

The Vale of Glamorgan Council

Environment and Regeneration Scrutiny Committee: 6 December, 2018

Report of the Director of Environmental and Housing

Street Lighting Energy Reduction Strategy Update

Purpose of the Report

1. To update Committee on the implementation of Street Lighting Energy Reduction Strategy Option 3.

Recommendations

1. That Committee notes the contents of this report.
2. That a further Street Lighting Energy Reduction Strategy Update is received on completion of Phase 2, Option 3.

Reasons for the Recommendations

1. To update Committee on progress of the Street Lighting Energy Reduction Strategy.
2. To ensure Committee receive further update reports on this important energy and cost saving initiative.

Background

2. Cabinet considered a report 'Street Lighting Energy Reduction Strategy - Next Steps' at its meeting on 25th April 2016. The report advised of the current position with the 'Street Lighting Energy Reduction Strategy' and proposed a series of further measures aimed at supporting the transition to full LED lighting to realise further energy savings. Minute number C3160 records that Cabinet resolved:
 - (1) T H A T the current position with the part night lighting and LED light installation programme be noted.
 - (2) T H A T the report and all the options and associated issues included in the report be referred to the Scrutiny Committee (Economy and Environment) for consideration.
 - (3) T H A T a further report be presented to Cabinet on conclusion of the consideration of the issue by the Scrutiny Committee (Economy and Environment).

3. The Scrutiny Committee (Environment and Regeneration) considered the 'Street Lighting Energy Reduction Strategy - Next Steps' report on 17 May, 2016. Minute C3198 records that Scrutiny Committee subsequently:
RECOMMENDED - T H A T Cabinet be advised that Option 3 was the Committee's preferred option as it would be a more comprehensive strategy for the Council to follow
4. Minute number C3198 records that Cabinet having considered the recommendation by Scrutiny Committee (Environment and Regeneration) at its meeting on 25th April 2016 resolved to:
 - (1) T H A T the comments of the Scrutiny Committee Environment and Regeneration be noted.
 - (2) T H A T the use of £1.2m from the Visible Services reserve to fund the replacement of all remaining conventional residential street lighting with LED units be agreed, and that this be included in the 2016 / 2017 Capital Programme.
 - (3) T H A T the progression of 'Option 3' detailed within the report be agreed and that, where possible, all old and new LED light installations be dimmed from midnight until dawn the following day.
 - (4) T H A T delegated authority be granted to the Director of Environment and Housing Services, in consultation with the Cabinet Member for Building Services, Highways and Transportation, to amend the current street lighting maintenance arrangements to include consideration of all forms of delivery, including outsourcing the service if this is established to be the most cost effective arrangement.
5. This report provides an update on the progress of implementing Option 3 and the investment of £1.2m in 2016/17 and £100k in 2017/18 and 2018/19 to dim existing LED lights at midnight and convert all residential street lights to LED which were also to be dimmed at midnight.
6. Prior to implementing Option 3, some 33% of Council street lights had already been converted to LED. There remained approximately 5,900 street lamps in residential areas throughout the Vale that would need to be changed as part of the Option 3 investment proposals.
7. Of these 5,900 street lamps, over 5,000 were estimated to comprise of conventional street lighting lanterns with either post top mounted or side entry mounted fittings to fix directly onto existing standard steel or aluminium street lighting columns. The remaining 846 lanterns are located on heritage, ornamental, decorative and cast iron street lighting columns and also include subway lights, bulkheads, floodlights etc. which cannot be replaced with the conventional LED lanterns and require bespoke LED lanterns and fittings.
8. A further separate project to replace existing main road street lighting lanterns with LED is currently progressing with loan funding of £1,916,079 from Salix Finance Ltd. This is a two year project that commenced in April this year and is currently not anticipated to be completed until March 2020 when all street lights throughout the Vale will have then be converted to LED.

