

Monitoring the performance of life saving lighting assets

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Lux Mapping

- Innovation
- Efficiency
- Safety

- Is there a quick way to monitor the performance of a lighting asset and apply appropriate action if the lights are not performing to the required Standard?
- Is there a quick way to perform an audit of road lighting installations?
- Is there a process to plan and calculate my priorities?

Yes



Advances in lighting technologies

- SSL (solid state lighting sources, LEDs)
- Light distribution
- Power and consumption
- Control and dimming methods

Question:

What sort of asset management practice should we apply to be on the correct path with developments in the field of lighting technology?

Regardless of your car model, tyre pressures are vitally important for both safety and efficiency. We have the following options:

- Visual check (can notice if it's flat)
- Some may prefer to apply a slightly more radical scientific approach, also known as tyre kicking
- Quantifiable measurement method using the proper tool (gives you precise information and allows you to take corrective action regarding efficiency and your safety)

Road lighting asset management options

- Typical until now – typical asset management practice today for road lighting. Involves day time inspections (asset condition evaluation) and desktop analysis using lighting database (installation geometry analysis) and type of fitting
- Lux Mapping system (mobile lux data collection, real time record of both GPS location and lux output)

Evaluation summary

Evaluation items	Typical until now	Lux Mapping Survey	Evaluation results
Type of data collection process	<p>Day time inspections</p> <ul style="list-style-type: none"> • Visual observation from a moving vehicle, which means that they are very subjective • Usually able to identify only highly visible failures, such as broken or dirty diffusers • Reliance on human visual observation, in practice fails to detect any reduction in lamp performance 	<p>Night time automated data collection. Lux data are automatically recorded to laptop along driving route approx. 1m from centre line.</p>	<p>Advantage: Lux Mapping system</p>
Speed	<p>Any reasonably accurate visual assessment requires two people in the vehicle, which is usually travelling at low speed</p> <p>Visual inspection at speed greater of 50km/h is demanding task as vehicle is passing light at average time of every 5 sec</p> <p>Sometimes, for a more detailed inspection, the vehicle has to be stopped which may block a traffic lane. This may require a traffic management plan or an extra vehicle, which escalates the cost of the whole operation</p>	<p>In-traffic mobile survey at road speed (30-100km/h)</p>	<p>Advantage : Lux Mapping system</p>

Evaluation summary continued

Evaluation items	Typical until now	Lux Mapping Survey	Evaluation results
Outcome / format of data	Day time survey results are manually added to client's database	Automated measurements of lux output for each light. Information is stored in spreadsheet	Advantage: Lux Mapping system
Traffic management	As required	Not required	Advantage : Lux Mapping system
Level of automation of data collection process	Low	High	Advantage : Lux Mapping system
Lux level records	None	Lux data collected at every 3-6m	Advantage : Lux Mapping system

Evaluation summary final

Evaluation items	Typical until now	Lux Mapping Survey	Evaluation results
Survey route tracking (recording)	Some asset management databases allow this	Automatically recorded as part of the lux survey	Advantage : Lux Mapping system
Lux vs survey route records	None	Stored in Excel format (spreadsheet and graph)	Advantage : Lux Mapping system
Desktop analysis	Asset management database can be evaluated for wattage, installation geometry and spacing of the lights in order to identify possible critical sections but no details of real-time individual light performance	Lux Mapping provides real-time quantifiable data records of performance for each light. Very practical and cost effective field operational tool for the asset owner, consultant and maintenance contractor	Advantage : Lux Mapping system
Overall advantage			Lux Mapping system

Existing Road Surveys:

- Road roughness
- Skid resistance
- Traffic Counts

New Addition:

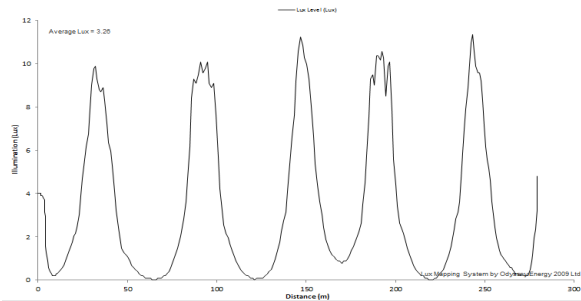
- Lux Survey



A Lux Mapping survey process involves the following actions:

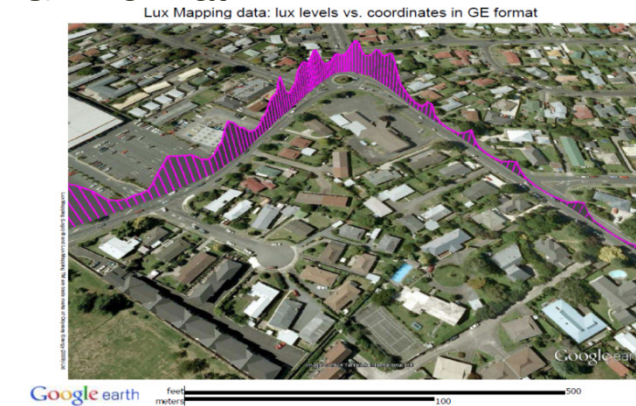
- Identification of area to be surveyed (asset owner)
- Lux Survey (night time data collection by a trained service provider or the maintenance contractor)
- Data processing and reporting (trained service provider with our assistance)
- Survey data export to roading database (asset owner)
- Mapping and prioritisation (asset owner)

Lux Mapping data processing formats: Spreadsheet

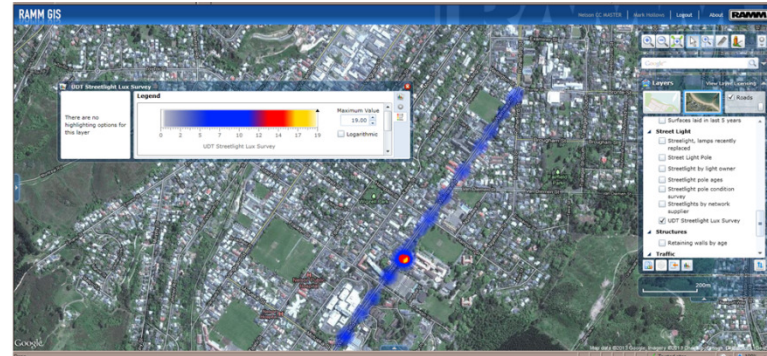


	GPS Coordinates (m)	Distance (m)	Lux Level (Lux)
2		0	4.007820137
3	-37.238435, 175.011653	0.270742111	4.007820137
4	-37.238437, 175.011655	0.539254719	4.007820137
5	-37.238439, 175.011657	0.806014195	4.007820137
6	-37.23844, 175.011659	1.071589159	4.007820137
7	-37.238442, 175.011661	1.336550695	4.007820137
8	-37.238444, 175.011663	1.601506235	3.910068426
9	-37.238446, 175.011665	1.867124182	3.910068426
10	-37.238447, 175.011668	2.134152918	3.910068426
11	-37.238449, 175.01167	2.403412889	3.910068426
12	-37.238451, 175.011672	2.675737458	3.812316716
13	-37.238453, 175.011674	2.951858739	3.812316716
14	-37.238455, 175.011676	3.208494609	3.714565005
15	-37.238458, 175.01168	3.508494609	3.616813294
16	-37.238459, 175.011681	3.643245159	3.519061584
17	-37.238459, 175.011681	3.709733811	3.421309873
18	-37.23846, 175.011682		

