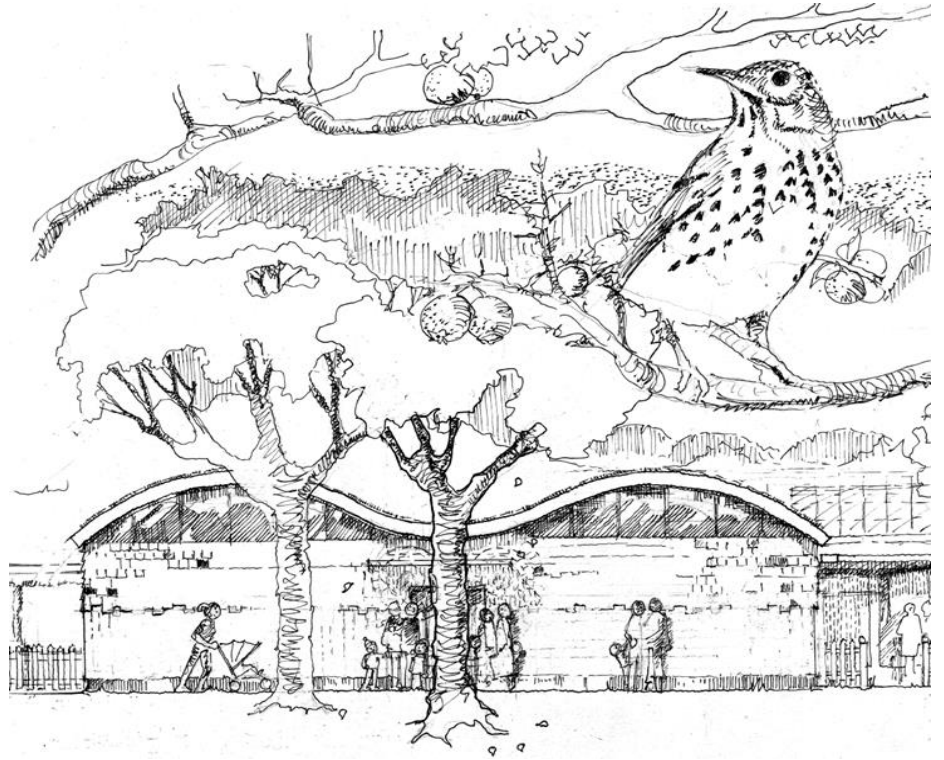


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## **Marble Hill Playcentres – New Development**

### **New Building Energy Statement**

February 2021

Rev 02 – FOR CONSULTATION

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# 1. Introduction

- 1.1.1** The Marble Hill Playcentres (MHPC) development aims to completely redevelop the current site for the ongoing use by Marble Hill Playcentres and other local charities.
- 1.1.2** The ultimate objective of this project is to provide a new community centre supporting local children and their parents & carers.
- 1.1.3** The existing building was built in the 1960's and is of traditional brickwork construction, with no insulation and few modern mechanical or electrical services. Due to the cold nature of the existing buildings, it is not feasible to operate the services throughout the winter months. The current building can only stay open circa 6 months of the year. The current buildings are expected to be demolished and replaced with a new modern playcentre.
- 1.1.4** This is a Planning Application supporting document, which details the Sustainable Low Energy design intent for the new building.

# 2. Location

- 2.1.1** Marble Hill Playcentres is located to the northeast corner of Marble Hill Park, which is on the north-bank of the River Thames. The full address is Marble Hill Playcentres, Marble Hill Park, Richmond Rd, Twickenham TW1 2NL.



Fig 1 - Location

## **2.2 The Intent**

**2.2.1** The intent is to provide a greatly enhanced upgrade of the current facilities available to the local residence.

**2.2.2** The proposed development is looking to provide a year round multi-functional space enclosed within a aesthetically pleasing, architecturally interesting and energy/carbon efficient structure.

**2.2.3** The deliverables from the structure is to support :

- (a) A community care space
- (b) Play and performance spaces for children
- (c) Music and music therapy domains
- (d) Childcare and hygiene/ public health facilities
- (e) Hospitality and catering facilities
- (f) Parent social hubs
- (g) Sensory spaces
- (h) Educational and training facilities

## **3. Sustainability and Energy**

### **3.1 Introduction**

**3.1.1** The energy performance and the sustainability credentials for this development will be a factor of the build specification of the structure and the installed building services and systems within.

**3.1.2** It is the intent of this development to create a comfortable, highly efficient and 'user-friendly' environment.

## **4. Current Building**

### **4.1 The Fabric**

**4.1.1** The current building comprises of single skin small brickwork rooms of single story. The floor is a ground bearing concrete slab, and the pitched roofs are traditional tiles.

**4.1.2** It is noted that the building is currently lightly used, and that the new design with a greater volume and capacity for increased visitor attendance will probably command additional water and drainage requirements.

