Batlight District Jette

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IBE-BIV Seminar 14 November 2024

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BELGISCH INSTITUUT voor VERLICHTINGSKUNDE
INSTITUT BELGE de l'ECLAIRAGE
CIE NATIONAL COMMITTEE – NBN SECTOR OPERATOR

MET DE STEUN VAN
AVEC LE SOUTIEN DU

NBN
BUREAU VOOR NORMALISATIE
BUREAU DE NORMALISATION

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Jette

Sibelga

bruxelles environnement leefmilieu brussel .brussels

natagora

Laborelec
RESEARCH & INNOVATION

RADIANCE 35

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Genesis of the project: Initiative of the Municipality of Jette 2020, Sibelga invites partners

Projects:
Aud-Rouge Cloitre 2016
WB-Dréve St-Hubert 2018

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Brainstorming

EXTENSION AND EXPECTED OBJECTIVE OF THE PROJECT

In terms of content:

Project spread over several years, which will lead:

- A "**test case**" communication made by all the participating companies
- On an **input for the "black mesh**" specifications that Bruxelles-Environnement wishes to publish
- On an **input for the urban planning regulations**, important in the eyes of Sibelga to ensure a peaceful night for all 19 Brussels municipalities, in addition to the RRU

Long-term placement of batloggers:

- Never done
- Provide **access to** an amount of important payload **data**
- Working in **multidisciplinary teams**

In terms of objective:

- Tests to evaluate and **measure the impact of different types of lighting** on behaviour bats
- Take advantage of the renovation of lighting installations, **testing new technologies**
- **Identify the most suitable solutions for biodiversity**, reducing light pollution for fauna, flora and inhabitants

All participants wish to:

- **Collaborate** on this project
- Take the opportunity to make a real **impact measurement before / after modification** of the lighting installation on bats
- That this work can be considered as a **textbook case** of reference

In terms of participants:

- Wish to **extend to private individuals** with outdoor lighting as part of the perimeter of the study (sports fields, hospital, shopkeepers ....)
- Lighting Designers

A priori, the area does not identify "**amphibian**" black spots, the maximum attention will be paid to the well-being of **bats**.

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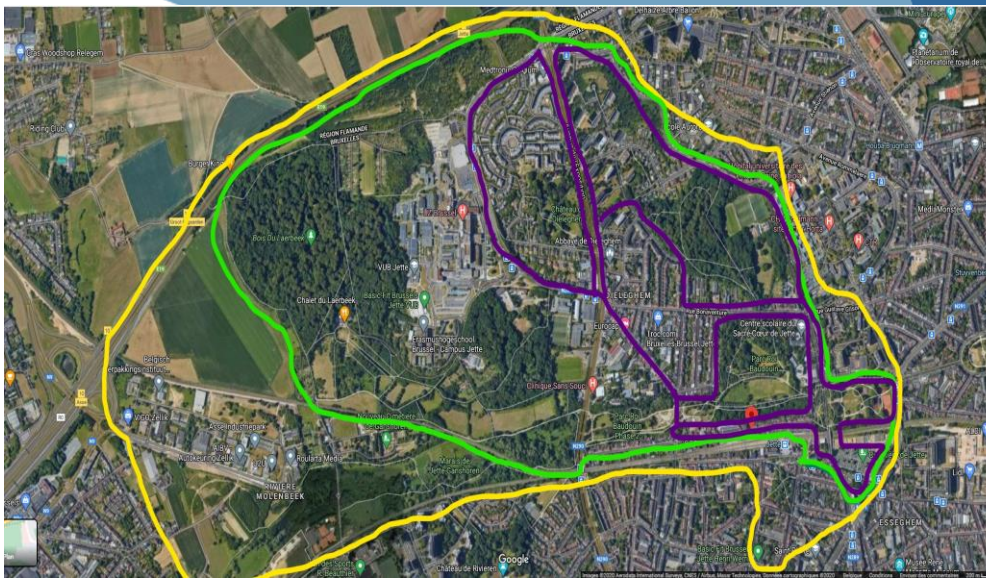
FIRST STEPS:

1. Define a study scope



2. Start a bicycle transect to identify areas of preponderant bat presence

Result of an outing + 1 evening listening points

Maps of contact points for the 3 bat species present in the study territory

Premier Transect Natagora 04/09/2020

Listening points

Point 1 20h40 : 2 contacts of pipistrellus pipistrellus

Point 2 20h52 : 3 contacts of pipistrellus pipistrellus

Point 3 21h05 : 0 contact

Point 4 21h17 : 21 contacts of pipistrellus pipistrellus

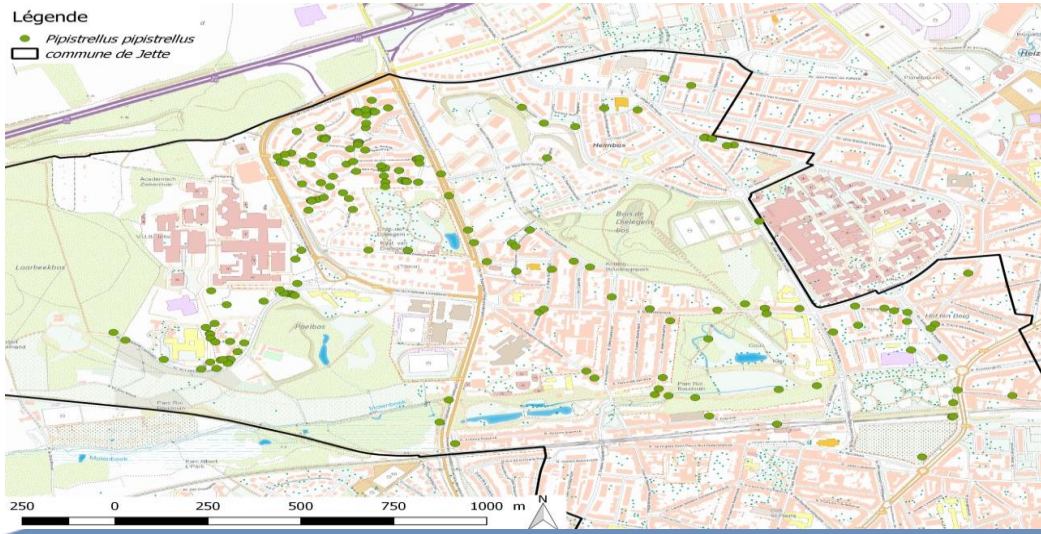
Point 5 21h33 : 10 contacts of pipistrellus pipistrellus

Point 6 21h45: 4 contacts of pipistrellus pipistrellus and 1 contact of Eptesicus serotinus

Point 7 22h00 : 30 contacts of pipistrellus pipistrellus

Point 8 22h15 : 7 contacts of pipistrellus pipistrellus

Point 9 22h25 : 19 contacts of pipistrellus pipistrellus



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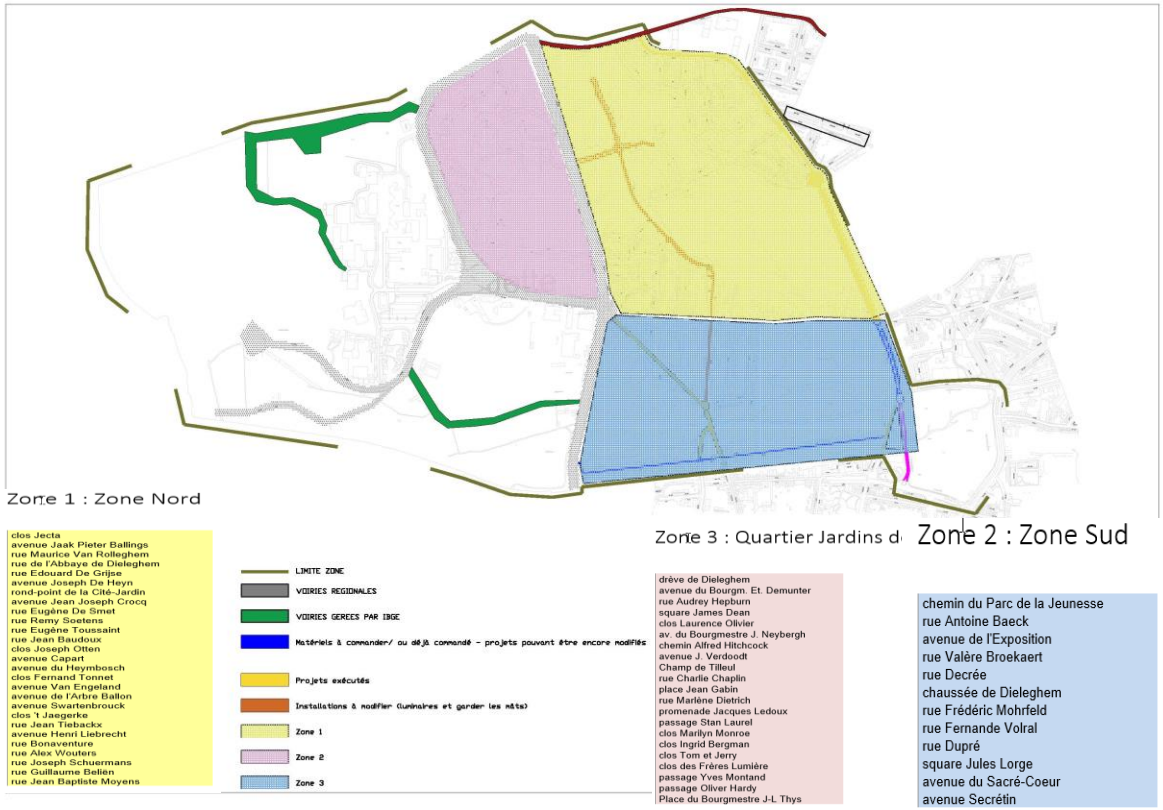
3. Analyze and Edit a map with the planned years of lighting renewal in the scope of the study

4. Make a renewal schedule with funding possibilities



Public lighting installation status card

Financial opportunities

- The renewal of facilities more than 20 years old covered by the MSP budget

- Limit the extent of the modification (example: replace some luminaires at the right of the bat crossings, without redoing the entire installation)

Almost all roads are more than 20 years old and therefore meet the investment criteria

