

Mayo Dark Skies Sec Dark Sky Energy Reduction Plan

Project: Newport Dark Sky Energy Reduction Plan
Co. Mayo, Ireland
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MAYO DARK SKIES SEC



MAYO.IE

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1.0 INTRODUCTION

The Newport Dark Sky Energy Reduction Plan has been commissioned by Mayo County Council (MCC), Sustainable Energy Authority of Ireland (SEAI) and developed by Dark Source (DS) lighting design studio.

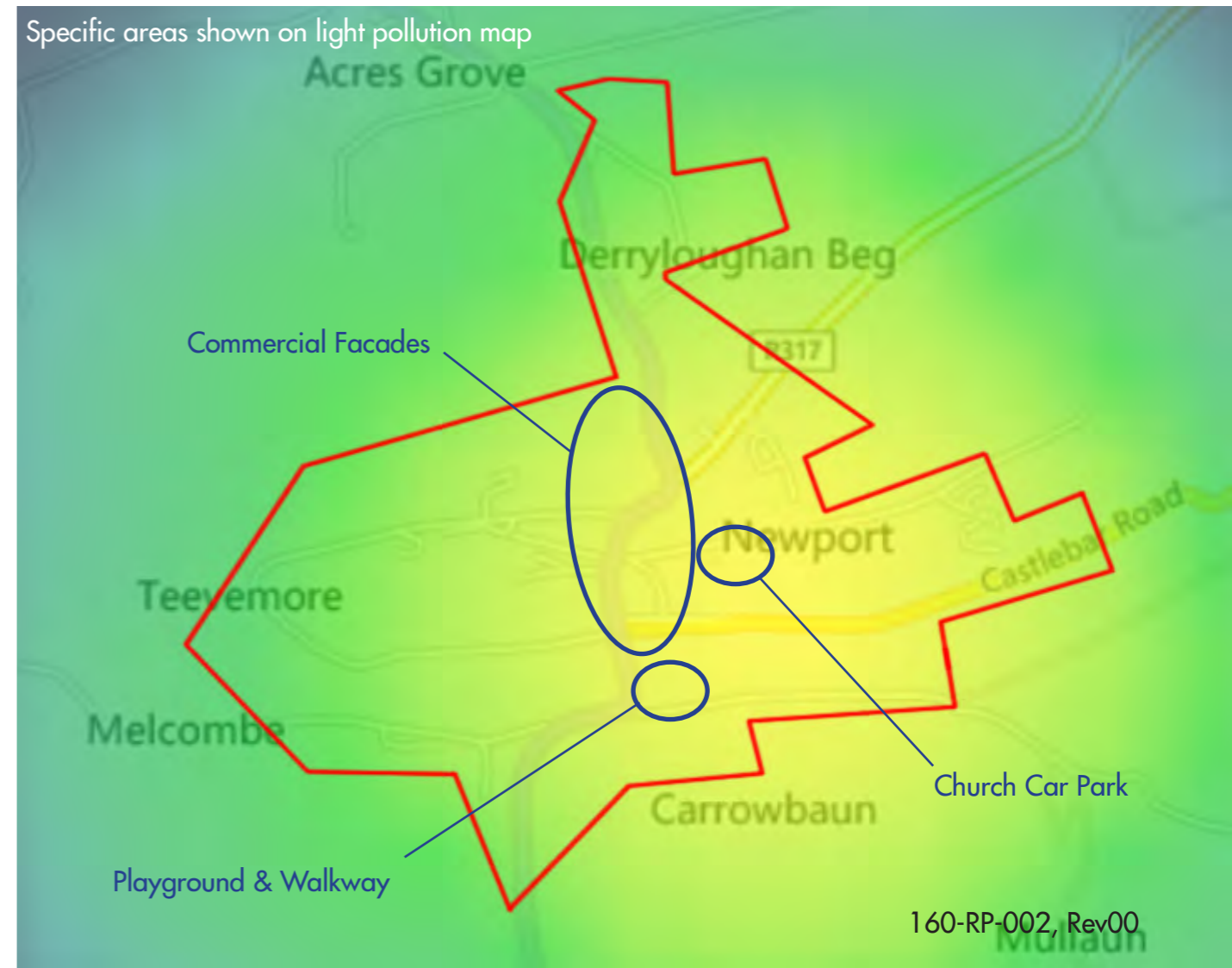
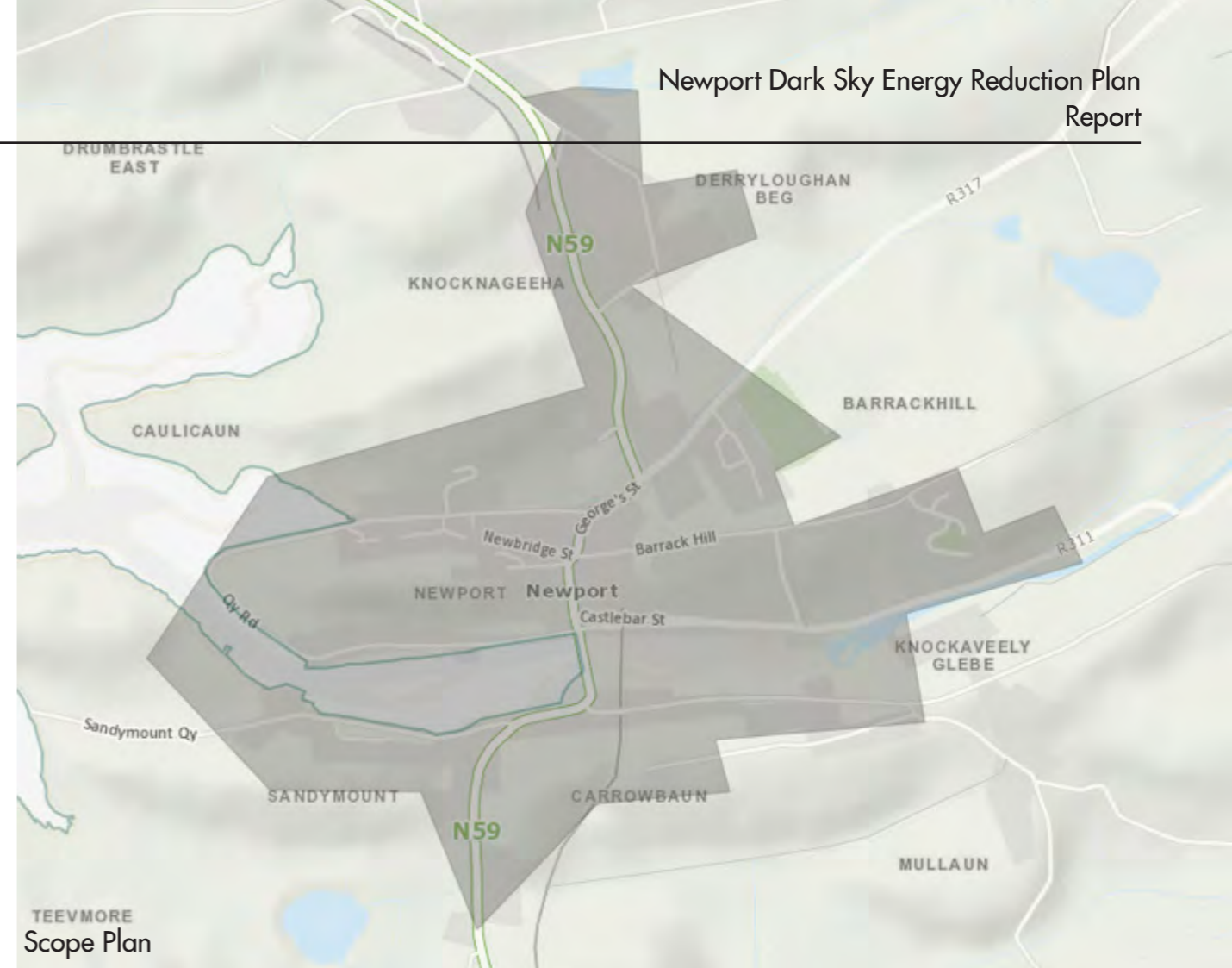
This report provides a holistic overview of the current energy consumption and potential opportunities through the lens of considerate & environmentally friendly lighting design. This document is specific to the areas shown within the Newport boundaries.

As part of the masterplan vision, the purpose of this particular SEC study is to assess the town's current lighting from the energy and design points of view, whilst exploring further opportunities of reducing the light pollution and energy usage across the town. The report is prepared with the aim of providing an outline framework of the potential strategies which can be employed to maximise the savings.

The report is a response to the objectives set out in the tender brief released by the MCC based on the subsequent consultations with all stakeholders (County Council, local community, Mayo Dark Skies Group, Electric Skyline including the planning team and street lighting engineers)

The proposals seek to support the sensitive and holistic lighting approach for the town. They address and aim to balance the visual, social, economic and environmental objectives for Newport as well as the requirement to maintain and enhance the atmosphere and physical fabric of the streetscape and the architecture.

This document is produced by Dark Source, a London-based lighting design practice driven by social and environmental values.



NEWPORT

Located in the County Mayo, Newport is a town with great aspirations of becoming the first dark sky community in Ireland. As the natural progression following the success of the Wild Nephin Dark Sky Park, the project aims to establish an important precedent which conveys that populated settlements can too become a dark sky destinations, as this is not a privilege only reserved for parks or unpopulated areas. Therefore, Newport Dark Sky Masterplan is set out to convey a very important and influential message which will inspire more communities to follow suit.

Based on its future targets and past achievements, initiating the changes highlighted in this document is perfectly feasible for Newport. This puts Newport on a particularly important international pedestal which can showcase the full extents of how much can be achieved through considerate illumination.

NEWPORT DARK SKY MASTERPLAN

This study forms a part of the Newport DS Masterplan. In addition to this SEC study, Dark Source is also appointed as the executive lighting designer for the town's two iconic landmarks, St Patrick's Church & Newport Bridge which have been identified as the fundamental features of the overall design vision in order to celebrate the heritage architecture, enhance the town's night-time accessibility and character, eliminate the light pollution and visual discomfort caused by the poor illumination.

Ireland is a country with a substantial dark skies potential which is yet to be fully explored. It would be wonderful to welcome and encourage new communities and territories in Ireland to join the dark skies movement. This project offers a great potential to inspire a wider community about the value and importance of dark skies.

This effort also represents a unique collaboration between different communities working together to improve their lighting and bringing Mayo one step closer to becoming a Dark Sky County. Dark Source supports the creation of such destinations where local authorities and communities work together to preserve their dark night skies; an important opportunity which offers residents and visitors to see the real night sky and perhaps encourage them to work towards an even better night-time environment for all humans, animals and insects.

Finding solutions to light pollution with resulting energy savings not only makes a contribution to the well-being of our planet, it also restores our oldest heritage, the stars.



This study employs several methods to seek and evaluate its findings. These involve assessing the operation hours, dimming profiles, taking church & viaduct lighting improvement projects into consideration, as well as looking at the current and potential future lighting standards.

Whilst subjective qualities such as the visual appearance and ambiance are very important topics for the masterplan, this particular study focuses on objective and quantifiable values such as the lumens, wattage, carbon and running cost savings.

A clear list of itemised lighting inventory was provided by the Mayo County Council and already improved upon by Dr. Brian Espey & Georgia Mac-Millan. This research builds itself on the impressive ground work and material which were developed by the local authority, members of the community, Mayo Dark Skies and Dark Sky Ireland groups.

The available material provided detailed information for identifying and extrapolating the following for each end every light column across the town: Name, quantity, height, energy consumption and operation hours. When the future potential changes were compared and also put in the light calculation software, it allowed for the improvement factor to be conveyed in a clear manner.

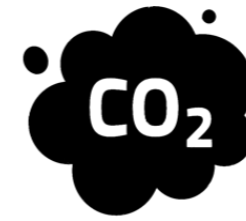
The methodology consisted of visually inspecting the day & night-time condition through an actual site visit and Google Maps Street View. Following that, the overall energy, CO2, cost and lamp lumens were calculated to convey a realistic projection of the proposed changes.



