	Interim Advice Note			Section	Design	
				Status	Final (Approved)	
	Reference	PMC-IAN-DES-010				
	Revision	2	Date	Mar. 2014		

INTERIM ADVICE NOTE LRDP 010

Lighting of Rural Cycleways

Amendment to DMM – Volume 2, September 2013

Project: Local Roads and Drainage Programme

IAN#: PMC-IAN-DES-010

Date: 19 March 2014

To: All Contractors and General Engineering Consultants

SUMMARY

This Interim Advice Note provides an addition to Section 17.8 in the Design Management Manual (DMM), Volume 2 (September 2013) for Local Road and Drainage Programme (LR&DP) projects.

INSTRUCTIONS FOR USE

This Interim Advice Note takes immediate effect. It is applicable on all candidate and managed LR&DP projects. Specific Projects designated in the Approved White Paper (Appendix B) include the following; QN006, QN078, QN079, QN080, QN081, QN082, QN083, QN085, QS006, QS016, QS032, QS034, QS035, DN035, DN036, DN037, DN038, and DN039. If implementation of this IAN will cause any impact to project delivery date, please contact Area Delivery Managers for further instruction.

Manager of Road Design Department

Attachment

Appendix A, AMENDMENTS/ADDITIONS TO LR&DP Design Management Manual (September 2013) Vol.2, Section 17.8 Lighting for Pedestrian and Cycle Paths

Appendix B, Technical Working Group White Paper on Lighting of Rural Cycleways


Received by Design Consultant / Contractor

Organisation _____

Contact Person _____

Signature _____

Date: / /

	Interim Advice Note			Section	Design	
				Status	Final (Approved)	
	Reference	PMC-IAN-DES-010				
	Revision	2	Date	Mar. 2014		

1. Introduction

1.1. This Interim Advice Note (IAN) takes immediate effect on all candidate and managed Local Roads & Drainage Programme (LR&DP) projects. It provides additional information to the DMM (September 2013), Volume 2, Section 17.8 Lighting for Pedestrian and Cycle Paths.

2. Withdrawn / Amended Standard

This IAN is an Amendment to the DMM, Volume 2 (September 2013), Section 17.8 Lighting for Pedestrian and Cycle Paths.

3. Implementation

3.1 The IAN is to be used with immediate effect on contracts as follows:

- All LR&DP projects in Concept Design Stage
- All LR&DP projects in Preliminary/Detailed Design Stage
- Other projects specifically directed by PWA

3.2 If in doubt, GECs and Construction Contractors should seek guidance from the Ashghal LR&DP PMC (PB), on a project-by-project basis.

4. Contact for Technical Queries

4.1 All technical queries on this IAN should be directed to Richard Henke (PMC Technical Director) at the following address:

Parsons Brinckerhoff
 Floor 5, Faisal Tower 2, West Bay
 P.O. Box 23013
 Doha, Qatar
henke@pbworld.com

Appendix A

AMENDMENTS/ADDITIONS TO LR&DP Design Management Manual (September 2013) Vol.2, Section 17.8 Lighting for Pedestrian and Cycle Paths

Insert after first paragraph of section 17.8 as follows:

The primary design consideration shall be to light Cycleways from the carriageway road lighting columns in accordance with Table 17-6 (Class F). This shall be accomplished without compromising the carriageway lighting or over lighting of the carriageway. Where this cannot be achieved, separate lighting provisions for the cycleway shall be provided.

Cycleways within the Right of Way situated in rural environments shall be lit in the following cases:

- cycleways located in population centres or villages that contain more than 500 residents as per MMUP policy plan
- cycleways within 2 km distance of the population centres
- the entire extent of cycleways connecting two population centres that are within 8 km distance of each other
- the approaches, up to 100 m, either side of rest areas

In the above areas, Table 17-6 (Class F) will apply.

The 2 km and 8 km distances discussed above are to be measured from the point where the posted speed of the roadway entering the village is reduced.

No additional lighting provisions are to be provided for remaining sections of the rural cycleways, with the exception of providing cross ducting of the carriageway for future lighting installations. An additional two-way duct (150 mm diameter) is to be installed under the carriageway at all electrical pillar locations to provide future service to cycleways located on the opposite side.

All cycleway lighting proposals should, where appropriate, be co-ordinated with the Expressway Programme to ensure a consistent design approach on any adjacent and connecting projects.

Appendix B
Technical Working Group White Paper on
Lighting of Rural Cycleways

Issue

Alternative options for the lighting of rural cycleways on 64m and 40m Arterial Road Corridor

Background

The LR&DP operates to Design Standards detailed in the DMM. The DMM includes the need to provide street lighting for cycleways, and does not make any exception for rural cycleways.

