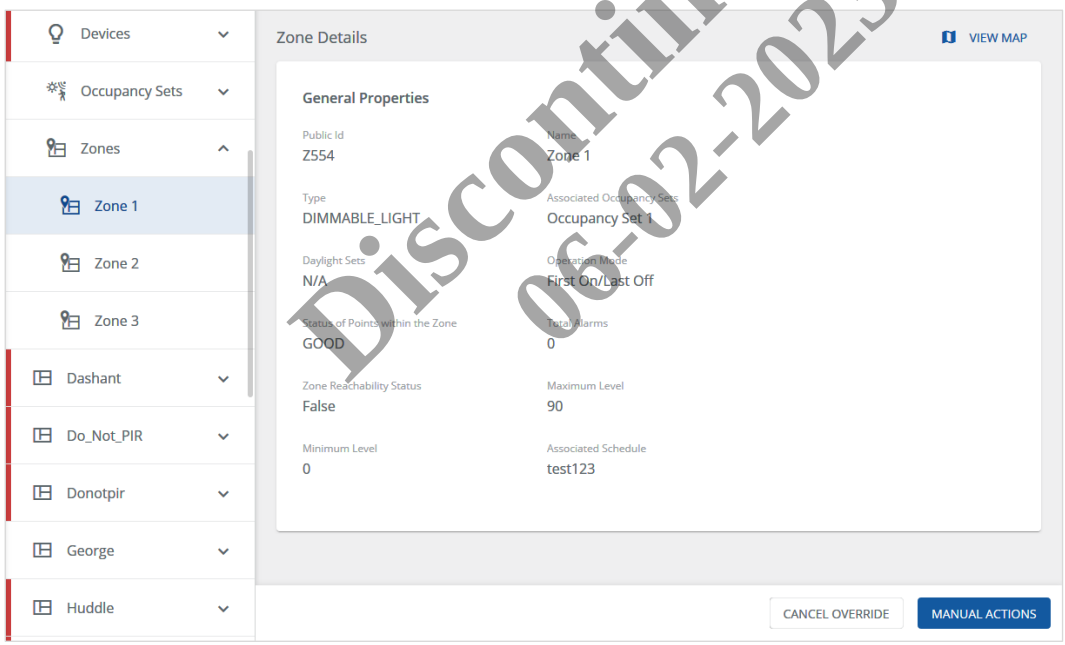
4.6 – Overriding Zones

Follow the steps below to override a Zone.

Step	Action
1	Click **Operate** in the main menu, then select a Building in the navigation panel, and then select a Floor. ***EXAMPLE*** 
2	Select a Zone on the chosen Floor to display the Zone Details. ***EXAMPLE*** 

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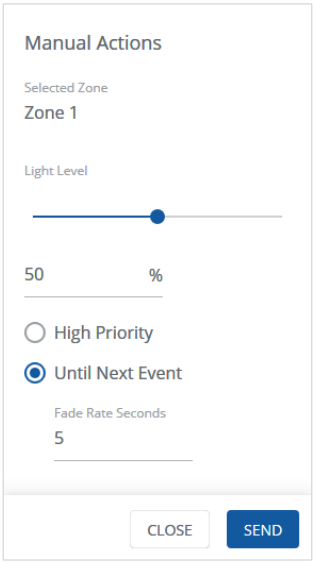
Step	Action
3	Click **Manual Actions**, then set the Zone Status to **On** or **Off**, and then • Click **High Priority** with a Duration value (shown below), or • Click **Until Next Event** with a Fade Rate value ***NOTE*** *You can access the override controls below on the Zone Details panel of a Floor Map (if configured).* ***EXAMPLE*** 
4	Click **Send** to apply the override, and **Close** when you are finished (shown above).

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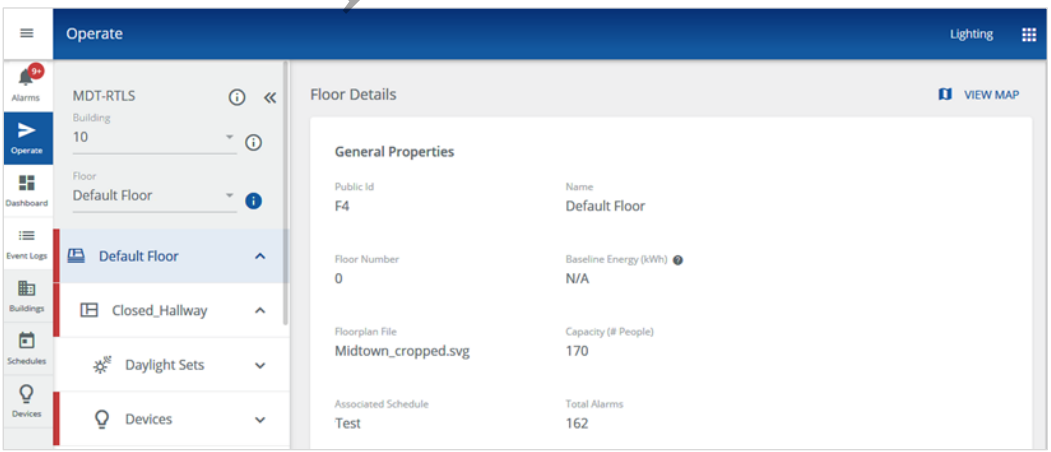
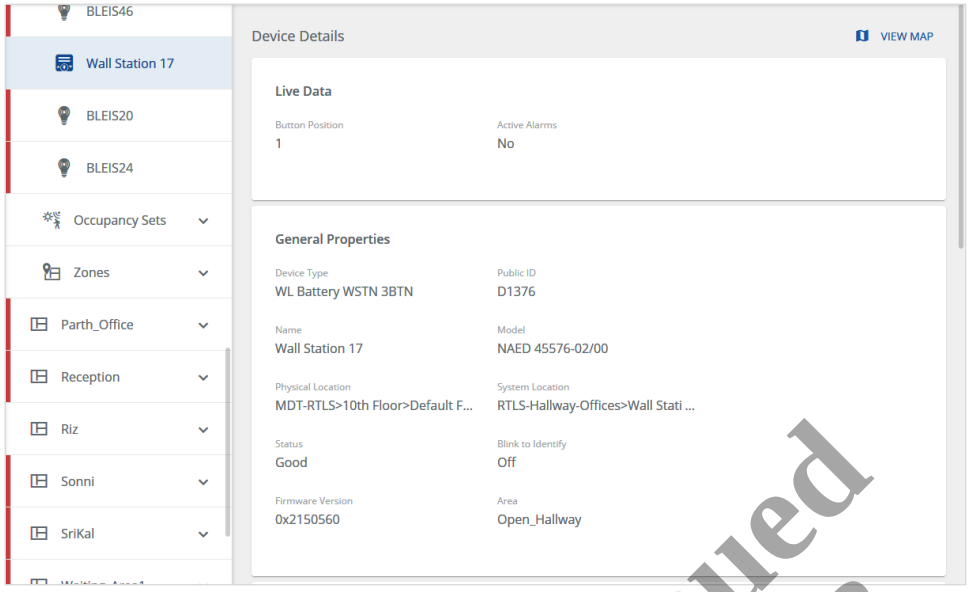
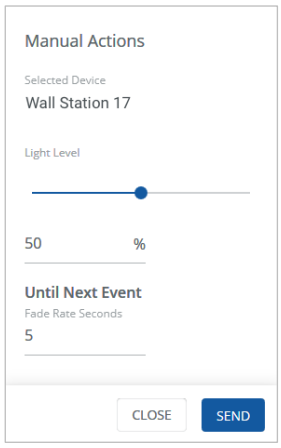
4.7 – Overriding Devices

Follow the steps below to override a Device.

Step	Action
1	Click **Operate** in the main menu, then select a Building in the navigation panel, and then select a Floor. ***EXAMPLE*** 

Step	Action
2	Select a Device on the selected Floor to display the Device Details. ***EXAMPLE*** 
3	Click **Override**, then drag the Light Level slider or enter a percentage value, then enter a Duration value. ***NOTE*** *You can access the override controls below on the Device Details panel of a Floor Map (if configured).* ***EXAMPLE*** 
4	Click **Send** to apply the override, and **Close** when you are finished (shown above).

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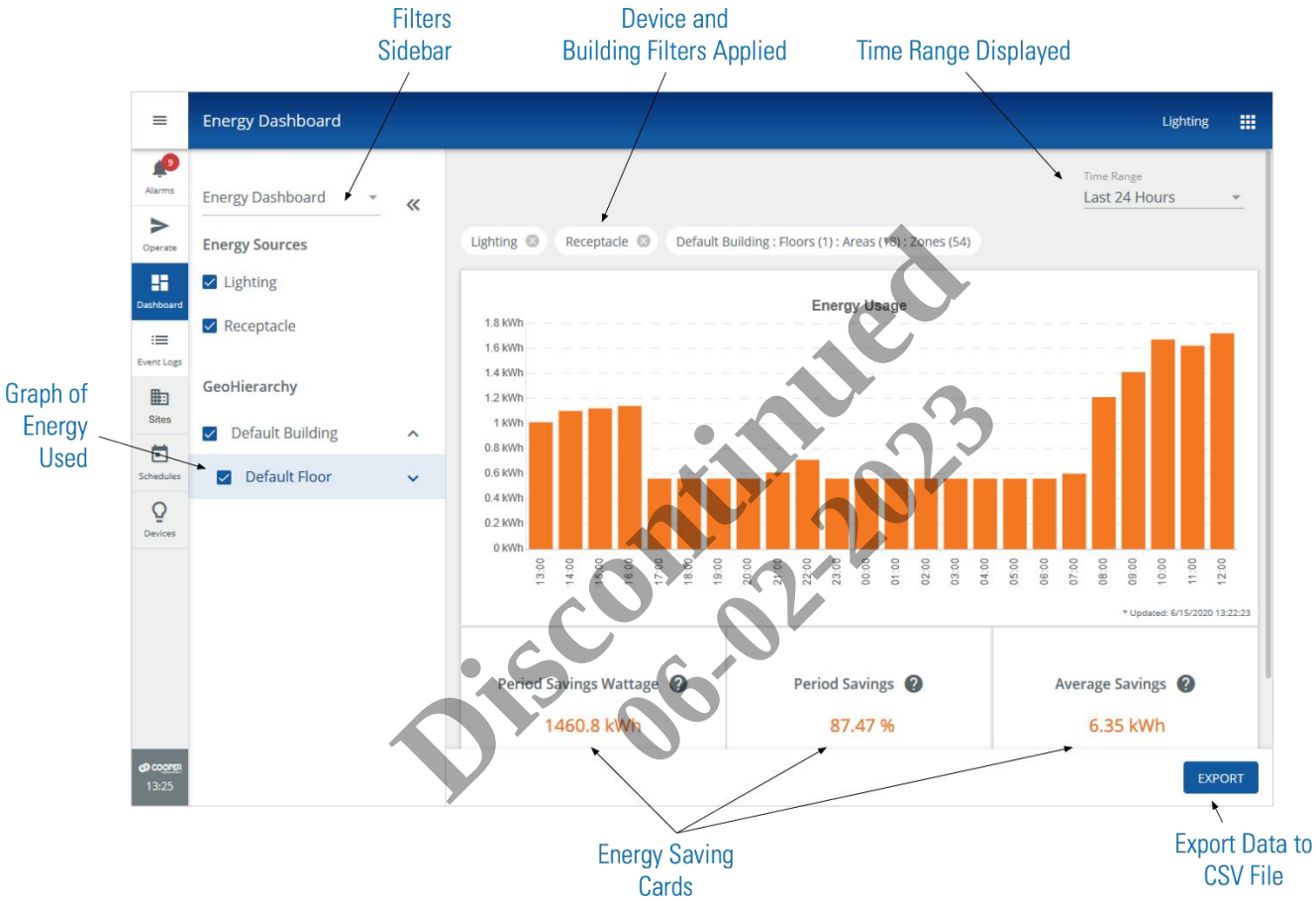
5 – Using the Energy Dashboard