Visual Survey



Energy



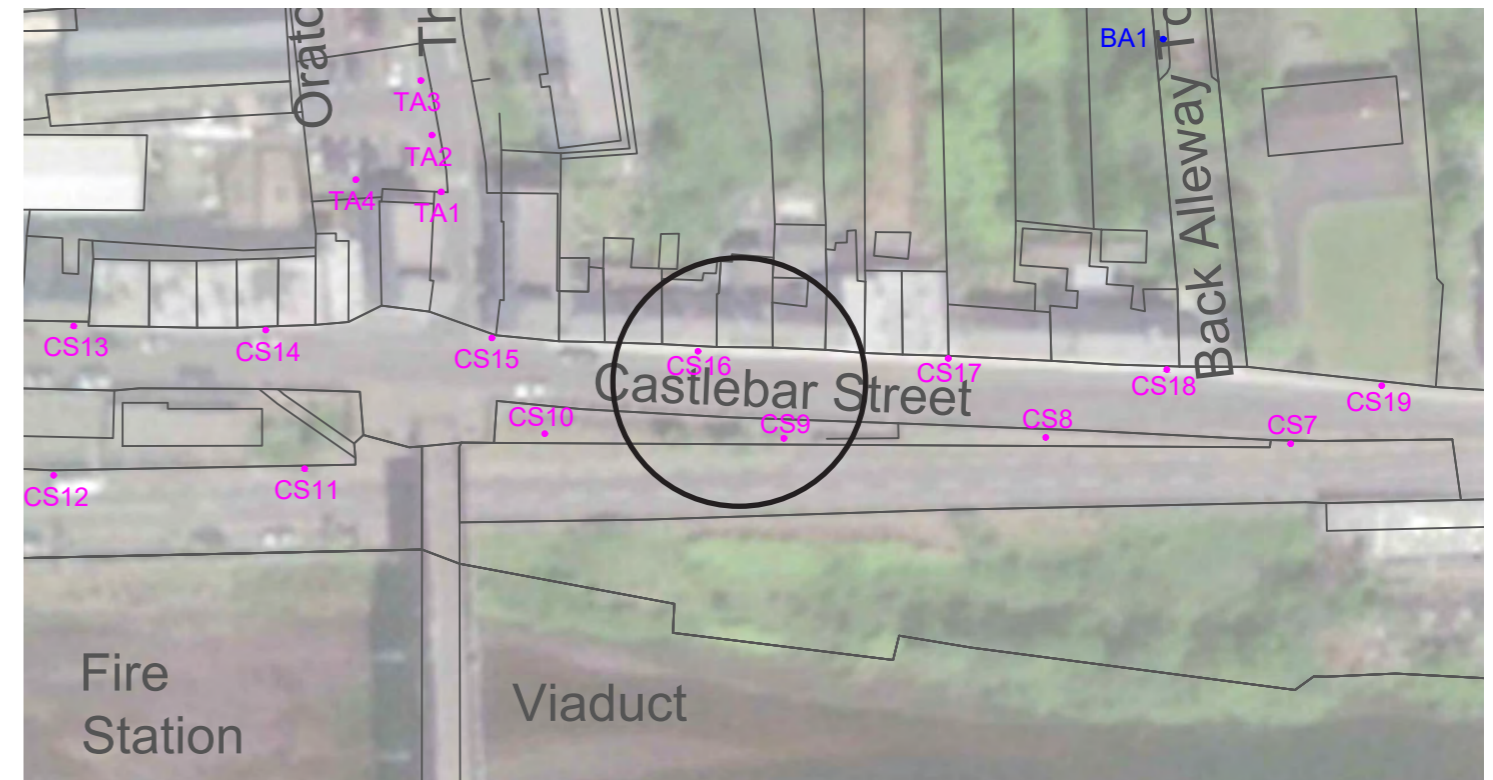
CO2



Cost



Light



Street	Owner	Number	Hgt.	Lamp	Wattage	Dimming Profile	Anl.Hours
CASTLEBAR ST NEWPORT	Council	9	8	SON	150	Dusk Until Dawn	4,150.10
CASTLEBAR ST NEWPORT	Council	16	5	SON	70	Dusk Until Dawn	4,150.10



It is important to highlight that Newport’s environmental goals and ambitions are greater than an average town’s. Based on the work that the town has already covered, Newport & its community have proven that they have a great potential to deliver on these aims within the foreseeable future. This project grants Newport an important platform and uniqueness which has the tremendous potential of influencing the international and national communities to follow suit and set higher goals to achieve greater results.

Newport is a needed, qualified and special precedent which is closer to its goals than any other. It should be understood that such exceptional ambitions of this calibre cannot be delivered by blanket standards.

The extract on the right was taken from the document by Transport Infrastructure Ireland which highlights relaxations within standards and the terms they can be based upon. The list of items perfectly represent Newport’s aspiration:

- a) Budget, energy and cost savings have been an integral part of the project. Through the implementation of the masterplan, the project is set to find an annual saving of €12K in energy usage based on the current rate of 0.22p. Through the use of latest lighting technology, the project aims to maximise the efficiency and longevity of the equipment.
- b) By reducing the magnitude of energy waste, light pollution & its adverse effects, Newport aims to become a destination known for protecting the environment, surrounding biodiversity and the night sky.
- c) By moderating its abundant & inconsistent levels of light and glare, Newport aims to make the town safer for the road user and provide a pleasant night-time experience for its residents & visitors.

The table shown below is an extract from the ILP’s document, The Reduction of Obtrusive Light which conveys the commonly accepted practice for identifying the environmental zones. Whilst this currently puts Newport into the E2 Rural category, it is important to highlight that Newport’s ambition is to climb up the ladder to become a Protected destination.

The ILP’s E Zones should not be taken as a categorisation which defines the future of a location. It is used to define the current circumstances of a location or settlement. By modifying its current lighting standards and dimming profiles across the town, it is envisaged that Newport will instantaneously improve its baseline condition. Therefore, E2 classification cannot be expected to apply to the town and suppress its environmental ambitions forever.

In exceptional situations, owing to economic, environmental or engineering constraints, the standards may not realistically be achievable in terms of buildability or maintainability. In such cases, sufficient advantages might justify either a Relaxation within the Standards or, in more constrained locations, a Departure from the Standards.

Relaxations and Departures shall be assessed in terms of their effects on:

- a) The economic worth of the scheme;
- b) The environment; and
- c) The safety of the road user.

Extract from Transport Infrastructure Ireland: Design of Road Lighting for the National Road Network DN-LHT-03038

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

Extract from ILP GN01 The Reduction of Obtrusive Light - Environmental Zones Diagram

5.1 STANDARDS

One of the most prominent issues with the current street lighting is that it's designed to meet standards that are much higher than required for the context of Newport. Some lighting standard extracts are shown below to argue that lower lighting standards are perfectly suitable and in fact crucial if the town is to apply for Dark Sky Community status in the future.

Overachieving lighting standards also come at the cost of increased energy consumption and reduced lamp life which will be covered under the dimming chapter.

The town's speed limit is 50kmh (30mph), roads consist of single carriageway with very low traffic flow, particularly at night.

The street lighting is currently set to achieve an average of P2/S2 from dusk until midnight and P3/S3 after midnight until dawn. This report aims to convey that Newport's streetlighting should meet S4/P4 class until midnight and P6/S6 from midnight until dawn to avoid unnecessary energy waste and light pollution. This will allow the town to find the substantial improvement factor which this study was commissioned to identify.



Photo showing 50kmh (30mph) inner town speed limit & single carriage way

Table A.1 Lighting classes of comparable level

ME or M class	CE or C class	S or P class
—	CE0 or C0	—
ME1 or M1	CE1 or C1	—
ME2 or M2	CE2 or C2	—
ME3 or M3	CE3 or C3	S1 or P1
ME4 or M4	CE4 or C4	S2 or P2
ME5 or M5	CE5 or C5	S3 or P3
ME6 or M6	—	S4 or P4
—	—	S5 or P5
—	—	S6 or P6

Current light levels are fluctuating from S1/P1 to S3/P3. This is excessive amount of light for a small town like Newport.

The reasonable light levels for a town of this calibre should be within this range.

Table A.3 Lighting classes for traffic routes ($v \leq 40$ mph)

Traffic flow	Lighting class	
	Dual carriageway	Single carriageway
High to very high ^{A)}	Junction density: high ME3b or M3	Junction density: low ME4a or M4
Low to moderate ^{B)}	ME4a or M4	ME5 or M5
Very low ^{C)}	ME5 or M5	ME6 or M6

The currently met standards are equipped to accommodate 40mph speed with high density traffic and dual carriageway which are not the case for Newport.

Table A.6 Lighting classes for subsidiary roads with mainly slow-moving vehicles, cyclists and pedestrians

Traffic flow	Lighting class	
	Ambient luminance: very low (E1) or low (E2)	Ambient luminance: moderate (E3) or high (E4)
Busy ^{A)}	S4 or P4	S4 or P4
Normal ^{B)}	S5 or P5	S5 or P5
Quiet ^{C)}	S6 or P6	S6 or P6

It is evident that Newport meets the E1 & E2 grade of ambient illumination. Therefore, it should be eligible for S6/P6 class, particularly after curfew.

BS 5489-1:2013 BRITISH STANDARD

Table A.5 Lighting classes for subsidiary roads with a typical speed of main user $v \leq 30$ mph

Traffic flow	Lighting class			
	Ambient luminance: very low (E1)	Ambient luminance: low (E2)	Ambient luminance: moderate (E3)	Ambient luminance: high (E4)
Busy ^{A)}	S3 or P3	S3 or P3	S2 or P2	S2 or P2
Normal ^{B)}	S4 or P4	S4 or P4	S3 or P3	S3 or P3
Quiet ^{C)}	S5 or P5	S5 or P5	S4 or P4	S4 or P4

BS 5489-1:2013 BRITISH STANDARD

Table A.7 Variation of maintained lighting level with S/P ratio of light source

Values in lux

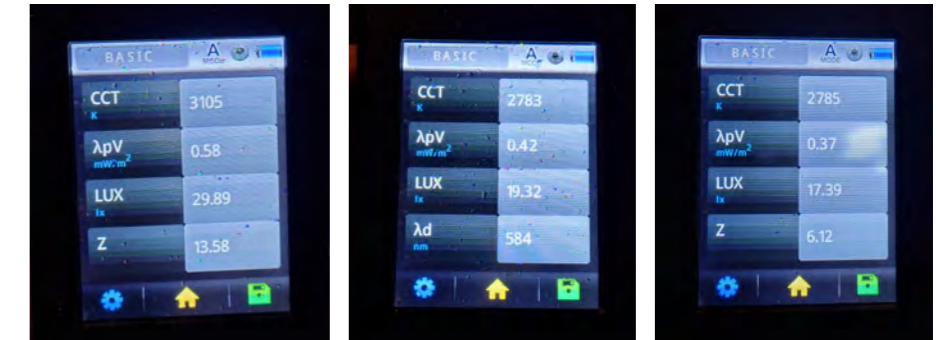
Lighting class	Benchmark (e.g. $R_a < 60$ or when S/P ratio of light source is not known or specified)		S/P ratio = 1.2 and $R_a \geq 60$ (e.g. some types of warm white lamp such as metal halide)		S/P ratio = 2 and $R_a \geq 60$ (e.g. some types of cool white compact fluorescent or LED)	
	\bar{E}	E_{min}	\bar{E}	E_{min}	\bar{E}	E_{min}
P1 or S1	15.0	3.0	13.4	2.7	12.3	2.5
P2 or S2	10.0	2.0	8.6	1.7	7.7	1.5
P3 or S3	7.5	1.5	6.3	1.3	5.5	1.1
P4 or S4	5.0	1.0	4.0	0.8	3.4	0.7
P5 or S5	3.0	0.6	2.2	0.4	1.8	0.4
P6 or S6	2.0	0.4	1.4	0.4	1.1	0.4

