

## Hadley Junior School, Telford, UK

UK2

### 1 Photo



Figure 1: Hadley Junior School

### 2 Project summary

#### *Project objectives:*

The main aim of the project was to reduce energy bills but the school head, Mike Jones, is a committed environmentalist and therefore the potential to achieve environmental benefits at the same time provided an additional motivation. The possibility of improving the insulation to the school buildings was considered but the payback period for this was not viable. However the electricity bills were more than double the heating bills and the quality of the existing lighting was poor. Therefore attention was turned to energy efficiency improvements to the lighting, which were found to be cost effective.

#### *Short project description:*

The lighting was redesigned using surface mounted 58 Watt, high frequency fittings with prismatic diffusers, reducing the lighting load from 24.4 kW to 9.71 kW. At the same time, the opportunity was taken to rewire the lighting circuits and lighting controls were also incorporated.

#### *Stage of construction:*

The project was completed in 2000

### 3 Site

Telford, UK, latitude: 52.4°N., longitude; 2.3°W. Altitude: 120 m. Temperate coastal climate. Mean annual temperature (Midlands): 10.1 °C, mean winter temperature: 4.8 °C.

### 4 Building description /typology

#### 4.1 Typology / Age

Typology/Age	Pre 1910	1910-1930	1930-1950	1950-1970	1970-
The main hall school				1	

1. The building is a Scola design but the original open plan layout has subsequently been sub-divided into individual classrooms.

#### 4.2 General information

Year of construction: 1973  
 Year of renovation (as described here): 2000  
 Total floor area: 1398 m<sup>2</sup>  
 Number of pupils: 230  
 Number of classrooms: 8  
 Typical class room size: 41 – 62 m<sup>2</sup>  
 window/glass areas (m<sup>2</sup>): not available  
 number of pupils: 29

Hours of operation: 40 hours/week, 40 weeks/year

#### 4.3 Architectural drawing

See Figure 2



Figure 3: Old type recessed lights

### 5 Previous heating, ventilation, cooling and lighting systems

The school is heated by an oil boiler and radiator systems, with natural ventilation. The previous lighting was provided by fluorescent lamps that were recessed within the ceiling and a large proportion of the light was lost within the fitting.

### 6 Energy saving features

Luminaires replaced with twin 58W high frequency fittings.  
 Ultrasonic and microwave sensors fitted to classrooms and project areas.

#### 6.1 Energy saving concept

The energy saving features of the project were more efficient high frequency lighting and automated lighting controls.

Fitting presence detectors to classrooms and work areas giving initial savings of 40% but based on the reduced figures of load above, this saving will be reduced by 36% to around 26%.

#### 6.2 Building

There were no improvements to the building fabric as part of this project.

#### 6.3 Heating

There were no improvements to the heating system as part of this project.

