CRES Conference 15th October : LRC Gloucester, UK Energy Solutions













Footpath.

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PHASING - (Assuming retention of existing housing.)

Phase One . LRC and teaching facilities.



Phase Two. Sports Facilities additional LRC and teaching facilities.

Phase Three. To be determined.













CO² emissions : kg/m² per year



BRE : New Environmental Office



CO2 PRODUCTION for Typical Office Buildings



New Environmental Office, BRE

Internal Summertime Temperatures (1997)

- % of time over 25°C and 28°C (cf Datum year)



New Environmental Office, BRE Internal And External Temperatures - Hottest part of August 1997











Termodeck : Precast Hollow Core Planks





Structural Conditioning : Termodeck System





Building Element	Approved document U-Value (Wm- ² K- ¹)	Oxstalls Design U- Value (Wm- ² K- ¹)	Shading Coefficient
Flat Roof	0.25	0.20	
External Walls (exposed)	0.45	0.25	
Walls (Semi-exposed)	0.60	0.25	
Windows to North elevation of atrium		1.6	45
Windows (all others) (Double Glazed)	3.30	1.90 (effective U-value)	79
Rooflights (Double Glazed)	3.30	1.90	87
Ground floor – LRC	0.45	0.32	

Facade	Wall Area (m²)	Windows/doors Area (m²)	Percentage of wall area
North	576.9	375.2	65
East	200.6	77.8	39
South	496.5	152.8	31
West	245.8	67.5	28
Total	1519.8	673.3	45

The system will be based upon the following heat gains.

Lighting	11 Watts per m ² Assume 5.5W/m ² during peak summer months due to daylight saving system.
Workstations	130 Watts each (Assumed at 1 workstation per person)
General Teaching	10 Watts per m ²
General Offices	15 Watts per m ²
Lecture Theatre	10 Watts per m ²
Circulation area/Book Stacks	3 Watts per m ²
People	80 Watts latent, 60W sensible

- Light levels at workstations 350 lux.
- High frequency LG3 category 2 T5. fittings.
- Digital dimming controlled luminance detection at each fitting.
- Presence detection omitted at client's instigation

LRC North Elevation : Daylighting Model





Figure 2 Direct sunlight to work space, type 1 effect, May 18:00.

LRC North Elevation : Glare Control



Figure 4 Time/date plot, extent of type 1 effect, direct glare through "north" facade.

LRC North Elevation : Shading Options



LRC North Elevation : Glare Control



Figure 15 Illustration of reflections from water feature brightening shade surfaces (April, 13:00 and 17:40).



Figure 16 Illustrations of conditions for 21 June 18:15 and 19:10, with revised shading



Figure 17 Time/date plot, extent of type 1 effect, with revised shading

LRC North Elevation : Glare Control



Figure 6 Time/date extent of type 2 effect, direct glare through "west" facade





























Other electricity
Catering and vending
Office equipment
Lighting
Fans, pumps and controls
Refrigeration and heat rejection
Heating and hot water - electricity
Gas for catering

Heating+ dhw gas (normalised)





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