Extracts from BS 5489-1

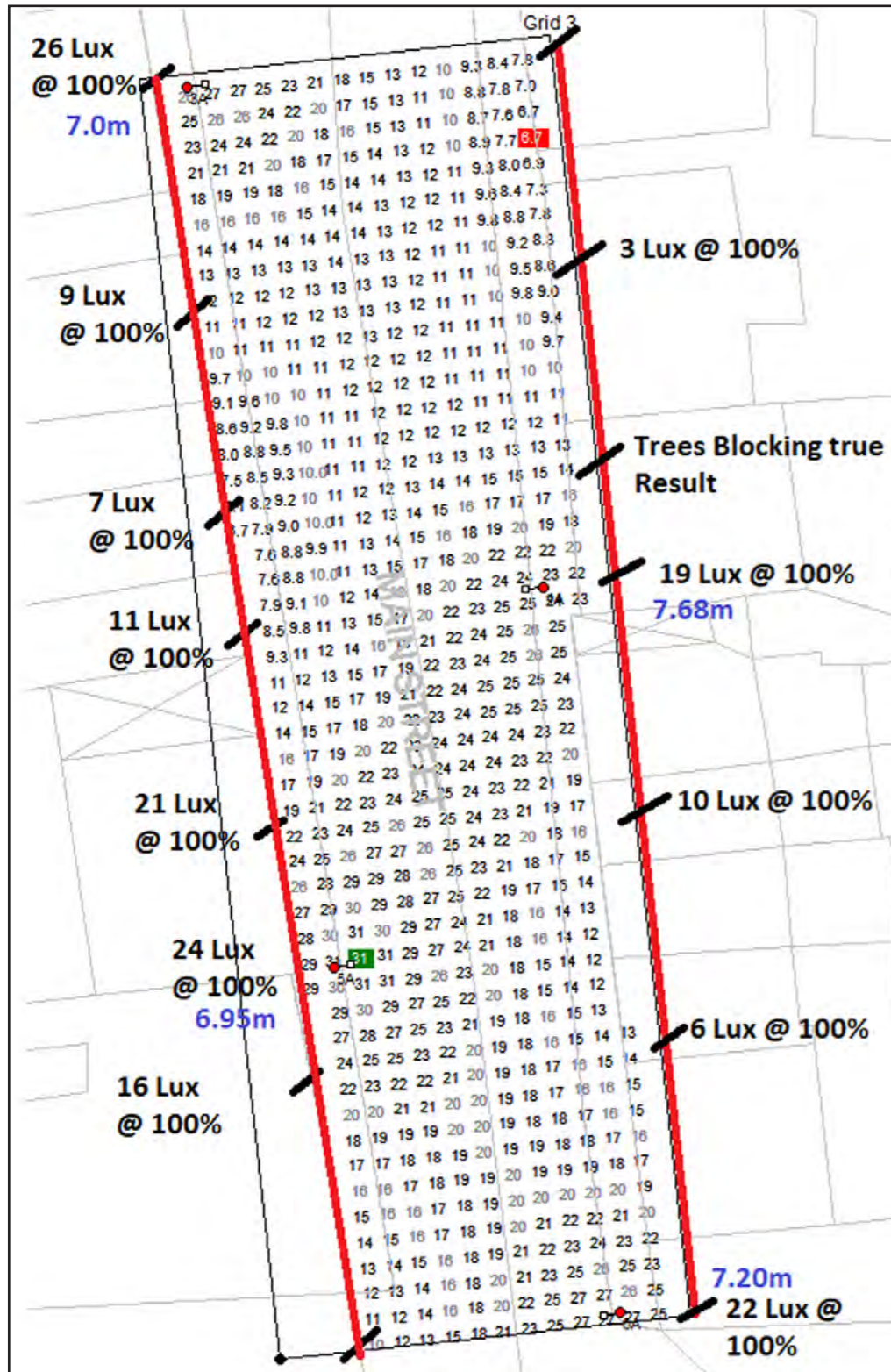
Extracts from BS 5489-1

CALCULATION vs READINGS

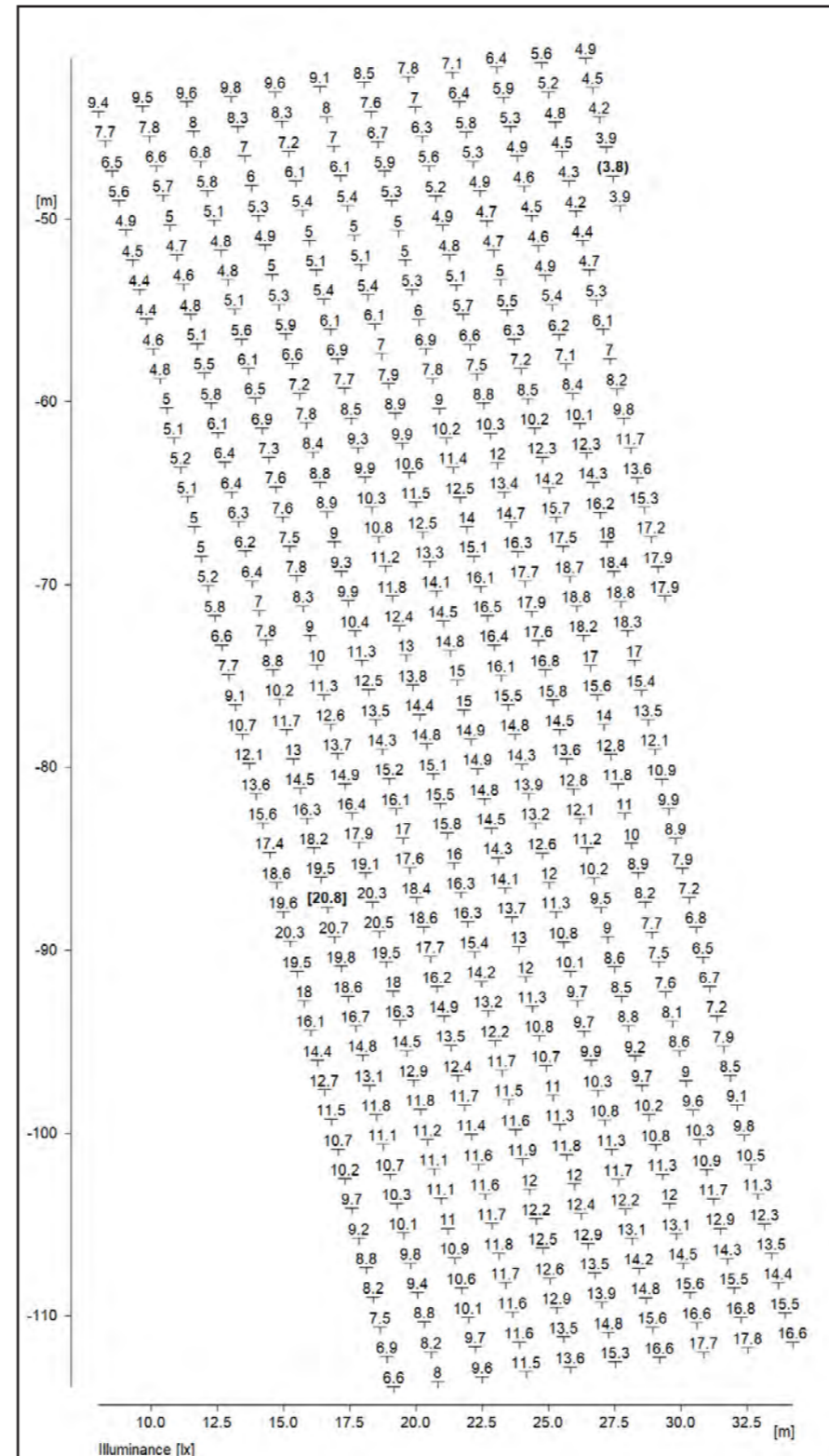
The confirmation of the actual light levels will be crucially important for the project. The sole reliance on the computer software may produce contradicting results if they are not validated on site. The three measurements below are achieved through different methods and they clearly convey the fluctuation of the values when compared. Further dimming test needs to be commissioned to trial & verify different light levels on site rather than fully relying on the computer-based calculation values.



Luxmeter readings on site



Electric Skyline's Main Street Calculation
dark source © 2022



Dark Source's Main Street Calculation
Page 9



Dark Source's Lux readings on Main Street at 3am

6.0 VISUAL SURVEY (N59)

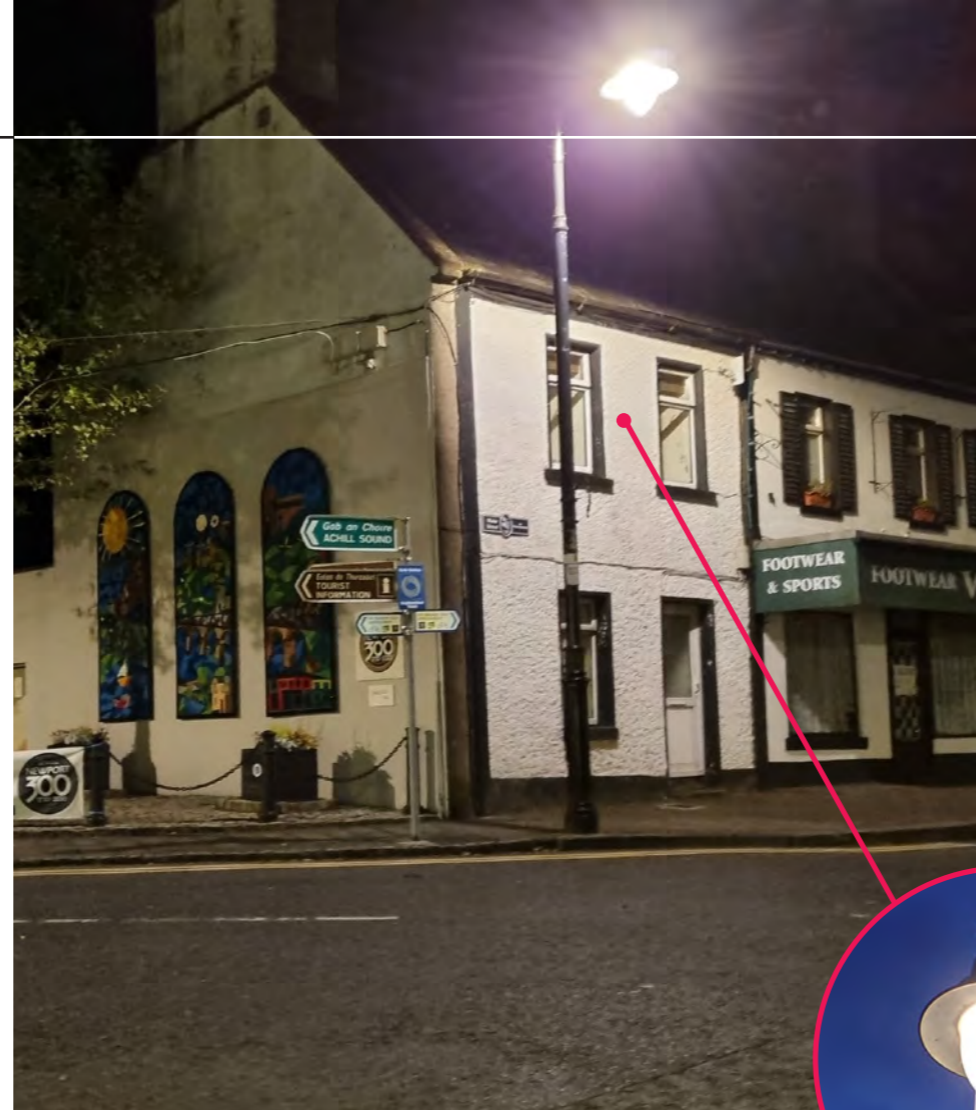
MAIN STREET

A night-time survey of the town centre was carried out on May 17th at 3am.

It is observed that the premises have been reasonable with their external and shop display illumination as the large majority are switched off when the shops are closed.

Street lighting is the main layer which has room for further improvement through dimming. It is also observed that the orb-like general light distribution of the lanterns cause light spill on the building frontage. This can be mitigated through the use of glare control accessories such as shields and baffles.

It can be argued if the signage needs to be on when pharmacy is closed. This signifies the wrong message to the user as if the pharmacy is open or on duty. However, it is helpful the pharmacy have the powerful projectors above the signage switched off. It is important to target such unused luminaires and question whether they can be decommissioned and removed now as they may be utilised by the next tenant.



6.1 VISUAL SURVEY (N59)

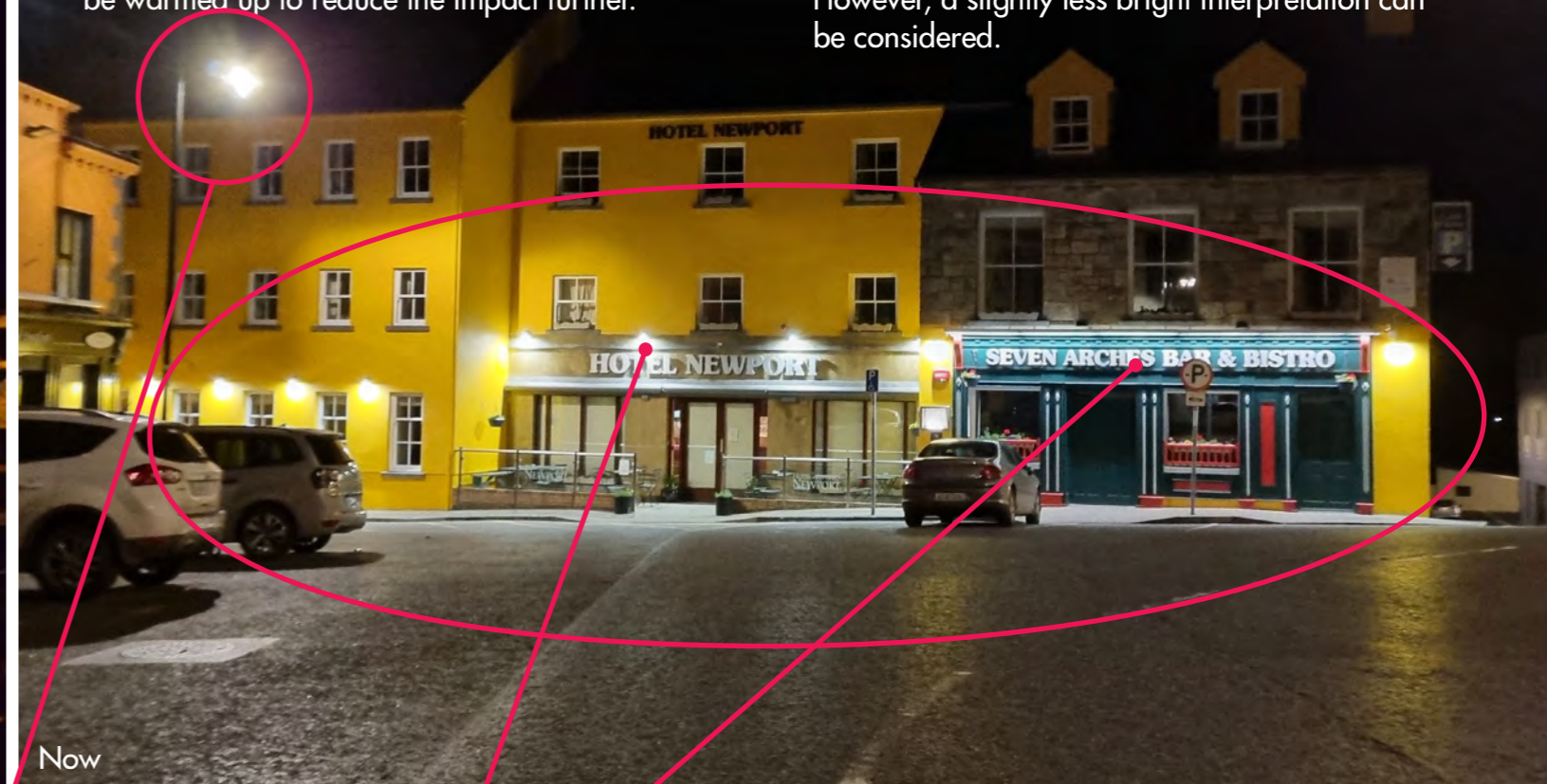
It is noted that some premises such as the Newport Hotel has gone extra lengths to improve their lighting by tilting their lights down. Image showing the previous lighting scheme.



Before

Whilst angling the lights downwards offers significant improvement, the colour temperature can too be warmed up to reduce the impact further.

The lit vertical surface provides a legible backdrop which assists wayfinding for the masterplan. However, a slightly less bright interpretation can be considered.