This chapter describes the energy monitoring features available in the Trellix Lighting Dashboard.

NOTE
See Logging into Trellix Lighting *if you are not familiar with accessing Trellix Lighting.*

5.1 – The Energy Dashboard Page

The Energy Dashboard provides insight into building lighting and receptacle energy use (measured and calculated). The layout of the Energy Dashboard page is shown below.



5.2 – Key Features

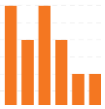
The key features of the Energy Dashboard are described in the table that follows.

About Baseline Energy

Note the following when viewing the Energy Savings Cards:

- The Baseline Energy for a floor is configured in the Floor properties, as described in the *Trellix System Configuration Guide*
- If no Baseline Energy is defined for the selected floors, the Savings Card values will not be calculated, and N/A will be displayed
- An asterisk (*) value indicates the displayed data may contain missing or unreliable data

Feature	Description
Filtering	The displayed data can be filtered by GeoHierarchy (Building, Area, Zone) and Energy Source (Lighting, Receptacle). It can also be limited to a Time Range (e.g., Last 24 Hours). ***NOTE*** *Construction Areas always appear at the bottom of an Areas list.*

Feature	Description
	A bar graph of energy consumption for the Time Range being viewed.
Period Savings Wattage Card	The difference between the Baseline Energy and Actual Energy on the selected floors over the displayed Time Range, in kWh. ***EXAMPLE*** 4200 kWh – 3100 kWh = 1100 kWh
Period Savings Card	The Period Savings on the selected Floors over the displayed Time Range, as a percentage of the Baseline Energy. It is calculated as follows: (Period Savings kWh / Baseline Energy kWh) X 100 ***EXAMPLE*** (1100 kWh / 4200 kWh) X 100 = 26.2%
Average Period Savings Card	The Average Period Savings on the selected floors for the displayed Time Range, in kWh. This average is derived from the period being viewed (e.g., 7 days). It uses the total savings since data collection began and the total number of periods collected. It is calculated as follows: Total Period Savings / Number of Periods ***EXAMPLE*** Assuming a total savings of 43,800 kWh has accrued over 48 weeks, and a 7-day period is being displayed: 43,800 kWh / 48 7-day periods = 912.5 kWh/7-day period

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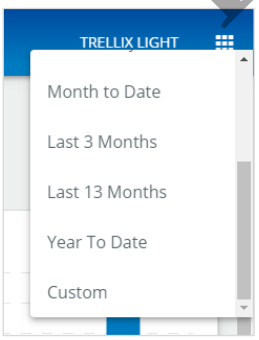
5.3 – Viewing Energy Data

Follow the steps below to view the data available in the Energy Dashboard.

If you want to…	Then…
Limit the reported Device and Building data	1. If the Energy Dashboard menu is not visible, click **>>**. 2. Under Energy Sources, select the **Lighting** check box, **Receptacle** check box, or both, depending on the **Energy Sources** you want included in the report. 3. Under GeoHierarchy, all Building, Floor, Area, and Zone check boxes are selected by default. To remove one or more of them from the report, deselect their check boxes. 4. Click **<<** to collapse the menu**.** The selections are shown above the Energy Usage Chart. Click ⊗ to remove the Lighting or Receptacle filter. ***EXAMPLE***
Choose a preselected Time Range for the report	Select a value in the Time Range menu. ***EXAMPLE*** 

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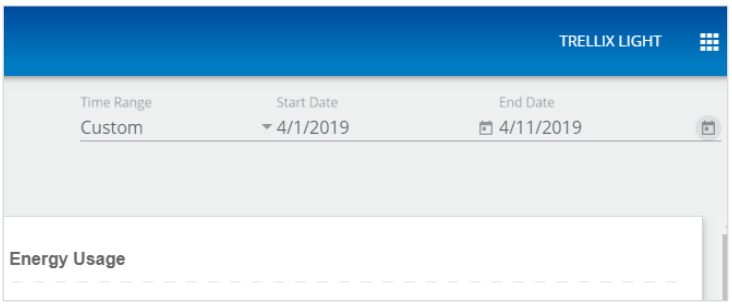
If you want to…	Then…
Choose a custom Time Range for the report	1. Select **Custom** in the Time Range menu. 2. Select a Start Date and End Date. ***EXAMPLE*** 

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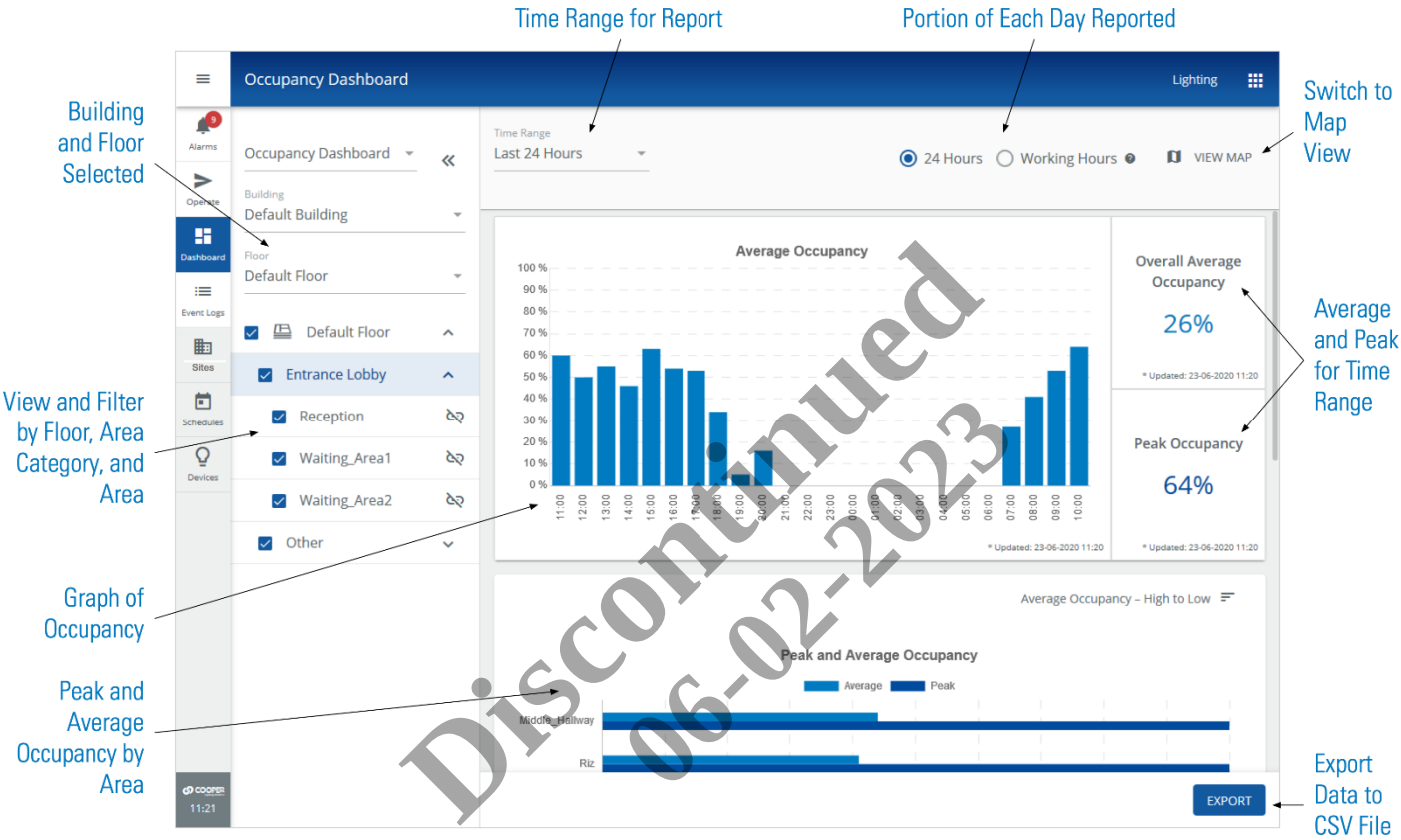
6 – Using the Occupancy Dashboard

This chapter describes the occupancy monitoring features available in the Trellix Lighting Dashboard.

NOTE
See Logging into Trellix Lighting *if you are not familiar with accessing Trellix Lighting.*

6.1 – The Occupancy Dashboard Page

The Occupancy Dashboard provides insight into the use of building spaces. The diagram below illustrates some of the available features.