Relevant Issues and Options

9. To manage the project in the most convenient and productive manner, it was decided to progress the project in two distinct phases. Phase 1 would include the conversion of all remaining conventional street lighting lanterns in residential areas to maximise

the benefits identified of the switch to LED technology. Phase 2 would deal with the more bespoke arrangements required to convert heritage, ornamental, decorative and cast iron columns as well as subway lights, bulkheads, floodlights etc. This will require the review and investigation of specialist equipment available to meet the Council's specific requirements in terms of converting these lanterns which are unlikely to realise the same benefits of the standard lanterns given the technology available. Phase 2 will also incorporate the necessary work to dim all existing LED lights by 50% between midnight and 06:00am.

10. In order to comply with Council's Financial Procedures when implementing Phase 1, a rigorous design and procurement process was undertaken in 2016/17 to identify the most suitable LED lantern specification to replace all remaining conventional residential street lights as well as to appoint the most appropriate and cost effective LED lantern manufacturer / supplier. Tender documents were issued via Sell to Wales website on 7th November 2016 inviting eight specialist street lighting suppliers to submit tenders by the specified return date of Noon on 25th November 2016. The award criteria was specified to be evaluated on the basis of the most advantageous tender price submitted with a strict pass or fail requirement in terms of complying with the detailed specification. Following a detailed assessment and arithmetic checks of the submitted tenders it was determined that the most advantageous (lowest) tender price complying with the specification criteria was submitted by specialist lantern manufacturer Urbis Schröder Ltd. As such the contract was awarded to Urbis Schröder Ltd to supply the required new LED lanterns in April 2017.
11. To enable a better understanding of the community's viewpoint in regard to future LED installations, particularly in residential areas, it was decided to undertake a small scale consultation in the Pencoedre area of two types of lantern with different colour temperatures. The different colour temperatures used in the trial were Neutral White and Warm White LED lamps. There was no difference in cost or quality between these two types of LED lantern to impact or invalidate the contract for supply of the LED lanterns awarded to Urbis Schröder Ltd in April 2017.
12. The specific details of the LED lantern trial in the form of an 'information pack' which included a resident letter, questionnaire and plan providing details and instructions for the trial was delivered to relevant households along Glas y Llwyn and Melyn y Gors in Pencoedre by hand on Friday 11th August 2017. The intention was that residents observe the lighting at night over the following week and then complete and return the questionnaire in a prepaid envelope. Details of the 'information pack' are attached in Appendix A. Prior to issuing the 'information pack' the Council replaced 5 lanterns in Glas y Llwyn with Neutral White LED lamps and 5 lanterns in Melyn y Gors with Warm White LED lamps.
13. Pencoedre was chosen for the trial as it represented a typical residential neighbourhood in the Vale where the arrangement of adjoining / interconnecting streets was considered to allow easy comparison of the two lantern types to be installed. It was also a reasonably short distance from the Council's Alps depot where the street lighting team is based allowing quick and efficient access to the area to install and / or adjust the lantern units as required for the trial.
14. The Council received four responses from some 20 households who were asked to take part along each street involved in the trial and consultation. This low response rate is not surprising as residents likely recognised that LED lanterns, which are exempt from part-night lighting, offer a significant benefit to street lights being turned off between midnight and 6am and are therefore generally ambivalent to the minimal difference in the colour temperature of lighting afforded by the two lanterns trialed.