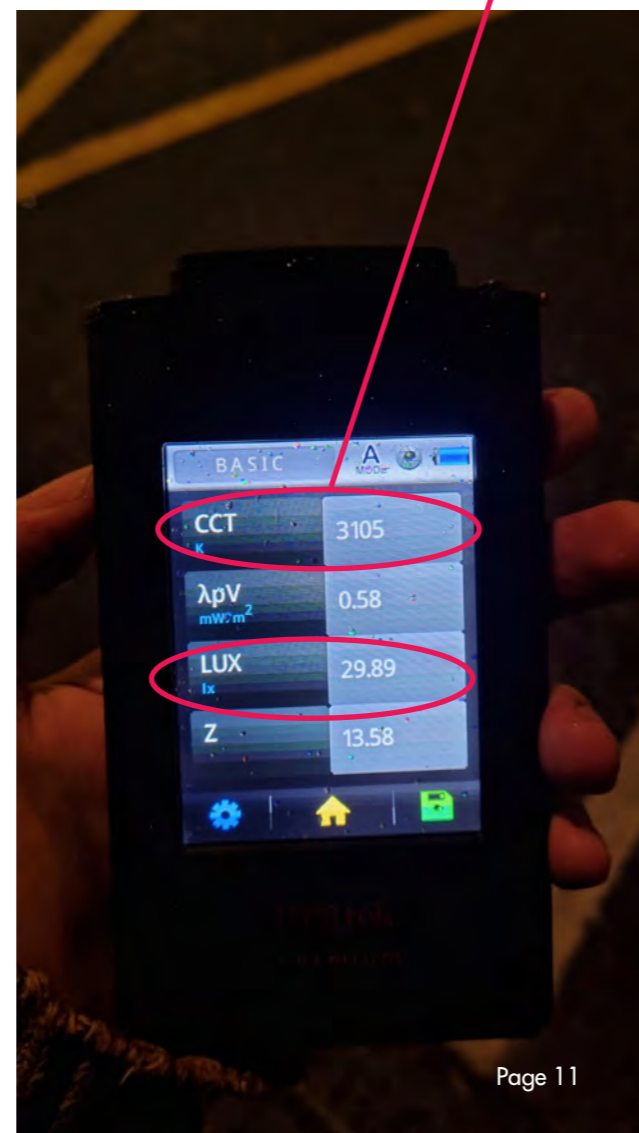
Now

NEWPORT HOTEL

Whilst it is helpful to have a lit backdrop of the hotel facade, reinforcing legibility and wayfinding within the town centre, it would be advisable to reduce the intensity further. Having no other facade illuminated to the same extent and the considerations for further dimming of the street lighting will make this lit surface stand out rather strongly in the visual hierarchy.

The colour temperature needs to be improved further and made warmer. This can be achieved via a gel or filter which might as well help with the reduction of the intensity as a by-product.

In addition to the hotel's facade lighting, the corner street column across from the hotel is found to be much brighter and cooler than the rest. This particular column needs to be replaced to keep the light level and quality consistent across the Main Street.



6.2 VISUAL SURVEY (N59)

MEDLICOTT STREET

The health centre building's lighting is on throughout the night. The lights consist of cool colour temperature bulkheads which throw lighting in every direction. It is arguable whether these lights need to be on at all times even when the building is closed. All the wall-mounted lights will need to be replaced with warm colour temperature luminaires which can throw the light downwards with full cut-off to reduce the glare and spill.

The lantern over the beauty saloon and the two uplighters are also left on at all times. The purpose of the uplighters is questionable in the grand scheme, whilst the lantern over the door can be improved with a warm colour temperature luminaire with full cut-off.

It was also observed that the back spill coming from the street lighting columns in this area go so far that it reaches the waterfront. Shields can be considered to reduce the backspill and allow the lawn area to go darker which would be helpful for the nocturnal and aquatic biodiversity.



6.3 VISUAL SURVEY (N59)

MULRANNY ROAD

The parking area on either side of the gas station is illuminated by a cool-coloured column and four wall-mounted bulkheads which are operational throughout the night. Their purpose is questionable. If they are meant to provide security for the two parked cars, they can as well be connected to a PIR (movement sensor) which can limit the energy usage when no activity is detected in the vicinity.

There is a double-headed column observed adjacent to the station. At the time of this survey, the lights were switched off but their purpose and ownership should be called into question as the luminaires can be as powerful as the street lighting columns.



BUILDING FRONTAGE & ELEVATIONS

The following composite elevation images of the important building frontage were produced as part of the visual survey.

There is a number of light sources privately owned by the premises situated in the town centre. However, it is also observed that a large number of these luminaires are either not operational or deliberately switched off at night. Whilst there is room for improvement, no major offenders or invasive lighting schemes were observed.



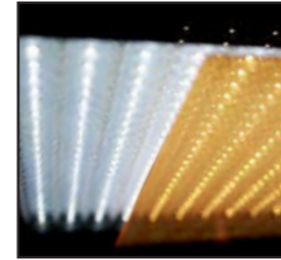
MAIN STREET

The further improvement strategy could be the replacement of the existing sources with warm coloured LED bulbs with a cut-off reflector. These can be offered to the premises & tenants. Whilst these improvements may not appear to substantiate enough to a sizable saving, the return they offer is not insignificant. In addition to the small energy savings, the upgrades will improve the visual appearance of the town by reinforcing a distinct and consistent night-time character which Newport will be renowned for but most importantly this gives the opportunity for the community to have a sense of ownership over the project. In addition, they allow the community to opt-in with a solution that is easy enough to commit to.

Potential solutions:



Relamping



Gels & Filters



Shielding



New Products



PIR Sensor



Decommissioning



Walsh's Bridge Inn

4x compact fluorescent bulbs (12W) can be replaced with LED bulbs (4W 2700K).

Newport Pharmacy & Animal Health Centre

Decommissioning of the 4x floodlights can be questioned. The illuminated sign can be switched off when the pharmacy is closed.

Stepping Stones School Entrance

Existing bulkhead can be replaced with a LED bulb and put on a PIR sensor.

Brannen's

Removal or improvement of the 2x signage lights can be questioned.

Keanes Meats

3x signage lights can be replaced with LED bulbs (4W 2700K). Removal of the festoon lighting can be questioned.

Kelly's Kitchen

2x halogen bulbs (12W) can be replaced with LED bulbs (4W 2700K).

Dominick Kelly's

Decommissioning of the 2x floodlights can be questioned.

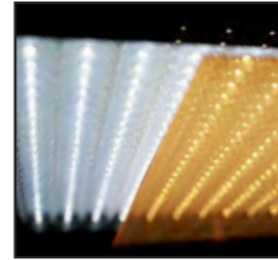


MAIN STREET

Potential solutions:



Relamping



Gels & Filters



Shielding



New Products



PIR Sensor



Decommissioning



Footwear Walsh's Sports

2x large lanterns can be replaced with LED bulbs (4W 2700K).

Lavelle Bourke Solicitors

Decommissioning of the 3x floodlights can be questioned.

Blue Bicycle Tea Rooms

Reactivation of the 2x lanterns with LED bulbs (4W 2700K) can be considered to improve the visual experience of the street.

Hairs & Sirs

Removal or improvement of the 2x signage lights can be questioned.

Patricia's

Removal or improvement of the 2x signage lights can be questioned.

Centra

5x lanterns can be replaced with LED bulbs (4W 2700K).

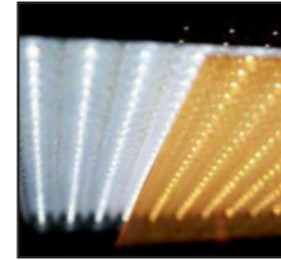


MEDLICOTT STREET

Potential solutions:



Relamping



Gels & Filters



Shielding



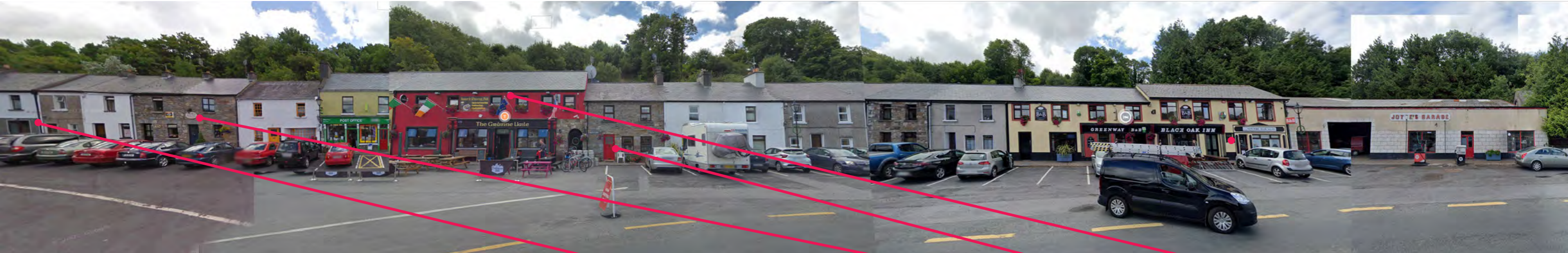
New Products



PIR Sensor



Decommissioning



Residential Entrances

All the lanterns can be relamped with LED bulbs (4W 2700K). Bulkheads can be considered for a luminaire upgrade.

The Gráinne Uaile Pub

The 4x downlights can be improved with a glare shield to reduce glare. The colour temperature can be further warmed with gel or filters.



7.0 ST PATRICK'S CHURCH

CURRENT LIGHTING

St. Patrick's excessive exterior illumination will be re-imagined as part of the masterplan vision. Currently floodlit with very high powered LED projectors, majority of the church illumination is wasted as it's cast towards the sky.

With this opportunity of reducing the energy and light waste, the new & judicious lighting design aims to bring an architectural finesse which is sympathetic to the heritage fabric after dark.



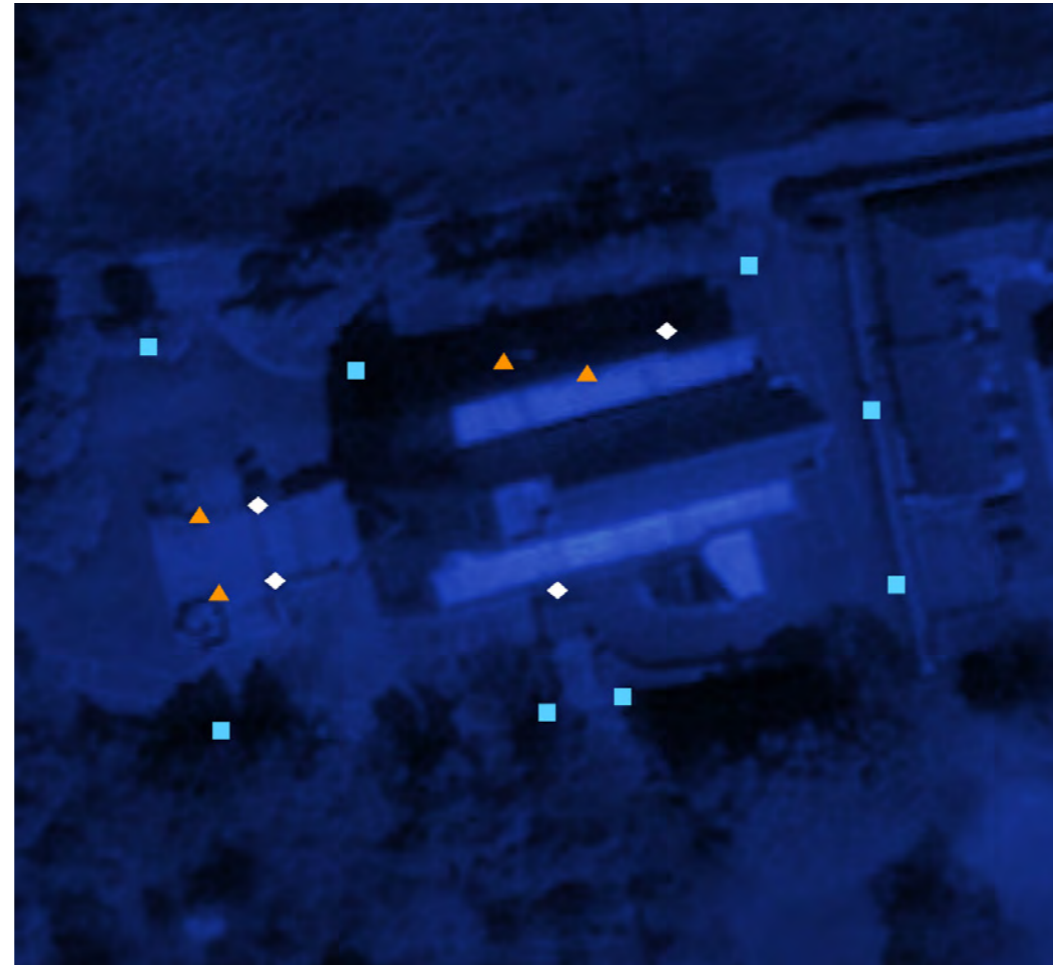
PROPOSED LIGHTING

The proposal intends to enhance the public experience by providing lighting to the church grounds allowing the visitors safely access & walk around the site. Key features of the architecture will be illuminated in a judicious manner to celebrate this heritage landmark which is visible across the town.