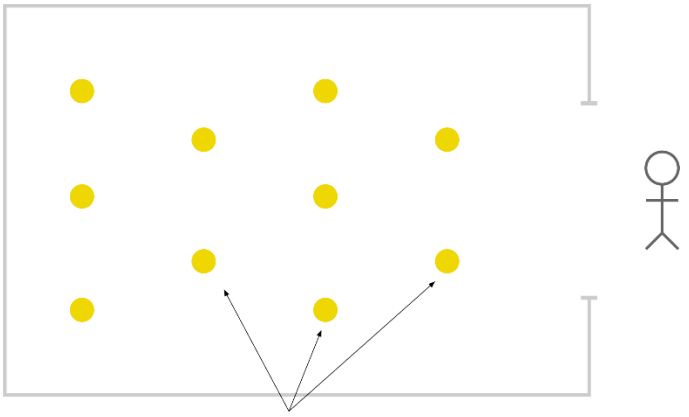


6.2 – How Occupancy Percentage is Calculated

The Occupancy percentage is determined by the proportion of the sensors in a space that detect motion and for how long. The sensors have a configurable delay period to provide more meaningful results, so that is also a factor. If the delay is 10 minutes, for example, once a sensor detects motion it will continue to report occupancy for 10 minutes *after* it stops detecting motion. The following example describes how the occupancy percentage is calculated.

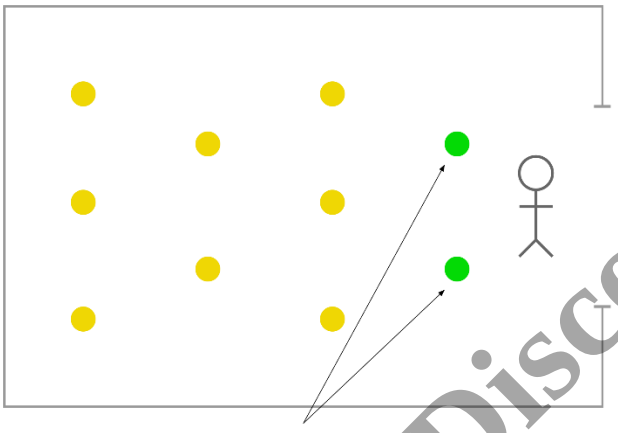
Example

Take a conference room with 10 sensors, as illustrated below. All sensors are configured with a 20-minute time delay. At 9 AM the room is empty and none of the sensors have detected any motion. The occupancy percentage at that moment is 0/10 or 0%.



Empty Room – 0 out of 10 Sensors Reporting Occupancy

Next, say someone enters the room at 9:05 AM and 2 of the 10 sensors detect their presence, as shown below. The occupancy rate at that moment (9:05 AM) is now 2/10 or 20%.



Occupied Room – 2 out of 10 Reporting Occupancy

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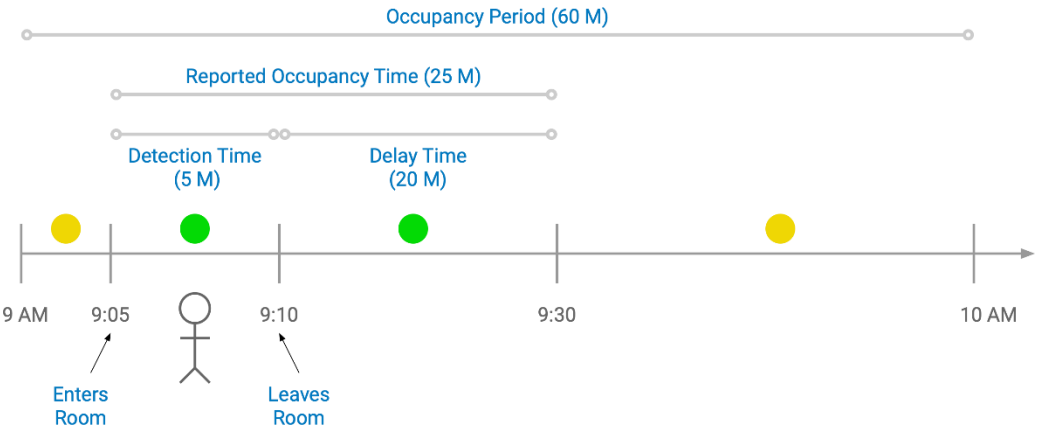
Finally, say the person stays in the room for 5 minutes, that only the two sensors ever detect their presence, and that no one else enters the room before 10 AM. As illustrated below, when we include the 20-minute configured sensor delay, the occupancy for that hour would be determined as 25 minutes out of 60, as reported by 2 out of 10 sensors. The percentage calculation would be **25/60 x 2/10 = 8.33%**.



6.3 – Key Features

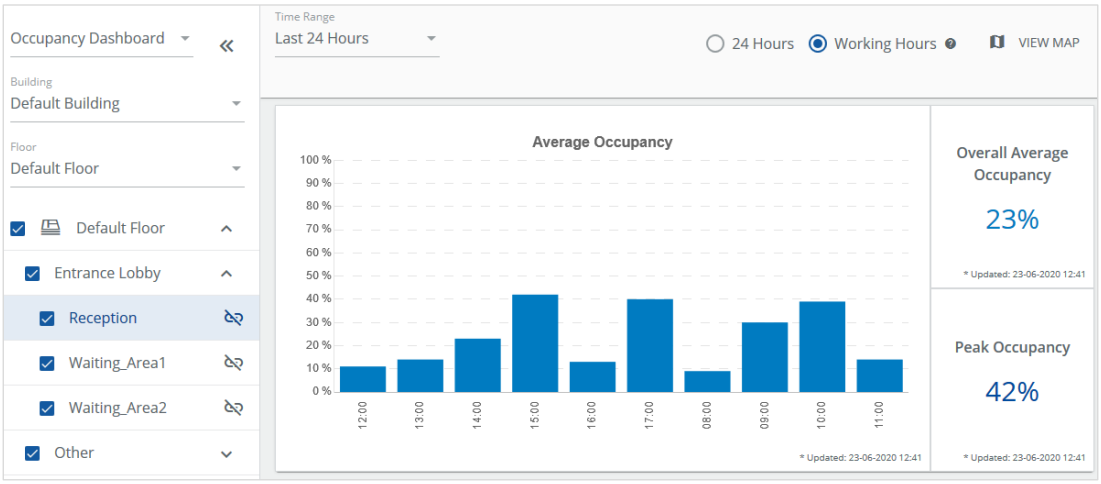
The key features of the Occupancy Dashboard are described in the table below.

Feature	Description
Report by Floor	Occupancy data is presented for a selected Floor in a Building.
	The main bar graph shows the average occupancy as a percentage, with Overall Average and Peak Occupancy cards displayed along the right side.
Time Range	A default set of time ranges, such as Last 24 Hours or Last 30 Days, are provided. There is also a custom time range option.
Full day or working hours	The graph can display data for the full 24-hours of each day or only the configured working hours (e.g., 8:30 – 4:30).
Peak and Average Occupancy by Area	There are individual Peak and Average Occupancy bar graphs for each Area on the selected Floor.
Occupancy on Floor Map	The occupancy data can be overlaid on a Floor Map for a visual representation.
Export to CSV	The occupancy data can be export to a CSV file for use with Excel and other tools.

6.4 – Viewing Occupancy Data

Follow the steps below to view the data available in the Occupancy Dashboard.

NOTE
An asterisk (*) value indicates the displayed data may contain missing or unreliable data.

If you want to…	Then…
View a bar graph representation	Click **View Data**.
View a floor plan representation	Click **View Map**.
Limit the reported Building, Floor, or Area data	1. If the Occupancy Dashboard menu is not visible, click **>>**. 2. Select a Building, and then select a Floor. 3. Click the name of a Floor, Area Category, or Area to limit the occupancy data to that level. 4. All Floor, Area Category, and Area check boxes are selected by default. To remove one or more of them from the overall occupancy report, deselect the corresponding check boxes. 5. Click **<<** to collapse the menu. ***EXAMPLE*** 

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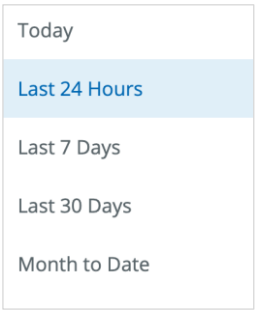
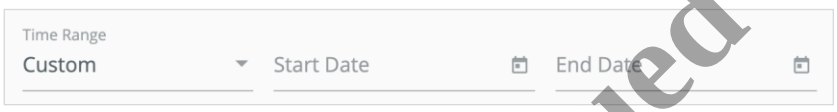
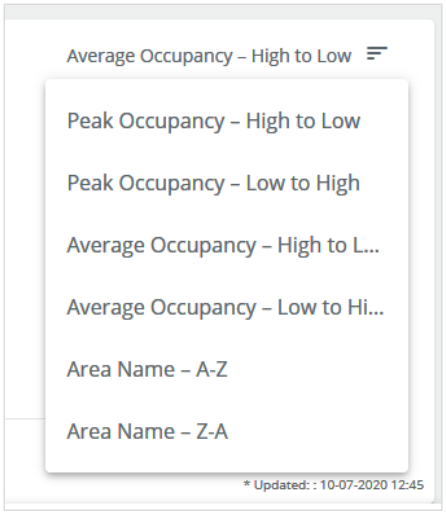
If you want to…	Then…
Choose a preselected Time Range for the report	Select a value in the Time Range menu. ***EXAMPLE*** 
Choose a custom Time Range for the report	1. Select **Custom** in the Time Range menu. 2. Select a Start Date and End Date. ***EXAMPLE*** 
Limit the hours in each day for which occupancy is calculated	Click **24 Hours** or **Working Hours** to set the portion of each day included in occupancy calculations. ***EXAMPLE***
Enable and disable Average or Peak Area bar graphs	Click either the **Average** or **Peak** bar to show/hide their data in the Area reporting. ***EXAMPLE***
Sort the Average and Peak Area bar graphs	Click ☰, and then select a sorting parameter and order. ***EXAMPLE*** 