Project portfolio 2020-2025

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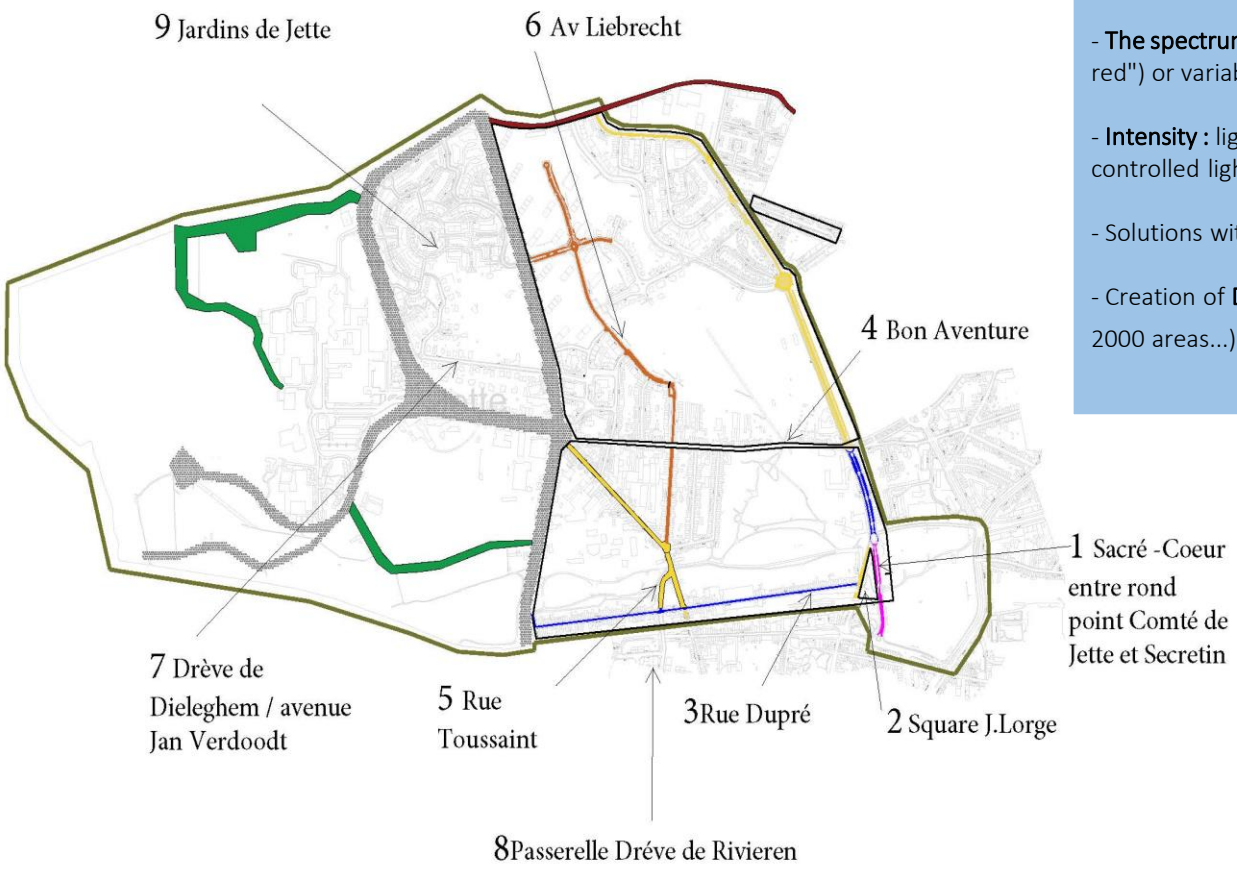
4. Choice of Technologies



The regulation / choice of lighting:

- **Photometric distribution :**(more intensive, more extensive, +/- controlled, ...)

- **The spectrum of the source :** either fixed (example: warm white or "l red") or variable (cf. Flexwhite at Schréder)

- **Intensity :** light power, variability over time - Dimming Via ISL (remot controlled lighting)

- Solutions with **presence detectors :** (PIR Technology) or Light Bubble

- Creation of **Dark Areas** not to be illuminated (Laerbeek Wood, Natur 2000 areas...)

Technological choices:

1- Amber Light with dimming 2- Orange filter 3- Low levels (Work on photometry) and Dimming

4- Orange filter 5- Orange filter +Work on photometry 6- Red Light 7- Temperature change (2700K to 2200K) + presence detection 8- Work on lighting (Different temperatures and colors) +Presence detection 9 – Non-dimmed regime (In the future: Temperature change)

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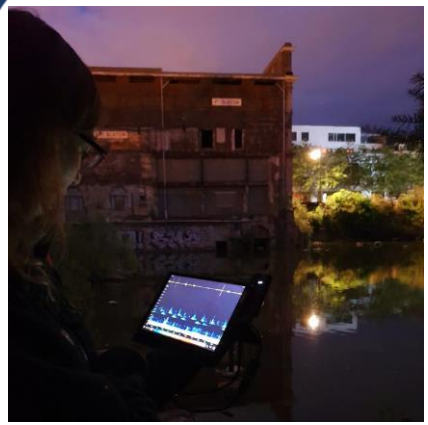

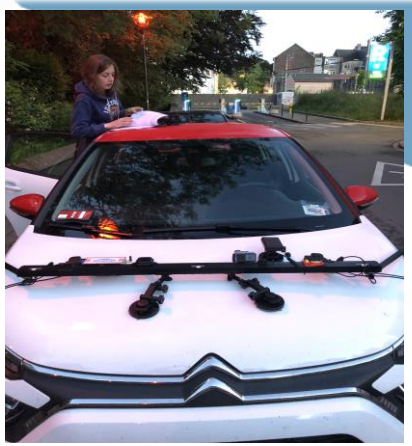

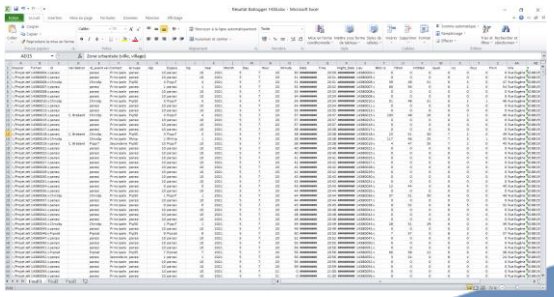

5. Recording Bat Behaviour

4 protocols

- Installation of long-term recorders
- Transect bike
- Point Counts
- Car transect

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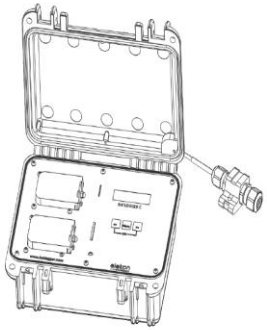
Placement of Batloggers

- Location of the Batlogger and survey of the route
- Permanenly Placement of Batloggers on light towers
- Placement in avril for the test period between May and October

BATLOGGER C

Manual

Firmware version V 2.5



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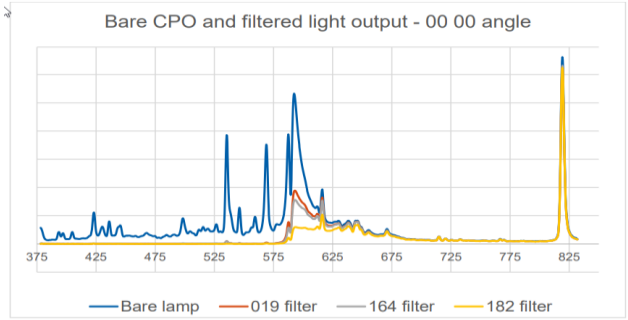
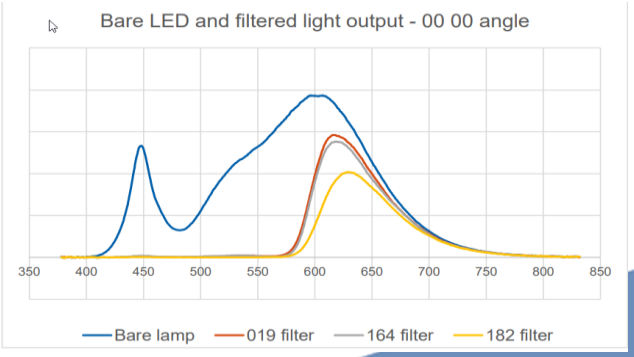
6. Filter Sélection and Placement

Photographie du luminaire LED avec filtre 019



Photographie du luminaire traditionnel avec filtre 019



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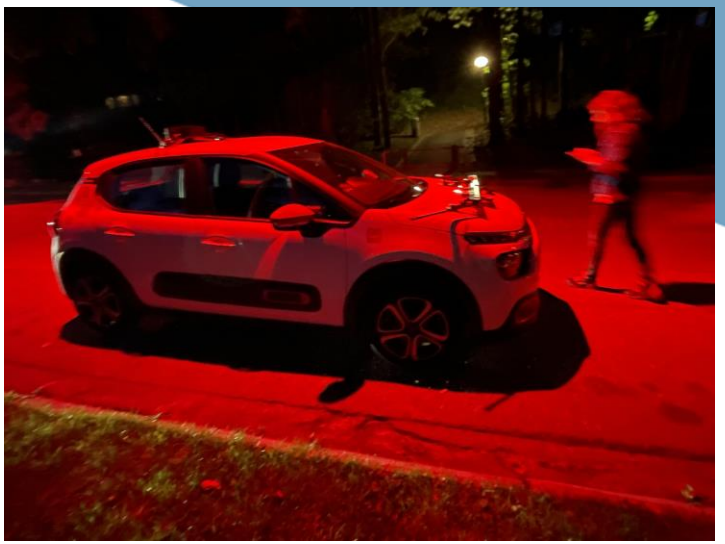
Measurement Companion with Dynamic Lighting Assessment (#DYLA)

Bat migration from Sep/Oct to March
Resumption of measures in May/June



Measurement Campaigns:2021

1 Dynamic measurement on 10/06/21 at 19:30
2 Dynamic measurement on 12/08/21 at 22:30
3 Dynamic measurement on 27/09/21 at 21:30

Measurement Compaigns:2022

1 Dynamic measurement on 07/06/22 at 19:30
2 Dynamic measurements on 25/08/22 at 22:30
3 Dynamic measurements on 05/10/22 at 21:30

Measurement Campaigns:2023

1 Dynamic measurement on 12/06/23 at 19:30
2 Dynamic measurement on 09/08/23 at 22:30
3 Dynamic measurement on 05/10/23 at 21:30

Measurement Campaigns:2024

1 Dynamic measurement on 10/06/24 at 19:30
2 Dynamic measurement on 08/08/24 at 22:30
3 Dynamic measurement on 01/10/24 at 21:30