GE Format

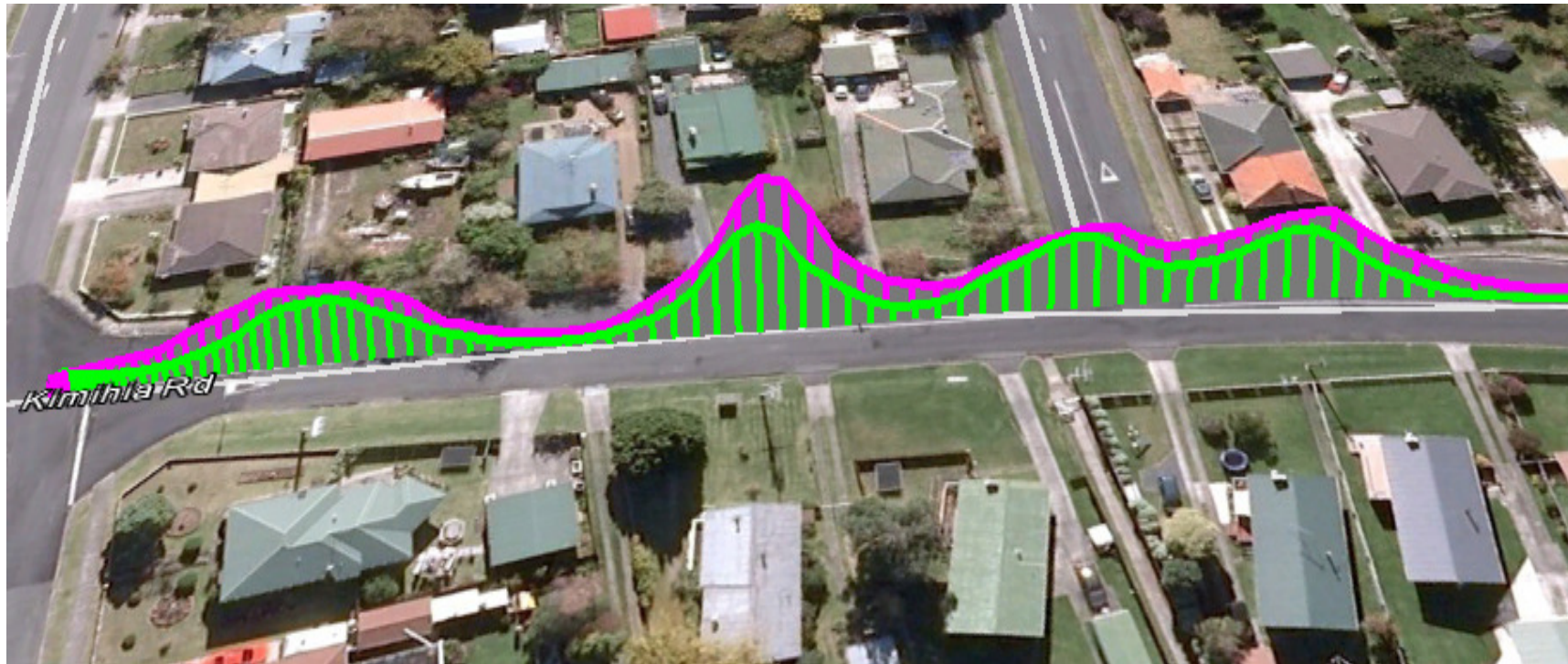


Heat Maps (available via asset owner database)



