



### Document Control

Rev	Date	By	Comments
A	Jan-20	M.Boylan	First Draft
B	Dec-20	M.Boylan	Second Draft
C	Jan 21	M.Boylan	Continued works to document to allow for release
D	Jan 21	UOL	Sign off for release

### Design Guidance

1. This document shall be read in conjunction with the University Guidance Document “GD” series of guides which give greater information regarding the philosophies of low carbon design and the need to try to minimise the services plant carbon footprint.
2. The University has declared a Climate Emergency and needs to reduce its carbon footprint. Buildings should be designed with a view to greatly reducing the electrical demands of the services installations wherever possible and where economic in overall life cycle terms taking into account all factors including carbon costs and reduction of carbon emissions. This is to be achieved by a combination of good design, intelligent controls and adequate metering.
3. Reference should be made to the detailed University’s electrical technical specification. Where there are discrepancies between this document and the University standards clarification shall be obtained from the University before proceeding.
4. Life cycle cost appraisals must be undertaken at early design stages in respect of the preferred electrical design solutions, especially lighting systems and intelligent controls, to the same to allow decisions to be taken as to the best overall choice in life cycle terms. This is to include energy, carbon, capital and maintenance costs. Refer to GD series for further Guidance.
5. This design guide outlines the requirements of the University for external Lighting systems. This design guide does not cover the requirements for emergency lighting systems or internal lighting systems. Please refer to ES05 “Emergency Lighting Systems” and ES04A “Internal Lighting Systems” respectively.
6. External lighting shall be designed in accordance with the relevant requirements of the below documents
  - The Society of light and lighting (CIBSE) LG02 (Lighting for healthcare premises)
  - The Society of light and lighting (CIBSE) LG04 (Sports Lighting)
  - The Society of light and lighting (CIBSE) LG05 (Lighting for education)
  - The Society of light and lighting (CIBSE) LG06 (The Exterior Environment)
  - The Society of light and lighting (CIBSE) LG16 (Lighting for stairs)
  - BS EN 12464-2 (Lighting of work places. Outdoor work places)
  - Sport England (Design Guidance Note)
  - IET Requirements for Electrical Installations - BS7671 – 18<sup>th</sup> edition
  - BS EN 40 (Lighting Columns)
7. External lighting shall be designed to ensure light pollution is reduced as far as reasonably practicable. Guidance to achieve such design criteria is available from the international dark sky association website.
  - <https://www.darksky.org/>
8. External lighting systems shall be designed to reduce future high risk maintenance activities such as working at height. It is foreseeable that working at height will be required for external lighting installations however, steps can be taken to reduce this risk, such as retractable lighting columns. Such design will ensure the ‘designer’s responsibilities within the Construction Design Management regulations 2015 are met with regards: ‘eliminate, reduce or control foreseeable risks that may happen during construction or maintenance and use of a building once it has been built’. Please reference the ‘Columns and accessories’ section for guidance on installing retractable columns.
9. Coordination between external lighting systems and CCTV systems shall be considered as to ensure the operation of the lighting system does not detrimentally affect the operation of CCTV. The security implications of a project should be considered and the design of the external lighting system should reflect such requirements.
10. Control of external luminaires shall be via the Telensa CMS system in all installations. An exemption to Telensa CMS control would be for external luminaires, which are not required for continual night time operation. For example: external plant compounds. In this scenario a suitable localised control method can be used.
11. The Telensa CMS system works with a software package entitled ‘PLANet’. No other software packages are required to install a Telensa compatible system. The University of Leicester already owns the software package and has a remote hosted solution from Telensa.