Measurement Circuit with Laborelec Vehicle

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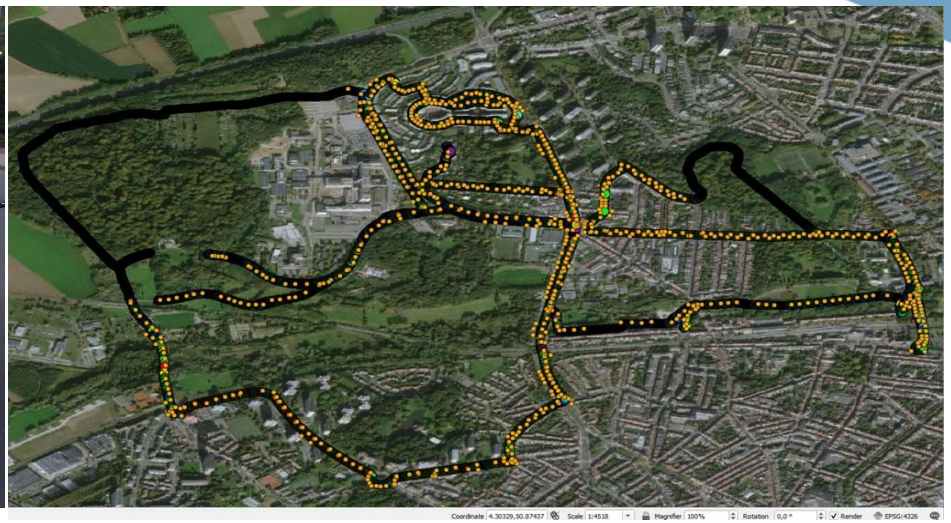
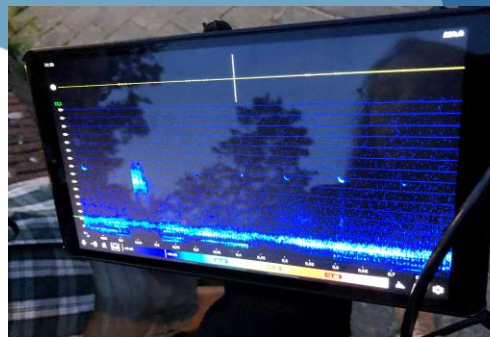
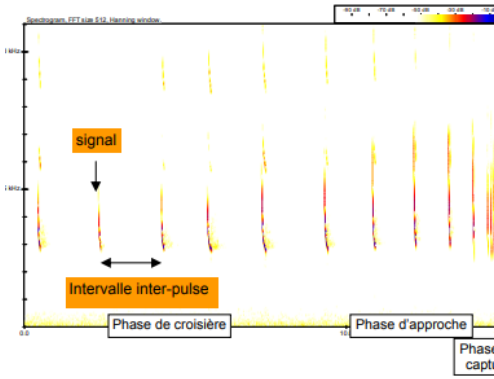
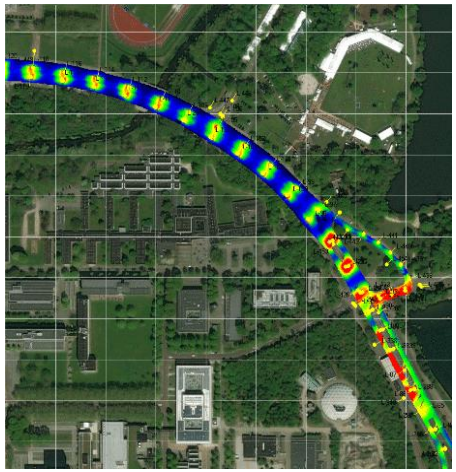
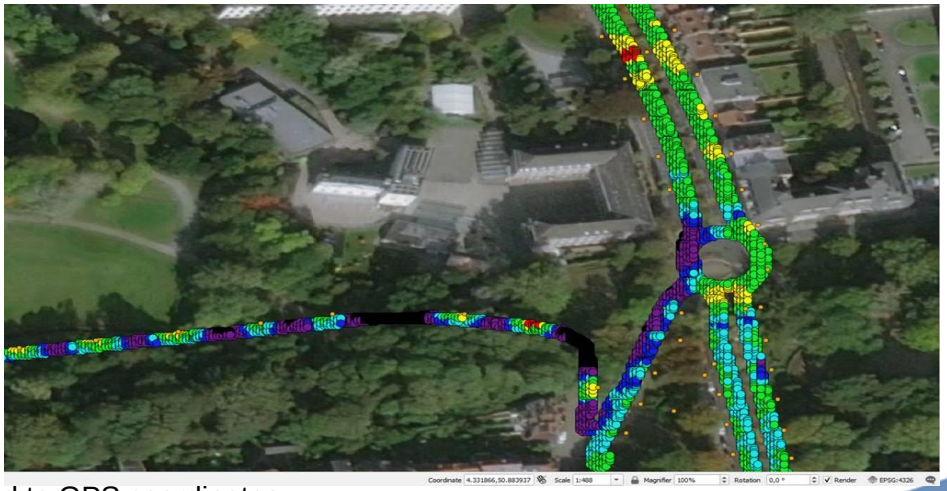
Measurements with special vehicle for illumination mapping in 3D modeling (add batlogger in vehicle) spectral analysis of devices

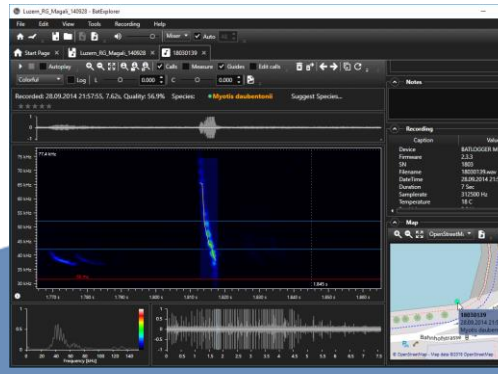












Example of spectral data related to GPS coordinates :

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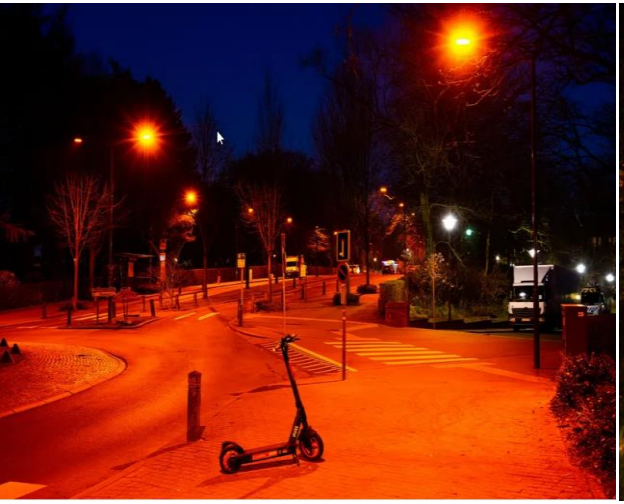
Sibelga projects completed 2021-2022

Sacré Cœur (Nicole Batlamp Ambre) 2021
Pont Sacré – Cœur 2022

1- Work on the avenue and the Sacré-Coeur Bridge



Bat lamp

Innolumis constantly strives to improve its products and applications to sustainably improve our environment and offer convenience.
In the European Union, all bat species are protected by law. Disruption of their permanent residence, routes and hunting areas, threatens the bat groups. In the Netherlands such disturbance is considered a violation of the Flora and Fauna act.

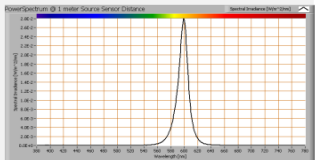
Bats are sensitive to light disturbance. Both in their roost, as well as on their flight paths and hunting habitats. Especially street lighting can lead to painful glare in these nocturnal animals. Research by Rijkswaterstaat (2012) showed that bats eyes are especially sensitive to blue and ultraviolet light. Much less orange and red. On this basis, we developed an amber-colored, UV free LED luminaire: the "Bat lamp".

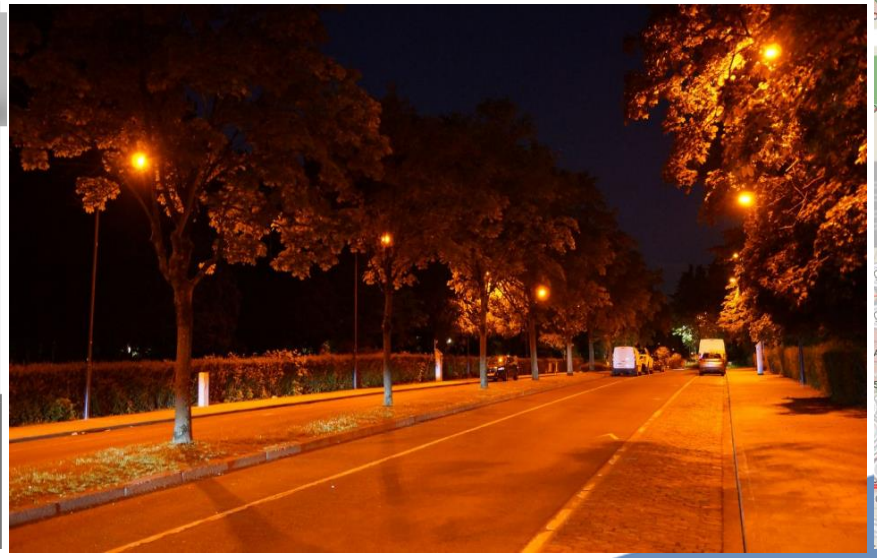
In the Netherlands 17 species of bats still occur, of which 8 are quite rare and 10 are particularly sensitive to light

Fitting material	Aluminium, LM6 quality
Finishing	Antifouling powder coating (dirt repellent)
Fitting colour	All RAL colours available, RAL 7035 standard
Optics materials	Safety glass and aluminium (miro6)
Driver	MeanWell® / CLQ Quad Output
Dimmable	Yes, 0 - 10 V (from 14 W)
Recommended dimmers	Dynadimmer, Liandimmer, SDU, OLC, PLM
Power	9 to 31 W
Power factor	> 0.95
Connector	Connector for a 3 or 5 conductor cable
Protection class	I and II
Source	100 - 240 VAC 50/60Hz
Ambient temperature	-40 to +50 °C
Number of light compartments	4
LEDs per compartment	10 x amber

Light current	System power
9 W: 760 lumen	9 W
14 W: 1020 lumen	16 W
22 W: 1300 lumen	24 W
31 W: 2000 lumen	33 W

Colour point	x/y = 0.6004 /0.3956
Wavelength	592-594 nm





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2- Orange filter on Malmô - Square Lorge

3- Orange filter on Hestia – Rue Toussaint

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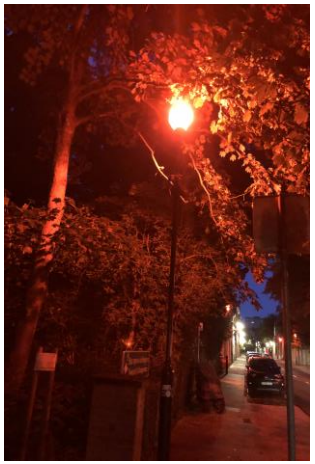
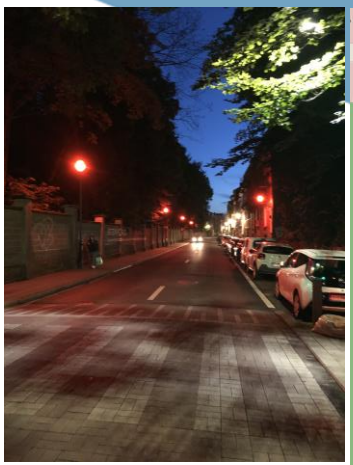
4- Orange filter on Temporé - Bon Aventure Street