Case Studies

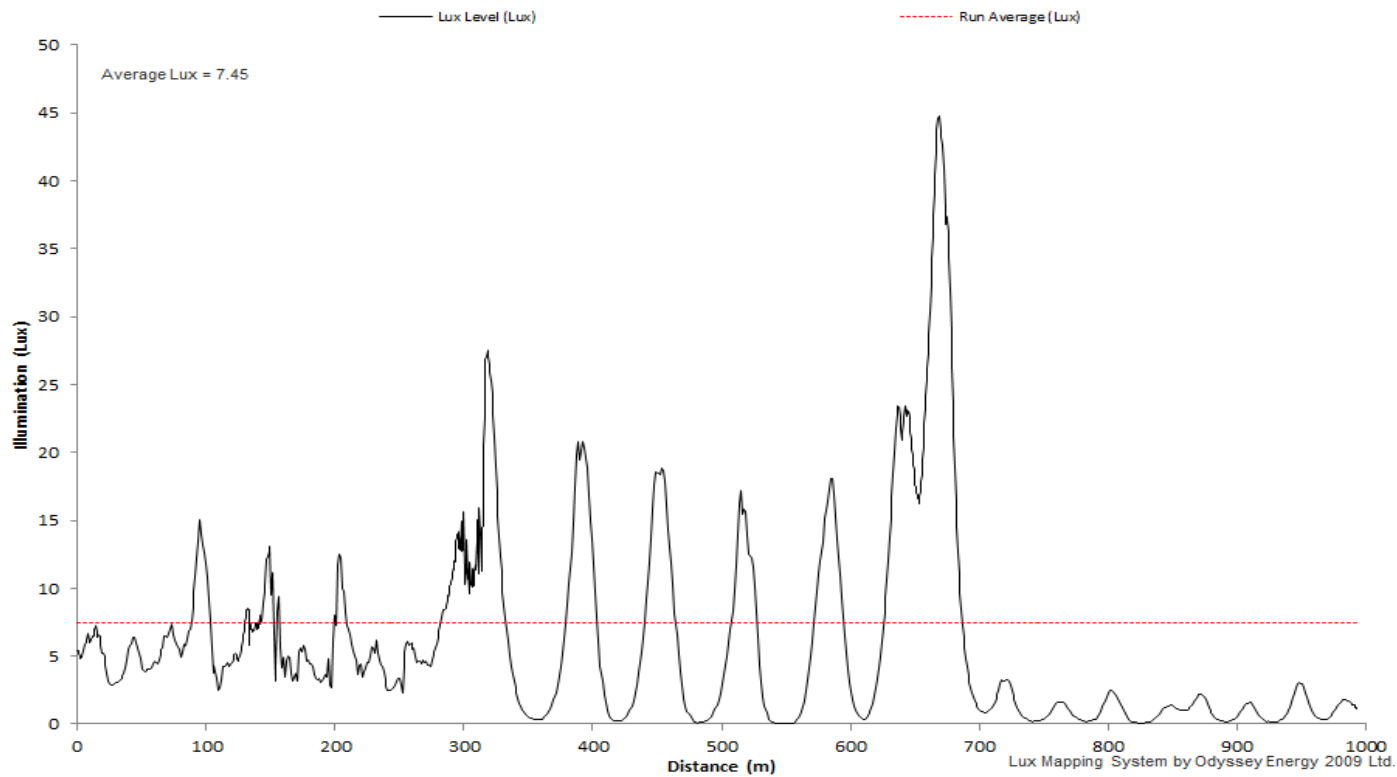
Case 1: Monitoring performance of new technologies (LED lights) and assessment of appropriate cleaning periods