15. Out of the four responses received a majority of three identified a preference for neutral white colour temperature of the LED lanterns as fitted along Glas y Llwyn with no adverse comments made regarding dimming. As a consequence, the Council committed to proceed with the move to full LED throughout all residential areas within the Vale in accordance with the Council's previously agreed Street Lighting Energy Reduction Strategy using the neutral white LED lanterns with dimming to 50%. The neutral white LED lantern was also consistent with previous LED lanterns that had been fitted previously throughout various areas of the Vale and is considered to offer better colour rendition within the street scene as well as providing optimum energy saving and reduced CO2 emissions.
16. Following the LED lantern trial, an Order was placed for the delivery of the necessary LED lanterns with specialist lantern manufacturer Urbis Schröder Ltd for the neutral white LED lantern. The terms of the contract identified that new lanterns had a delivery lead time of 6-8 weeks from submission of order with an additional 2 week factory shutdown for Christmas needing to be factored in to any orders placed before January 2017.
17. Concurrently, tender documents were also prepared to procure the services of specialist street lighting installer to carry out the conversion of remaining conventional residential street lights to LED. Again, tender documents were issued via Sell to Wales website with tenders being returned by the specified return date of Noon on 7th December 2017. Tenders were assessed on the basis of the most advantageous tender price submitted with a pass or fail requirement in terms of the detailed requirements of the tender. Following detailed assessment the contract was awarded to the specialist installer Centregreat Limited on 9th January 2018. The installer confirmed that the works would take some 14 weeks in total to complete the full installation in all residential streets in the Vale subject to agreed start date.
18. The works to convert all remaining conventional residential street lights to LED subsequently commenced during the week commencing 26th February 2018 in the eastern urban areas of the Vale and extend north and west to completion. All Ward Members were provided with a detailed street by street schedule of the works programme to fit the new LED lanterns in their Wards in February 2018. The conversion of conventional residential street lights throughout the Vale was substantially completed by the end of August 2018 at which time the installer Centregreat Ltd. had installed 5,313 LED lanterns with approximately 53 not replaced due to overgrown vegetation from private properties restricting access to the lamp column or lantern. Arrangements are currently progressing to remove the vegetation and these outstanding works should now be completed by the end of the calendar year.
19. Works are currently progressing on the implementation of Phase 2 of the project to convert the remaining 896 heritage, ornamental, decorative and cast iron columns as well as subway lights, bulkheads, floodlights etc. to LED lanterns which exist in certain residential areas, including conservation areas within the Vale of Glamorgan.
20. There are currently some 268 cast iron or ornamental columns that can be directly swapped over to the conventional street lighting columns and utilise the conventional LED lanterns for continuity to match in with existing roads that have already been converted to LED under Phase 1 of this project. A further 50 cast iron lighting columns whose lanterns cannot be readily switched to LED are required to be fully replaced in order to convert them to LED technology.

21. There are 20 bulkhead lanterns to replace with LED in The Mount, Dinas Powys. These lanterns were fabricated when the site was first developed and are bespoke only to this particular road. They are not a standard specification and it is intended to replace these bulkhead lanterns with the Council's current specification LED bollard lantern for consistency and ease of future maintenance and repair. The proposed changes will be notified to both residents and the Council's Planning Department before this change is undertaken.
22. It has been confirmed that 172 heritage style lighting columns located mainly in the Penarth area and Whitmore Footpath, Barry Island that can now be easily replaced with an off the shelf heritage style LED lantern as a direct conversion which needs to be procured in accordance with the Council's Financial regulations.
23. There are currently 204 cast iron columns with a swan neck bracket are proposed to be replaced with the conventional LED lanterns. This will require cutting off the old bracket on the end of the swan neck and installing an adaptor for the conventional LED lantern. In the future, there will need to consider a rolling program to replace approximately 200 of these old cast iron columns with newer style columns subject to budget availability. The LED lanterns will be reutilised should such replacement programme commence.
24. Within Penarth Marina there are 148 Saturn style or globe lanterns which are proposed to be directly swapped to a conventional LED lantern. This will require the replacement and / or modification of the existing bracket arrangement on the existing street lighting columns. These proposed changes will be notified to both the residents association and Ward Members prior to any works taking place.
25. Along the Barry Waterfront and Barry Island Promenade there are 205 bespoke style lanterns that require conversion to LED. Due to the style and costs to procure these particular lanterns two options are being considered at this time. This includes retaining the existing lantern and installing a retrofit gear tray / globe or alternately retaining the existing lantern globe and installing a bespoke LED lamp.
26. There are 41 subway, wall lights and flood lights throughout the Vale that require complete replacement with new LED units. These lights are site specific and will need to be individually assessed and new lights sourced to fit and suite the location.
27. There are currently 15 zebra crossing locations that require conversion of 30 no. lanterns to LED units. The design for this work has been completed and procurement will be carried out this financial year.
28. The various elements of the phase 2 works described above are currently being planned and programmed with the intention of completing this phase within the next six months subject to procurement of any necessary specialist equipment required. When completed the overall project to convert residential lanterns to LED in residential areas will be successfully concluded. As previously advised a further LED replacement programme involving non-residential, mainly, main road lighting is currently being developed and this will be the subject of future reports to Cabinet and this Committee.
29. As the conversion of all conventional residential street lights to LED throughout the Vale was only completed by the end of August 2018, a detailed analysis has yet to be undertaken to understand the full energy and CO2 savings achieved to date.
30. The previous report on 'Street Lighting Energy Reduction Strategy - Next Steps' assumes a 3% per annum inflation for projected energy costs year on year associated with Option 3. However, the unit rate for street lighting energy has

