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14.1 INTRODUCTION

14.1.1 This report has been prepared by Robin Pritchett of Cundall. It has been prepared to address the requirements for sustainability within the relevant planning policies.

Description of the site

14.1.2 The proposed development is located in the London Borough of Richmond upon Thames at the site of Teddington Studios (TW11 9NT).

14.1.3 The proposed development incorporates accommodation with a range of unit sizes in each building. A schedule of the proposed accommodation is given below:

Residential:

Building	Residential Area (m ²)
Building A	4,713
Building B	5,566
Building C	9,333
Building D	3,396
Building E7	1,156
Houses	854
Total	25,018

	Number
1 Bed Unit	45
2 Bed Unit	103
3/4 Bed Unit	71
Total	219

Scope of Assessment

14.1.4 The assessment is based on the national, regional and local planning policy requirements in respect of the site’s predicted carbon dioxide emissions.

Data Collection Methodology

14.1.5 The data presented is based on the results of modelling, in accordance with the requirements of the National Calculation Methodology defined in Part L of the Building Regulations.

14.2 POLICY CONTEXT

National Planning Policy

14.2.1 The National Planning Policy Framework (NPPF) was published in March 2012 and states a clear presumption in favour of sustainable development. The NPPF supports the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourages the use of renewable resources.

14.2.2 The NPPF replaces PPS22 and in Section 10 outlines its energy and climate change policies. To support the move to a low carbon future, local planning authorities should:

- i. Plan for new development in locations and ways which reduce greenhouse gas emissions;
- ii. Actively support energy efficiency improvements to existing buildings; and

- iii. When setting any local requirement for a building's sustainability, do so in a way consistent with the Government's zero carbon buildings policy and adopt nationally described standards.

14.2.3 In determining planning applications, local planning authorities should expect new developments to:

- i. Comply with adopted Local Plan policies on local requirements for decentralised energy supply unless it can be demonstrated that this is not feasible or viable; and
- ii. Take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption;
- iii. Have a positive strategy to promote energy from renewable and low carbon sources;
- iv. Identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

The key focus of the NPPF is to support local and regional planning authorities.

Regional Planning Policy

14.2.4 The GLA London Plan and GLA Energy Strategy are considered to be the benchmark for local planning regulation. Together they provide a useful tool against which to undertake energy and sustainability assessments. For the purpose of this assessment they have been used in conjunction with the requirements of the London Borough of Richmond upon Thames, to help incorporate a number of energy efficiency measures into the proposed development. The key requirements of the London Plan (2011) for new developments are:

14.2.5 **Policy 5.2** - requires that major developments, received after 1st October 2013, achieve a 40% improvement over the 2010 Building Regulation CO₂ Emission Target:

- a. 2010 – 2013 25 per cent
- b. 2013 – 2016 40 per cent
- c. 2016 – 2031 Zero carbon

14.2.6 **Policy 5.6** - requires all major developments to evaluate the feasibility of connecting to existing or proposed district heating networks and where no opportunity exists to consider a site wide Combined Heat and Power (CHP) system.

14.2.7 **Policy 5.7** - requires that all major developments seek to reduce their CO₂ emissions by at least 20% through the use of onsite renewable energy generation, wherever feasible.

Local Planning Policy

14.2.8 The Council's development plan comprise the London Plan, the adopted Development (core) Strategy (April 2009) and the adopted Development Management Plan (November 2011), which replaces the UDP policies. In addition to these documents there is also a Supplementary Planning Document (SPD) called Sustainable Construction Checklist Guidance Document (August 2011).

14.2.9 The relevant energy policy contained within the core strategy is *CP2 Reducing Carbon Emissions*, which requires:

2.A The Borough will reduce its carbon dioxide emissions by requiring measures that minimise energy consumption in new development and promoting these measures in existing development, particularly in its own buildings.

2.B The Council will require the evaluation, development and use of decentralised energy in appropriate development.

2.C The Council will increase the use of renewable energy by requiring all new development to achieve a reduction in carbon dioxide emissions by 20% from on-site renewable energy generation unless it can be demonstrated that such provision is not feasible, and by promoting its use in existing development.

14.2.10 The Development Management Plan expands upon some of these policies, as detailed below.

Policy CP1- Sustainable Development. Requires that new developments achieve Code for Sustainable Homes Level 3 standards.

Policy DM SD1 – Sustainable Construction requires that:

Developments must also achieve a minimum 25 per cent reduction in carbon dioxide emissions over building regulations (2010) in line with best practice from 2010 to 2013, 40 per cent from 2013 to 2016, and 'zero carbon' standards from 2016.

Policy DM SD2 - Renewable Energy and Decentralised Energy Networks requires development to conform with the Sustainable Construction Checklist and:

- a) Maximise opportunities for the micro-generation of renewable energy. Some form of low carbon renewable and/or de-centralised energy will be expected in all new development.
- b) Developments of 1 dwelling or more, or 100 sqm of non-residential floor space or more will be required to reduce their total carbon dioxide emissions by following a hierarchy that first requires an efficient design to minimise the energy used, secondly, by using low carbon technologies and finally, where feasible and viable, including a contribution from renewable sources.