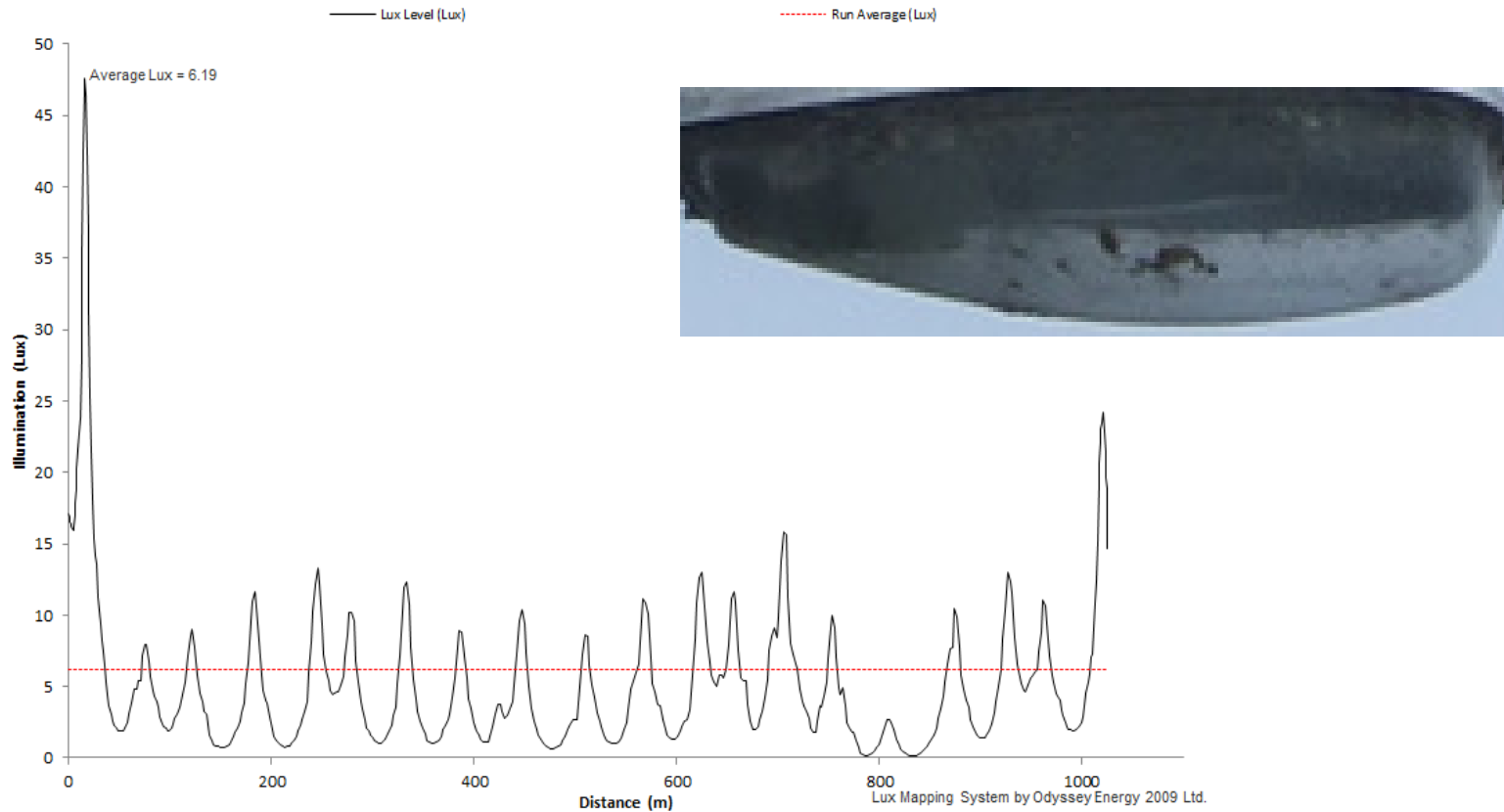
Case 2: Performance assessment of LED dimming systems, post project audit of new installation



Case 3: Identification of poorly lit road section and prioritisation of poorly performing lights



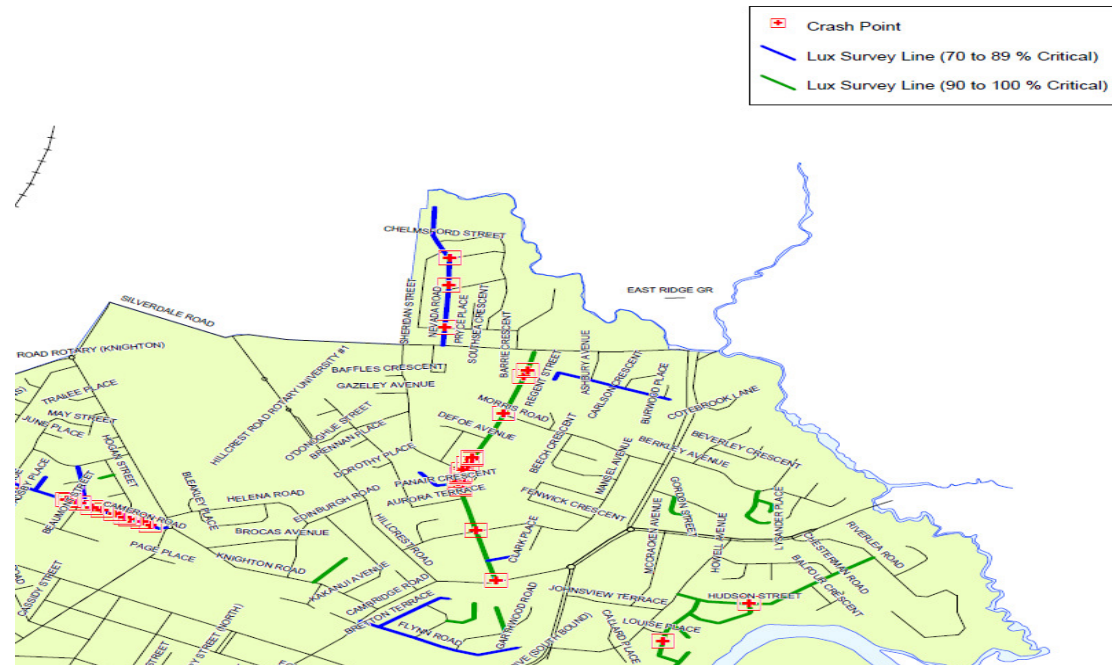
Case 4: Light Performance to single light level