increased from 1st April 2018 this financial year from 12.69 to 13.65p per kWh. This represents an increase of some 8% which is significantly higher than the 3% per annum inflation originally projected.

31. Therefore, whilst the kWh's consumed indicates a considerable energy saving which is attributable to the ongoing conversion to LED, it is considered that the cost savings that will be achieved and the pay-back period for the investment as reported for Option 3 is unlikely to be fully realised at this time. A more detailed analysis of energy and cost savings will be carried out following completion of the final Phase 2 element of this project
32. The reduction in CO2 emissions is directly related to the energy consumed in kWh's and should therefore be unaffected by the price increases in the unit rate for street lighting energy.

Resource Implications (Financial and Employment)

33. The original budget to carry out the conversion of all residential street lighting lanterns to LED approved by Cabinet in 2016 as part of the Council's Street Lighting Energy Reduction Strategy was £1.3m.
34. The current budget remaining for the 2018/19 financial year is £650k, will be used to cover the remaining costs of Phase 1 and also Phase 2 works.
35. Option 3 to dim existing LED lights at midnight and convert all street lighting in residential areas to LED which are also to be dimmed at midnight, is being project managed using the Council's in-house street lighting resources.

Sustainability and Climate Change Implications

36. The implementation of Option 3 was estimated to reduce the Council's CO² emissions by 493 tonnes per annum which represents a major contribution towards the Council's greenhouse gas reduction targets.

Legal Implications (to Include Human Rights Implications)

37. The Council has a legal duty to protect users of the public highway and its liabilities in respect of any changes to street lighting need to be carefully assessed and managed to avoid any additional third party risks as a consequence.
38. There are no Human Rights Implications with regard to this report.

Crime and Disorder Implications

39. Part-night lighting schemes and light dimming schemes are not new initiatives. They have been in operation in certain Local Authorities in England for some time. So far the evidence from these schemes, suggest no increases in crime and disorder as a result of the lighting change. However, the size of the samples for such assessments and the timeframes used are generally insufficient to provide unequivocal evidence of the effects of the change. There will also be a 'local' element to any such changes and this will have to be carefully monitored and assessed in the vale if the proposal is accepted.
40. The effects of reduced lighting on road traffic collisions' is also a debateable point. Certain newspaper headlines over recent years have suggested a correlation between reduced street lighting and an increase in the number of road deaths and serious injuries. Again this is a matter that requires much greater investigation over a longer time period. All road traffic incidence within the Vale are monitored and

consideration is always given in such monitoring to the possible highway implications, which includes street lighting.

Equal Opportunities Implications (to include Welsh Language issues)

41. The implementation of LED lanterns in all residential areas is considered to offer a substantial benefit to all residents including members of the public with protected characteristics over the current part-night lighting which it replaces.

Corporate/Service Objectives

42. This report links primarily to the wellbeing outcome of "An environmentally responsible and prosperous Vale", but also links to the outcome of "An inclusive a Safe Vale".
43. The specific objective is objective 4; "Promoting sustainable, development and protecting the environment, and the related action is; Review and implement the Council's Carbon Management Plan and targets to reduce emissions from Street Lighting, Council vehicles and Council buildings 2017 / 2018.

Consultation (including Ward Member Consultation)

44. No Ward Member consultation has been undertaken as the matters relates to all areas of the Vale of Glamorgan.

Background Papers

None.

Contact Officer

Michael Clogg, Operational Manager Engineering - 029 20673200.