12. Consideration should be made to the location of the proposed project, as the Telensa system is an RF based system and additional base stations may be required. Please refer to UOL Estates for guidance on coverage.
13. Integration of Telensa CMS control should be designed to achieve individual luminaire control. Designs that incorporate a Telensa component to switch several luminaires should generally be avoided however, may be required dependant on the luminaire types specified.
14. All external luminaries and accessories should be specified as RAL 9007 and in-ground luminaires as stainless steel in order to achieve a consistent aesthetic across UOL sites. Exemptions may be made due to the architectural merits of a project and or planning constraints, however deviation should generally be avoided where possible.
15. Local isolation for each luminaire should be factored into design as far as reasonably practicable. Examples of this would be to ensure that a column mounted luminaire has an appropriate cut-out installed at the base of the column. Wall mounted luminaires above 3M in height should have an appropriate rotary isolator installed next to the luminaire. Some installations may omit wall mounted rotary isolators due to the aesthetic impact which may negatively affect the architectural merits and or planning constraints of the project. However, where possible we would encourage the installation of such devices to assist in future maintainability. If the outcome is to remove the local isolation due to the above circumstances, then Estates should be consulted about this before installation starts, and the project should have evidence of this being signed off by Estates.
16. Any electrical works undertaken should comply with the most recent version of BS7671.
17. Within the design there will be various locations where flexible cable will be specified, for example from a rotary isolator to a wall mounted luminaire. The cable should be specified in line with BS7671 and appropriate for use within the environment intended. The use of HO7RN-F style rubber black flexible cable shall be used when the use of a flexible cable is required.
18. For guidance on emergency lighting please refer to ES05. The external lighting system should be separate to emergency lighting. Any proposed interlink between should be agreed by UOL Estates. 'Combined' external and emergency luminaires are not permitted.

### Design Components – Isolation Equipment

Item	Manufacturer	Comments
<b>Rotary Isolator</b>	Siemens	<p>A rotary isolator should be installed for each wall mounted luminaire which is above 3M in height, and for installations of low level lighting such as wall and ground recessed luminaires by installing the isolator on a wall local to the luminaires at 3M height. The rotary isolator should have a grey enclosure and black operating rotary switch. Under no circumstances should yellow and red isolation devices be installed. The current switching rating of the isolator should be equal or greater than the circuit protective device. When a rotary isolator cannot be used due to the architectural and or planning restraints, the circuit protective device shall act as the point of isolation for future maintenance.</p> <p>The University generally uses the below product for this requirement:</p> <p>Siemens - 3LD2064-1GP51</p>
<b>Cut-Out</b>	Kingfisher Lighting Iguzzini	<p>Cut-Outs should be suitably sized and rated for the appropriate number and size of cables to be terminated within the column. Only the line conductor should be fused within the cut-out.</p>



### Design Components – Control System

Item	Manufacturer	Comments
<b>NEMA Tele-Cell</b>	Telensa	<p>The (NEMA - Dimming tele-cell) shall be used with all luminaires that incorporate a NEMA socket to (ANSI C136.41) (7 Pin). Luminaires incorporating this socket should be fitted with a DALI driver. The electrical load of the luminaire should be through the tele-cell.</p> <p>The (NEMA tele-cell) shall be used with all luminaires that incorporate a NEMA socket to (ANSI C136.10) (3 Pin). This version does not require a DALI driver.</p> <p>Note: Sockets installed to (ANSI C136.41) or (ANSI C136.10) shall be installed at a height =&gt;3M.</p> <p>Note: telecells should have an un-switched electrical supply.</p>
<b>Conduit Tele-Cell</b>	Telensa	<p>The Conduit Dimming tele-cell shall be used for luminaires and control panels where the installation of a NEMA socket is not possible. Drivers being controlled should be DALI. The load of the circuit should be through the tele-cell.</p> <p>Another variant of this product is available without dimming functionality. This version does not require the driver to be DALI.</p> <p>Note: telecells should have an un-switched electrical supply.</p>
<b>2-Part Tele-Cell</b>	Telensa	<p>The 2-Part Dimming Tele-Cell should be used for luminaires and control panels where the aesthetic or physical mounting surface does not allow for a conduit tele-cell to be utilised. Drivers being controlled should be DALI. The load of the circuit should be through the Tele-Cell.</p> <p>Another variant of this product is available without dimming functionality. This version does not require the driver to be DALI.</p> <p>Note: telecells should have an un-switched electrical supply.</p>
<b>Post Top Tele-Cell</b>	Telensa	<p>The Post Top - Dimming Tele-Cell shall be used within heritage style luminaires that do not allow for any external mounting of equipment. The Post Top Tele-Cell is compatible with an internally mounted NEMA socket to (ANSI C136.41) (7 Pin). Luminaires incorporating this socket should be fitted with a DALI driver. The electrical load of the luminaire should be through the tele-cell.</p> <p>The Post Top Tele-Cell shall be used with all luminaires that incorporate an internally mounted NEMA socket to (ANSI C136.10) (3 Pin). This version does not require a DALI driver.</p> <p>Note: telecells should have an un-switched electrical supply.</p>