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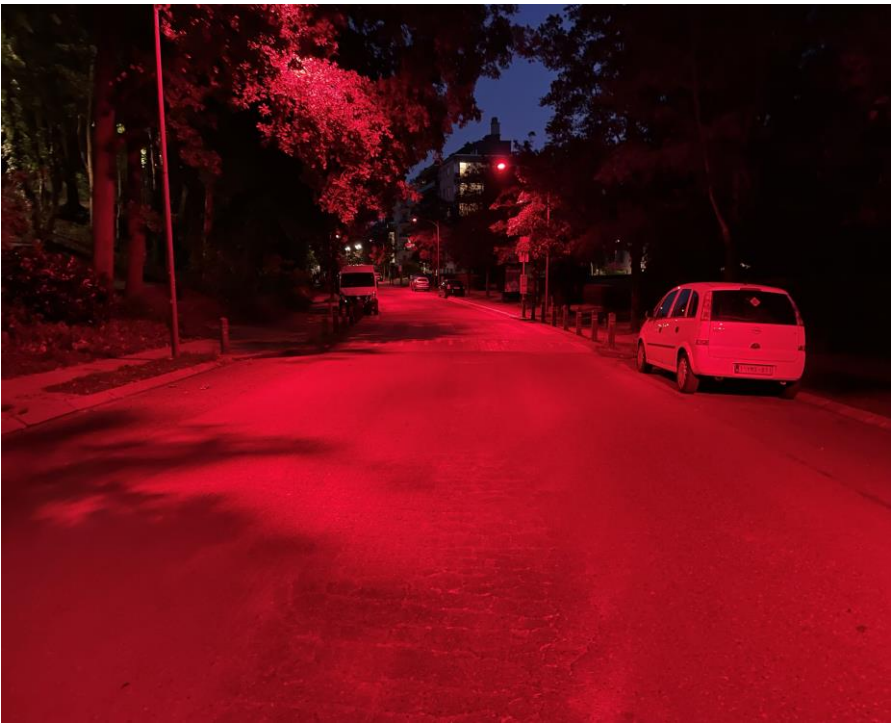
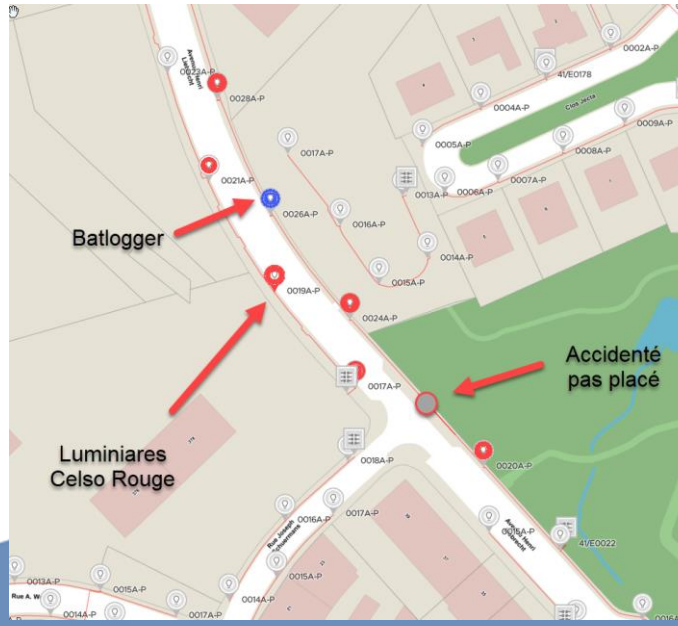
5- Intervention on Avenue H.Liebrecht: Monochromatique Red Replacement of 7 luminaries - Jan 22

		C3	M3	C3	M3	C3	M3
		Celso 3000K	Celso 3000K	Red 4020lm	Red 4020lm	Red 6000lm	Red 600
	Emoy	15,99		14,76		22,03	
	Umoy	0,62		0,51		0,51	
	Lmoy		1,24		1,02		1,53
	U0		0,55		0,37		0,37
	UI		0,6		0,38		0,38
	TI		9		6		7
	REI		0,41		0,24		0,24

H	7m
Bilatéral Alterné	46m entre mâts du même côté
Inclinaison	5°
Console	2m
Recul	0,5m
Maintenance	0,85





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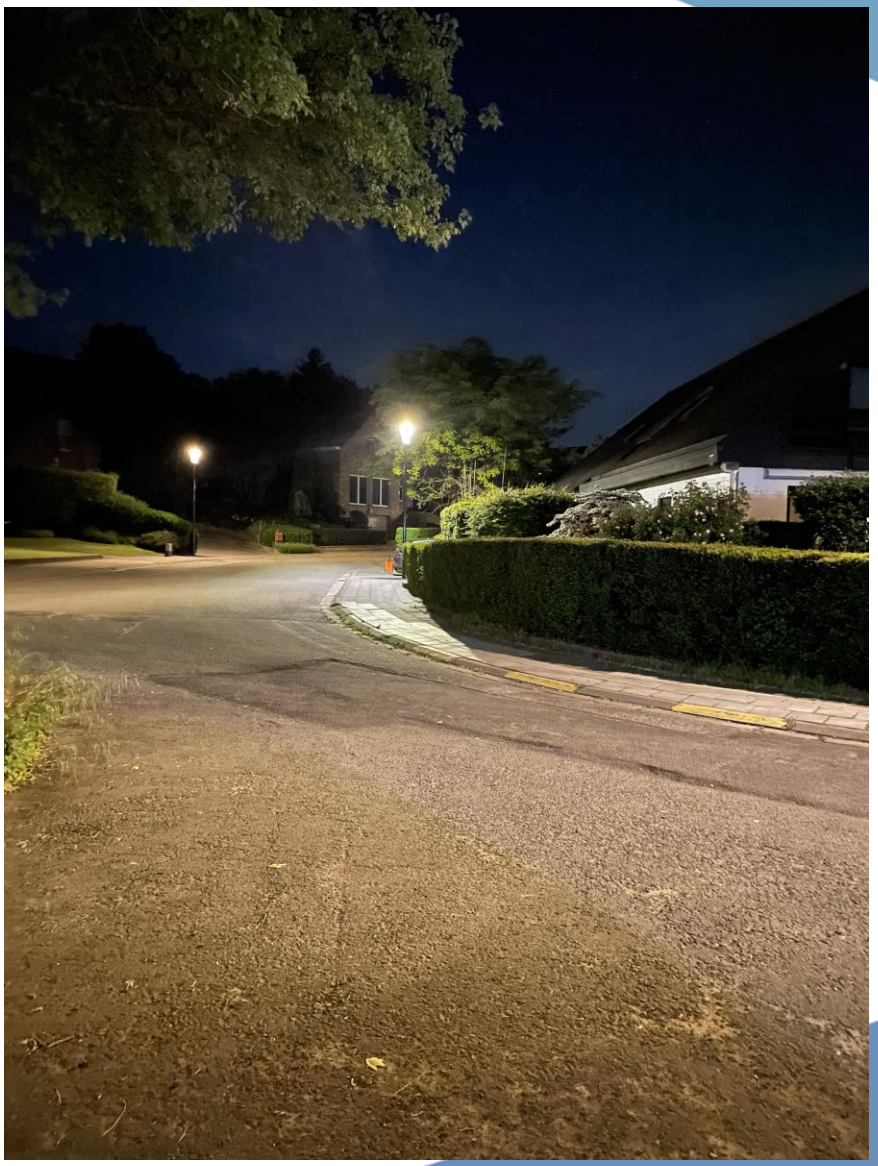
6- Rue Verdoodt +Dréve de Dieleghem (Flexia luminaire)

T° Change Solution 2200K-2700K



Comparison Photometric studies Change of road class

2700 k

Emoy	= 9.76
Emin	= 0.34
Emax	= 34.55
Emin/Emax	= 0.01
Emin/Emoy	= 0.03

2200 k

Emoy	= 5.64
Emin	= 0.20
Emax	= 21.60
Emin/Emax	= 0.01
Emin/Emoy	= 0.03

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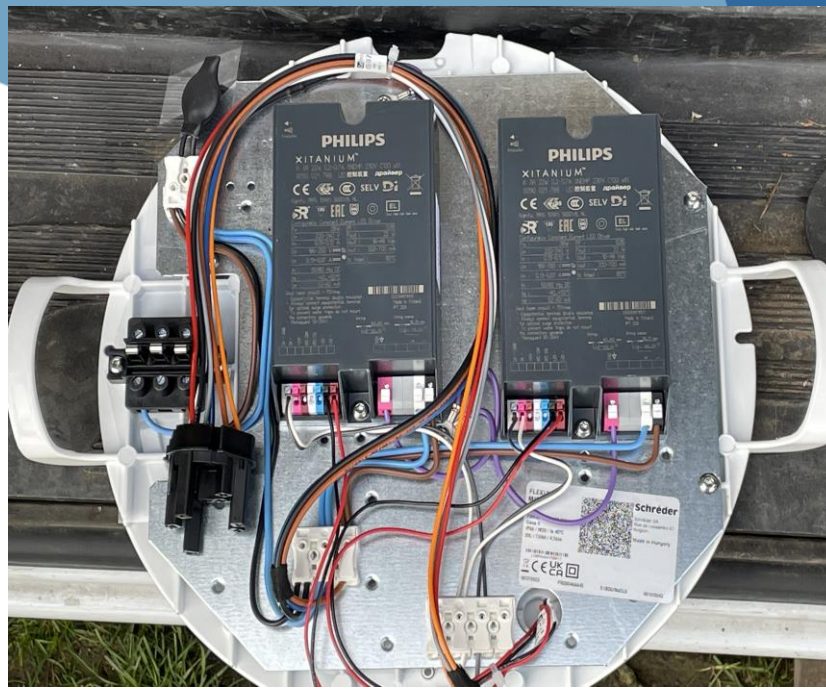