The LR&DP includes a number of road projects in rural areas, sometimes remote from major conurbations, linking small village populations. The roads are either 64m RoW two lane dual carriageway or 40m RoW single carriageway. In either case the MMUP have indicated they require cycleways to be provided on either side of the carriageway at project opening.

In total across the LR&DP there are currently 20 rural road projects (some with multiple packages) covering a total (centreline) length of 423 km. Three of these projects are located immediately adjacent to, or within environmentally protected Biosphere areas.

The justification for lighting remote lengths of rural cycleway has been questioned at all levels within the LR&DP.

Purpose

In general, international best practice is for dedicated rural cycleways separate from carriageways to be not lit as the majority of users will be recreational. This type of cycleway is generally used by the casual leisure cyclist and families in daylight.

In contrast, for urban and urban fringe areas where trips are made for a specific purpose, and to promote cycling to play an important role as an alternative to the car for short journeys, then international standards promote lighting to support an around-the-clock means of safe transport, rather than just a daylight activity

In the context of Qatar the main concerns for the development of options for rural cycleway lighting include:-

- Safety – To enable cyclists to see the route of the cycleway
- Safety – To enable cyclists to see any obstructions on the cycleway e.g. windblown sand, debris
- Safety - To enable the cyclist to be seen by others
- To encourage use of cycleways to promote health (sport, leisure) or as an alternative mode transport, e.g. commuting to school, work, between communities
- Qatar National Vision 2030 defines 'participation in a wide variety of sports'
- Qatar National Vision 2030 defines 'An environmentally aware population that values the preservation of the natural heritage of Qatar'
- Lighting for general public use i.e. not for professional or club competition cycling training or events (see Qatar National Bicycle Master Plan March 2008 DRAFT 5.4.6 for definitions).

International standards that have been referred include:

- [Sustrans UK - Lighting of Cycle Paths, Technical Information Note No. 29 2012](#)
- [AASHTO 2012 Guide for the Development of Bicycle Facilities](#)
- [National Cycle Manual Ireland](#)
- [Bicycle Network - Australian Good Design Guides](#)

Other Standards available:

- Qatar National Bicycle Master Plan March 2008 DRAFT
- Draft QHDM (details 5 lux average for cycleways)
- KBR Expressway Programme Interim Bicycle Design Guidelines Jan 2012 (details 5 lux to 22 lux)

Options

Initial list of option ideas:-

No Lighting

- Option 1 – Provide cross ducting for future provisions but no lighting

Full lighting

- Option 2 – Provide Lighting to current DMM Specifications (photo cell switching)
- Option 3 – 3-4m high columns @ 30 – 40m spacing
- Option 4 – Solar Powered LED Lighting + motion sensor
- Option 5 – Provide Lighting to current Specifications (with timer switching)
- Option 6 – Lighting from carriageway

Edge Lighting

- Option 7 – Edge lighting to replace traditional lighting
- Option 8 – LED edge lighting
- Option 9 – Bollards LED
- Option 10 – 'Starpath' glow in the dark product
- Option 11 – Bicycle lights (front/back)
- Option 12 – Solar LED Cats eyes

Following discussion the above initial ideas were consolidated as below.

Consolidated Options:

Option 1 – Provide Ducting only

Provide ducting (road crossings only) for future provisions i.e. no lighting installed until demand is demonstrated.

Option 2 – Provide Lighting to current DMM Specifications

4 Lux required minimum any cycleway (average) DMM Sept 2013

Sub categories to this option are defined as:

- a – Provide Lighting Dusk to Dawn (photo cell switching/timer)
- b – Provide Lighting Reduced Operating hours (timer)
- c – Pedestrian scale columns
- d – Lighting from carriageway (only if it does not result in over lighting carriageway)
- e – Solar Powered LED Lighting + motion sensor

Option 3 – Provide edge lighting only

- a – LED edge lighting - Discounted (see below)
- b – Bollards LED – mini or full height
- c – 'Starpath' glow in the dark product - Discounted (see below)
- d – Solar LED Cats eyes – Discounted (see below)

For edge lighting the Technical Working Group agreed that the lighting must be raised above ground level due to the potential of windblown sand covering any ground level solution. For this reason only option 3b Bollards are taken forward for full option appraisal.