### Design Components – Luminaires

Item	Manufacturer	Comments
<b>Column and bracket mounted</b>	Iguzzini	Luminaires should incorporate the below minimum requirements. <ul style="list-style-type: none"> <li>• NEMA socket to (ANSI C136.41)</li> <li>• DALI driver</li> <li>• LED light source</li> <li>• 100,000h</li> <li>• L80</li> <li>• B10</li> <li>• CRI 70</li> <li>• CCT 3000K (Higher CCT not permitted)</li> <li>• MacAdam Step 5</li> <li>• Lm/W 100</li> <li>• IP65</li> <li>• IK10</li> <li>• Protection against over voltages 10KV</li> <li>• RAL 9007</li> <li>• Passive cooling only / Active cooling not permitted</li> <li>• No upward emission of luminous flux</li> </ul>
	D.W.Windsor	
	Dextra	
	Thorlux	
	Signify	
<b>Wall and ceiling</b>	Iguzzini	Luminaires should incorporate the below minimum requirements. <ul style="list-style-type: none"> <li>• On / Off operation acceptable / DALI preferred</li> <li>• LED light source</li> <li>• 100,000h</li> <li>• L80</li> <li>• B10</li> <li>• CRI 70</li> <li>• CCT 3000K (Higher CCT not permitted)</li> <li>• MacAdam Step 5</li> <li>• Lm/W 75</li> <li>• IP65</li> <li>• IK07</li> <li>• RAL 9007</li> <li>• Passive cooling only / Active cooling not permitted</li> <li>• Integral / external Telensa CMS control</li> <li>• No upward emission of luminous flux</li> </ul>
	D.W.Windsor	
	Dextra	
	Thorlux	
	Signify	
<b>Bollard and light stacks</b>	Iguzzini	Luminaires should incorporate the below minimum requirements. <ul style="list-style-type: none"> <li>• On/Off operation acceptable / DALI preferred</li> <li>• LED light source</li> <li>• 100,000h</li> <li>• L70</li> <li>• B20</li> <li>• CRI 70</li> <li>• CCT 3000K (Higher CCT not permitted)</li> <li>• MacAdam Step 5</li> <li>• Lm/W 50</li> <li>• IP 65</li> <li>• IK10</li> <li>• RAL 9007</li> <li>• Passive cooling only / Active cooling not permitted</li> <li>• Integral Telensa CMS control</li> <li>• No upward emission of luminous flux</li> </ul>
	D.W.Windsor	
	Signify	