EXEDRA

BeeZeeLinx

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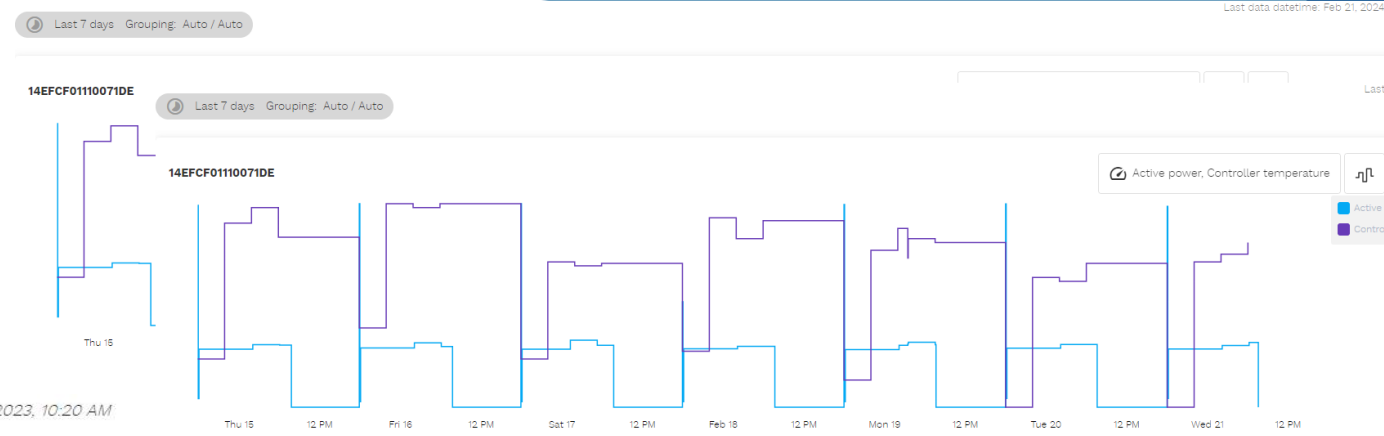
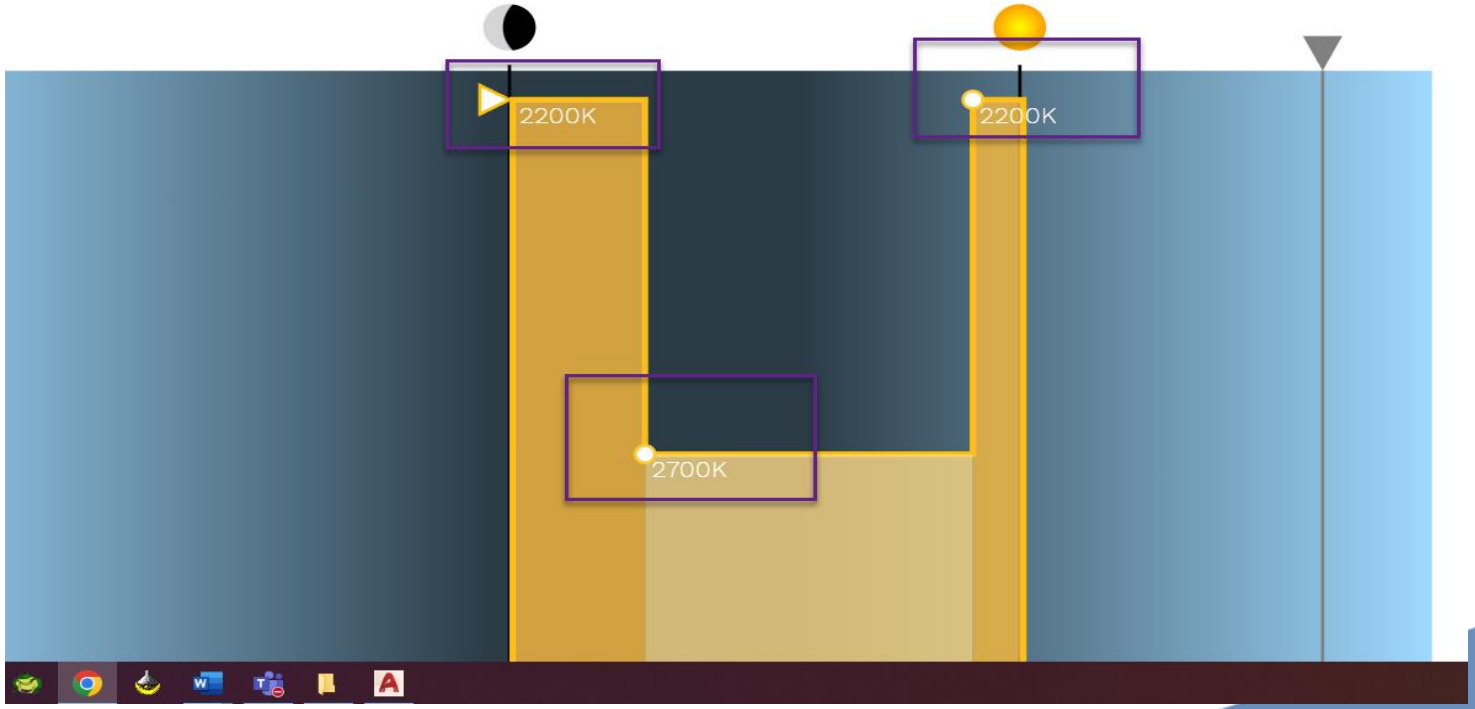
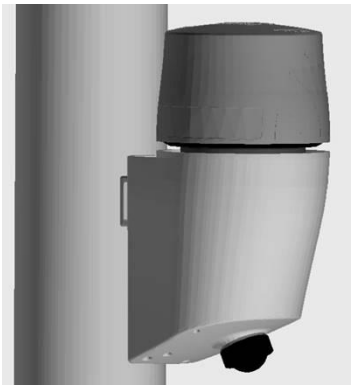
6- Rue Verdoodt + Dréve de Dieleghem

Dimming Scénari





7- Solution with PIR "presence detection"



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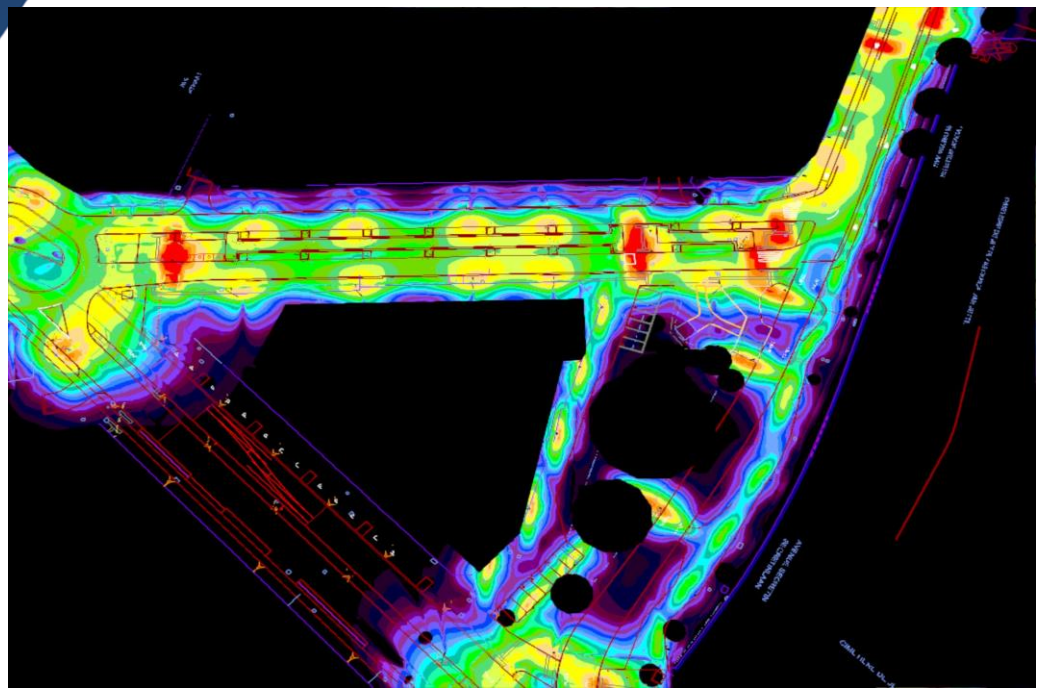
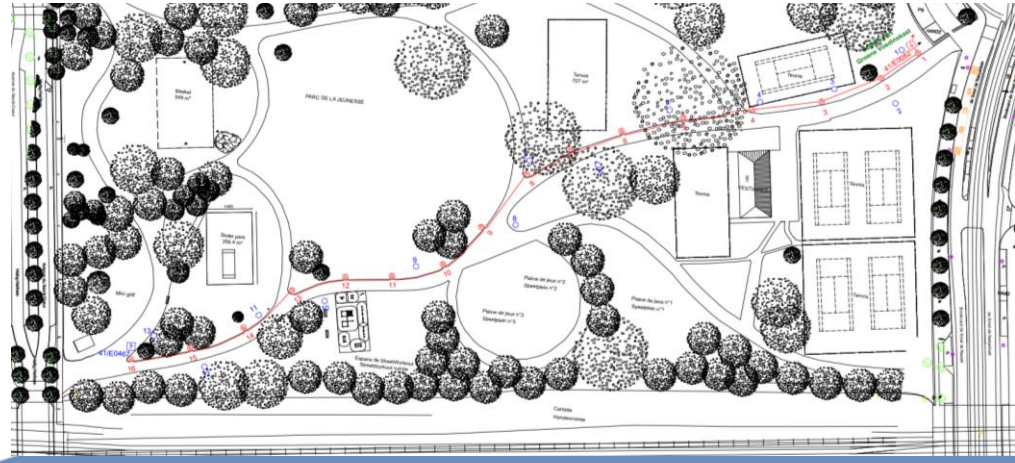
8- Project Secretin Démineur 2022-2023-2024



9- Parc de la Jeunesse Flexia Midi 2200k



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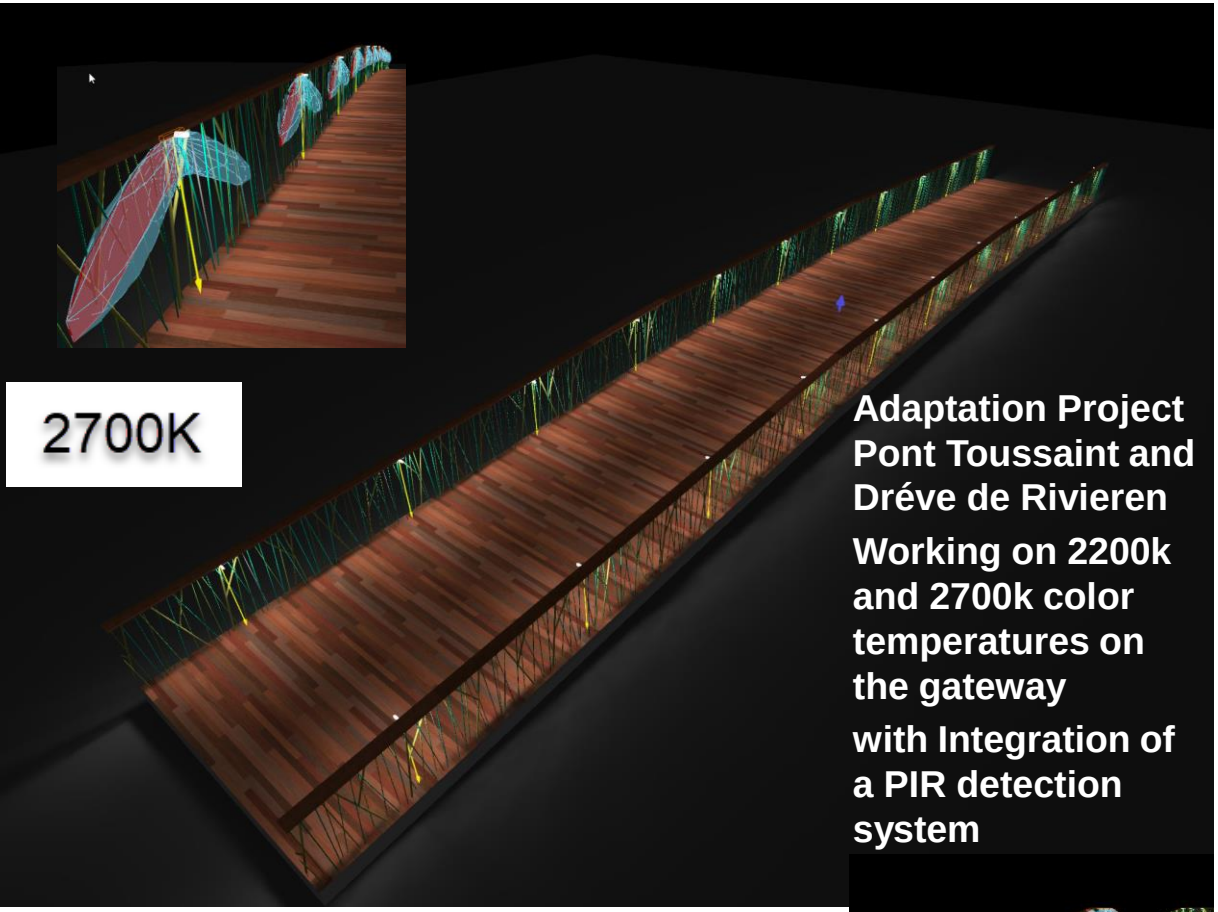
Mixte Flexia FG Midi
(2200k+2700k) +Hestia 3000k

