11/1443/FUL Response to CON 1/9/11

CHBSustainability

BUILDING SERVICES + SUSTAINABILITY CONSULTANTS

PROJECT FEEDBACK **31/08/11**

Response to: Climate Consulting Energy and Sustainability Strategy Review 25/8/11

CHBS Project Ref.: CHBS9090 Solum Twickenham
CHBS Report Ref.: Energy Statement 28-04-11 Revision B

Justification of CHP Sizing and assumption of 24 hr operation

Regarding the comparisons made between the original Energy Statement 26/10/2010 and the Revision B submission the following table directly compares the CHP sizing & specification.

It can be seen that the reduction in predicted baseload energy demand and CHP output per day (kWh) have changed approximately proportionally. It can also be observed that although the electrical efficiency of the proposed CHP unit has decreased the thermal efficiency and overall efficiency have increased.

From the comparison of the baseload and CHP thermal output it can be seen that the CHP design in the original Energy Statement was slightly oversized which would result in some rejection of heat generated, this would not be the case with the Revision B CHP design.

	Energy Statement 26/10/20	Energy Statement Revision B 28/04/11
Approximate Baseload (kWh/Day)	1,333	1,000
Reduction in Baseload	25%	
CHP Thermal Output (kWh)	76	39.9
CHP Operating Hours	17	24
CHP Thermal Energy (kWh/Day)	1,343	958
Reduction in Thermal Output	29%	
CHP Thermal Efficiency	42.2	58.4
CHP Electrical Efficiency	28.2	24.1
CHP Total Efficiency	70.4	82.5
Increase in Total CHP Efficiency	17%	

The CHP system has been designed to achieve maximum operating hours per day as per manufacturers recommendations, this is the most efficient operating regime for a CHP engine and avoids 'load searching' where an on and off operation is achieved as the CHP output is too high for the heat demand.

The CHP engine operates least efficiently and has the highest noise and emissions of the operational range at start-up, hence the number of hours of start-up operation should be minimised.

There will be short periods of maintenance, however, if each CHP engine if off line for 24 hours within a year then the annual CHP output will only reduce by 0.3% which can be considered negligible.

There will not be a 24 hour heat demand on the system, however sufficient buffer vessels and incidental storage within the system will act to smooth out the constant steady generation of heat from the CHP with the peaks and troughs of heat demand throughout the day.

Clarification of CHP emissions reduction calculation methodology

Within the Energy Statements SAP and SBEM methodologies have been used to model all scenarios.

Estimated development electricity demand and CHP electricity generation

Based on an assumed 24 hour operation the proposed CHP system will output 144,540 kWh/year of electrical power.

Based on the electrical demand for lighting and appliances estimated within SAP, SAP Section 14 and SBEM there will be an annual electricity demand of 287,589 kWh. So theoretically the CHP system will provide 50% of the site electricity demand. In practice there will be occasions where onsite demand will be reduced and the electricity generated from the CHP engine will be exported to grid.