Officers Consulted

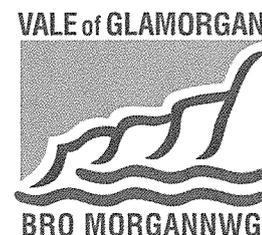
Operational Manager Legal Services
Accountant, Environment and Housing Services
Team Leader - Neighbourhood Services (Street Lighting)

Responsible Officer:

Miles Punter - Director of Environment and Housing Services

Date/Dyddiad August 2017
Ask for/Gofynnwch am
Telephone/Rhif ffôn 01446 700 111
Fax/Ffacs
Your Ref/Eich Cyf
My Ref/Cyf SL/LED/CC
e-mail/e-bost

The Vale of Glamorgan Council
The Alps, Wenvoe CF5 6AA
Cyngor Bro Morgannwg
Yr Alpau, Gwenfô CF5 6AA
www.valeofglamorgan.gov.uk
www.bromorgannwg.gov.uk



The Householder
Glas y Llwyn/Melyn y Gors
Pencoedtre Village
Barry

Dear Resident

Re: LED Lamp Consultation

We are writing to ask if you would be willing to take part in a consultation exercise on the type of LED lamp to be used in the next phase of our LED street lighting installations.

The Council will shortly be changing all remaining conventional style residential street lighting to LED as part of our continuing efforts to reduce energy consumption. These LED lights will remain on at night, albeit at reduced power after midnight, replacing those lighting units that are currently switched off after midnight. There are a number of types of LED units and we have narrowed down our choice to two and we are seeking your input as to which lamps you would prefer based on a number of criteria. We also want your views of the lighting levels after midnight when the LED units will be dimmed.

We have replaced 5 lanterns in Glas y Llwyn with Neutral White LED lamps and 5 lanterns in Melyn y Gors with Warm White LED lamps, please see attached plan. Enclosed is a questionnaire that will allow you to give your opinions on the both types of lamps.

We hope that as many householders as possible will be able to take part in the consultation as we will use all feedback to inform the procurement of the preferred lantern.

We would be very grateful if you could this week, observe the lighting at night and complete and return the questionnaire.

If you require further information or wish to speak to an officer regarding the consultation please contact CIV 01446 700111 and ask for Street Lighting.

Yours faithfully

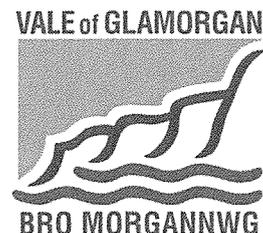
Colin Chorley
Senior Technical Officer Street Lighting

Date/Dyddiad Awst 2017
Ask for/Gofynwch am Colin Chorley
Telephone/Rhif ffôn 01446 700 111
Fax/Ffacs
Your Ref/Eich Cyf
My Ref/Cyf SL/LED/CC
e-mail/e-bost

The Vale of Glamorgan Council
The Alps, Wenvoe CF5 6AA

Cyngor Bro Morgannwg
Yr Alpau, Gwenfô CF5 6AA

www.valeofglamorgan.gov.uk
www.bromorgannwg.gov.uk



Deiliad y Tŷ
Glas y Llwyn/Melyn y Gors
Pentref Pencoedtre
Y Barri

Annwyl Breswlydd

Parthed: Ymgynghoriad ar Lampau LED

Rydym yn ysgrifennu atoch i ofyn a fyddech yn fodlon cymryd rhan mewn ymgynghoriad ar y math o lampau LED a ddylai gael eu defnyddio yn y cam nesaf o'n gwaith i osod goleuadau stryd LED.

Yn fuan bydd y Cyngor yn newid yr holl oleuadau stryd preswyl traddodiadol sy'n weddill i LED fel rhan o'n hymdrechion parhaol i leihau faint o ynni sy'n cael ei ddefnyddio. Bydd y goleuadau LED hyn ar waith drwy'r nos, ond yn defnyddio pŵer gostyngedig ar ôl canol nos, gan gymryd lle'r goleuadau hynny sy'n cael eu diffodd ar ôl canol nos ar hyn o bryd. Mae nifer o fathau o unedau LED ac rydym wedi dewis 2 o blith y rhain ac yn gofyn eich barn o ran ba oleuadau y byddai'n well gennych ar sail nifer o feini prawf. Hoffem ni hefyd gael eich barn ar y lefelau goleuo ar ôl canol nos pan gaiff yr unedau LED eu gwanhau.

