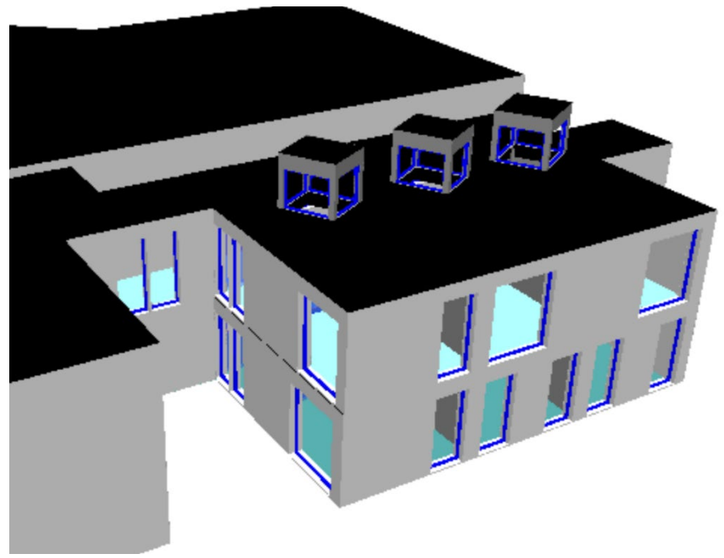
IN2
ENGINEERING DESIGN PARTNERSHIP

A1924 Leitrim Hive Extension



Daylight Assessment

28th of February 2020
Rev.04

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1.0 INITIAL DAYLIGHT ASSESSMENT

1.1 Methodology

Daylighting analysis was undertaking using a dynamic simulation model (Tas Software). The daylight analysis accounts for building form, orientation, adjoining buildings along with detailed framing, cill depth and glazing properties in accordance with the architectural design drawings. Simulation results are displayed as colour images contour plots showing the achieved values for average daylight factors.

Internal daylighting for all internal spaces were assessed by undertaking lighting simulations, enabling both quantification and visualisation of predicted illumination levels (lux) and uniformity. This enabled Average Daylight Factor (ADF) values to be determined for each floor space. Internal Lighting levels were determined for a CIE Overcast Sky of 10,000 Lux. This CIE sky is uni-directional, so façade orientation does not affect daylight factors.

The building has been assessed against the European Standard for Daylight in Buildings (EN17037) which utilises Median Daylight Factors as a means of assessing the quality of daylight within a space.

EN.17037 is based on achieving a requisite *Median* Daylight Factor (MDF) as opposed to *Average*; that is, that 50%+ of a space achieve at least the stipulated value. The methodology then calculates what the required MDF is for each EU location based on the Annual Median External Diffuse Illuminance. For Dublin, this is 14,900 Lux, so for target internal illuminance of 300 Lux, target MDF is 300/ 14,900 = 2.0% MDF.

To allow comparison, for a simple room shape, a 3% Average Daylight Factor (ADF) will achieve a 2.0% Median Daylight Factor (MDF).

The daylighting model were calculated based on the following assumptions:

- Glazing Transmission = 70%
- Ceilings: 82% reflectance (BS 00E55 White)
- Walls: 62% reflectance (BS 08B15 Off White)
- Floors: 36% reflectance (BS 00A05 Platinum Grey)

The visual results overleaf illustrate the daylight contours assessed for each applicable space.