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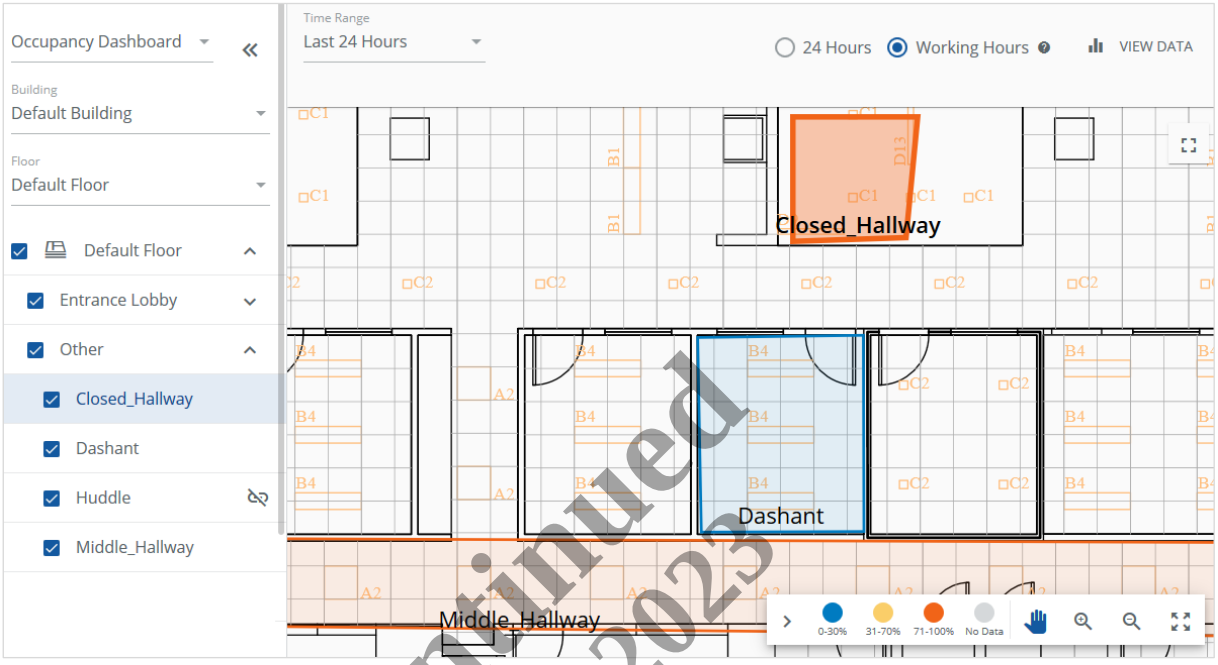
If you want to…	Then…
View the data on a Floor Map	1. Click **View Map**. 2. Select an Area to highlight it on the map. 3. Click **<** to reveal the occupancy percentage color code in the Viewing Tools (shown expanded at bottom). ***EXAMPLE*** 

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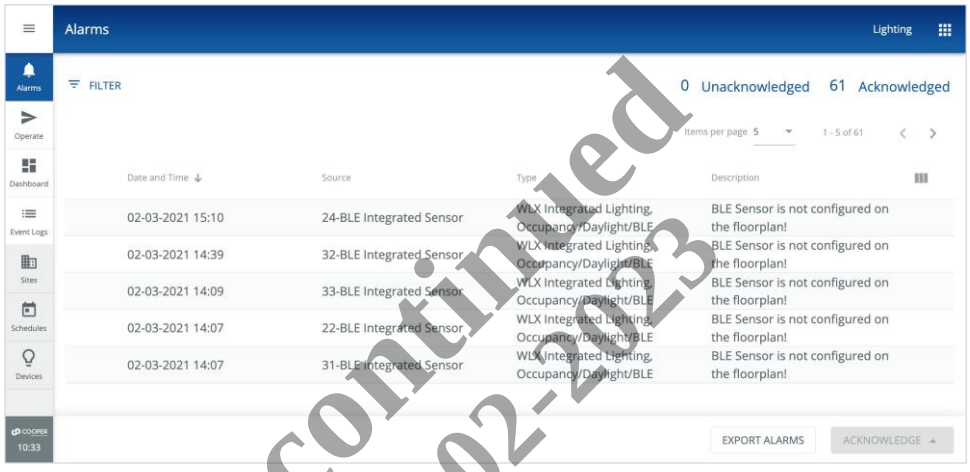
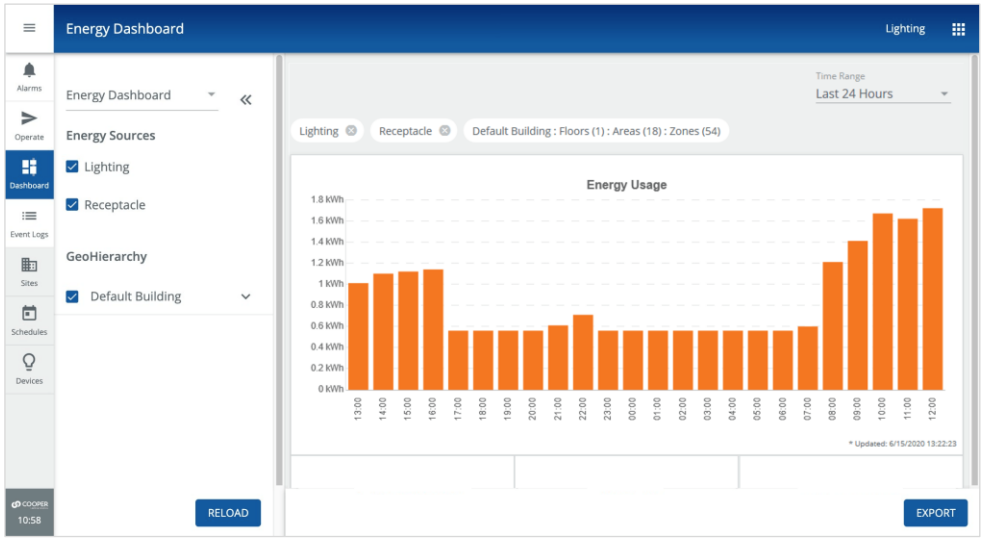
7 – Exporting Alarm, Energy, Occupancy, and Event Data

The following procedure describes how to export alarm, energy, occupancy, and event data.

NOTES

- *Energy and Occupancy data are not available in PDF format*
- *Comments are not included in the exported data*
- *The display or download of a file will depend on the Web browser you are using and how it is configured*

7.1 – Exporting

If you want to export…	Then…
Alarm data	1. Click **Alarms** in the main menu. 2. Check that only Filters you want are currently applied (as described in *Managing Alarms and Events*). 3. Click **Export Alarms**, and then select the format (**PDF** or **Excel**). ***EXAMPLE***  ***NOTE*** *If more than 100,000 alarms will be exported, you will be prompted to either continue or cancel. This provides the option to filter for fewer alarms.*
Energy data	1. Click **Dashboard** in the main menu. 2. Check that only Filters you want are currently applied (as described in *Using the Energy Dashboard*). 3. Click **Export**. ***EXAMPLE*** 

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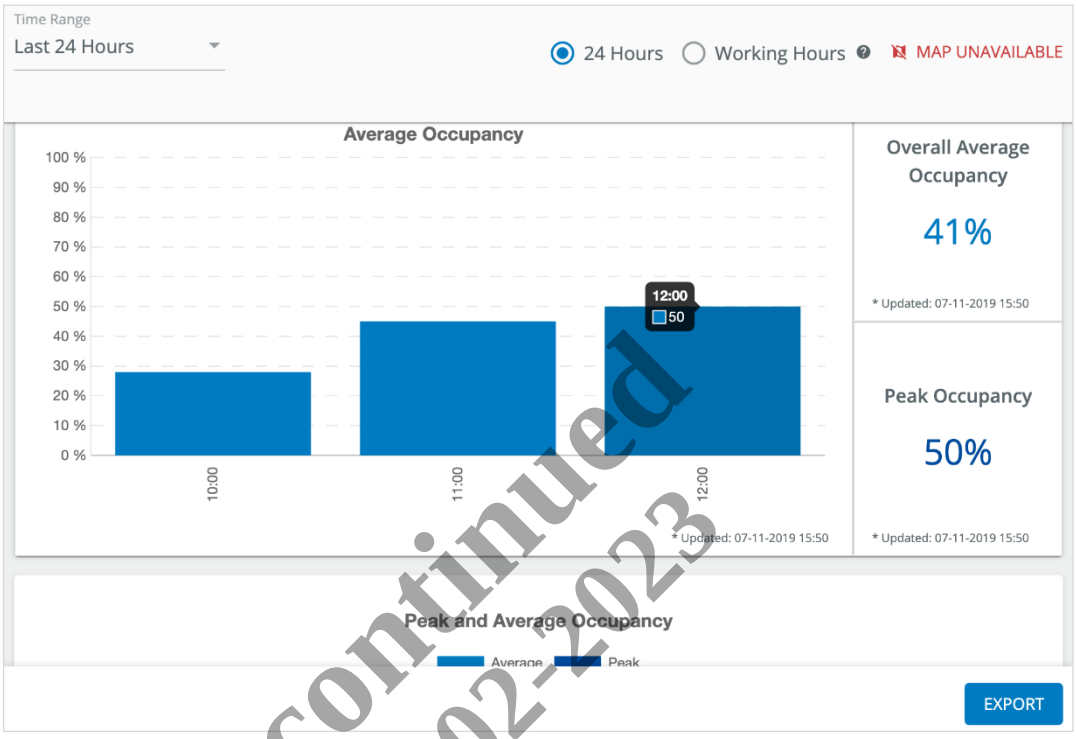
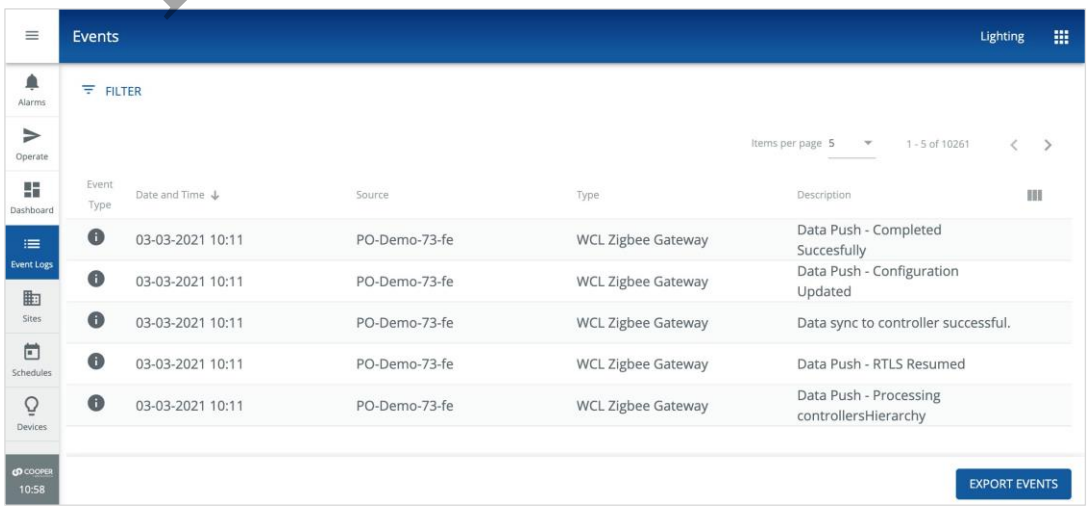
If you want to export…	Then…
Occupancy data	1. Click **Dashboard** in the main menu, and then click **Occupancy**. 2. Check that the Time Range and portion you want are currently applied (as described in *Viewing Occupancy Data*). 3. Click **Export**, and then confirm the operation. ***EXAMPLE*** 
Event data	1. Click **Events** in the main menu. 2. Check that only Filters you want are currently applied (as described in *Managing Alarms and Events*). 3. Click **Export Events**, and then select the format (**PDF** or **Excel**). ***EXAMPLE*** 