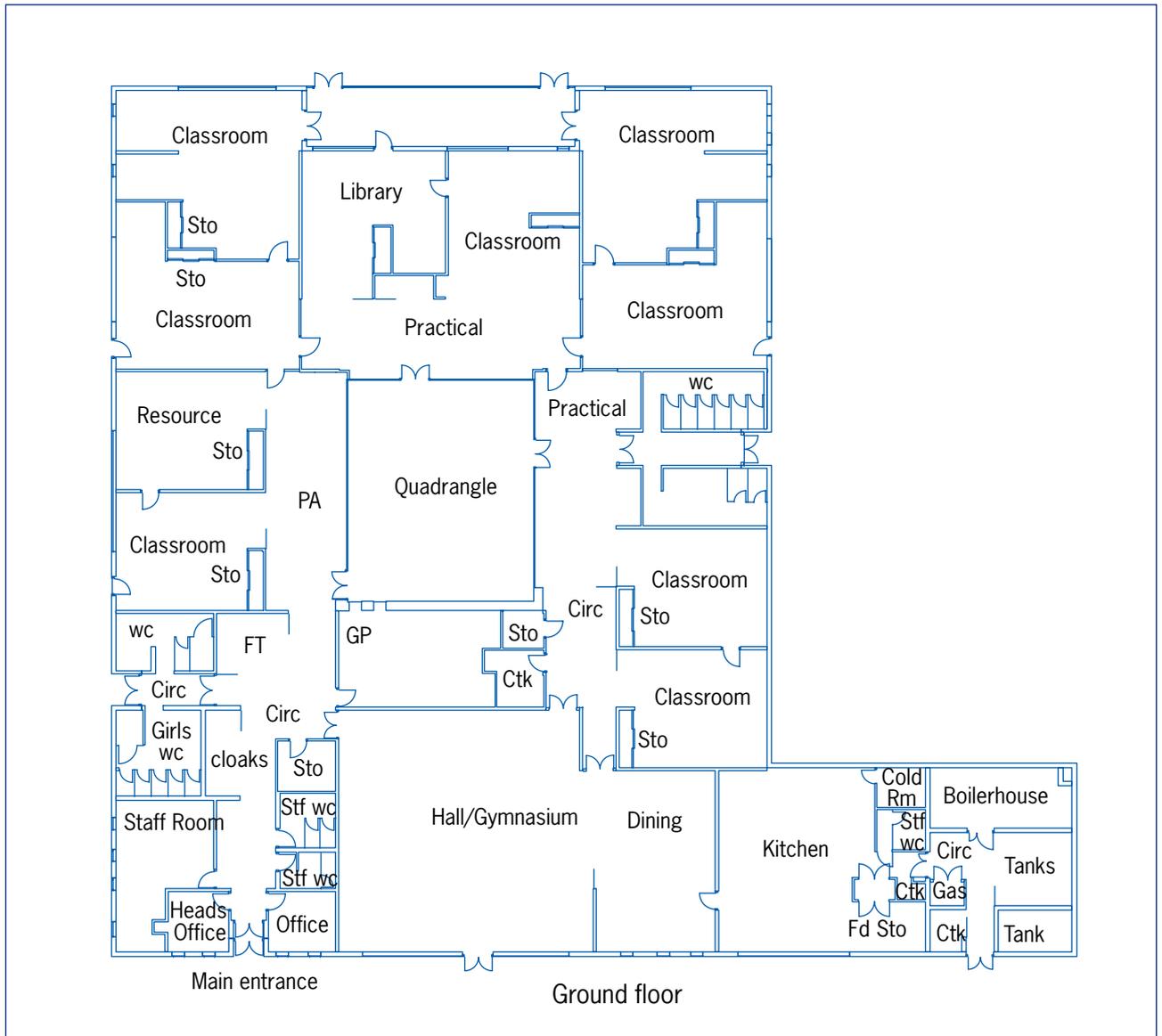


Figure 2: Junior school layout

**6.4 Ventilation:**

There were no improvements to the ventilation system as part of this project.

**6.5 Lighting**

The lighting load was reduced by 14.7 kW from 24.41 kW to 9.71 kW as a result of the replacement lighting, and this together with the lighting controls led to the electricity bills being halved. The building occupants also benefited from brighter lighting without any flickering.

**7 Resulting Energy Savings**

The estimated energy savings due to the energy efficient lighting were 23,520 kWh/year. In addition the energy savings estimated due to the lighting controls were an additional 26% of the reduced lighting load of 9.71 kW, i.e. 4,039 kWh/year. This gave a total estimated energy saving of 27,559 kWh/year. The electricity consumption for 2001/02 was 28,073 kWh and this is approximately half the consumption before the lighting improvements were carried out. Measured energy savings are not available since the project was



Figure 4: New surface mounted lights with occupancy sensors

completed before the “Eco Warrior” energy management system was installed that enables the lighting use to be monitored separately from other electrical use. (For details of the Eco Warrior system, see the case study UK5 on Ketley Junior School, Telford).

## **8 User evaluation**

The building occupants have benefited from their electricity bill being halved, saving about £2,000 per year, and also from an improved quality of lighting.

## **9 Renovation costs**

The total cost of the project, including the rewiring, was £15,158.43.

This was broken down as follows:

<i>Rewiring:</i>	£6,000.00
<i>Replacement lighting:</i>	£6,718.83
<i>Lighting controls:</i>	£2,439.60

## **10 Experiences/Lessons learned**

### **10.1 Energy use**

Electricity use was halved immediately after the work was carried out, but subsequently electricity usage has gone up again due to additional computer equipment installed at the school.

### **10.2 Impact on indoor climate**

No impact apart from the improved quality of lighting as already mentioned.

### **10.3 Economics**

The estimated simple payback period for the capital cost of the lighting and control improvements (i.e. excluding the rewiring cost) was 5 years.

### **10.4 Practical experiences of interest for a broader audience**

A number of the new high frequency ballasts failed when the voltage went above a certain point. This is believed to be due to the ballasts used not being of the highest quality, and is an ongoing problem. To prevent this recurring, a voltage regulator would need to be installed on the lighting circuit.

### **10.5 Resulting design guidance**

High quality ballasts should be used to avoid the problems experienced with the failure of ballasts where there is no voltage control.

## **11 General data**

### **11.1 Address of project**

Hadley Junior School,  
Crescent Road, Hadley, Telford, Shropshire TF1 4JU.

### **11.2 Project dates**

*Project initiation:* 2000  
*Design completed:* 2000  
*Renovation construction completed:* 2000  
*Monitoring and evaluation completed:* 2002

### **11.3 Date of this report/revision no.**

Draft 1 – 24/07/03

## 12 Acknowledgements

*Builder:* Not applicable  
*Architect:* Not applicable  
*Engineer:* Mike Webb, Energy Conservation Officer,  
Telford and Wrekin Council  
*National, international support programmes:*  
SchoolEnergy Programme  
*Author (of this description):*  
Alan Pither

## 13 References

none