BEFORE & AFTER

The existing and proposed lighting impact comparison of the St. Patrick's Church and Site is as follows:

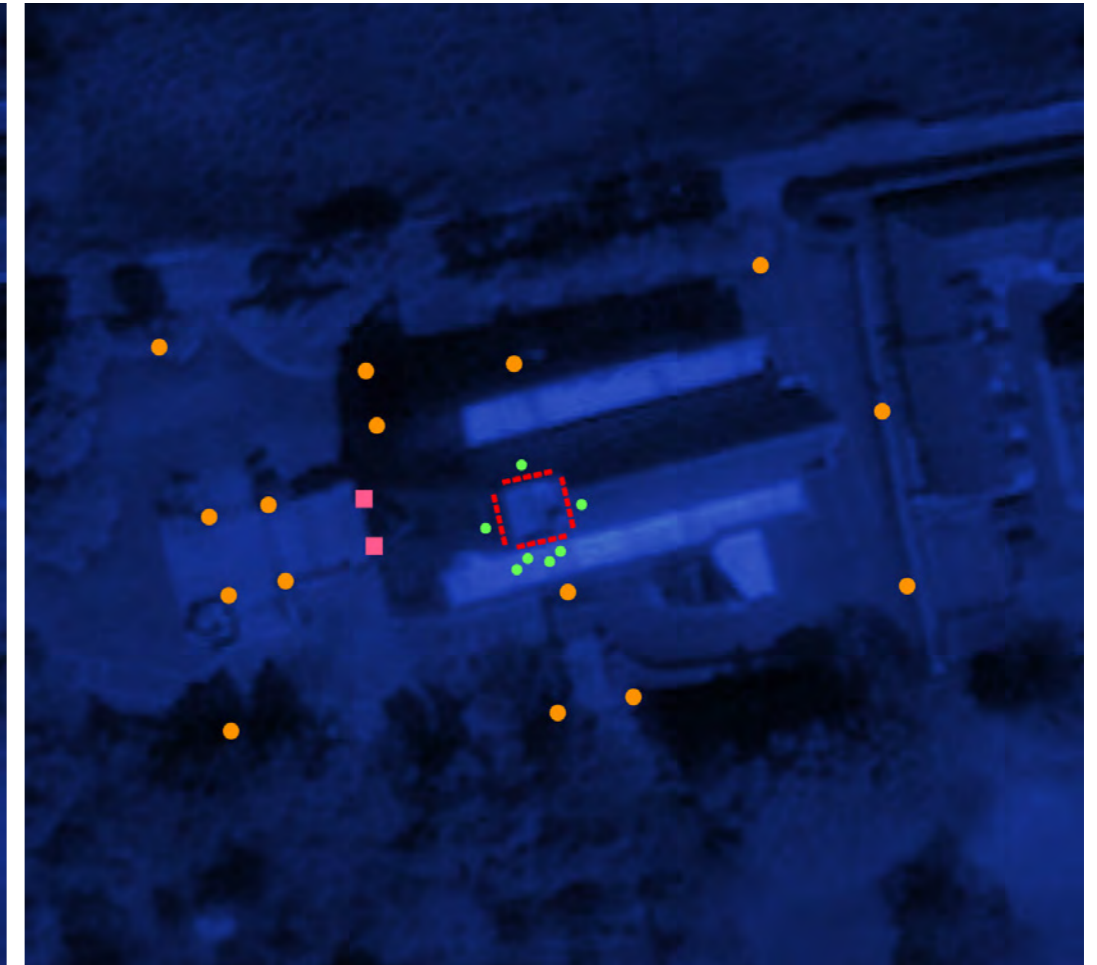


CURRENT LIGHTING

- 8x LED Floodlights 220W, 30960 lumens = 1,760W, 247680 lumens
- 4x Sodium lights 70W, 6000 lumens = 280W, 24000 lumens
- 4x Fluorescent bulkheads 18W, 1350 lumens = 72W, 5400 lumens
- 2x Halogen interior floodlights 230W, 4650 lumens = 460W, 9300 lumens

TOTAL = 8,200 kWh (producing 948 million lumens per year)
TOTAL = 1.9 Tonnes of CO2e per year

(*Based on the current control regime: Average of **10** hours operation per day for all external floodlights & internal backlighting of the windows, **1** hour per day for all external entrance lights.)

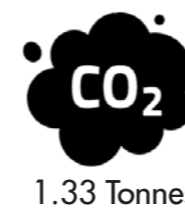


PROPOSED LIGHTING

- 15x LED Lanterns 23W, 829 lumens = 345W, 2435 lumens
- 2x LED Main entrance lights 12W, 1000 lumens = 24W, 2000 lumens
- 7x LED Slit window lights 12W, 1000 lumens = 84W, 7000 lumens
- 20x LED Linear window reveal lights 5W, 440 lumens = 100W, 8800 lumens
- 10x LED Handrail lights 2W, 120 lumens = 20W, 1200 lumens
- 2x LED Gobo image projectors 45W, 750 lumens = 90W, 1500 lumens
- 20x LED Adjustable interior spotlights 35W, 3000 lumens = 700W, 60000 lumens

TOTAL = 2,487 kWh (producing 151 million lumens per year)
TOTAL = 0.57 Tonnes of CO2e per year

(*Based on the envisaged control regime: Average of **5** hours operation per day for all lighting.)



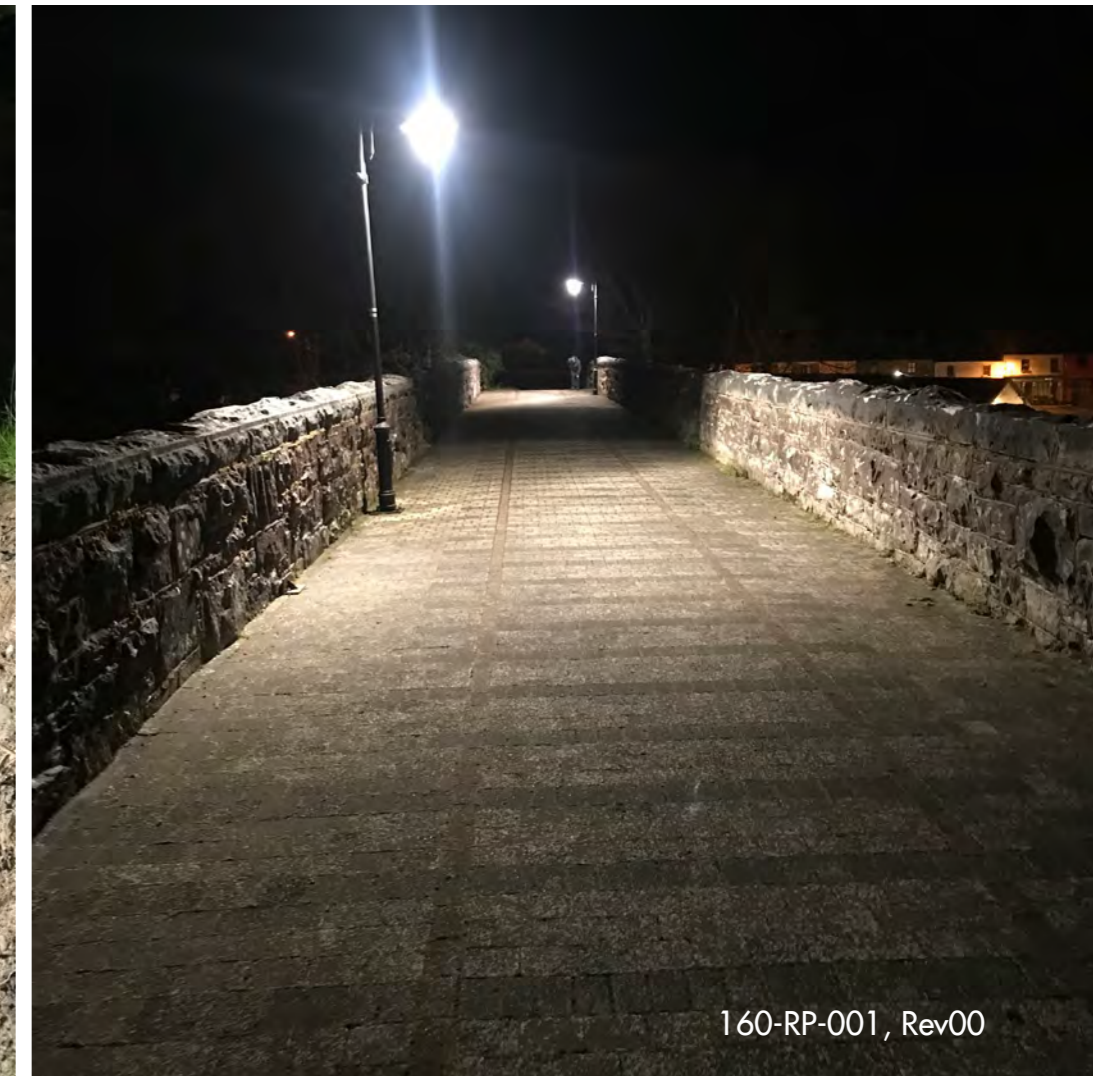
%70 ANNUAL TOTAL REDUCTION

%84 LIGHT REDUCTION
1,138,571 domestic LED bulbs.

8.0 SEVEN ARCHES VIADUCT

CURRENT LIGHTING

Seven Arches Viaduct is currently illuminated by an excessive amount of high powered SON projectors. Some of which are no longer operational and some are facing away from the bridge causing glare for the viewers. By re-imagining the lighting at such a critical time, Newport wants to intercept the old lighting technology before it transitions into LEDs before greater damage is caused by higher intensity and power waste. In addition, lighting of the bridge walkway will also be improved by reducing the glary sources and light spill into the river.



8.0 SEVEN ARCHES VIADUCT

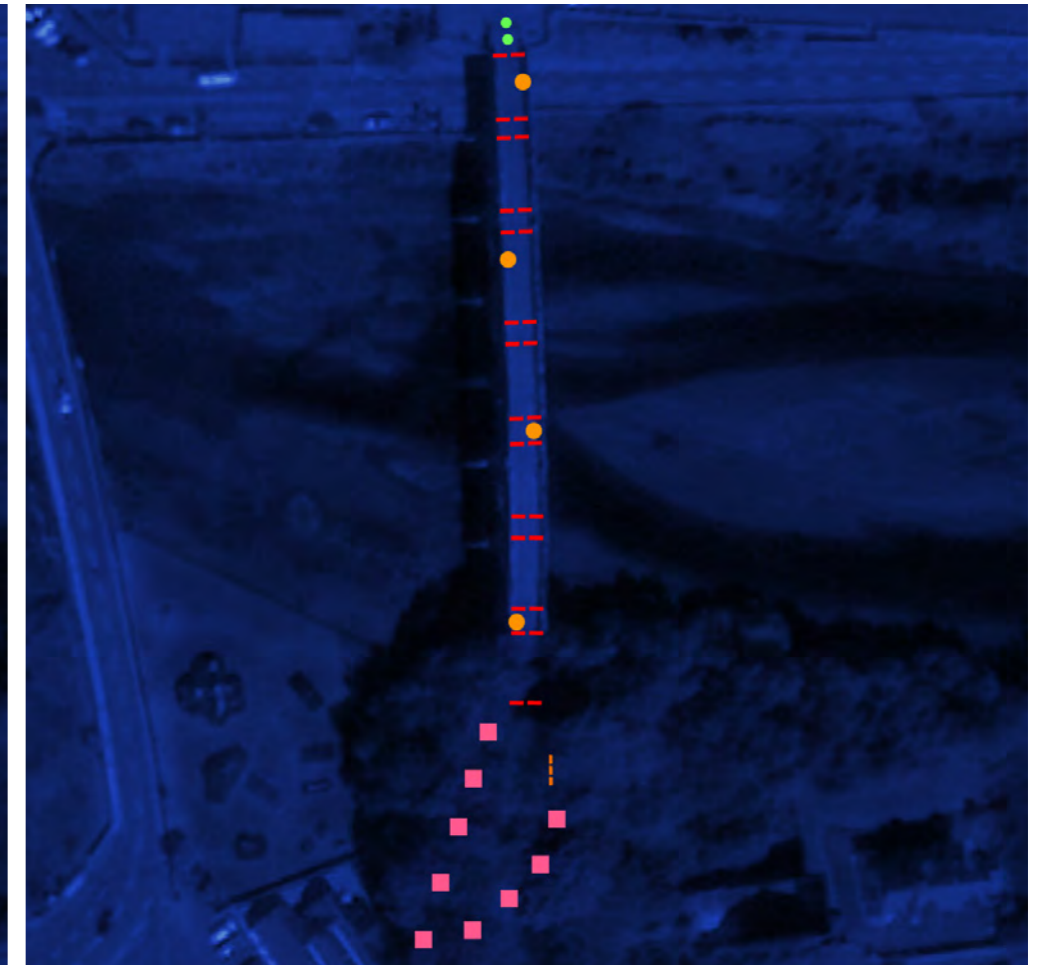
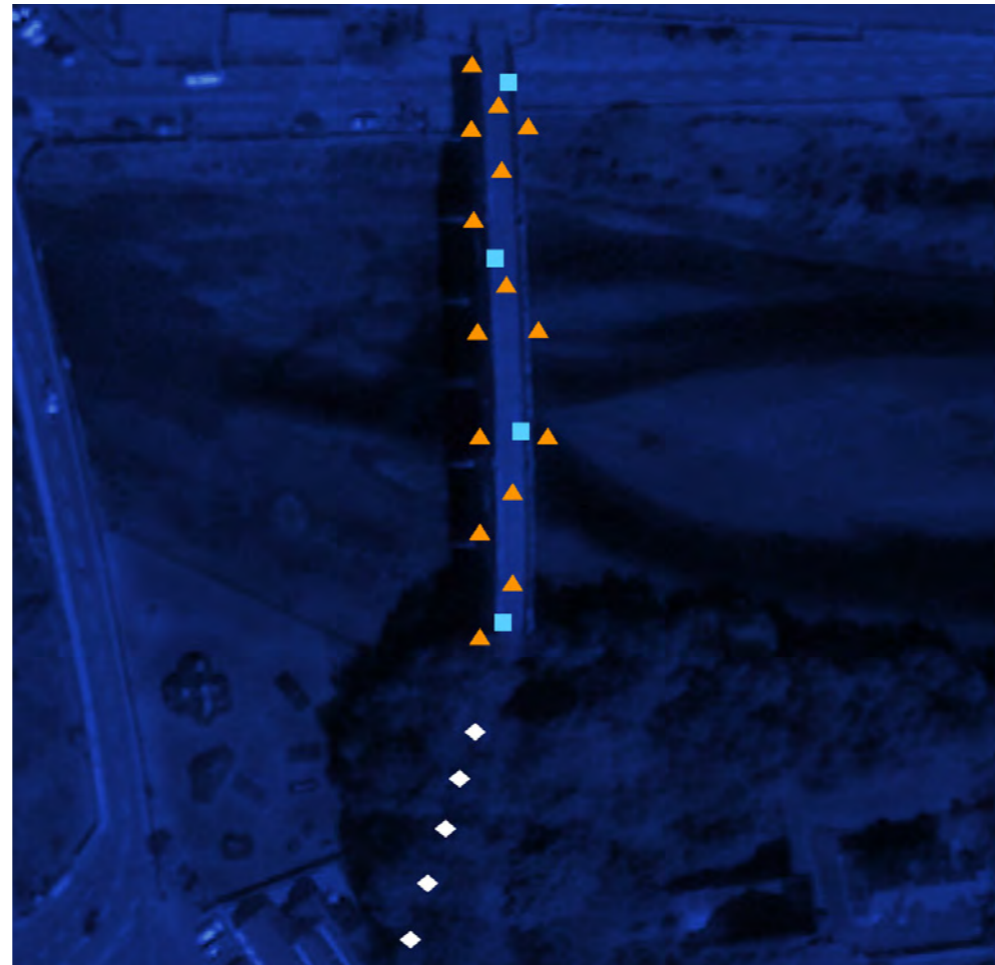
PROPOSED LIGHTING

The proposal aims to enhance the night-time character of the bridge by emphasising the arches which in return will also help by containing the light spill. The pedestrian experience will be improved through better visibility and additional layers of lighting which is sympathetic to the human scale.



