Technical Report.

GLOSSOP NORTH END AFC – PROPOSED FLOODLIGHTING TO THE FOOTBALL PITCH

20/05/2016

FOOTBALL PITCH FLOODLIGHTING
LOW LIGHT POLLUTION INSTALLATION

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Glossop North End AFC and Abacus Lighting Ltd are proposing the installation of purpose built floodlighting to the natural turf pitch.

Abacus Design Outline.

In designing as suitable floodlighting solution for the sports pitch at Glossop North End AFC key specification issues had to be considered. These included the illuminance level required, the environmental zone category for the site, the minimum mast height & the number type of floodlights. Details of how these issues were resolved are as follows:-

1. To ascertain the illuminance level required we referred to the Footballo Associations minimum requirements for football This requires a maintained illuminance level of 250 Lux over the whole pitch. This is based on Competitive Training and match play.
2. For the relevant environmental zone reference was made The Institution of Lighting Engineers: *Guidance Notes for The Reduction of Light Pollution, 2000.*(as attached). This document categorises the environment into four zones ranging from National Parks to City Centres. The site at Uttoxeter would fall into Zone E3 for a urban location
3. The mast height was calculated using the method detailed in the CIBSE guide LG4 "Sports Lighting". This uses angles projected from the centre of the pitch & the touch line to produce a head frame location zone. When applied to this project the optimum mast height ranged from 12m to 18m for the Pitch. A 15m mounting height was chosen as it would allow the floodlights to be mounted horizontally. This will result in low vertical overspill & good uniformity on the playing surface, without compromising cost. The 15m HL250D15 mast will offer a slimline profile which will minimise daytime impact. If the mounting height was reduced to 12m the floodlights would be elevated above the horizontal consequently increasing overspill.
4. In order to meet the requirements of The Institution of Lighting Engineers: Guidance Notes for The Reduction of Light Pollution, 2000, the Abacus AL5760 Challenger 1 floodlight, using **Flat Glass Technology** was chosen as being suitable. Details of the main features of this product are highlighted below.
5. Abacus have taken every care and consideration into the floodlighting design, this includes installing rear floodlight shields, front cowls and positioning of the masts to reduce the impact of floodlights on the local properties. Abacus appreciate that the floodlights and masts are going to be noticeable, however everything has been undertaken and designed to ensure that this provides minimal impact on the neighbours.

Abacus AL5760 Challenger 1 Floodlight.

The Abacus AL5760 series floodlight has been specifically designed to fulfil the requirements of sports area lighting. It is particularly suited to applications were low light pollution is essential. The floodlight incorporates the **Abacus Light Control** system to ensure that light pollution is minimised.

The AL5760 series floodlight features a **Double Asymmetric** reflector which a produces full flow of light over the application area. The main beam of light is emitted at an angle of 60 degrees forward when the front glass is horizontal. This results in a flat floodlight appearance & as a consequence reduces the area of reflector visible to residents outside the site.

The **Internal Baffle** re-directs upward waste light back into the floodlight beam, providing increased efficiency. At angles above the beam it also shields the view of the lamp, thus reducing glare to participants.

By using **Flat Glass Technology** overspill & upward light is therefore reduced in the surrounding environment.

The AL5760 series has been designed to accept many lamp types from several manufactures, including the latest metal halide & high pressure sodium, double-ended lamps. The use of double-ended lamps ensures that the light source is always located precisely in the optical system, further improving light control & installation accuracy. Rear lamp access also allows ease of maintenance.

Further features of the Challenger 1 include the following:-

- Compact wind area, this allows smaller mast & foundations to be used.
- High quality, high pressure die cast body, finished polyester powder coated grey.
- High purity polished reflector system.
- Toughened front glass.
- IP66 ingress protection (floodlight housing & ignitor box).

For full details of dimensions & specification please see the colour brochure enclosed.

Please see pictures below of recent installations using the above floodlight.

Abacus Lighting Design

The Abacus lighting proposals are detailed on the design, these show the mast locations, floodlight orientations, illuminance levels on the pitch & projected overspill values.

For the pitch the design achieves a maintained minimum illuminance value of 250 Lux with a uniformity in excess of 0.6 which meets the requirements of the Football Association. The maintained illuminance values are calculated using a maintenance factor of 0.8. This takes into account light losses due to dirt accumulation on the floodlight front glass & lamp lumen depreciation, ensuring that the minimum requirements for safe play are achieved.

The use of the Challenger 1 floodlight ensures that horizontal & vertical overspill containment is excellent. As less than 10 Lux vertical illuminance will be projected towards any residential property windows the system will exceed the requirements for an environmental zone E3 location. Upward waste light will also be minimised & at the floodlight elevations used 0% will be projected into the atmosphere. This will meet the recommendations of The Campaign for Dark Skies, an organisation who lobby for low light pollution systems & recommend the use of Abacus Challenger 1 systems.

All design calculations have been undertaken using an open, unobstructed site, the values of overspill will be further reduced any existing mature trees or natural screening.

Conclusion.

The proposed system would be suitable for installing in an environmental zone E3, meeting the most stringent of light control parameters whilst maintaining the specified illuminance levels for the sports pitch.

The impact on residents will be minimised as overspill values into gardens will be no more than moonlight & vertical illuminance into windows before curfew are below the values recommended by the ILE. Daytime visual impact will also be minimised by using slimline masts & light grey floodlights which do not stand out against the skyline.

For reference please see below a description of lighting levels.

Light Source	**Horizontal Lux**
Full Moon	0.3 to 0.5
Street Lights – Footpath	3 to 10
Street Lights – Residential Area	5 to 15
Typical City Centre Car Park(non retail)	20 to 30
Office/Classroom	250 to 750
Professional Stadium	800 to 2500
Sunny Day	80,000 to 120,000

Once installed the AL5760 series light control system will provide the optimum sports lighting solution, ensuring that light reaches the sports surface & not into the sky or polluting the environment.

Abacus Lighting Limited are world leaders in the design & manufacture of low pollution exterior lighting solutions. For further information regarding Abacus low light pollution products please contact our Head Office on 01623 511111 or visit our Web Site www.lighting4sport.com

For and on behalf of **Abacus Lighting Limited**

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