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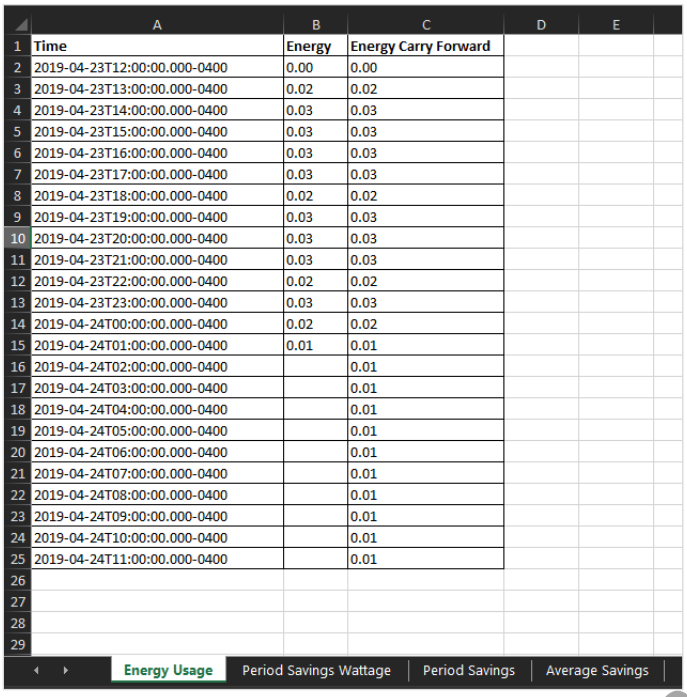
PDF and Excel Examples

The images below show examples of exported Trellix Energy and Occupancy data in CSV/Excel format.

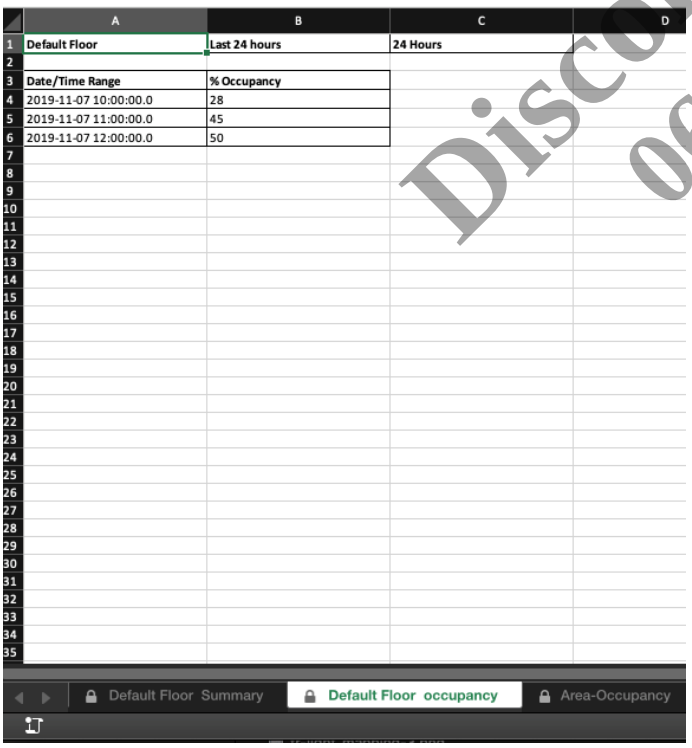
Excel (Energy Data)



	A	B	C	D	E
1	Time	Energy	Energy Carry Forward		
2	2019-04-23T12:00:00.000-0400	0.00	0.00		
3	2019-04-23T13:00:00.000-0400	0.02	0.02		
4	2019-04-23T14:00:00.000-0400	0.03	0.03		
5	2019-04-23T15:00:00.000-0400	0.03	0.03		
6	2019-04-23T16:00:00.000-0400	0.03	0.03		
7	2019-04-23T17:00:00.000-0400	0.03	0.03		
8	2019-04-23T18:00:00.000-0400	0.02	0.02		
9	2019-04-23T19:00:00.000-0400	0.03	0.03		
10	2019-04-23T20:00:00.000-0400	0.03	0.03		
11	2019-04-23T21:00:00.000-0400	0.03	0.03		
12	2019-04-23T22:00:00.000-0400	0.02	0.02		
13	2019-04-23T23:00:00.000-0400	0.03	0.03		
14	2019-04-24T00:00:00.000-0400	0.02	0.02		
15	2019-04-24T01:00:00.000-0400	0.01	0.01		
16	2019-04-24T02:00:00.000-0400		0.01		
17	2019-04-24T03:00:00.000-0400		0.01		
18	2019-04-24T04:00:00.000-0400		0.01		
19	2019-04-24T05:00:00.000-0400		0.01		
20	2019-04-24T06:00:00.000-0400		0.01		
21	2019-04-24T07:00:00.000-0400		0.01		
22	2019-04-24T08:00:00.000-0400		0.01		
23	2019-04-24T09:00:00.000-0400		0.01		
24	2019-04-24T10:00:00.000-0400		0.01		
25	2019-04-24T11:00:00.000-0400		0.01		
26					
27					
28					
29					

Energy Usage | Period Savings Wattage | Period Savings | Average Savings

Excel (Occupancy Data)



	A	B	C	D
1	Default Floor	Last 24 hours	24 Hours	
2				
3	Date/Time Range	% Occupancy		
4	2019-11-07 10:00:00.0	28		
5	2019-11-07 11:00:00.0	45		
6	2019-11-07 12:00:00.0	50		

Default Floor Summary | Default Floor occupancy | Area-Occupancy

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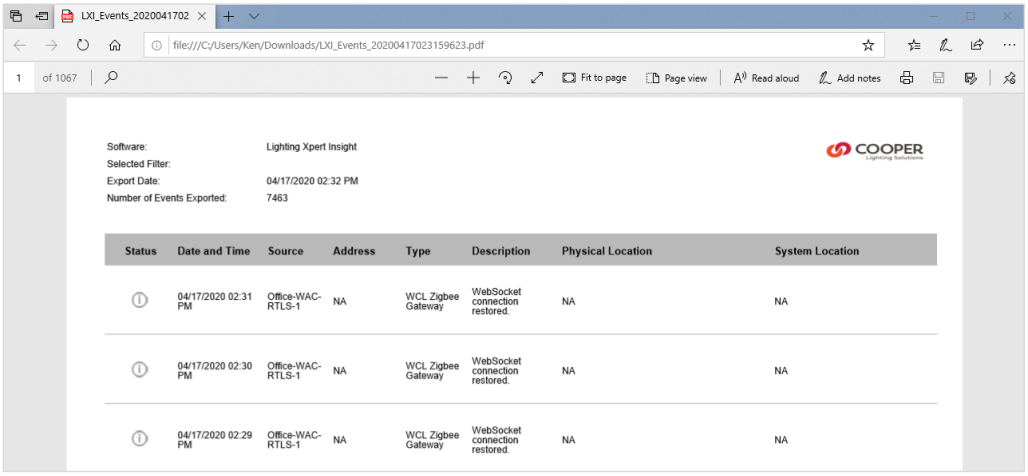
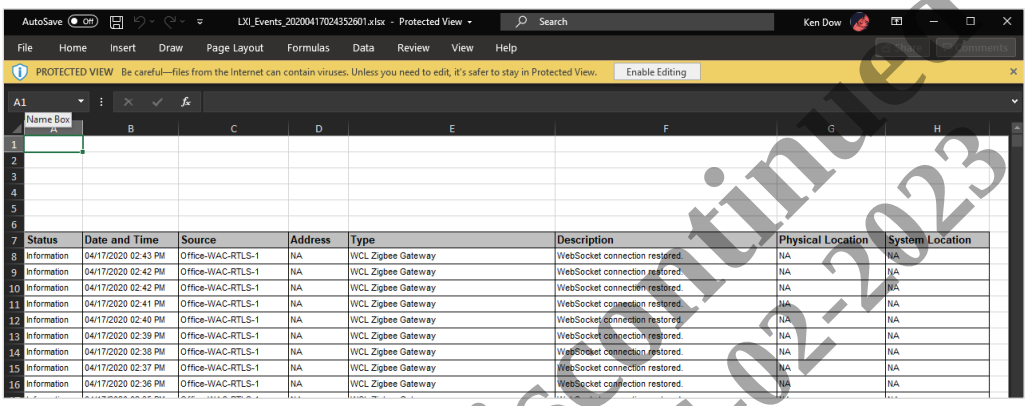
PDF (Event Data)