8.1 SEVEN ARCHES VIADUCT

The existing and proposed lighting impact comparison of the Seven Arches Viaduct is as follows:



CURRENT LIGHTING

15x Sodium Projctrs. 150W, 17200lumens = 2,250W/ 258000 lumens
 4x Metal Halide Lanterns 70W, 5800lumens = 280W/ 40600 lumens
 5x LED Bulkheads 15W/ 1,500lumens = 75W/ 7500 lumens

TOTAL = 10,744 kWh (producing 1.2 billion lumens per year)
 TOTAL = 2.5 Tonnes of CO2e per year.

(*Based on the current control regime: Average of **11.3** hours operation per day.)

PROPOSED LIGHTING

14x Linear Profiles 30W/ 3056 lumens = 420W/ 42,784 lumens
 4x LED Lanterns 30W/ 2000 lumens = 120W/ 8,000 lumens
 9x LED Wall-mounted downlights 10W/ 1000 lumens = 90W/ 9000 lumens
 2x LED Handrail lights 2W/ 120 lumens = 4W/ 440 lumens
 1x LED Linear underbench light 17W/ 1000 lumens

TOTAL = 1,583 kWh (producing 143 million lumens per year)
 TOTAL = 0.36 Tonnes of CO2e per year

(*Based on the envisaged control regime: Average of **5** hours operation per day for all architectural lighting, **9.7** hours per day for all pedestrian lighting.



9,161 kWh



2.1 Tonnes



€2,015



1 Billion lumens

%85 ANNUAL TOTAL REDUCTION

%88 LIGHT REDUCTION
 1,510,000 domestic LED bulbs.

9.0 DIMMING

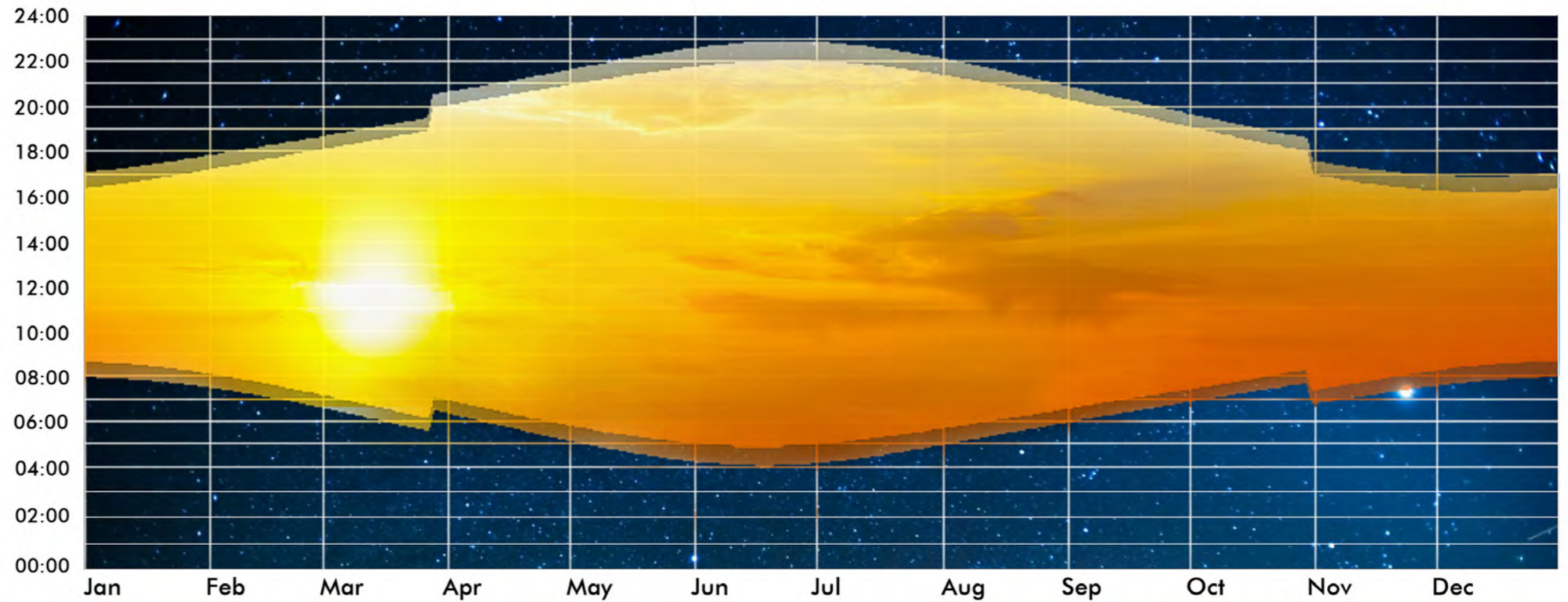
The greatest quality which modern day LEDs can offer is the ability to adjust the light intensity automatically to pre-set values through the day.

Exterior lighting is only required after dark. It is therefore important that the street lighting adheres to the seasonal and daily variables to maximise the savings.

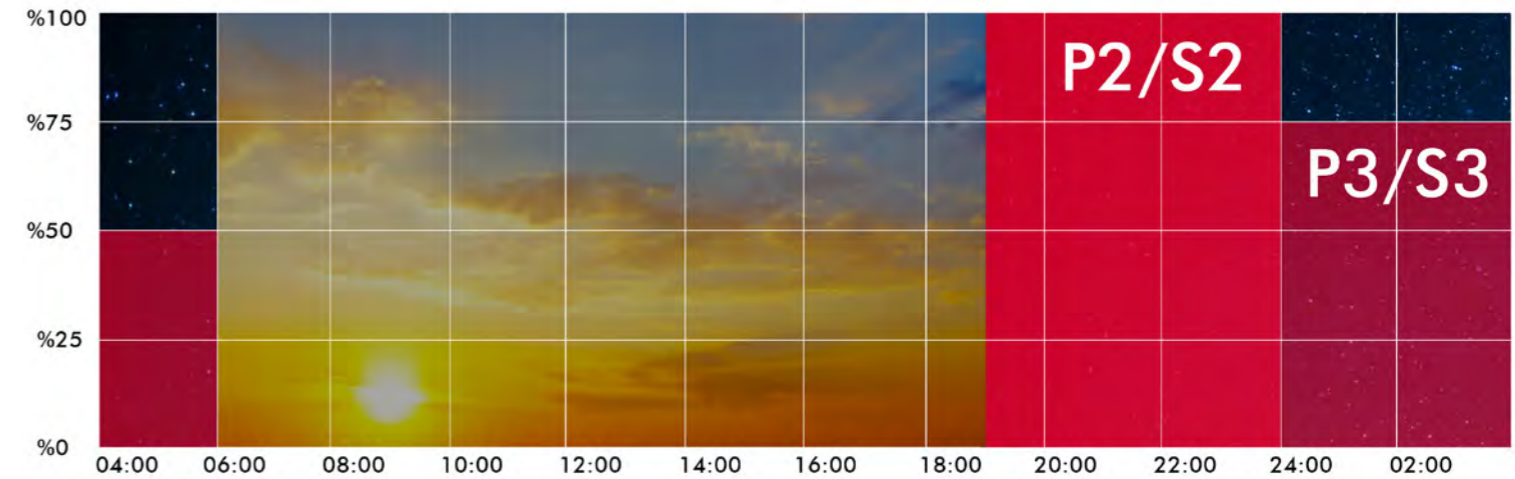
In the context of Newport, the tremendous potential that dimming can offer is currently untapped. The greatest energy and light waste reduction can only be achieved through the reconsideration of the dimming strategy.

In the following pages, the direct relationship between the energy conservation and dimming will be conveyed through street-specific light calculation examples.

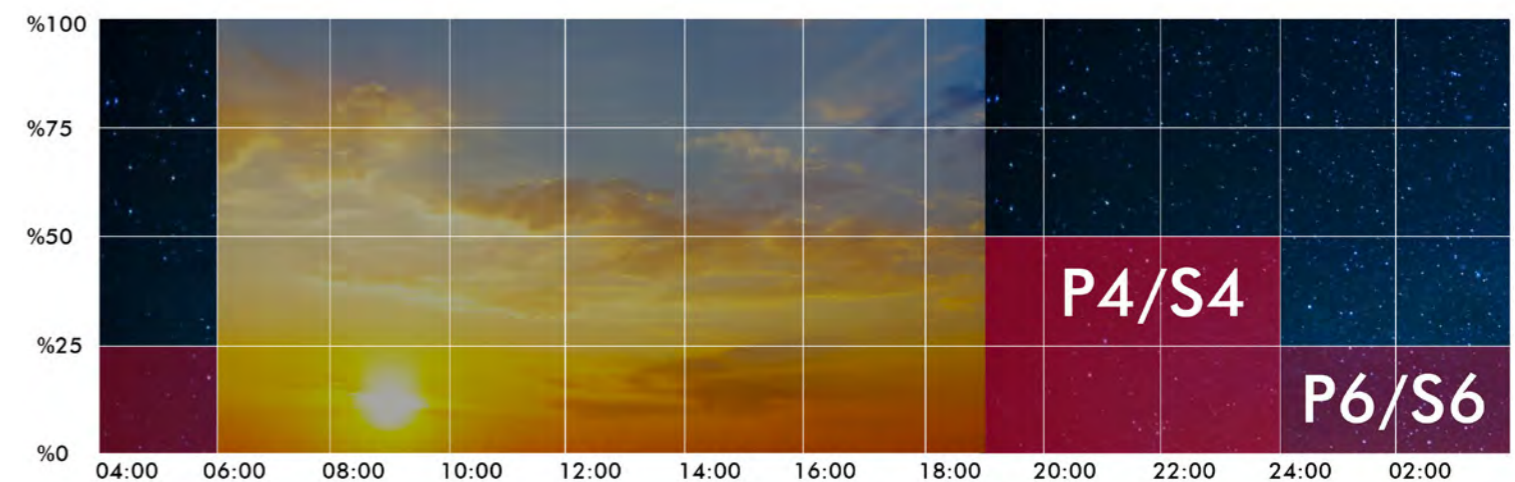
As previously mentioned in the standards chapter, the street lighting is currently set to over-achieve an average of P2/S2 from dusk until midnight and P3/S3 after midnight until dawn. The following examples will convey the potential of savings if the street lighting was moderated and set to meet S4/P4 class from dusk until midnight and P6/S6 from midnight until dawn.