10- Taking into account the installations around the perimeter (Bridge + Toussaint Footbridge) - 2023

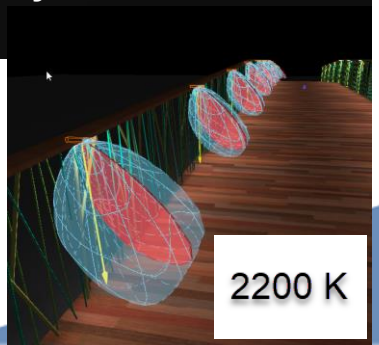
Modification of the Toussaint Project (continued redevelopment)

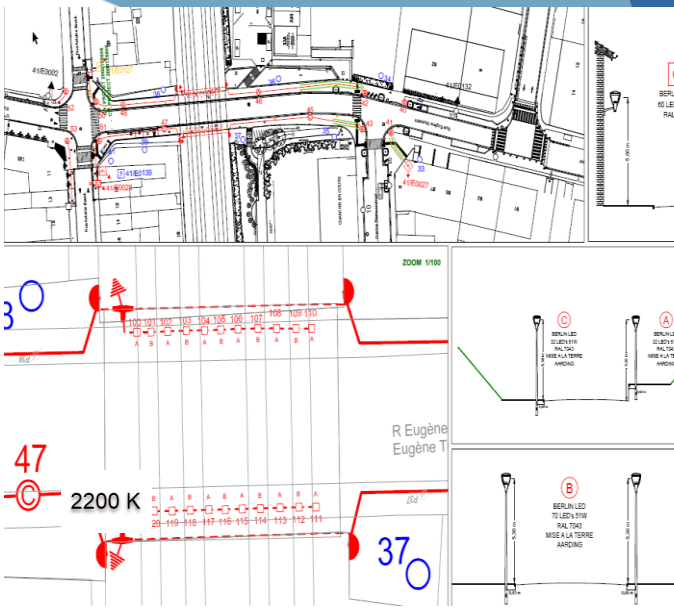


Adaptation Project Pont Toussaint and Dréve de Rivieren

Working on 2200k and 2700k color temperatures on the gateway

with Integration of a PIR detection system





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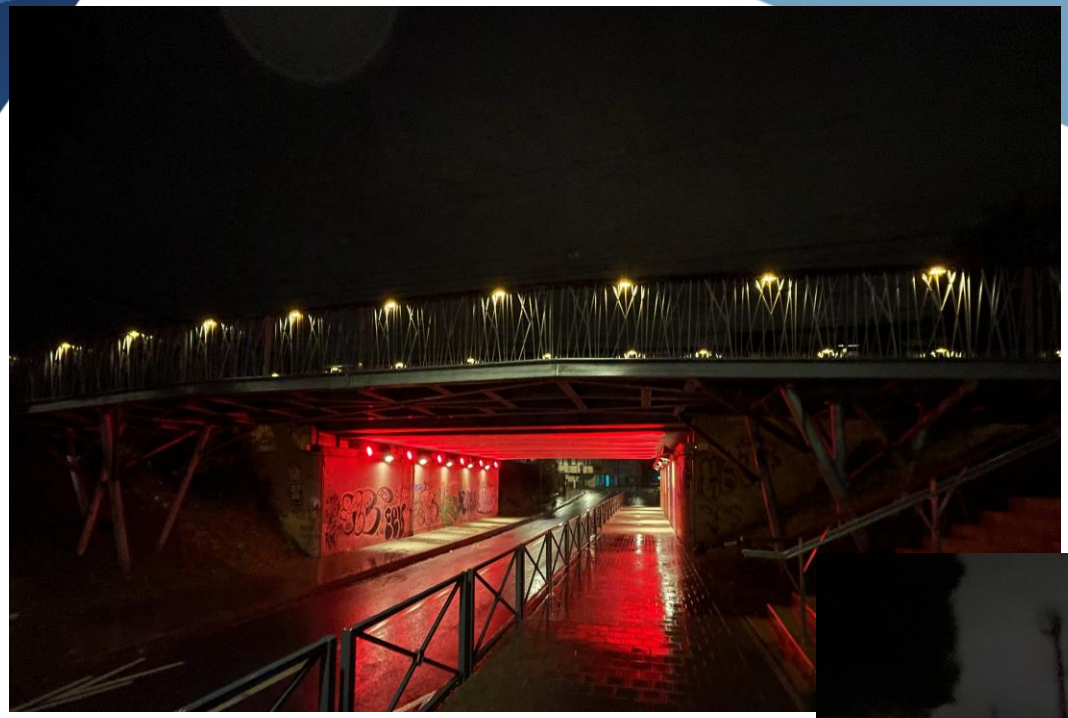

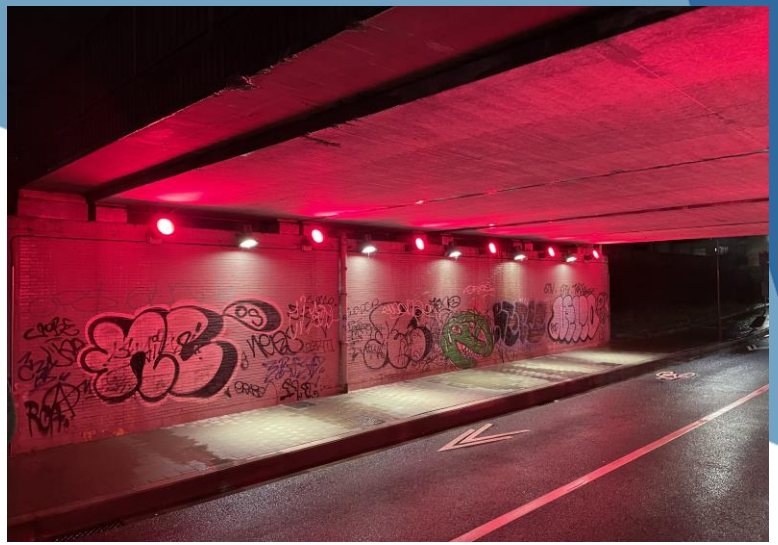

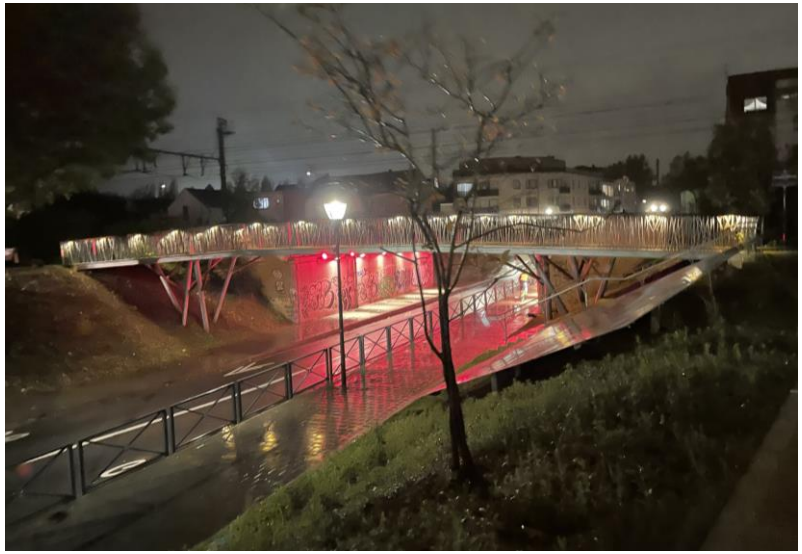

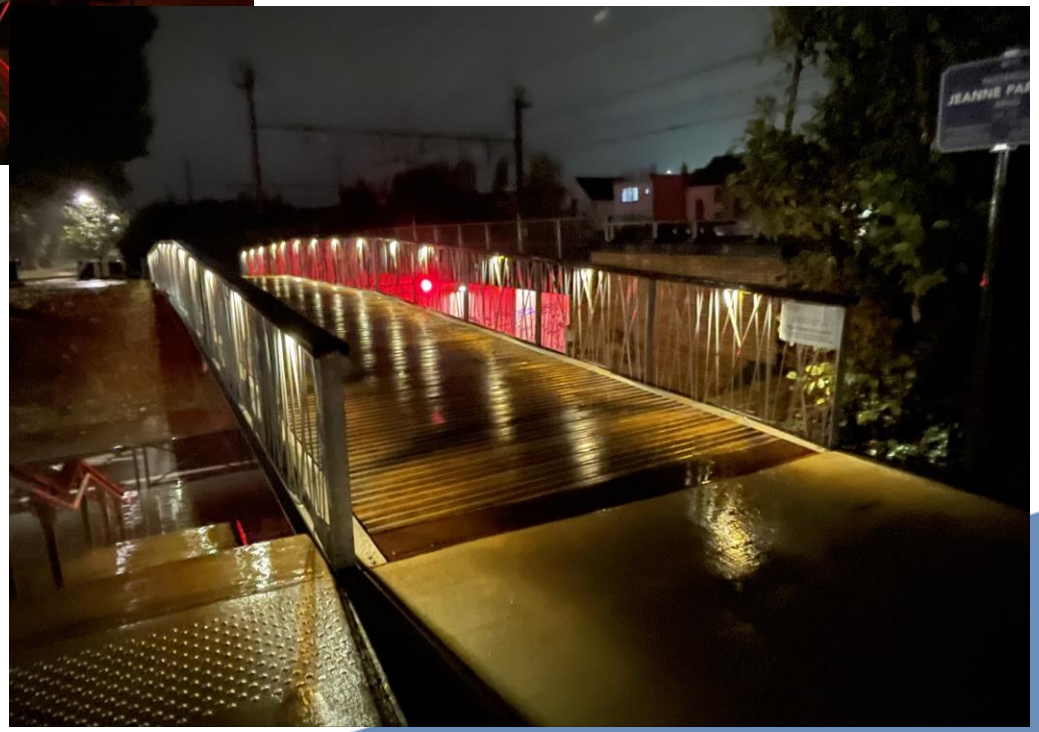

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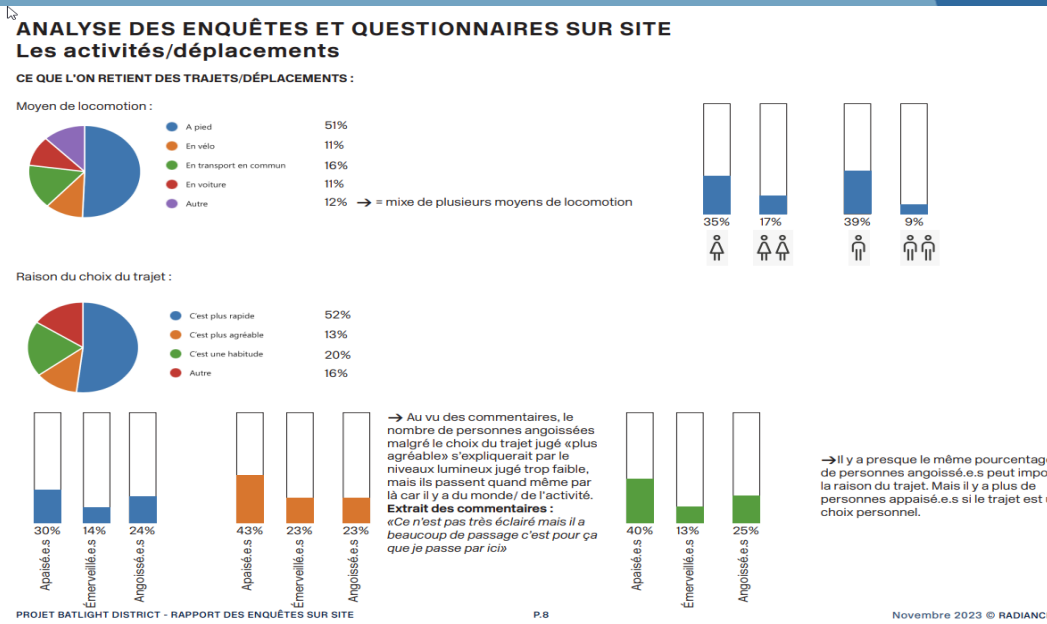
Survey