Rydym wedi adnewyddu 5 lantern yn Glas y Llwyn gyda lampau LED Gwyn Niwtral a 5 lantern ym Melyn y Gors gyda lampau LED Gwyn Twym, gweler y cynllun atodedig. Mae holiadur a fydd yn eich galluogi i roi eich barn ar y ddau fath o lampau wedi'i amgáu.

Rydym yn gobeithio y bydd cymaint o aneddiadau â phosibl yn gallu cymryd rhan yn yr ymgynghoriad gan y byddwn yn defnyddio'r holl adborth i lywio'r gwaith o gaffael y lantern a ffefrir.

Byddwn yn ddiolchgar pe gallech chi edrych ar y goleuadau gyda'r nos yr wythnos hon a chwblhau a dychwelyd yr holiadur.

Os oes angen mwy o wybodaeth arnoch neu os hoffech chi siarad â swyddog am yr ymgynghoriad cysylltwch â CIV ar 01446 700111 gan ofyn am yr adran Goleuadau Stryd.

Yn gywir

Colin Chorley
Uwch Swyddog Technegol – Goleuadau Stryd

Correspondence is welcomed in Welsh or English / Croesewir Gohebiaeth yn y Gymraeg neu yn Saesneg

Director of Environment and Housing Services/Cyfarwyddwr Gwasanaethau'r Amgylchedd a Thai – Miles Punter

Questionnaire

Area Identification

Glas y Llwyn and Melyn y Gors have been selected for a trial LED lantern replacement. The Vale of Glamorgan Council is undertaking this survey to allow a better understanding of the community's viewpoint on the lighting of their street.

The street lighting lanterns that have been upgraded are identified on the enclosed plan.

Why LED?

The principal aims of selecting a LED luminaire are summarised as follows:

- ✓ Have a much longer lifespan and more efficient than the traditional lighting which will mean lower maintenance costs.
- ✓ Have enhanced facial recognition for security and CCTV cameras.
- ✓ Will reduce energy consumption and carbon footprint than traditional street lighting.
- ✓ Provide safe and clear routes during the night time for traffic and pedestrians.
- ✓ To provide an environment where users feel safe and secure. Reduce fear of crime within the local area and increase visual perception which will ease residents' safety concerns.
- ✓ Brighter white light enabling a better distinguishing of colours and making objects look sharper and clearer at night.
- ✓ Provide a white light source that concentrates light into the road and footway leading to less light pollution into homes and gardens.

Note

Street lighting on residential areas are designed to light the road and associated footpaths only and not to light private areas such as driveways, paths and front doors (set away from the highway) therefore, this must be taken into consideration when undertaking this survey.

Street lighting survey:

Name: _____
Address: _____
Date: _____

Questionnaire:

1. Do you prefer the lighting scheme in Glas Y Llwyn?

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
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Could you please explain your answer in the box below

2. Do you prefer the lighting scheme in Melyn y Gors?

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
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Could you please explain your answer in the box below

3. Do you like the colour in Glas y Llwyn? (Colour Temperature-see below*)

Yes		No	
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4. Do you like the colour in Melyn y Gors? (Colour Temperature see below*)

Yes		No	
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***Colour Temperature:**

The colour temperature of a light source is a measure of the 'warmth' or 'coldness' of the light that it produces where yellow appearance indicates warm and blue appearance indicates cold

5. Do you have any comments on the dimming effect of the lighting in your Street between the hours of midnight and 06:00am?

6. Are there any further comments you would like to make regarding the street lighting, please do so in the box below.

END OF QUESTIONNAIRE

Please return in the pre-paid envelope provided.

The Vale of Glamorgan Council would like to thank you for taking part in this consultation and completing the questionnaire.

All records and information will not be shared with any external parties and will be held with the strictest confidence.

Yr Ardal

Mae Glas y Llwyn a Melyn y Gors wedi'u dewis i gael goleuadau LED newydd yn rhan o dreial. Mae Cyngor Bro Morgannwg yn gwneud yr arolwg hwn er mwyn deall yn well barn y gymuned ar y goleuadau yn ei stryd.