Daylight diagram

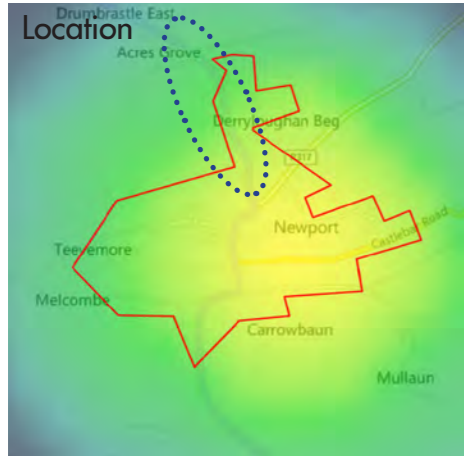


Current operation hours & dimming profile



Proposed operation hours & dimming profile

9.0 DIMMING N59 - Mulranny Road



Urbis Schreder
Axia 3.2, 32LED, 5266, 79W, 2700K

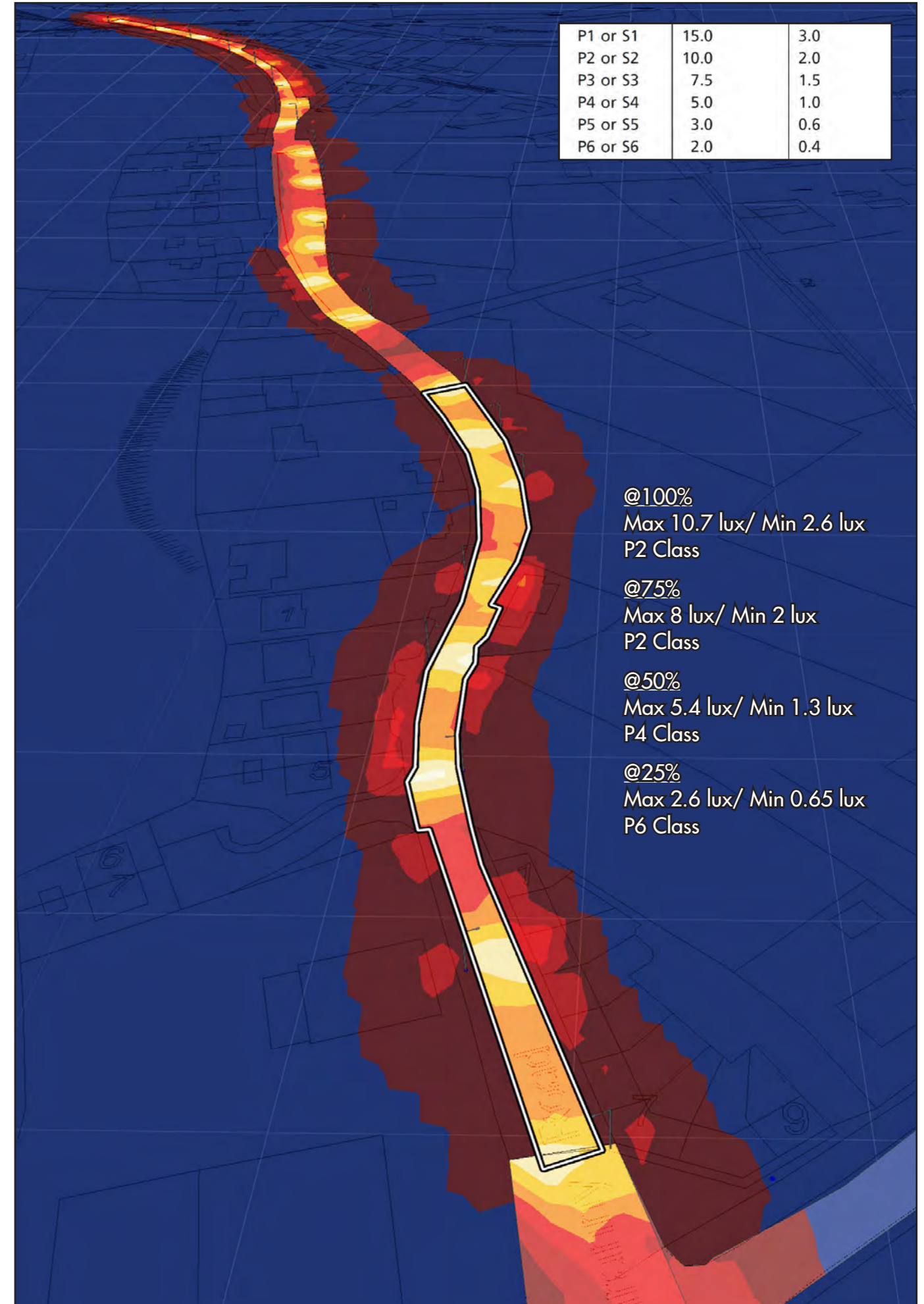


Total of 25 luminaires
9.7 average daily operation

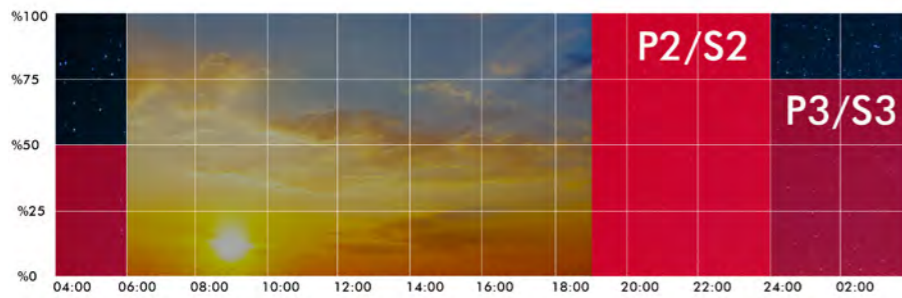
List of luminaires

Street	Owner	Number	Hgt.	Lamp	Wattage	Dimming Profile	Anl.Hours
MULRANNY RD NEWPORT	TII	1	8	LED	103	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	2	8	LED	93	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	3	8	LED	93	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	4	8	LED	93	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	5	8	LED	93	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	6	8	LED	36	Hours Dimmed to 67%	3,402.16
MULRANNY RD NEWPORT	TII	7	8	LED	93	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	8	8	LED	103	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	9	8	LED	93	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	10	8	LED	93	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	11	8	LED	93	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	12	8	LED	79	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	13	8	LED	79	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	14	8	LED	79	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	15	8	LED	93	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	16	8	LED	79	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	17	8	LED	103	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	18	8	LED	93	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	19	8	LED	79	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	20	8	LED	79	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	21	8	LED	103	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	22	8	LED	96	Dusk Until Dawn	4,150.10
MULRANNY RD NEWPORT	TII	23	8	LED	103	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	24	8	LED	79	Hours Dimmed to 75%	3,570.11
MULRANNY RD NEWPORT	TII	25	8	LED	79	Hours Dimmed to 75%	3,570.11

Lux calculation area

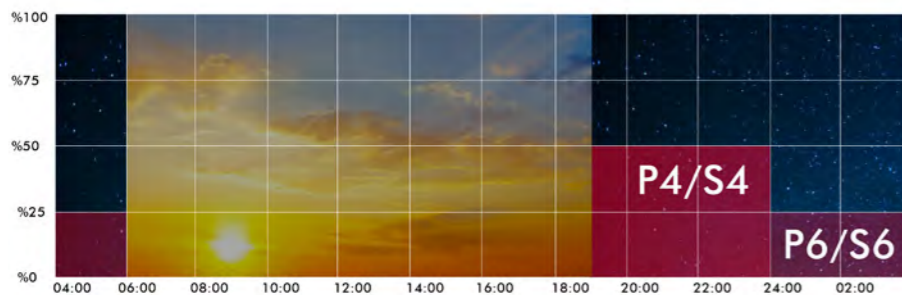


Existing Dimming Profile



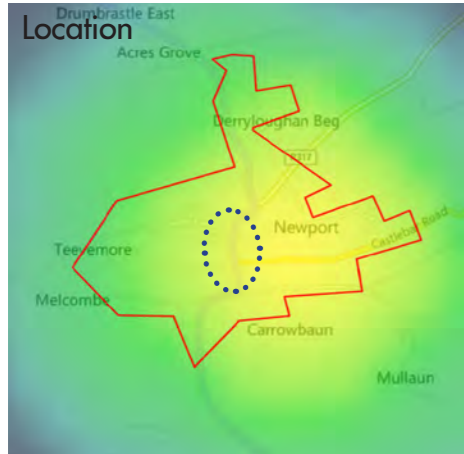
Annual Cost
6,145 kWh
Equivalent of 1.4 Tonnes of CO2e
€1,352 (Based on 22 cents per kW)

Proposed Dimming Profile



Annual Cost
2,286 kWh
Equivalent of 0.5 Tonnes of CO2e
€503 (Based on 22 cents per kW)

9.0 DIMMING N59 - Main Street



Total of 11 luminaires
9.7 average daily operation

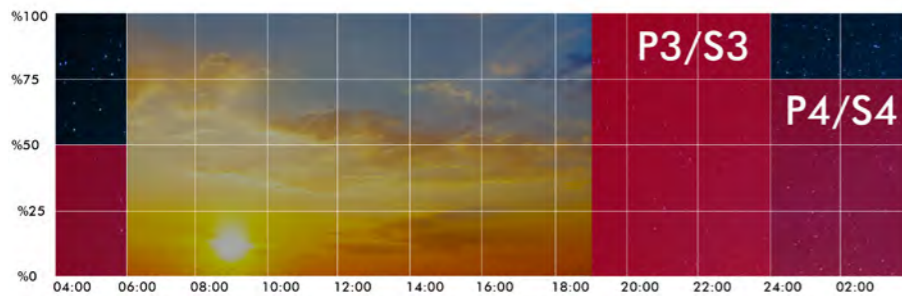
List of luminaires

Street	Owner	Number	Hgt.	Lamp	Wattage	Dimming Profile	Anl. Hours
MAIN ST NEWPORT	TII	1	8	SON	70	Hours Dimmed to 75%	3,570.11
MAIN ST NEWPORT	TII	2	8	LED	156	Hours Dimmed to 75%	3,570.11
MAIN ST NEWPORT	TII	3	8	LED	156	Hours Dimmed to 75%	3,570.11
MAIN ST NEWPORT	TII	4	8	LED	156	Hours Dimmed to 75%	3,570.11
MAIN ST NEWPORT	TII	5	8	LED	156	Hours Dimmed to 75%	3,570.11
MAIN ST NEWPORT	TII	6	8	LED	156	Hours Dimmed to 75%	3,570.11
MAIN ST NEWPORT	TII	7	8	LED	156	Hours Dimmed to 75%	3,570.11
MAIN ST NEWPORT	TII	8	8	LED	156	Hours Dimmed to 75%	3,570.11
MAIN ST NEWPORT	TII	9	8	LED	156	Hours Dimmed to 75%	3,570.11
MAIN ST NEWPORT	TII	10	8	LED	156	Hours Dimmed to 75%	3,570.11
MAIN ST NEWPORT	TII	11	8	LED	156	Hours Dimmed to 75%	3,570.11

Lux calculation area

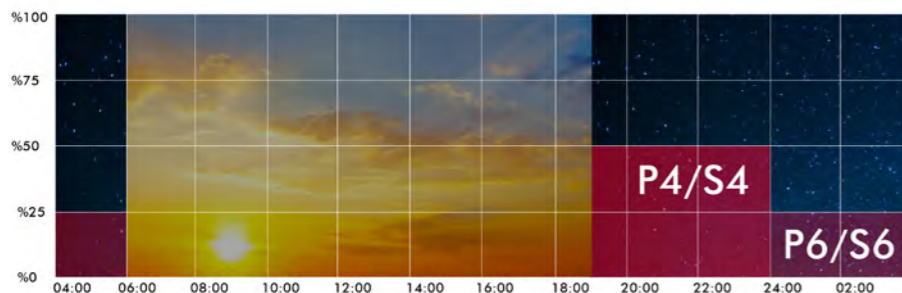


Existing Dimming Profile



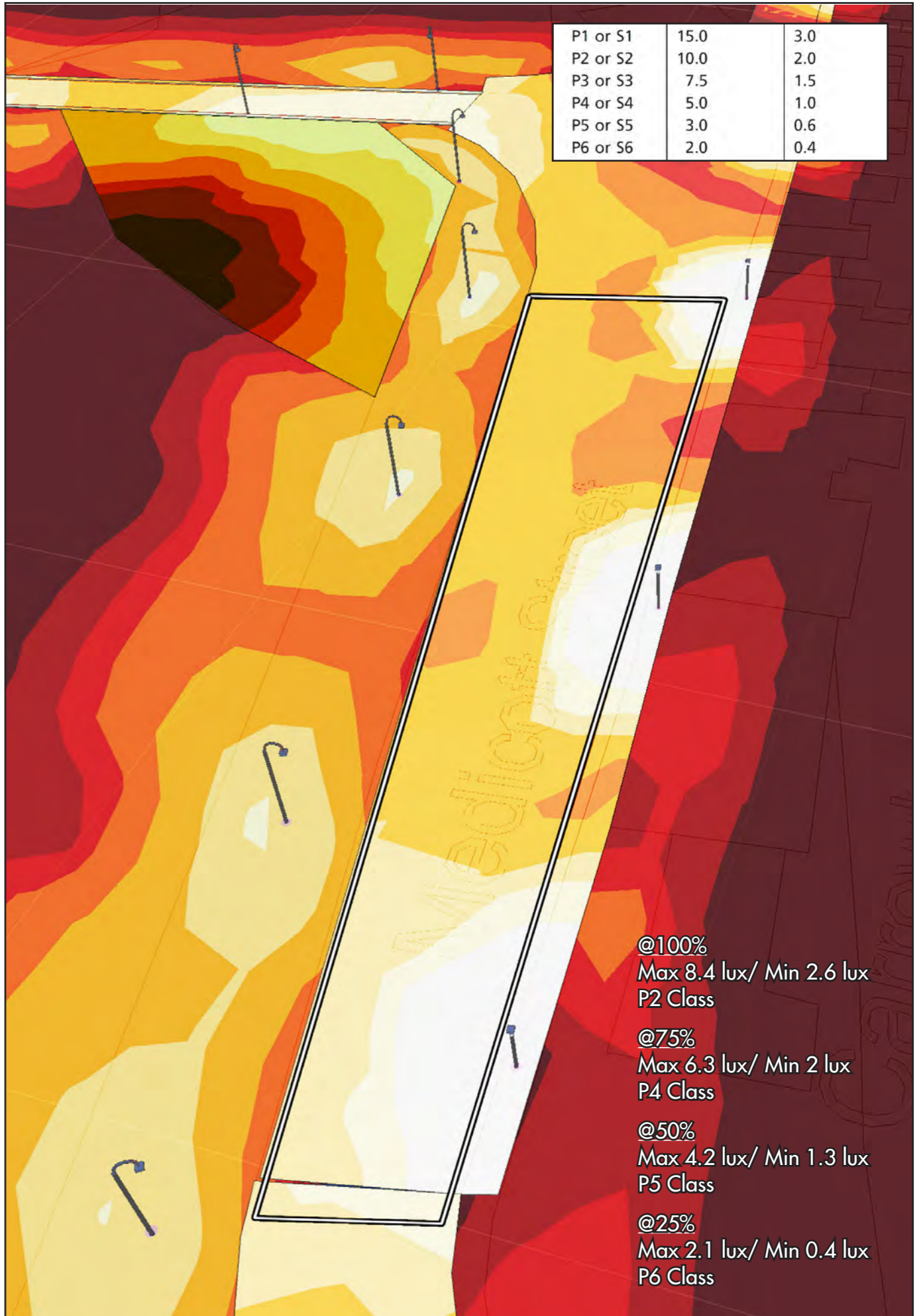
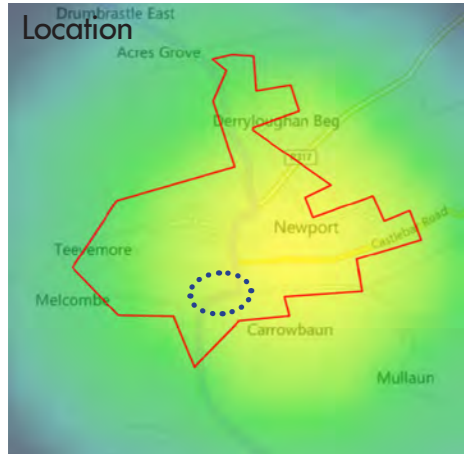
Annual Cost
245 kWh
Equivalent of 0.05 Tonnes of CO₂e
€53.9 (Based on 22 cents per kW)