Operating Parameters: in conjunction with the above options, additional operating parameters were discussed which could apply to all options. They include the following:

- a) Areas within 2km to population centres (500) (e.g. villages) based on MMUP policy plan
- b) Areas connecting population centres (500) up to 8km apart
- c) Areas not meeting criteria a) or b) – provide ducting only
- d) Provide lighting to approaches to rest areas
- e) Operating hours dusk until midnight on, + motion sensors
- f) Bicycle lights (front/back)

The operational parameters are not technical solutions but provide guidance for the placement of lighting and working basis. Distances based on the Qatar National Bicycle Master Plan March 2008 DRAFT 5.2.2.3 'Existing and Future Short Distance Trips' where short trip commute distances are identified as 2km-8km.

Advantages / Disadvantages

Option 1 – Provide cross ducting for future provisions but no lighting

	Advantage	Disadvantage
Safety	<ul style="list-style-type: none"> Lit at reduced level from central median lighting (approx 1lux 64m, >1Lux 40m corridor) 	<ul style="list-style-type: none"> Possible accidents due to no lighting – eg seeing objects/other users. Cyclist falls and cannot be seen
Public	<ul style="list-style-type: none"> Reduced light pollution 	<ul style="list-style-type: none"> Less likely to use the path at night
PWA	<ul style="list-style-type: none"> Reduced cost Future proofed 	<ul style="list-style-type: none"> 2030 Vision to encourage wide variety of sports not fully met Future cost
O&M	<ul style="list-style-type: none"> No maintenance cost No energy cost 	
Environmental	<ul style="list-style-type: none"> Reduced visual intrusion Sustainability – for lighting Sustainability – for maintaining Reduced light pollution 	
Design Delivery	<ul style="list-style-type: none"> Dependant on design stage, however easy to implement a removal of item for construction 	<ul style="list-style-type: none"> Dependant Possible abortive work by GEC
Cost	<ul style="list-style-type: none"> Minimize current capital costs 	<ul style="list-style-type: none"> Potential future cost

• Supporting statement – Option 1

- a) Field study is recommended to confirm light levels when lit from central median only.
- b) This option falls in line with international practice for rural areas with provision for installation in the future for any development that may change the general use of the cycleway or if a high demand is subsequently identified.
- c) The option does not address urban fringes

Option 2 – Provide Lighting to current DMM Specifications

	Advantage	Disadvantage
Safety	<ul style="list-style-type: none"> Standards fully met for lighting levels. Greater security 	
Public	<ul style="list-style-type: none"> Safety Security Encourages healthy activity 	<ul style="list-style-type: none"> Public opinion of lighting & funds for low use facility
PWA	<ul style="list-style-type: none"> Encourages 2030 Vision to encourage wide variety of sports not fully met 	<ul style="list-style-type: none"> May raise adverse publicity against use of energy & funding required
O&M		<ul style="list-style-type: none"> O&M costs – maintenance O&M costs - energy
Environmental		<ul style="list-style-type: none"> Light pollution emissions increased due to O&M, energy consumption sustainability Does not support 2030 Vision to achieve an environmentally aware population that values the preservation of the natural heritage of Qatar
Design Delivery	<ul style="list-style-type: none"> Neutral 	
Cost		<ul style="list-style-type: none"> Forever Cost Energy Most expensive option O&M Costs

• Supporting statement – Option 2

- a) Advantages are all aimed at providing a service to the public which conversely they may feel is unnecessary. Further stakeholder discussion recommended to confirm demand for lighting of cycleways.
- b) This option does not follow international policies for lighting of rural cycleways.

Option 3 - Bollards Solar LED – mini or full height

	Advantage	Disadvantage
Safety	<ul style="list-style-type: none"> • Delineates cycleway 	<ul style="list-style-type: none"> • Does not provide full lighting to Design Standards
Public	<ul style="list-style-type: none"> • Delineates cycleway 	
PWA	<ul style="list-style-type: none"> • Less capital and operating cost 	<ul style="list-style-type: none"> • Does not meet current standards (4 lux) Possible Departure from Standard required
O&M	<ul style="list-style-type: none"> • Delineates cycleway for clearance of sand • Cherry picker not required 	<ul style="list-style-type: none"> • Frequent 'low tech' maintenance required to clean solar panels of dust
Environmental	<ul style="list-style-type: none"> • Lower light pollution than full lighting option • Lower energy consumption than full lighting option 	<ul style="list-style-type: none"> • Higher light pollution than 'no lighting' option • Proper disposal of used batteries
Design Delivery	<ul style="list-style-type: none"> • 30m spacing envisaged 	<ul style="list-style-type: none"> • Existing designs will require amendment
Cost	<ul style="list-style-type: none"> • Lower energy cost than street lighting • Lower Capital cost • Lower operating cost 	<ul style="list-style-type: none"> • Forever Energy cost (unless solar powered)