Case 5: Prioritisation list, custom mapping

Lux Mapping data can be combined with other maps or layers e.g.:

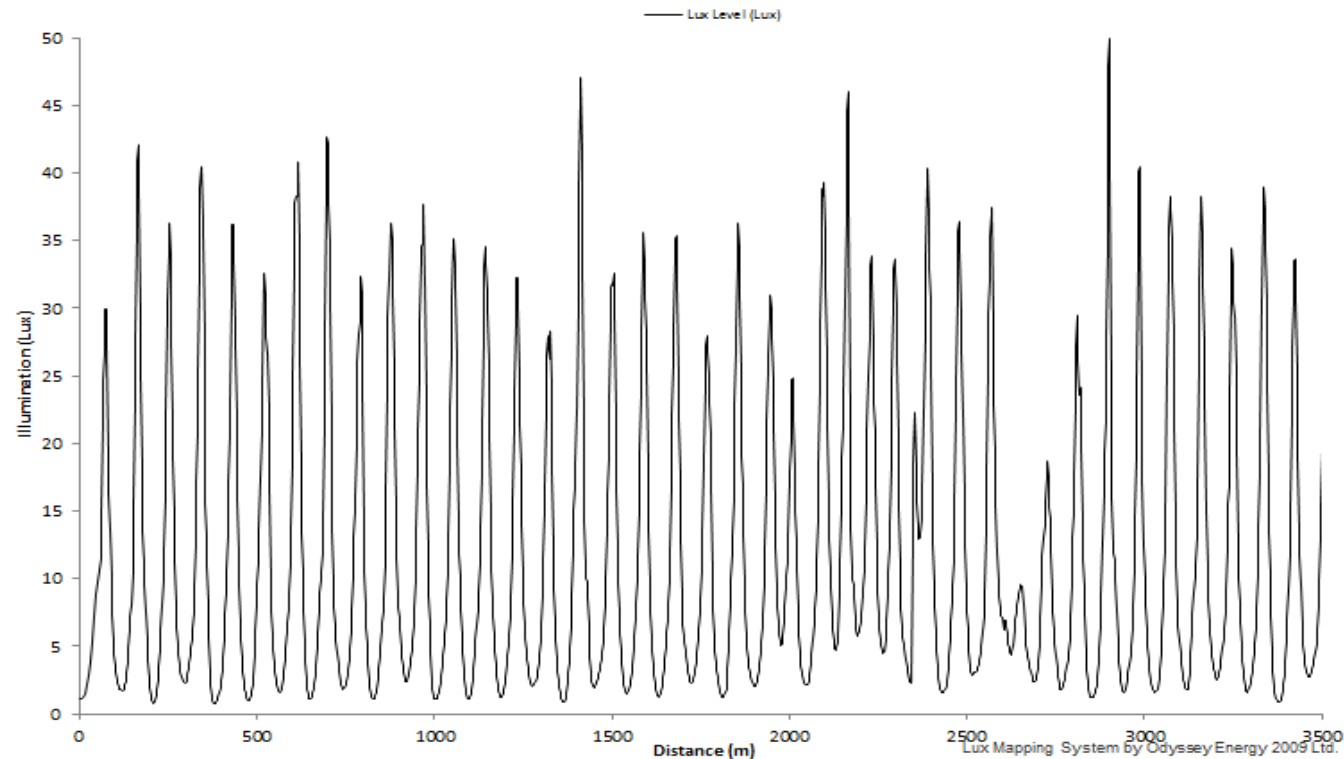
- Crime data
- Cycle routes
- Night time public transport routes
- Pedestrian or vehicle traffic count



