

Justification Statement – Replacement Light Fittings

This statement is provided in support of our application for Listed Building Consent to replace and upgrade the internal artificial lighting within the principle hall of the building.

The project to refurbish and update the hall is a desire by the school to provide the best learning environment possible whilst reflecting the historic nature of the building. The hall is currently used for assembly and some events, but the current lighting is not longer fit for purpose especially as the School now wish to maximise the building for wider uses such as for examination, performance and dining.

The main hall currently features high level sodium floodlights in inelegant fittings mounted visibly in the apex of the roof. The roof is an impressive hammer truss construction with exposed timber elements drawing the eye upward to be met by the unsympathetic and unattractive flood light fittings.

These lights provide a medium to low level of illumination which is uncontrollable, orange tinted and provide a flat light which is unsympathetic to the historic fabric.

In the proposals to increase the use of the hall, replacing the existing light fittings was high on the School's list of priorities. The school's desire is to provide elegant pendant light fittings that can provide an easily controllable multiple light levels for different uses whilst being able present the building more favourably.

The ambition is for a range of light 'scenes' for different uses and occasions as follows.

- Assembly – general good quality light
- Occasional dining/events – atmospheric lighting
- Examination – a even light with no shadows
- Performance – dimmable general and atmospheric lighting
- Teaching - a even light with no shadows

The most technically difficult lighting to achieve is that for teaching and examination. The light level needs to be high to remove eye strain and give good definition at desk level. Shadows needs to be minimised which requires the light fittings to be lower than the truss zone of the roof.

The light fittings that are proposed are elegant single pendant fittings that contain 3no dimmable lamps that can be separately controlled. A downlight for task lighting, a radiant light for general illumination and an uplighter for showcasing the roof structure. However, these lights still need to be supplemented by additional lighting to reach the higher light levels required by examination and teaching functions. A light level of 500 lux is widely accepted by both CIBSE and examining bodies as the minimum requirement for examinations.

There is a balance to be struck between providing supplementary lighting or providing more pendant fittings. Both of which have draw backs in that the roof space could become cluttered with too many fittings and this would distract from the roof itself.

For the School, it is vital that exams can be accommodated in Pears School. There is a reliance on increased examinations in Schools and the School is fast running out of suitable venues on campus. Therefore, as a suitable large space it is the Schools desire to use Pears School as a venue for examinations amongst other functions to support the running of the School.

The locations of cable runs and controls have considered and will be located away from sight with minimum disruption to the building fabric. Utilising existing cable routes, existing light switch face plates/boxes and using the top side of trusses and timberwork where the cable is out of sight.

The Mechanical and Electrical Engineer has provided the following statement from a technical aspect.

Overview

The lighting scheme at Pears Hall can be reviewed on the previously issued drawings and renders from the lighting software that has been designed following meetings with school, lighting manufacturer and Architect. The school have put forward their brief to us for this space and the vision they have for utilising this building for the next 25 years.

Like so many buildings today, Pears Hall will need to cater for multiple different uses so the school can fulfil the buildings potential and use the space with confidence in future. The hall is in use on a daily basis.

Currently the main hall is illuminated by eight number high bay sodium fittings that have been in use for many years and provide a very basic warm output that cast shadows due to their location. These luminaires have been installed at circa 14 metres high and still use lamps which require replacing when they fail. The access requirements that are need to be put in place for maintaining the current fittings is always a task that is not relished by any member of the team at Repton.

To supplement the high bay lighting there are several directional lights that run the length of each side of the hall and are used primarily to pick out the detail of the structure. These are also aged sodium or Halide type fittings that provide the majority of their output upwards towards the ceiling although they are mounted at a more reasonable height for maintenance.

Below we have made reference to two of the principle uses of the main hall and how through the new scheme we intend to meet industry guidelines and help the school to use this space in the future.

Exams

The school are under significant pressure to provide a well illuminated space for exams. Pears Hall has become over the last several years a prime space for the school which they need to utilise as much as possible for the future. The main hall currently offers poor levels of lighting for this type of use and is currently well below the industry standards set out within Lighting guide 5 (LG5) CIBSE guidelines.

Current Lux Levels measured in the Main Hall

Balcony		
45	150	30
105	292	130
118	308	168
120	265	137
Stage		

Extract from CIBSE Lighting Guide 5

5.7.2 General lighting

The function of the general lighting in a multi-purpose room is to provide an overall uniform illuminance of acceptable colour rendering that is free from glare, and which may be dimmed. The designer should research and indicate the illuminance needed at working plane height, e.g. 0.85 m above the floor for desk based tasks or floor level for some sports. If no such survey can be made the designer should aim for a value of about 150 lux. If it is known that the room will be used regularly for examinations then the provision should be for 500 lux.

It can be seen that the light spread is not uniform in its spread nor does it achieve, in any part, the required light levels.

Private Hire Facility

The main hall has a large potential for public hire through weddings and private functions and while the current lighting scheme offers some luminance levels the output from the current system is very basic, functional and limited in its operation. Industry guidelines show that assembly halls, canteens and restaurants should be illuminated to

200lux, while dining halls should be offering 150 lux. Meeting rooms and conference rooms will be expected to meet between 300 – 500 lux depending on the more specific use. Currently the room may be deemed acceptable for some aspects of the private hire but falls short of being an acceptable level for conference facility.

The new design

Several options were calculated and discussed with the architect prior to settling on the design shown to date and with the design in its current form it is satisfying the architectural element and showing that we are meeting the technical calculations necessary for providing the different lighting levels.

The new design for the main hall allows for the space to be versatile and meet the modern-day standards required. The design allows for suspended glass pendants to be used primarily when the space is used in a more social environment and will also have the ability to be dimmed or programmed into groups in a pre-set scene setting system that will provide a very versatile system.

The use of the pendants alone will provide around 250 lux with the feature spot lights and the downlights below the balcony enhancing this further up to a maximum of 300 lux while also aiding the uniformity within the space.

To provide a lighting design that meets the requirement for a space known to be used for exams we need to enhance the design further and to facilitate this requirement we have used a circular high bay luminaire which has been suspended between the pendants but at a higher level. The high bay luminaires working along with the pendants provides 500 Lux and will provide a good level of light and uniformity for the area when used for exams.

FEA Summary

In summary, it is the nature of modern teaching that large spaces are sought after to accommodate the variety of activities required by the modern curriculum and out of school activities. It is vital for the School continued success that Pears School has the ability to provide accommodation for these events including to assist in the burden of yearly examination. The lighting design proposed has been developed to provide an elegant solution to this requirement while striking a balance between function, numbers of fittings and aesthetics to achieve the lighting levels required by outside agencies including examining bodies without distracting from the impressive architecture of the heritage asset.

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