- Supporting statement – Option 3
 - a) Mini Bollards will keep lighting clear of windblown sand coverage
 - b) Solar powered would demonstrate sustainability
 - c) Relaxation of lighting levels may be required (current standards do not differentiate between rural and urban cycleways. This is a very important factor (see 'Purpose' section of this document))

Operating Parameters:

- a) Areas within 2Km to population centres (500) (e.g. villages) based on MMUP policy plan
- b) Areas connecting population centres (500) up to 8Km apart
- c) Areas not meeting criteria a) or b) – provide ducting only
- d) Provide lighting to approaches to rest areas
- e) Operating hours dusk until midnight on, motion activated midnight to dawn
- f) Bicycle lights (front/back)

	Advantage	Disadvantage
Safety	<ul style="list-style-type: none"> • Focuses service delivery to where there is demand. • Timing can be adjusted if high demand is subsequently identified 	<ul style="list-style-type: none"> • Not all lengths are lit
Public	<ul style="list-style-type: none"> • Service provided where most needed 	
PWA	<ul style="list-style-type: none"> • Planned approach rather than blanket installation • Regarded as innovative organisation • Regarded as helping to meet Qatar 2030 Vision 	
O&M	<ul style="list-style-type: none"> • Reduced O&M costs – smaller length of lit cycleways 	<ul style="list-style-type: none"> • Resources to confirm motion sensors working
Environmental	<ul style="list-style-type: none"> • Reduced light pollution • Reduced emissions • Reduced energy consumption 	
Design Delivery	<ul style="list-style-type: none"> • Reduced design time (without motion sensors) – 	<ul style="list-style-type: none"> • large increase in design delivery time if motion sensors incorporated
Cost	<ul style="list-style-type: none"> • Reduced Capital and operating costs 	<ul style="list-style-type: none"> • High cost for motion sensors and associated cabling • Future costs to extend lighting

• Supporting statement – Operating Parameters

- a) Motion sensors removed from operating parameters until technology is proven and specification is approved by PWA.
- b) The above are operating policies that are recommended to be considered in conjunction with selected technical solution.

Projects Affected

Primarily the purpose of this white paper is concerned with current projects with roads classed as rural arterial with cycleways on both sides shown on the plan in Appendix 1. The projects currently considered to be affected by the need for rural cycleway lighting includes:

LR&DP Project Area	Overall Length	Cycleway length if fully lit along entire length	Cycleway length to be lit utilising Operating Parameters
Qatar North	148 km	296 km	24 km
Qatar South	204 km	408 km	154 km
Doha North	71 km	142 km	12 km
Totals	423 km	846 km	190 km

Recommendation of Technical Working Group

Recommendations

1. **Option 2 Provide Lighting to current DMM Specifications** is recommended when paired with **Operating Parameters** stated below. This will then provide full lighting focused to urban fringe areas where public demand is likely to be highest.
2. It is recommended that cross ducting be provided in all other areas as a provision for future lighting if warranted at a later time.
3. It is recommended that all designs for lighting to current specifications must always begin with an assessment as to whether this can be achieved from carriageway lighting (without over lighting the road).
4. It is recommended that a performance specification is developed for solar powered lighting suitable for lighting rural cycleways in urban fringes and near to rest areas.
5. It is recommended that coordination with the Expressway Programme occur to discuss connection options and lighting design and implications on adjacent and connecting projects.

Option 3 Bollards Solar LED is less expensive to install and maintain with good sustainability. It could also equally be used in conjunction with the identified Operating Parameters. However this option is not recommended as bollards provide a reduced level of lighting service possibly requiring relaxation to current standards of lighting in urban areas.

Operating Parameters to take forward:

- a) Provide lighting in areas within 2Km to population centres (500) (e.g. villages) based on MMUP policy plan
- b) Provide lighting on cycleways connecting population centres (500) up to 8Km apart
- c) Areas not meeting criteria a) or b) – provide ducting only
- d) Provide lighting to approaches to rest areas
- e) Low lighting or No lighting next to Biospheres and environmentally sensitive areas

Technical Sponsor

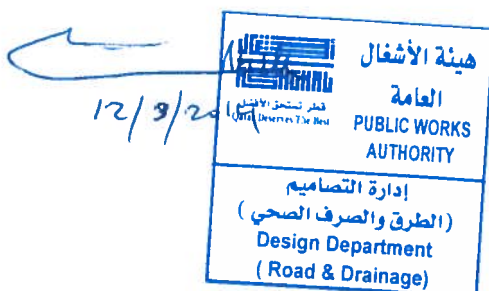
Rob Lamont

Implementation

IAN (for future DMM update) Letter to GEC/PMC/PWA

Approval Status (from TAG)

Approve Approve with comment Reject



Appendix 1