Proposed Dimming Profile



Annual Cost
105 kWh
Equivalent of 0.025 Tonnes of CO₂e
€23.1 (Based on 22 cents per kW)

9.0 DIMMING N59 - Medicott Street

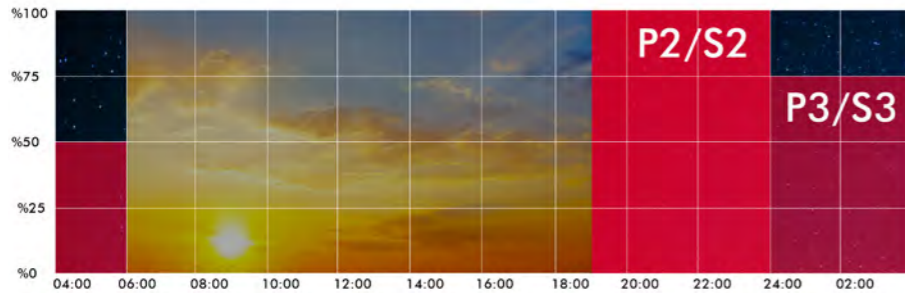


List of luminaires

Street	Owner	Number	Hgt.	Lamp	Wattage	Dimming Profile	Anl. Hours
MEDICOTT ST NEWPORT	TII	1	8	LED	156	Hours Dimmed to 75%	3,570.11
MEDICOTT ST NEWPORT	TII	2	8	LED	156	Hours Dimmed to 75%	3,570.11
MEDICOTT ST NEWPORT	TII	3	8	LED	156	Hours Dimmed to 75%	3,570.11
MEDICOTT ST NEWPORT	TII	4	8	LED	156	Hours Dimmed to 75%	3,570.11
MEDICOTT ST NEWPORT	TII	5	8	LED	156	Hours Dimmed to 75%	3,570.11
MEDICOTT ST NEWPORT	TII	6	8	LED	156	Hours Dimmed to 75%	3,570.11
MEDICOTT ST NEWPORT	TII	7	4	SON	70	Dusk Until Dawn	4,150.10
MEDICOTT ST NEWPORT	TII	8	4	SON	70	Dusk Until Dawn	4,150.10
MEDICOTT ST NEWPORT	TII	9	4	SON	70	Dusk Until Dawn	4,150.10
MEDICOTT ST NEWPORT	TII	10	4	SON	70	Dusk Until Dawn	4,150.10
MEDICOTT ST NEWPORT	Council	11	4	SON	70	Dusk Until Dawn	4,150.10
MEDICOTT ST NEWPORT	Council	12	8	SON	100	Dusk Until Dawn	4,150.10
MEDICOTT ST NEWPORT	Council	13	8	SON	150	Dusk Until Dawn	4,150.10
MEDICOTT ST NEWPORT	Council	14	8	SON	150	Dusk Until Dawn	4,150.10
MEDICOTT ST NEWPORT	Council	15	8	SON	150	Dusk Until Dawn	4,150.10

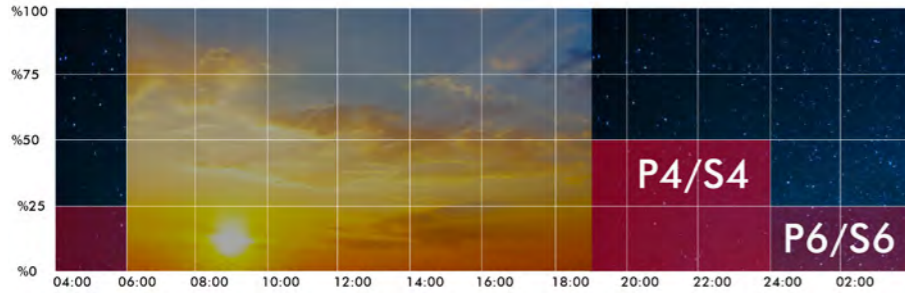
N59 scope
Lux calculation area

Existing Dimming Profile



Annual Cost
4423 kWh
Equivalent of 1 Tonne of CO2e
€973 (Based on 22 cents per kW)

Proposed Dimming Profile



Annual Cost
1501 kWh
Equivalent of 0.35 Tonnes of CO2e
€330 (Based on 22 cents per kW)

@100%
Max 8.4 lux/ Min 2.6 lux
P2 Class

@75%
Max 6.3 lux/ Min 2 lux
P4 Class

@50%
Max 4.2 lux/ Min 1.3 lux
P5 Class

@25%
Max 2.1 lux/ Min 0.4 lux
P6 Class

The magnitude of the savings which can be achieved by dimming the N59 only is as follows:



Based on avg. of **9.7** hours operation per day.
Evening times based on 19:00 - 00:00 (5 hours)
Morning times based on 00:00 - 04:45 (4.7 hours)

CURRENT DIMMING

PROPOSED DIMMING

DIMMING PROFILE

100% EVENING
75% MORNING

50% EVENING
25% MORNING

STANDARDS

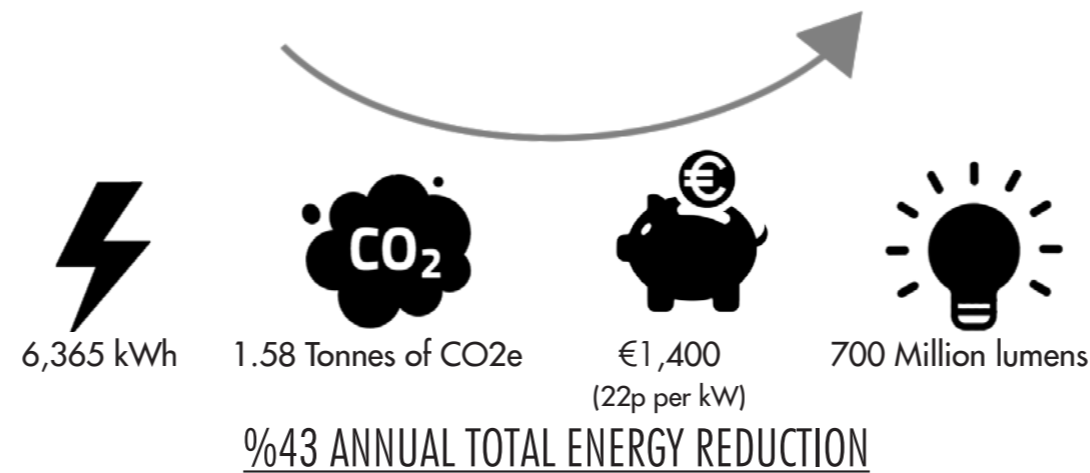
P2/S2 Evening
P4/S4 Morning

P4/S4 Evening
P6/S6 Morning

TOTAL IMPACT

Daily: 40.8 kWh
Annual: 14,906 kWh
Annual: 3.48 Tonnes of CO₂e

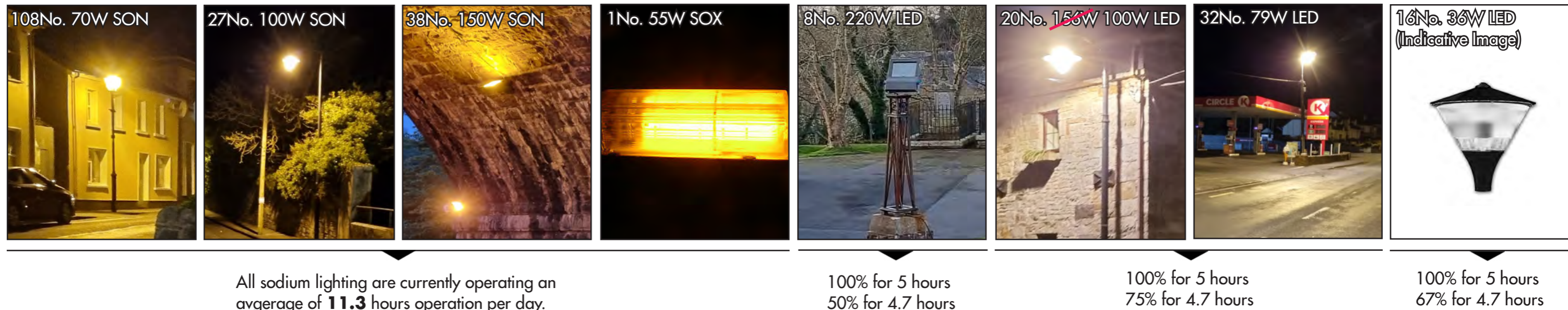
Hourly = 23.4 kWh
Annual = 8,541 kWh
1.9 Tonnes of CO₂e



2.0 STREET LIGHTING (TOWN WIDE)

When we consider the same dimming regime is utilised across the town, all old luminaires are upgraded to LEDs and all the architectural lighting enhancement projects are delivered as envisaged, the result is as follows:

CURRENT SCHEME



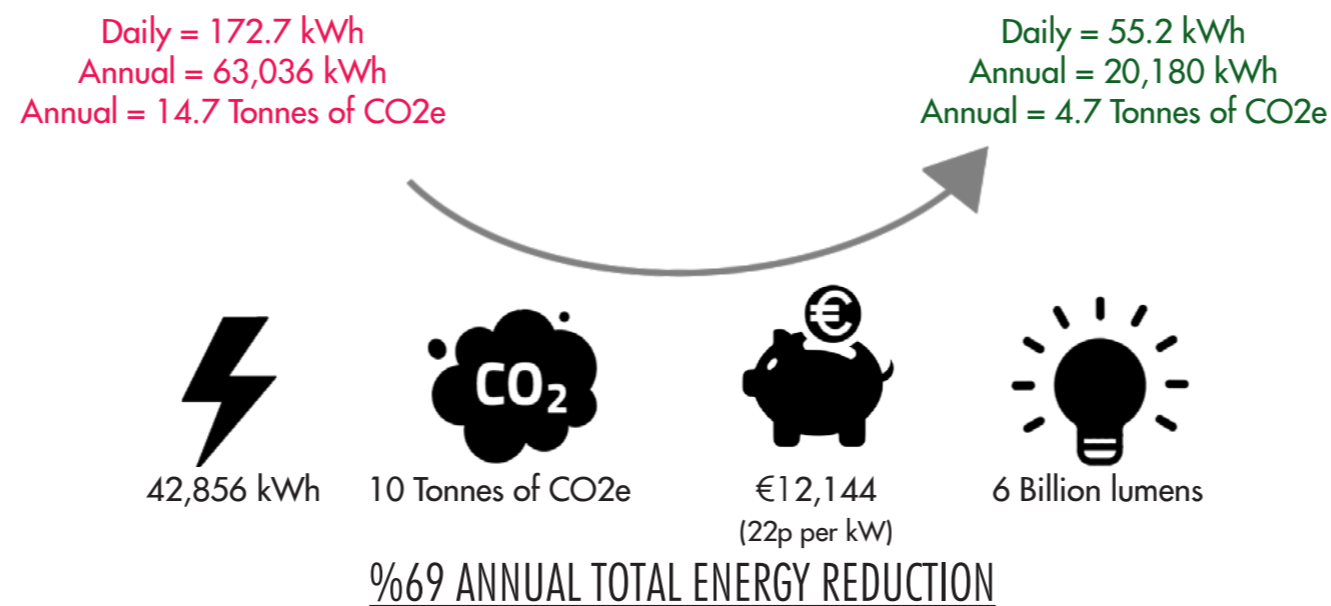
POTENTIAL SCHEME

All 55W, 70W, 100W sodium lighting are replaced by 50W LED luminaires and operating an average of: **5** hours at **50%** until midnight, **4.7** hours at **25%** after midnight.

The church & viaduct lighting improvements are factored in.

Already refurbished & new LED luminaires will be operating on an average of: **5** hours at **50%** until midnight, **4.7** hours at **25%** after midnight.

TOTAL IMPACT



Mayo Dark Skies Sec Dark Sky Energy Reduction Plan

Project: Newport Dark Sky Energy Reduction Plan
Co. Mayo, Ireland
Document Number: 160-RP-002
Revision: 00
Date: 09/09/2022



MAYO DARK SKIES SEC



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