Lux Mapping + crime data + cycle routes + night time public routes + pedestrian traffic = more confidence in safety, long and short term prioritisation lists and budget planning

Case 6: Asset maintenance optimisation (lux survey with the aim of optimisation of bulk lamp changes for motorways)

Lux survey for test, Road ID = 3 on 31/1/2014, 11:51:2 p.m.



Users of Lux Mapping include:

New Zealand

- Auckland Motorway Alliance
- Hamilton City Council
- Hastings District Council
- Waikato District Council
- South Waikato District Council
- Strategic Lighting Partnership
- MWH
- Transfield Services

Australia

- Maintenance Contractor for Melbourne City Council
- Dubbo City Council
- Queensland Motorways
- Main Roads Western Australia

Road Lighting: Innovation, Efficiency, Safety

LED Lights:

New technology in the area of light source comprising all of the above aspects

Lux Mapping System:

Complimentary asset management tool comprising and delivering on innovation, efficiency and safety

Advantage:

Establishing connection between those two innovations is especially important now in the early stages of using LED lights when we are operating with statistical and theoretical figures. Field type real time surveys allow the auditing of lights in operation and will help with decisions on the most appropriate asset management practices

Lux Mapping System as an asset management tool

Benefits:

- Long term or short term prioritisation, planning / distribution of future budgets
- Quick Identification of critical road sections.
- Audit of new technologies
- Audit of new lighting installations and dimming systems
- Real time not theoretical assessment of light performance
- Planning of maintenance activities

Conclusions:

There are several valid conclusions in report regarding City of Los Angeles LED trial “**Changing our Glow for Efficiency**” author **Mr Ed Ebrahimian**, I will particularly draw your attention to those two below.

- Trust but verify
- Realty versus theory

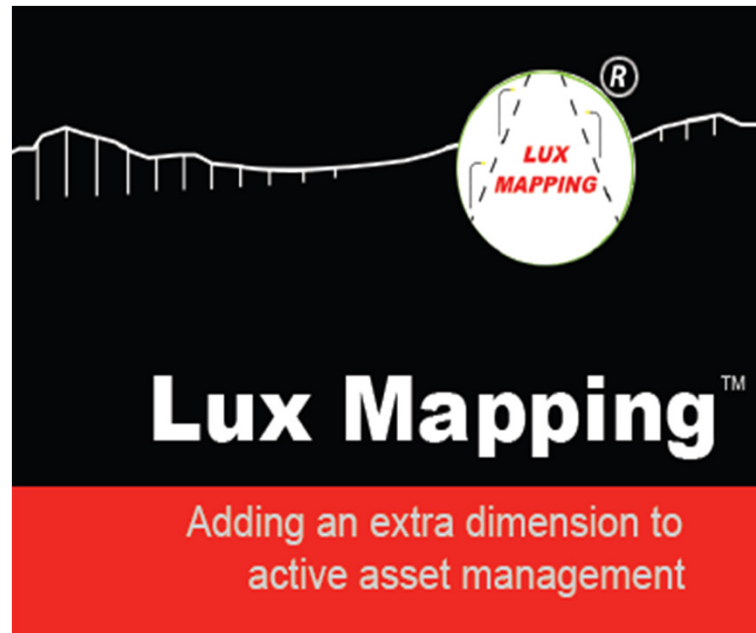
Lux Mapping System as an asset management tool

Our conclusion in line with the motto of this conference is:

- Be mindful of **Innovation/s** .
- **Efficiency** also means cost savings.
- **Safety** and saving human lives has no price.

The above conclusions certainly have a place in asset management process and if that has not been case before we have every chance to start now!

Thank You, See us at booth 8



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