### Design Components – Luminaires

Item	Manufacturer	Comments
<b>Wall / ground recessed</b>	Iguzzini D.W.Windsor	<p>Luminaires should incorporate the below minimum requirements.</p> <ul style="list-style-type: none"> <li>• On/off operation acceptable / DALI preferred</li> <li>• LED light source</li> <li>• 70,000h</li> <li>• L70</li> <li>• B10</li> <li>• CRI 70</li> <li>• CCT 3000K (Higher CCT not permitted)</li> <li>• MacAdam Step 3</li> <li>• Lm/W 30</li> <li>• IP65</li> <li>• IK08</li> <li>• RAL 9007 or similar for wall mounted</li> <li>• Stainless steel finish for ground recessed</li> <li>• Passive cooling only / Active cooling not permitted</li> <li>• Remote Telensa CMS control required</li> <li>• No upward emission of luminous flux for wall recessed luminaire</li> <li>• Telensa schedule required to reduce running hours or light output of ground recessed luminaires in late night operation to reduce light pollution.</li> </ul>
<b>Sports Pitch</b>	Luceco Kingfisher Signify Abacus Venture	<p>Luminaires should incorporate the below minimum requirements.</p> <ul style="list-style-type: none"> <li>• On / Off operation acceptable / DALI preferred</li> <li>• LED light source</li> <li>• 100,000h</li> <li>• L70</li> <li>• B10</li> <li>• CRI 70</li> <li>• CCT – (to be selected in line with Sports England Guidance)</li> <li>• MacAdam Step 3</li> <li>• Lm/W 130</li> <li>• IP65</li> <li>• IK08</li> <li>• Passive cooling only / Active cooling not permitted</li> <li>• Integral / External Telensa CMS control with local control</li> <li>• No upward emission of luminous flux</li> </ul>
<b>Colour changing</b>	Iguzzini D.W.Windsor Signify Dextra	<p>Luminaires should incorporate the below minimum requirements.</p> <ul style="list-style-type: none"> <li>• DALI Driver</li> <li>• LED light source</li> <li>• 50,000h</li> <li>• L70</li> <li>• B10</li> <li>• RGB / RGBW Preferred with 3000K CCT</li> <li>• Lm/W 25</li> <li>• IP65</li> <li>• IK05</li> <li>• Passive cooling only / Active cooling not permitted</li> <li>• Standalone colour changing controls, Overridden on and off by Telensa CMS controls.</li> <li>• Where possible reduce upward emission of luminous flux.</li> </ul>



### Design Components – Columns And Accessories

Item	Manufacturer	Comments
<b>Columns</b>	Iguzzini D.W.Windsor Kingfisher Abacus Pudsey Diamond	Columns to be specified to ensure the weight and windage of the items to be installed is within the specifications as supplied by manufacturer. Columns to have access door to allow for cut-out to be serviced. Columns to be produced to RAL 9007, Exemptions may be made due to the architectural merits of a project and or planning constraints, however deviation should generally be avoided where possible. Retractable columns shall be utilised for all columns >6M in height.
<b>Column Brackets</b>	Iguzzini D.W.Windsor Kingfisher Abacus Pudsey Diamond	Manufacturers specifications should be followed to ensure correct brackets are installed on columns. Particular attention to any windage and weight additions posed by the bracket should be factored into the design to ensure the manufacturer's specifications are not exceeded. All bracketry should be produced to RAL 9007, Exemptions may be made due to the architectural merits of a project and or planning constraints, however deviation should generally be avoided where possible.
<b>Column Protection</b>	Pudsey Diamond or equivalent	Pudsey Diamond produce a 'Column Guard' for root or flange mounting at the base of a column. Consideration should be made to the requirement for column protection as to ensure the column is protected by vehicular traffic.
<b>Column Banner Brackets</b>	BannerFlex Europe	<p>If column mounted banners are to be utilised, it is important that the additional wind loading that is to be applied to the column does not exceed the structural capacity of the column. It is also important that the installation of the bracketry does not compromise the structure of the column. Banner brackets should only be secured to columns by the use of 19mm stainless steel banding, with appropriate clips.</p> <p>To protect the paint finish of the column a 2mm thick Neoprene Rubber strip should be placed between the column and the bracket. Generally the neoprene rubber strip can be purchased in a roll and trimmed to the required length to suit the column diameter. The height of the neoprene rubber strip will be dependent on the type of bracket purchased, however 200mm seems to be generally correct for most brackets.</p> <p>Manufacturer's installation instructions should be followed upon installation.</p> <p>Column banner brackets and hardware should be RAL-9005 (Black).</p> <p>Column brackets should comply with EN40.</p>