Participatory support of the Star Mesh experience

- Data analysis process
- Participatory and pedagogical processes

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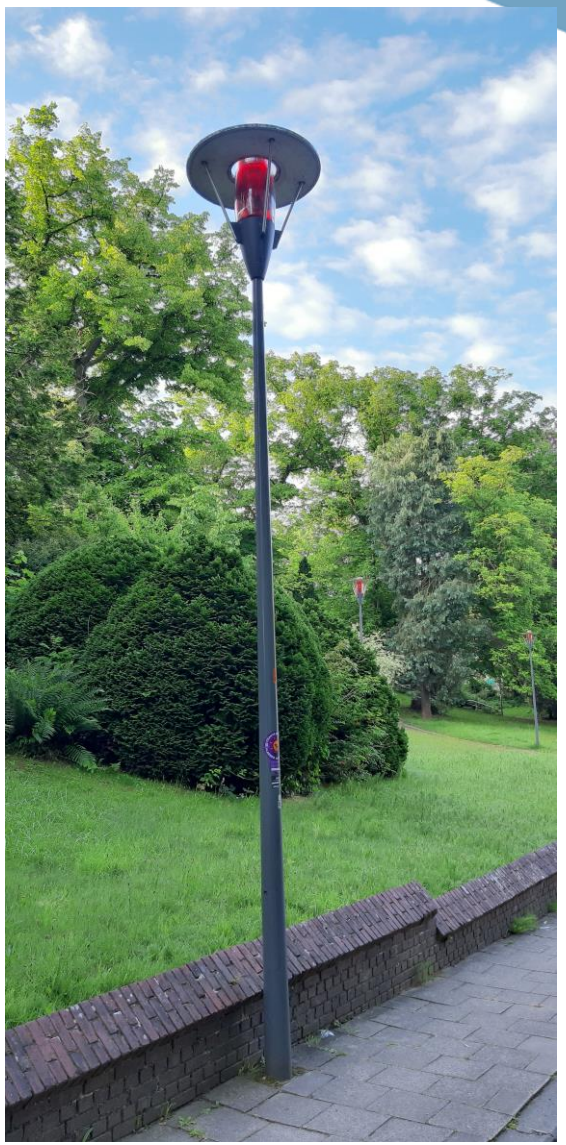
Communication

Stickers on poles
+ QR code

Social Media



https://www.bruzz.be/milieu/bat-light-district-jette-
https://www.laminutesauvage.be/

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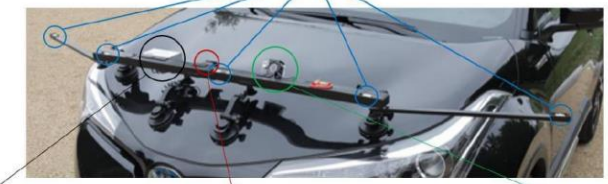
Tools and data collected



Embedded spectrometer

Per measurement point:

- Time and date
- GPS coordinates
- Spectrum (360-780 nm)
- Colour temperature (K)

DyLA (Dynamic Lighting Asssessment) (ISO 17025 accredited)

Per measurement point:

- Illuminance per cell (lux)
- Average illuminance (lux)
- Light point position: GPS coordinates, height (m)
- Time and date

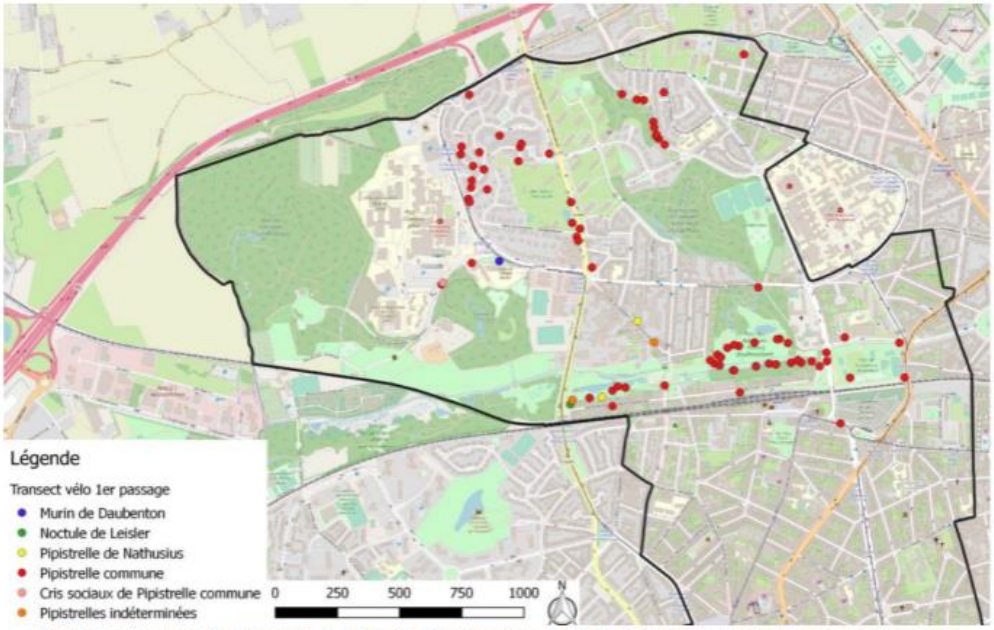
Batlogger M

Per bat contacted:

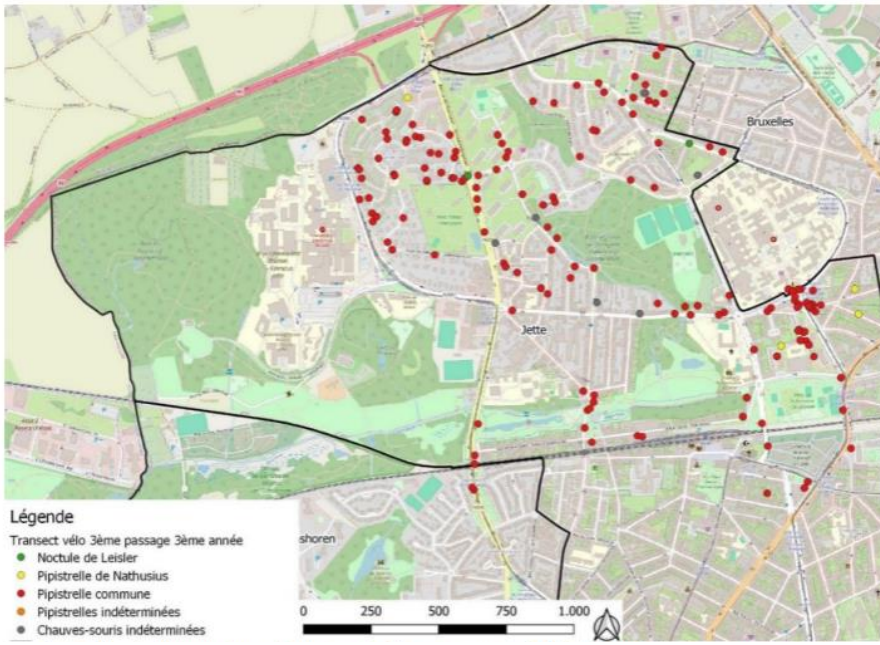
- Time and date
- GPS coordinates
- Bat species

Results: bats dipersion

Natagora observed that the bats seem to have spread more evenly in the neighbourhood after the change in lighting



First measurement campaign of Natagora – May 2021



Last measurement campaign of Natagora – September 2023

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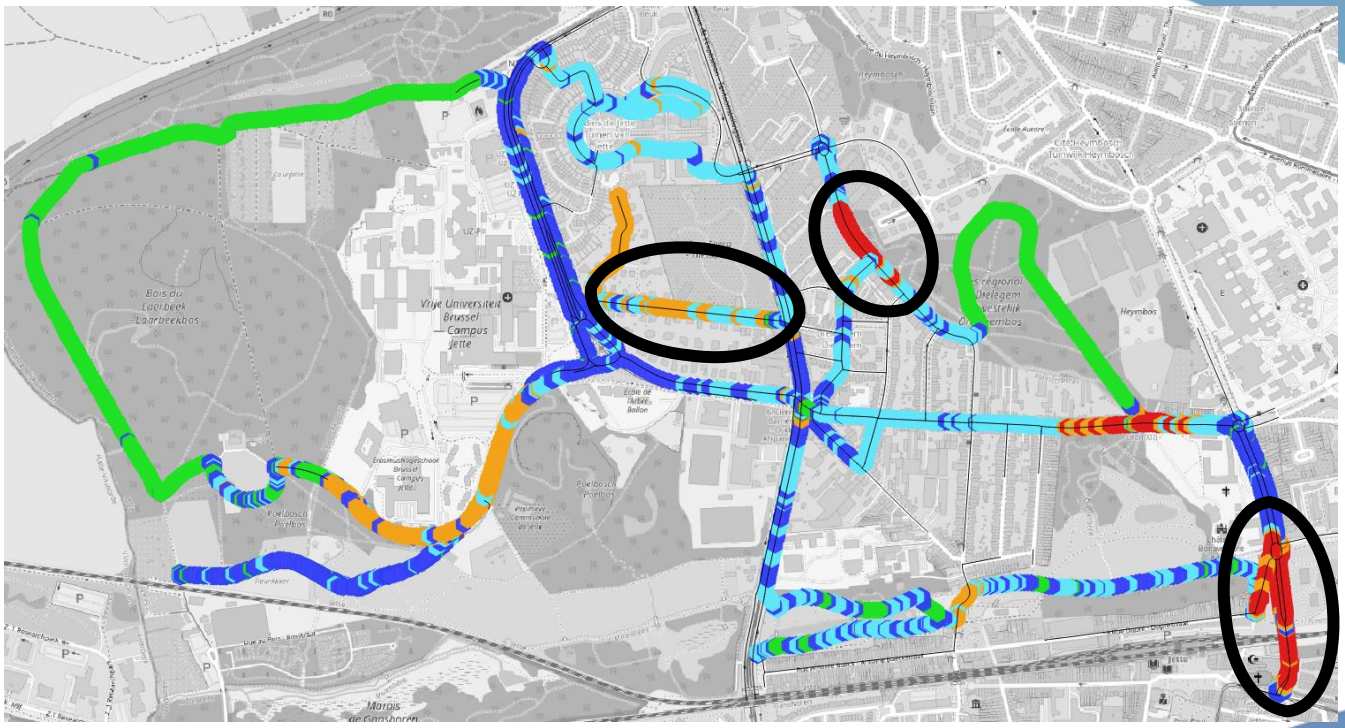
Results: CCT vs bats number and species