Software: Lighting Xpert Insight
Selected Filter:
Export Date: 04/17/2020 02:32 PM
Number of Events Exported: 7463

Status	Date and Time	Source	Address	Type	Description	Physical Location	System Location
	04/17/2020 02:31 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA
	04/17/2020 02:30 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA
	04/17/2020 02:29 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA

Excel (Event Data)



Status	Date and Time	Source	Address	Type	Description	Physical Location	System Location
Information	04/17/2020 02:43 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA
Information	04/17/2020 02:42 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA
Information	04/17/2020 02:42 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA
Information	04/17/2020 02:41 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA
Information	04/17/2020 02:40 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA
Information	04/17/2020 02:39 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA
Information	04/17/2020 02:38 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA
Information	04/17/2020 02:37 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA
Information	04/17/2020 02:36 PM	Office-WAC-RTLS-1	NA	WCL Zigbee Gateway	WebSocket connection restored.	NA	NA

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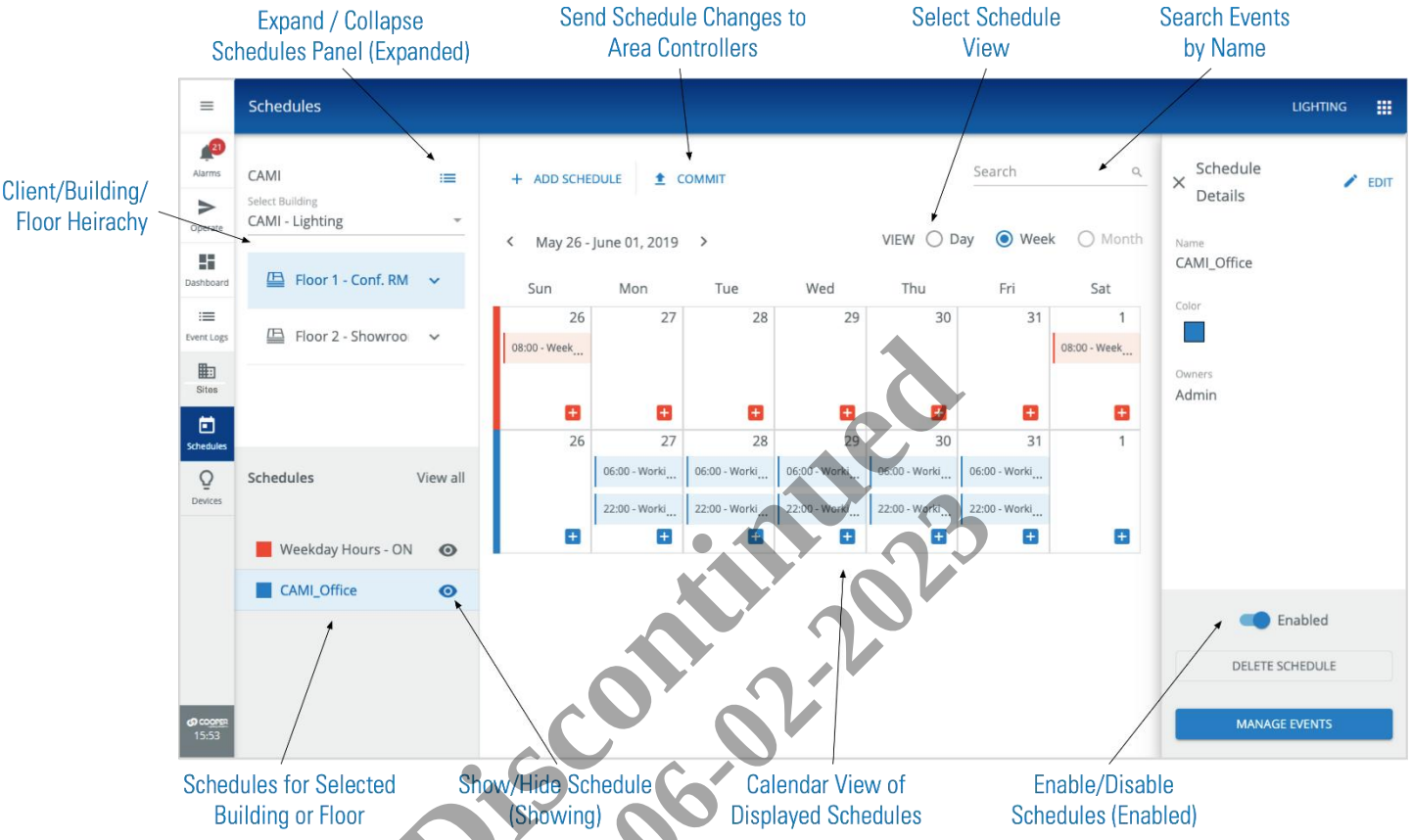
8 – Managing Schedules

The following procedure describes how to view, filter, search, and commit schedule data. The image below shows the Schedules page.

8.1 – Filtering the Displayed Schedules

Follow the steps below to filter the schedules that appear in the Calendar view.



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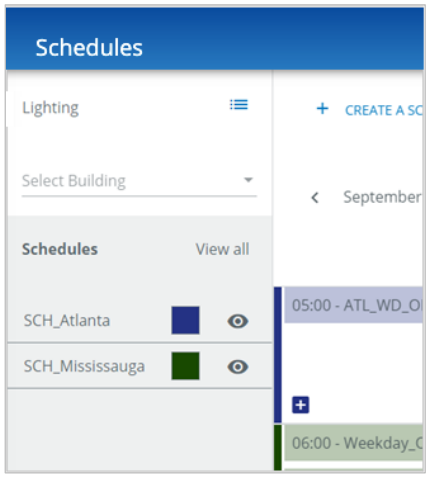
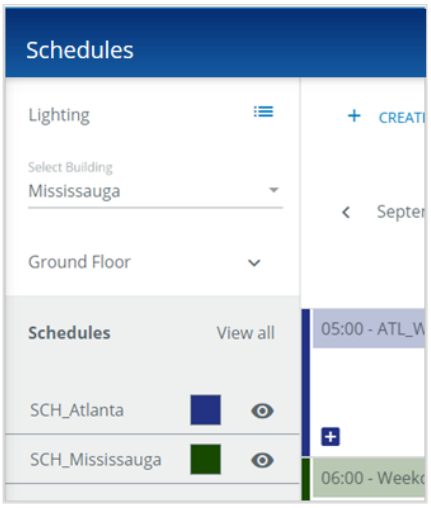
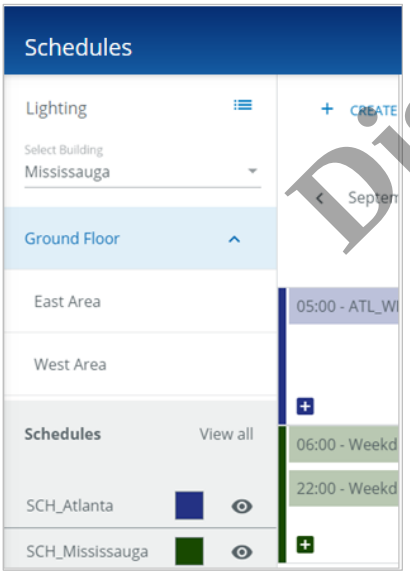
Step	Action
1	If the Schedules navigation panel is not visible, click ☰. By default, the Schedules panel will show all Schedules configured on this Trellix Core.

EXAMPLE



Step	Action
2	To limit the displayed Schedules to a specific Building, click **Select Building**, and then choose a Building from the list. ***NOTE*** *All Floors for the selected Building will be shown.* ***EXAMPLE*** 
3	To limit the displayed Schedules to a specific Floor, click the Floor name. ***NOTE*** *All Areas for the selected Floor will be shown.* ***EXAMPLE*** 

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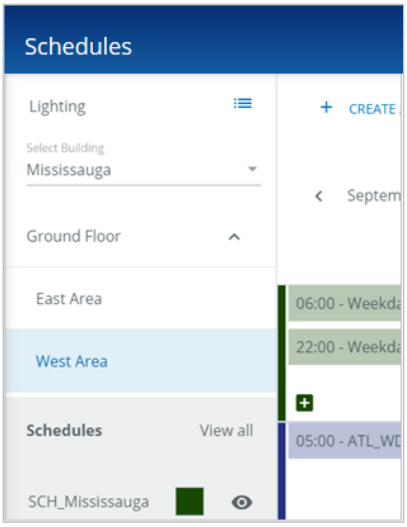
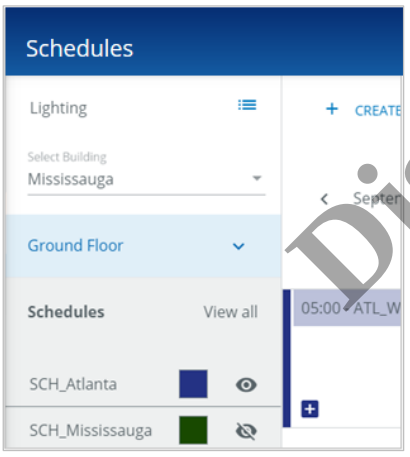
Step	Action
4	To limit the displayed Schedules to a specific Area, click the Area name. ***EXAMPLE*** 
5	To hide or show a specific Schedule, click 👁 beside it. ***TIP*** *Use the **View All** / **Hide All** toggle link in combination with 👁 when working with many schedules.* ***EXAMPLE*** 