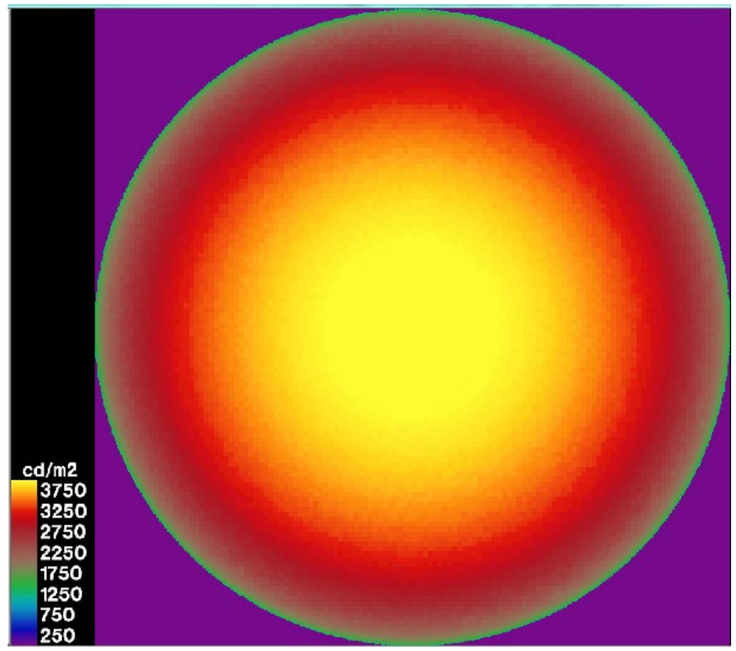

Fig 1.1 - CIE Overcast Sky

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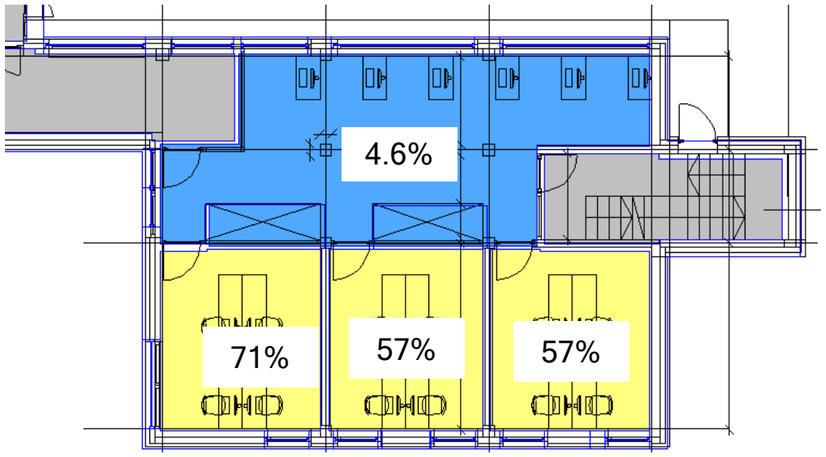
1.0 INITIAL DAYLIGHT ASSESSMENT

1.2 Results -

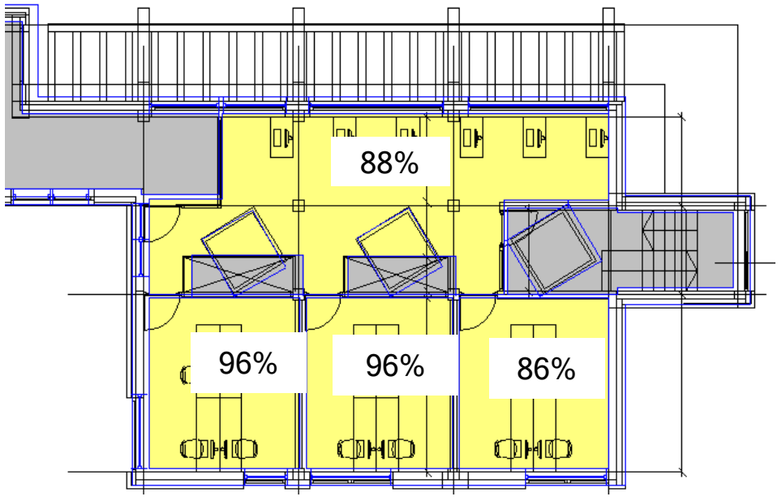
Daylighting analysis, as illustrated in figures 1.2.2 & 1.2.3, identifies the potential daylight availability for each space. The percentage area of each space achieving a 2% or greater daylight factor is shown below. The standard stipulates > 50% of space should achieve this value, i.e. medium daylight factor of 2%.

Ground Floor spaces does not meet the requirement.

MDF	@2%
FAIL	<50%
PASS	>50%



Ground Floor



First Floor

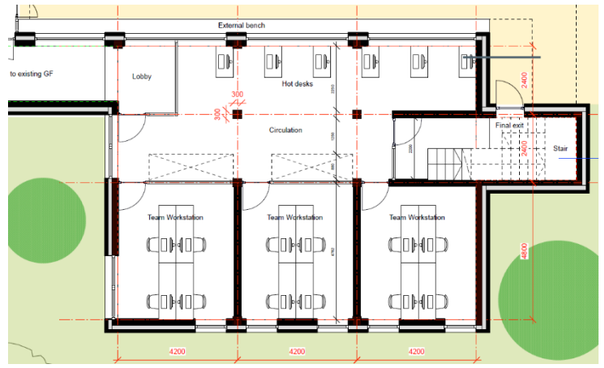


Fig 1.2.1 - Layout

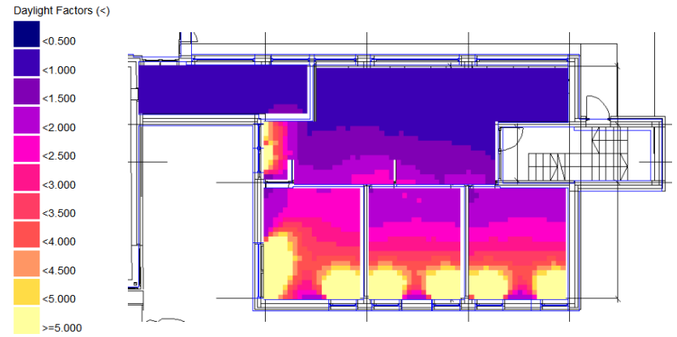


Fig 1.2.2 - Ground Floor

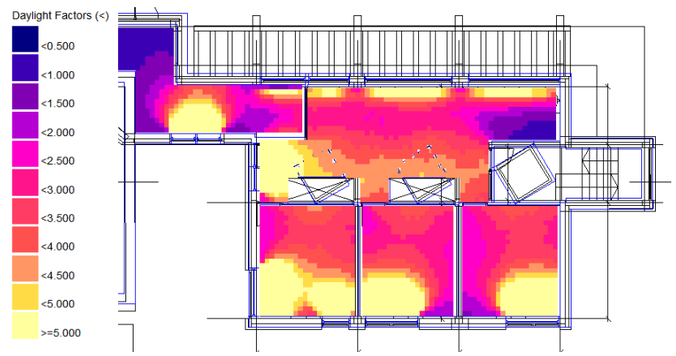


Fig 1.2.3 - First Floor