Lighting data 2023	
Average CCT	**3031 K**
Average illuminance	**13,77 lux**
Illuminance max	**326 lux**
Illuminance min	**0 lux**

- < 1600 K
- 1600 – 2500 K
- 2500 – 3000 K
- 3000 – 4000 K
- No data



Bat Light District CCT mapping in 2023

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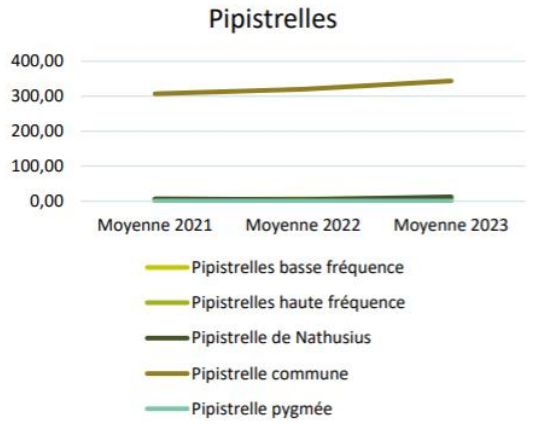
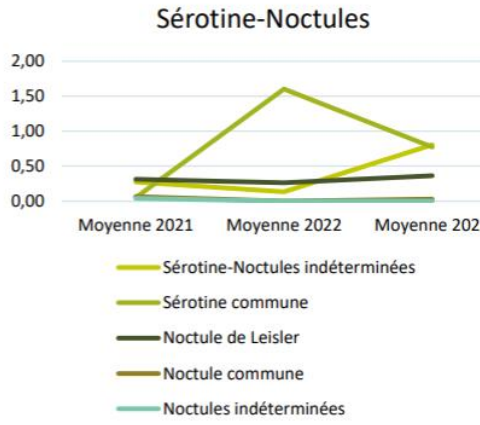
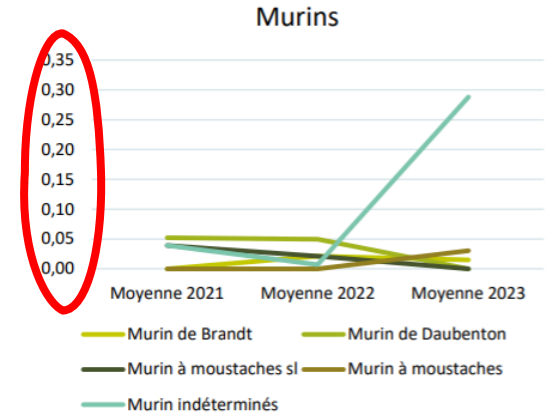
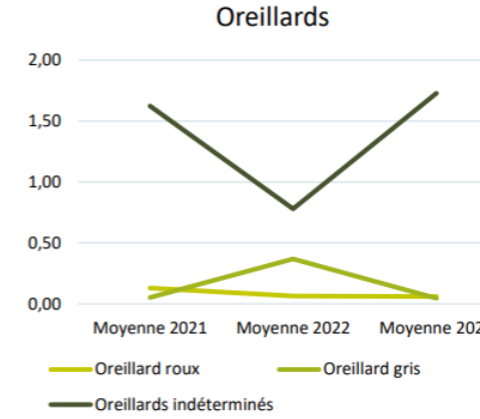
Results: evolution of bats number per species

- Monochromatic red LEDs (630 nm peak)









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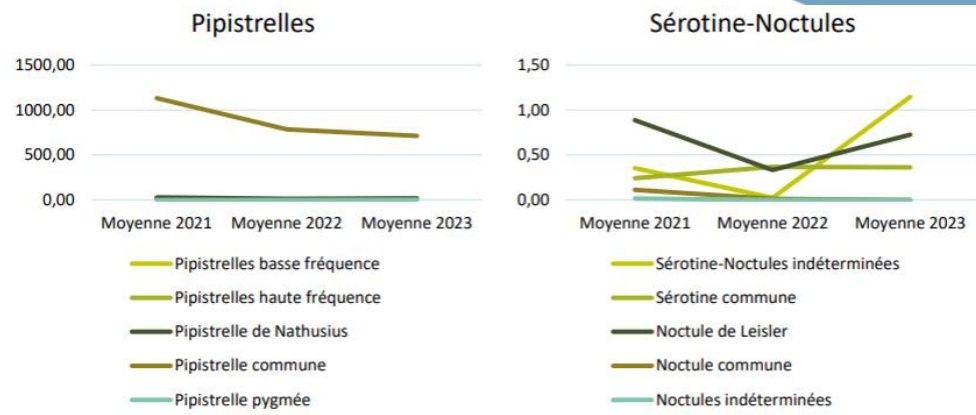
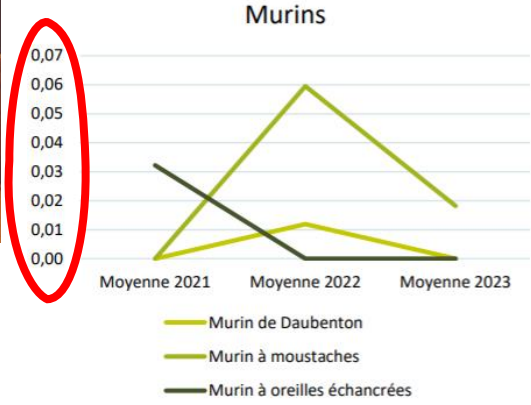
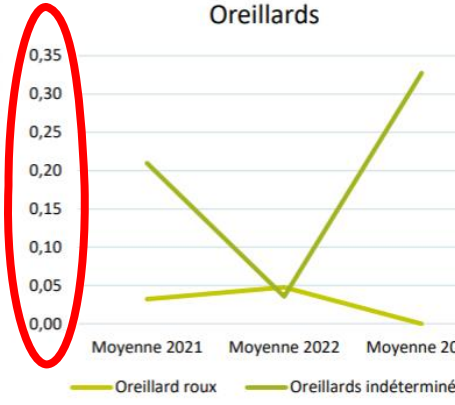
Results: evolution of bats number per species

- Monochromatic amber LEDs (600 nm)







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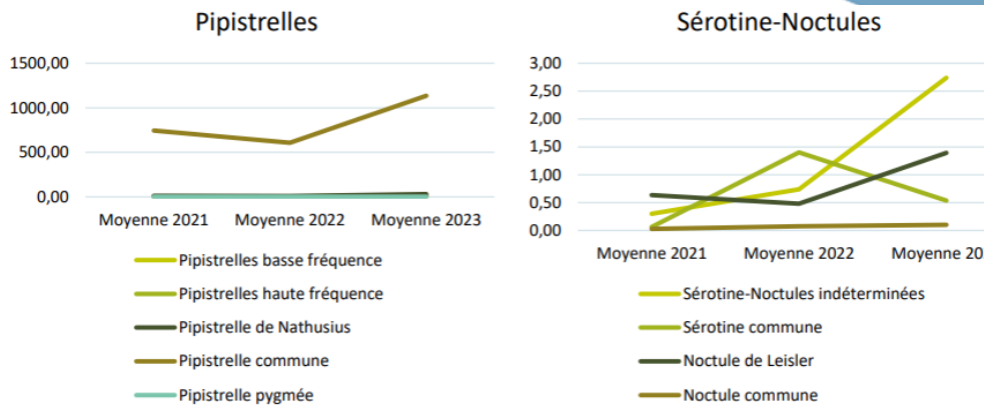
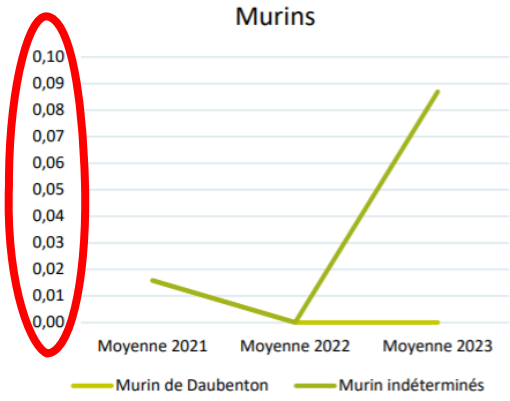
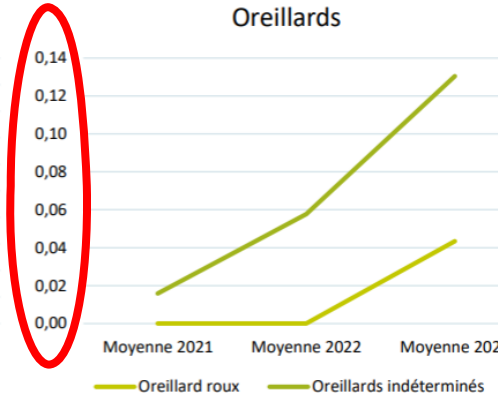
Results: evolution of bats number per species

- Flexiwhite 2200 K – 2700 K







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Results: first conclusions

- Natagora observed new species after the change in lighting, including **light-sensitive species** (mouse-eared bats, long-eard bats) but **their abundance is still difficult to evaluate**;
- The number of bats evolved **positively** in some locations, **negatively** in others, the bats seem to :
  - Be **less concentrated** in some areas
  - **Take advantage of some dark spots** for moving around the neighbourhood;
- The **fixed** batloggers are efficient for detecting the **presence/absence of bats** species and less relevant for quantifying their abundance;
- **Embedded** batloggers are efficient for recording **abundance** of bats and less relevant for finding species;
- The **repetition of the measurements** is key to avoid bias related to the season, the weather, other pollutants.

Belgium for Biodiversity

The **LIFE B4B** project will use the **DyLA measurements + embedded Batlogger protocol** over at least **four years** to make some recommendations for the lighting in **three different locations** of Brussels Region.

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Belgium for Biodiversity (B4B) project

LIFE SNAP grant application

Partenaires

AGENCY NATURE & FORESTS

RESEARCH INSTITUTE NATURE AND FOREST

federale overheidsdienst VOLKSGEZONDHEID, VEILIGHEID VAN DE VOEDSELKETEN EN LEEFMILIEU

Vlaanderen is open ruimte

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Wallonie

bruxelles environnement .brussels

Eurosite

ZONIËNWOUD

ELO European Landowners' Organization

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Thank you

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BELGISCH INSTITUUT voor VERLICHTINGSKUNDE
INSTITUT BELGE de l'ECLAIRAGE
CIE NATIONAL COMMITTEE – NBN SECTOR OPERATOR

MET DE STEUN VAN
AVEC LE SOUTIEN DU

NBN
BUREAU VOOR NORMALISATIE
BUREAU DE NORMALISATION

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