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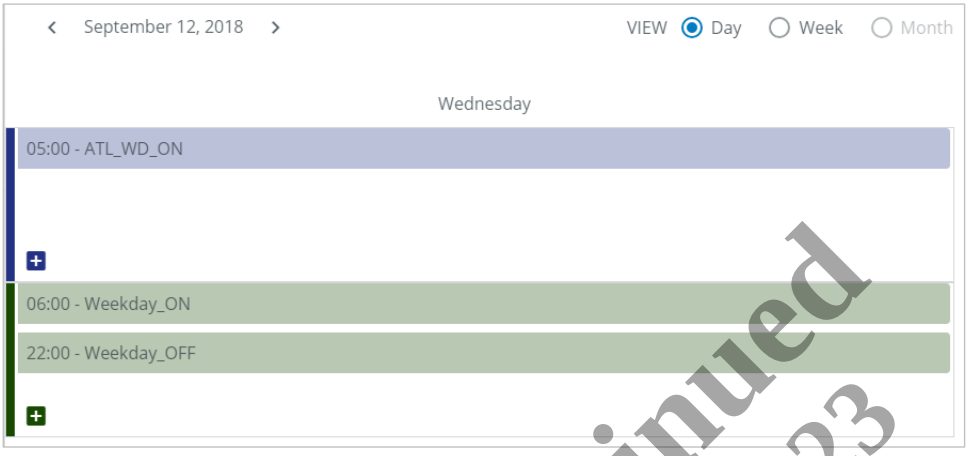
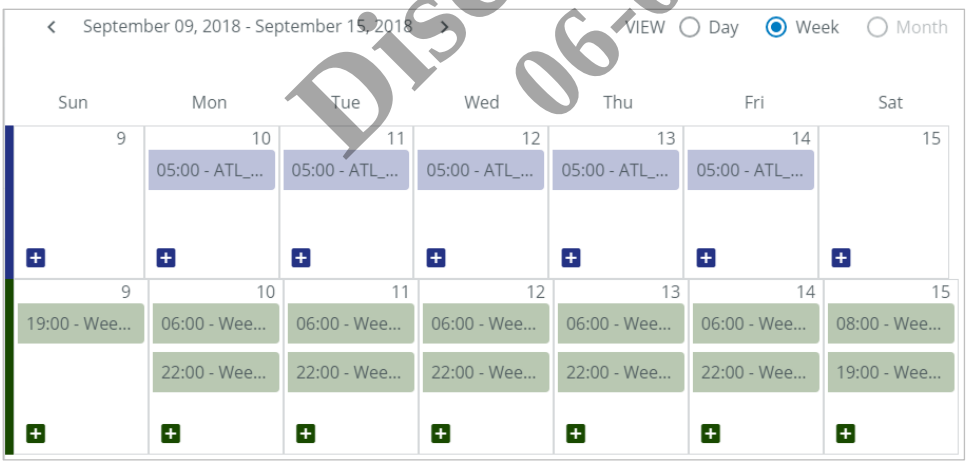
8.2 – Browsing the Calendar View

Follow the steps below to search the browse Events in the Calendar view.

Step	Action
1	When the Schedules page is first displayed, the Calendar View is set to **Day**, and shows all Events for all visible Schedules on the current date. ***NOTE*** *The Month view is disabled when more than one Schedule is being displayed.* ***EXAMPLE***  **Other Tasks** • Click the **<** and **>** beside the date to move back and ahead one day at a time • Click ☰ to show or hide the Schedules navigation panel
2	To see a week of Events in the view, click **Week**. ***EXAMPLE***  ***OTHER TASKS*** • Click the **<** and **>** beside the date range to move back and ahead one week at a time • Click ☰ to show or hide the Schedules navigation panel

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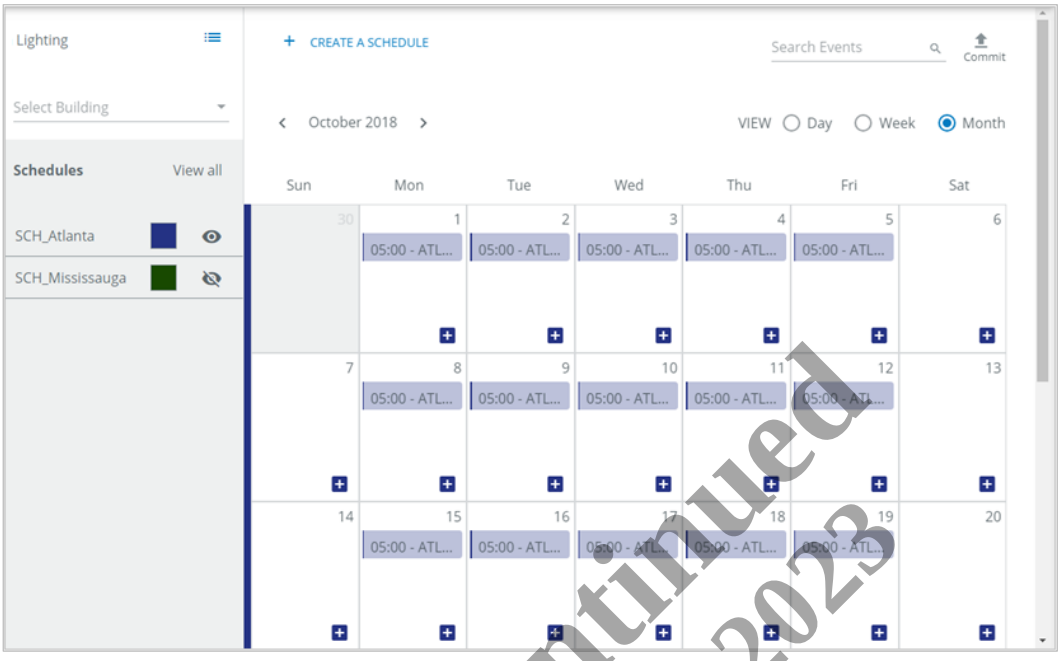
Step	Action
3	To see a month of events in the view, hide all Schedules except one, and then click **Month**.

TIP

*Use the **View All** / **Hide All** link in combination with 👁 when working with many Schedules.*

EXAMPLE



OTHER TASKS

- Click the **<** and **>** beside the month to move back and ahead one month at a time
- If a scroll bar appears on the right, use that to view the entire month
- Click ☰ to show or hide the Schedules navigation panel

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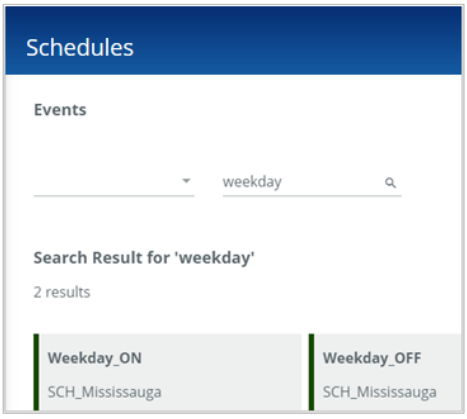
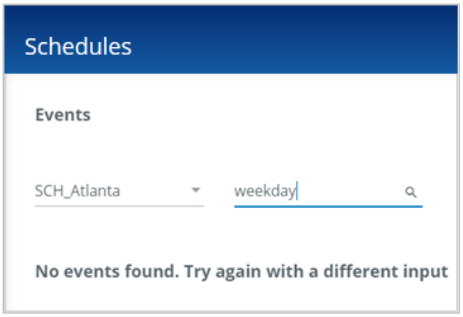
8.3 – Searching Events

Follow the steps below to search the scheduled Events.

Step	Action
1	Enter the text you are searching for in the Search Events box, and then press Enter or click 🔍.

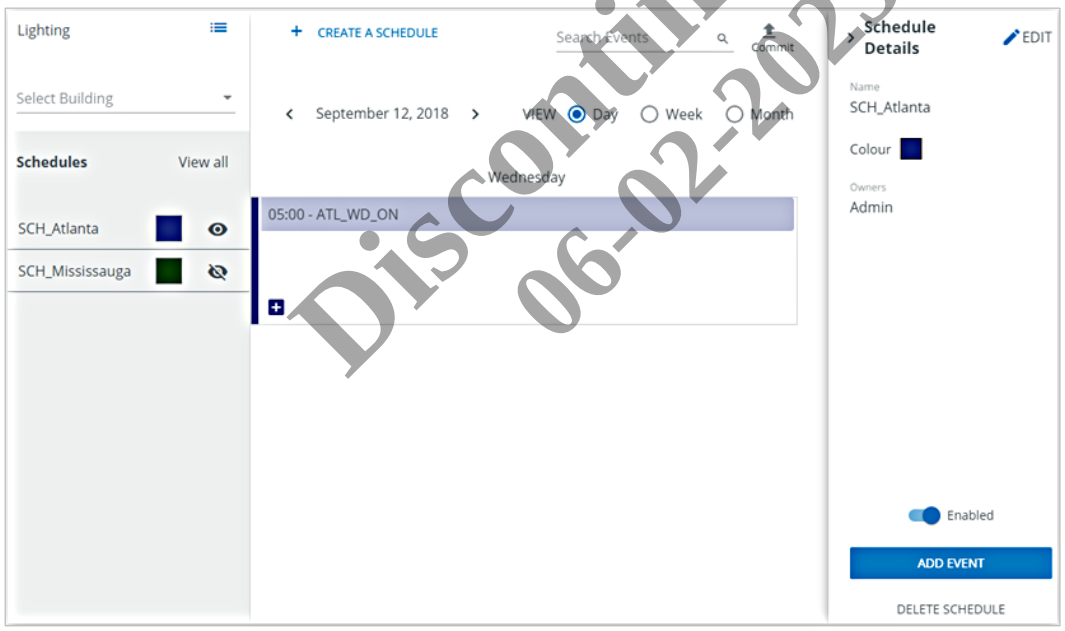
EXAMPLE



Step	Action
2	To limit the search to a specific Schedule, select it from the list on the left. ***EXAMPLE*** 
3	Click **Clear Results** to return to the Schedules page.

8.4 – Enabling and Disabling Schedules

Follow the steps below to enable and disable a Schedule.