Nodir y goleuadau stryd sydd wedi'u huwchraddio ar y cynllun amgaaedig.

Pam LED?

Crynohir prif nodau dewis uned oleuo LED fel a ganlyn:

- ✓ Maen nhw'n para'n hirach o lawer ac maen nhw'n fwy effeithlon na goleuadau traddodiadol – felly mae'r gost i'w cynnal a chadw'n is.
- ✓ Maen nhw'n galluogi camerâu TCC a diogelwch i adnabod wynebau'n well.
- ✓ Maen nhw'n lleihau ôl troed carbon a'r ynni a ddefnyddir o'u cymharu â goleuadau stryd traddodiadol.
- ✓ Maen nhw'n gwneud llwybrau'n ddiogel a chilir yn ystod y nos i draffig a cherddwyr.
- ✓ Maen nhw'n gwneud i bobl deimlo'n ddiogel ac yn dawel eu meddwl yn eu hamgylchedd.
- ✓ Maen nhw'n lleihau ofn oherwydd trosedd yn yr ardal leol ac maen nhw'n ei gwneud yn haws gweld, sy'n lleihau pryderon preswylwyr o ran diogelwch.
- ✓ Maen nhw'n taflu golau gwyn sy'n fwy disglair gan ei gwneud yn bosibl gwahaniaethu rhwng lliwiau'n well, ac maen nhw'n gwneud i wrthrychau edrych yn gliriach gyda'r nos.
- ✓ Maen nhw'n ffynhonnell o olau gwyn i gyfeiriad y ffordd a'r droedffordd yn benodol, gan beri llai o lygredd golau i gartrefi a gerddi.

Nodyn

Dylunnir goleuadau stryd mewn ardaloedd preswyl i oleuo'r ffordd a llwybrau cerdded cysylltiedig yn unig ac nid i oleuo ardaloedd preifat megis mannau parcio, llwybrau a drysau blaen (nad ydyn nhw'n gyfagos â'r briffordd) felly rhaid ystyried hyn wrth wneud yr arolwg hwn.

**Arolwg Goleuadau Stryd:**

Enw; _____

Cyfeiriad: _____

Dyddiad: _____

Holiadur:

1. Oes gwell gennych chi'r cynllun goleuadau yn Nglas y Llwyn?

Oes		Nac	
		oes	

Esboniwch eich ateb yn y blwch isod

2. Oes gwell gennych chi'r cynllun goleuadau ym Melyn y Gors?

Oes		Nac	
		oes	

Esboniwch eich ateb yn y blwch isod



3. Ydych chi'n hoffi'r lliw yn Nglas y Llwyn? (Tymheredd Lliw-gweler isod*)

Ydw		Nac ydw	
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4. Ydych chi'n hoffi'r lliw ym Melyn y Gors? (Tymheredd Lliw gweler isod*)

Ydw		Nac ydw	
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***Tymheredd Lliw:**

Mae tymheredd lliw ffynhonnell olau yn fodd i fesur pa mor 'dwym' neu 'oer' y mae'r golau. Mae arlliw melyn yn dwym, ac mae arlliw glas yn oer.