- c) Local opportunities to contribute towards decentralised energy supply from renewable and low-carbon technologies will be encouraged where there is no over-riding adverse local impact.
- d) All new development will be required to connect to existing or planned decentralised energy networks where one exists. In all major developments and large Proposal Sites identified in the Site Allocations DPD, provision should be made for future connection to a local energy network should one become available.

14.3 BASELINE CONDITIONS

14.3.1 In accordance with the London Borough of Richmond upon Thames, and the Mayor’s Energy Hierarchy, the estimated energy consumption for the development has been based on the National Calculation Methodology (NCM).

14.4 PREDICTING THE IMPACTS OF DEVELOPMENT

14.4.1 The combined estimated CO₂ emissions rates from the Building Regulations assessments are summarised below:

	KgCO ₂	per sqm
Heating	67,767	2.71
Hot water	161,863	6.47
Cooling	633	0.03
Lights	59,689	2.39
Fans & Pumps	59,314	2.37
Regulated Emissions	349,266	13.96

14.5 MITIGATION

14.5.1 In order to demonstrate that the development is complying with the sustainability standards required by policy, a Code for Sustainable Homes pre-assessment has been undertaken. This predicts that a Level 4 standard will be achieved which exceeds the minimum Level 3 stipulated by policy.

Completed Development

Energy Strategy

14.5.2 The residential units will be well insulated with accredited and/or enhanced construction details ensuring heat losses are kept to a minimum. Mechanical Ventilation Heat Recovery (MVHR) units will provide the apartments' minimum fresh air requirements whilst recovering heat from the stale exhaust air.

14.5.3 The heating in the individual dwellings will be provided by a Low Temperature Hot Water (LTHW), connected up to site wide heating system via individual heat interface units, with heat meters, in the dwellings.

14.5.4 Domestic Hot Water (DHW) will be produced instantaneously by the individual heat interface units with no storage.

14.5.5 These measures will result in a 13% reduction in the CO₂ rate below Part L 2010.

Low and Zero Carbon Strategy

14.5.6 As part of the design the feasibility of incorporating a Combined Heat & Power (CHP) has been investigated. The analysis indicates that a single 95kWe/160kWth natural gas-fired CHP engine could potentially satisfy up to 87% of the residential development's heat load (including 100% of the base load). This would result in a potential reduction of 37% in the development's regulated annual CO₂ emissions and 29% in the total annual CO₂ emissions.

14.5.7 An analysis of Photovoltaic Panels indicates that a 3.9% reduction in the site’s total CO₂ emissions, after the application of Combined Heat & Power, could be achieved through the use of polycrystalline cells.

14.5.8 This gives a total annual CO₂ savings for the development over the base line Building Regulation target of 49%.

14.6 RESIDUAL IMPACTS

Construction

14.6.1 Not applicable.

Completed Development

14.6.2 The CO₂ emissions from the site after the application of the measures identified are given in the table below.

Total CO ₂ Emissions	Absolute (kgCO ₂ pa)	per sqm
Completed Development	303,422	12.1

14.7 SUMMARY AND CONCLUSIONS

14.7.1 In accordance with the London Borough of Richmond upon Thames’s Planning requirements and the GLA’s London Plan the following energy strategy has been developed for the proposed Riverside Teddington residential development.

14.7.2 The development is being designed to achieve a Code for Sustainable Homes Level 4 which exceeds the minimum standard. A pre-assessment has been undertaken which confirms this.

14.7.3 The building’s envelope will be designed to perform significantly better than the Building Regulation standards, with extremely low U-values, accredited

construction details and low design air leakage rates. This is expected to provide an improvement over the Part L baseline CO₂ of 13%

- 14.7.4 The feasibility of incorporating a Combined Heat & Power (CHP) has been investigated. The analysis indicates that a single 95kWe/160kWth natural gas-fired CHP engine could potentially satisfy up to 87% of the residential development’s heat load (including 100% of the base load).). This would result in a potential reduction of 37% in the development’s regulated annual CO₂ emissions and 29% in the total annual CO₂ emissions.
- 14.7.5 An extensive range of low and zero carbon technologies have been considered in terms of providing a proportion of the development’s energy demand. As the CHP is satisfying the heat demand for the site only electricity generating technologies are possible for integration.
- 14.7.6 An analysis of Photovoltaic Panels indicates that a 3.9% reduction in the site’s total CO₂ emissions, after the application of Combined Heat & Power, could be achieved through the use of polycrystalline cells.
- 14.7.7 The combination of the above measures result in the development achieving an improvement of 49% over the 2010 Building Regulations standards
- 14.7.8 The table below summarises the regulated CO₂ emissions of the site at each stage of the hierarchy.

Regulated CO ₂ Emissions	Absolute	per sqm	Reduction
Baseline (TER)	403,714	16.1	
Be Lean (BER)	349,266	14.0	13.5%
Be Clean (+ CHP)	219,651	8.8	45.6%
Be Green (+PV)	207,320	8.3	48.6%