Step	Action
1	Click the Schedule in the navigation sidebar on the left to display the **Schedule Details** panel. The status of the Schedule is indicated by the **Enabled** / **Disabled**) button. ***EXAMPLE*** 

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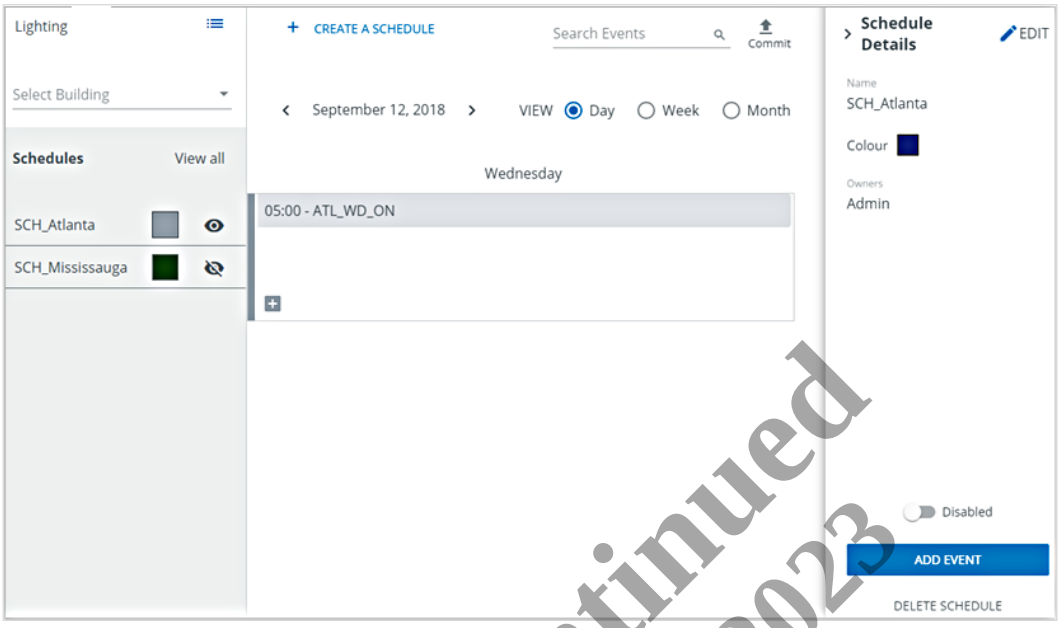
Step	Action
2	Toggle the **Enabled / Disabled** button to change the Schedule state. ***NOTE*** *When a Schedule is disabled, it appears pale grey in the Schedule navigation and Calendar view.* ***EXAMPLE*** 
3	Click **>** to collapse the Schedule Details panel.

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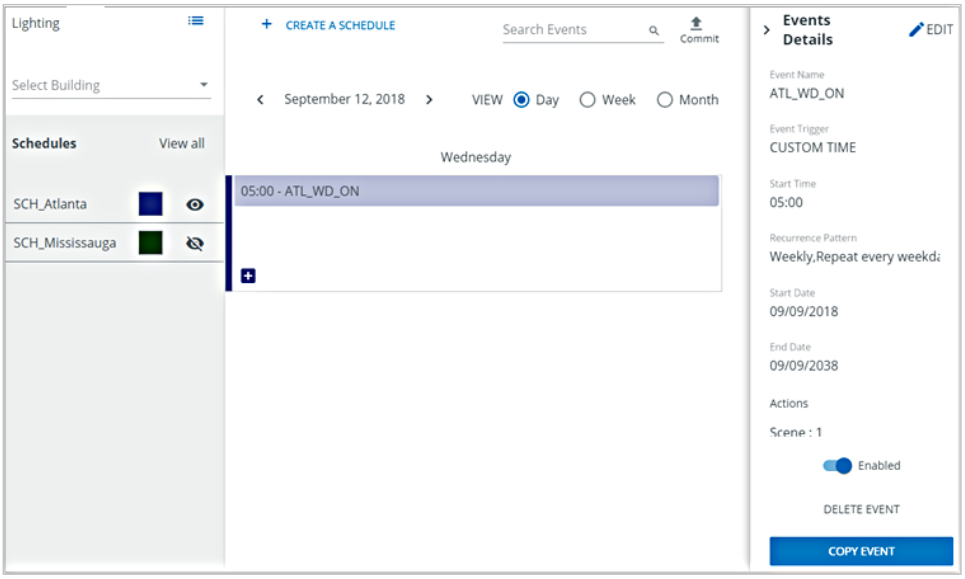
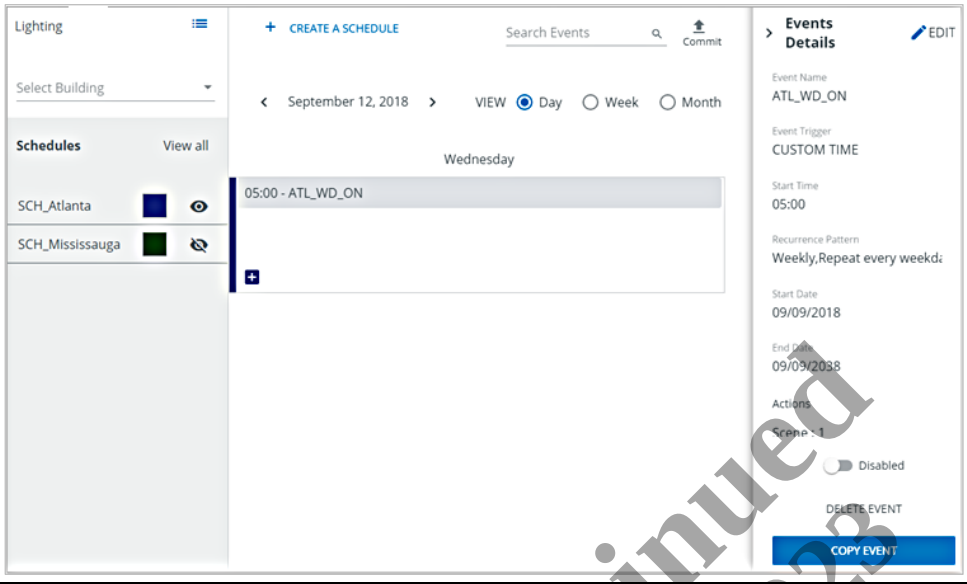
8.5 – Viewing, Enabling, and Disabling Events

Follow the steps below to view Event details, and to enable and disable an Event.

Step	Action
1	Click the Event in the Calendar view to display the **Event Details** panel. The status of the Event is indicated by the **Enabled** / **Disabled**) button. ***EXAMPLE*** 

Step	Action
2	Toggle the **Enabled / Disabled** button to change the Event state. ***NOTE*** *When an Event is disabled, it appears pale grey in the Calendar view.* ***EXAMPLE*** 
3	Click **>** to collapse the **Event Details** panel.

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9 – Appendix

This chapter contains supporting information for Trellix.

9.1 – Default Accounts, Roles, and Permissions

The default user accounts, roles, and permissions provided with Trellix Lighting are described below.

Username	Password	Role Assigned	Permissions
`Viewer`	`BXLinx!1`	Viewer	The Viewer user has view-only access to the following: • **Lighting app**: Alarms, Operate, Event Log, and Dashboard features. • **Admin app**: Alarms, Event Logs.
`Tenant`	`BXLinx!2`	Tenant	The Tenant user has view and operate access to the Alarms, Operate, Event Log and Dashboard features.
`Facman`	`BXLinx!3`	Facility Manager	The Facility Manager user has view, operate, and administer access to all features except the following: Manage Roles; Backup/Restore, Factory Reset; Firewall; GSA Warning; Language Plugin; and Software Upgrade.
`ITAdmin`	`BXLinx!4`	IT Administrator	The IT/Network Administrator has view, operate, and administer access to the following: • **Lighting app**: Alarm, Operate, Event Log • **Admin app**: System - Backup/Restore; BACnet, Email Server; Factory Reset; Firewall; GSA Warning; Language Plugin; Published API; and Software Upgrade.
`Admin`	`BXLinx!5`	System Administrator	The Trellix Lighting Administrator has full access to all features.
`DRUser`	`BXLinx!6`	Demand Response	The Demand Response User has access to the Demand Response and OpenADR interfaces.
`Public`	`BXLinx!7`	Third Party Integration	The Third-Party Integration User has access to the Published API.

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9.2 – Account Permissions

The access provided by each Trellix permission is listed below.

Permission	Description
View Only	View-only access to assigned Areas.
User Management	Create, view, modify, and delete user accounts.
User Role Management	Management of user roles and permissions.
System Settings	• Modify the system and subsystem networking settings • Backup and restore system configuration • Backup and restore the database • Update and manage system and subsystem software versions • View diagnostic logs components and features
System Configuration	Manage system configuration such as Sites, Devices, and Floorplans.
Schedule	View and manage schedules in assigned Areas.
Acknowledge Alarms	Acknowledge alarms.
Normal Priority Override	Send a Normal Priority override.
High Priority Override	Send a High Priority override.
Demand Response	Access demand response components and features (can only be assigned Demand Response role).

Permission	Description
Interface Settings	Access integrated interface settings components and features (can only be assigned Third Party Integration role).
Alarms and Events View	View-only access to Alarms, Events, and Dashboard.

9.3 – WaveLinx Alarms

The WaveLinx alarms reported by Trellix Lighting are listed and described below.

Alarm	Description
Device not reachable	Unable to communicate with device
Battery low	Device is battery-powered, and the battery will soon need replacement
Battery very low	Device is battery-powered, and will go offline very soon unless the battery is replaced
Device failed to update	The WAC failed to update its firmware or that of a paired device
Voltage out of range	DC power bus voltage is out of its specified range
Lamp error	Occupancy sensor has signaled that the lamp voltage or current is out of the specified range

9.4 – WaveLinx Wired Alarms

The WaveLinx Wired alarms reported by Trellix Lighting are listed and described below.

Alarm	Description
E0270	No connection to EG2 during import. Import of controller data failed. Transceiver connection to controller failed.
E0277	No response from iLight API during import. Import of controller data failed. Error response received from controller/Transceiver.
E0014	No response from EG2. Unable to communicate with device.
E0001	The elms_transceiver lost connection to elms_adapter. WebSocket connection lost.

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FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.
(2) This device must accept any interference received, including interference that may cause undesired operation.

Note: The grantee is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications could void the user's authority to operate the equipment.

Note: The equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons.

Warranties and Limitation of Liability

Please refer to www.cooperlighting.com/WarrantyTerms for our terms and conditions.

Garanties et limitation de responsabilité

Veuillez consulter le site www.cooperlighting.com/WarrantyTerms pour obtenir les conditions générales.

Garantías y Limitación de Responsabilidad

Visite www.cooperlighting.com/WarrantyTerms para conocer nuestros términos y condiciones.

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06-02-2023

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