5. Oes gennych chi unrhyw sylwadau ar effaith tywyllu'r goleuadau yn eich stryd rhwng hanner nos a 06:00am?

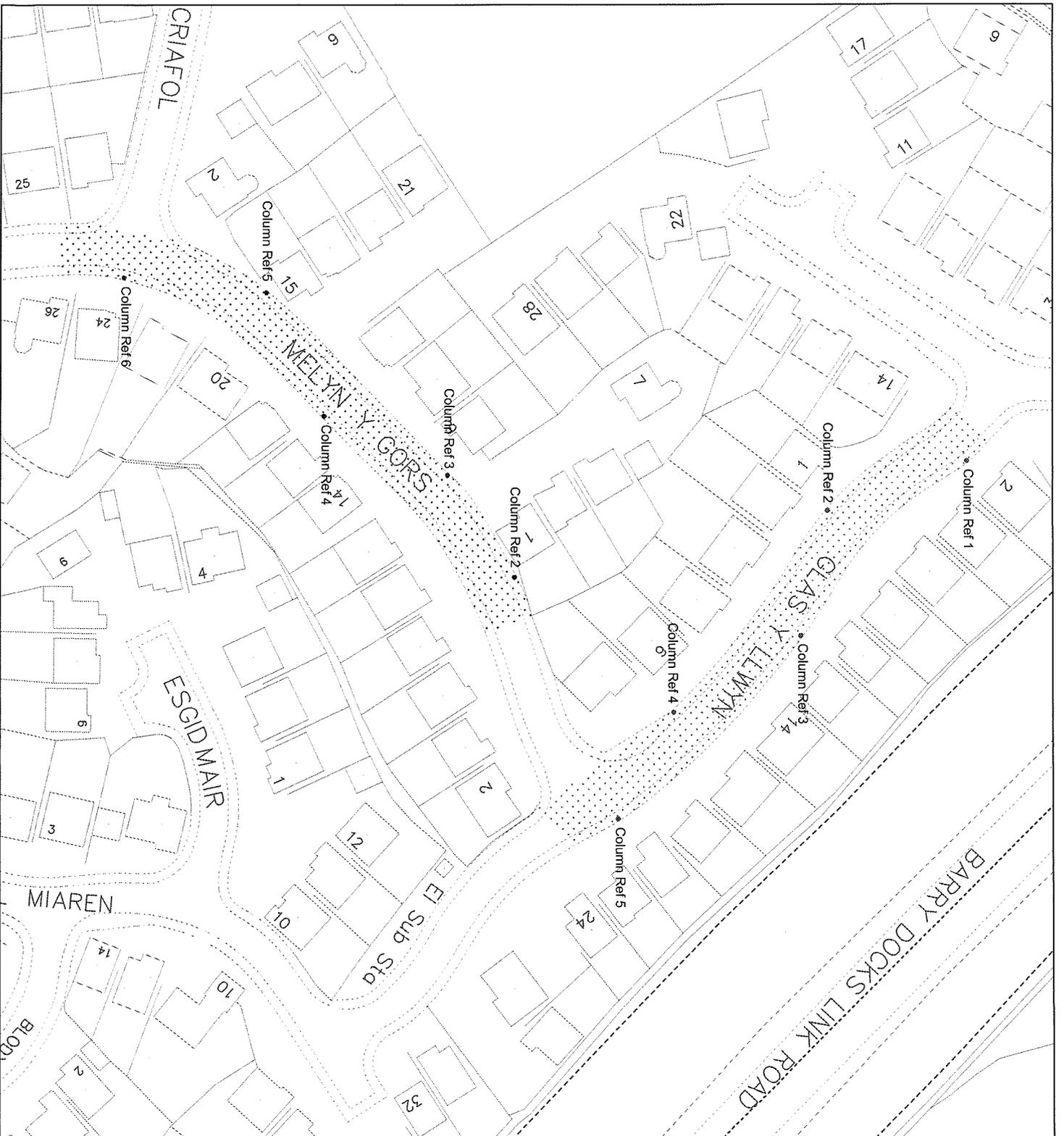
6. Oes gennych chi unrhyw sylwadau pellach yr hoffech chi eu gwneud am y goleuadau stryd? Gwnewch hynny yn y blwch isod.

DIWEDD YR HOLIADUR

Dychwelwch yr holiadur yn yr amlen barod wedi darparu.

Hoffai Cyngor Bro Morgannwg ddiolch i chi am gymryd rhan yn yr ymgynghoriad hwn ac am gwblhau'r holiadur.

Ni rennir cofnodion a gwybodaeth â phartïon allanol ac fe'u cedwir yn gwbl gyfrinachol.



Rev	By	Description of Amendment	Rev	Date


ENVIRONMENT & HOUSING SERVICES

SCHEMATIC
LED LANTERN REPLACEMENT

Drawing Title
GLASY LLWYNN & MELYNN Y GORS
PENCOEDTREE VILLAGE, BARRY

Drawn	C. Cheyney	Scale	Project No.		Drawing No.	
Date	10/08/17				LED1/CC/01	
Approved						
Name						