**4.1.3** There is no insulation or double glazing in the building, and as such the building fails every new standard for air leakage or thermal efficiency.

## 5. Design Strategy

- 5.1.1** The policy is to greatly improve the environmental sustainability of the new premises, and the adoption of low energy materials and quality design is crucial to the long-term sustainable plan for the scheme.
- 5.1.2** This project has every intention to demonstrate that the development will comply with local and regional requirements, and will target meeting higher levels of sustainability through the integration of quality design and adoption of new technologies.

## 6. Design Regulation & Guidance

### 6.1 Building Regulations Part L2A

- 6.1.1** In line with adopted local planning policies, Richmond Council requires all schemes including 1 or more residential units, and commercial or other developments of 100m<sup>2</sup> or more to design for minimum energy use and reduce predicted site CO<sub>2</sub> emissions, which should be addressed in an Energy Statement. An Energy Statement will be provided to demonstrate that the design will meet the relevant thresholds and will be submitted to the Local Planning Authority as part of the planning application.
- 6.1.2** The new development will be subject to the requirements of the Building Regulations Part L2A 2013: Conservation of fuel and power in new buildings other than dwellings.
- 6.1.3** Part L2A 2013 of the Building Regulations is concerned with the conservation of fuel and power in new buildings other than dwellings. It sets out statutory requirements for energy efficiency and limiting carbon emissions from buildings. It includes performance standards for individual elements of the building fabric (e.g. wall, floor, fans, etc.). Computer simulation calculations must be performed to show that the Building Emissions Rate (BER) demonstrates an improvement of 30% of the calculated Target Emissions Rate (TER).

### 6.2 LONDON BOROUGH OF RICHMOND UPON THAMES LOCAL PLAN (JULY/2018)

- 6.1.1** The below is some of the regulation and guidance which the project will be delivered under.

### 6.3 Policy LP 20 Climate Change Adaption

- 6.3.1** The Council will promote and encourage development to be fully resilient to the future impacts of climate change in order to minimise vulnerability of people and property.
- 6.3.2** New development, in their layout, design, construction, materials, landscaping and operation, should minimise the effects of overheating as well as minimise energy consumption in accordance with the following cooling hierarchy:
- (a) minimise internal heat generation through energy efficient design

- (b) reduce the amount of heat entering a building in summer through shading, reducing solar reflectance, fenestration, insulation and green roofs and walls
- (c) manage the heat within the building through exposed internal thermal mass and high Ceilings
- (d) passive ventilation
- (e) mechanical ventilation
- (f) active cooling systems (ensuring they are the lowest carbon options).

**6.3.3** Opportunities to adapt existing buildings, places and spaces to the likely effects of climate change should be maximised and will be supported.

#### **6.4 Policy LP 21 Flood Risk and Sustainable Drainage**

**6.4.1** All developments should avoid, or minimise, contributing to all sources of flooding, including fluvial, tidal, surface water, groundwater and flooding from sewers, taking account of climate change and without increasing flood risk elsewhere. Development will be guided to areas of lower risk by applying the 'Sequential Test' as set out in national policy guidance, and where necessary, the 'Exception Test' will be applied. Unacceptable developments and land uses will be refused in line with national policy and guidance, the Council's Strategic Flood Risk Assessment (SFRA)

**6.4.2** In Flood Zones 2 and 3, all proposals on sites of 10 dwellings or more or 1000sqm of non-residential development or more, or on any other proposal where safe access/egress cannot be achieved, a Flood Emergency Plan must be submitted.

**6.4.3** Where a Flood Risk Assessment is required, on-site attenuation to alleviate fluvial and/or surface water flooding over and above the Environment Agency's floodplain compensation is required where feasible.

**6.4.4** The Council will require the use of Sustainable Drainage Systems (SuDS) in all development proposals. Applicants will have to demonstrate that their proposal complies with the following:

- (a) A reduction in surface water discharge to greenfield run-off rates wherever feasible.
- (b) Where greenfield run-off rates are not feasible, this will need to be demonstrated by the applicant, and in such instances, the minimum requirement is to achieve at least a 50% attenuation of the site's surface water runoff at peak times based on the levels existing prior to the development.

#### **6.5 Policy LP 22 Sustainable Design and Construction**

**6.5.1** Developments will be required to achieve the highest standards of sustainable design and construction to mitigate the likely effects of climate change. Applicants will be required to complete the following:

- 
- (a) Development of 1 dwelling unit or more, or 100sqm or more of non-residential floor space (including extensions) will be required to complete the Sustainable Construction Checklist SPD. A completed Checklist has to be submitted as part of the planning application.
  - (b) Development that results in a new residential dwelling, including conversions, change of use, and extensions that result in a new dwelling unit, will be required to incorporate water conservation measures to achieve maximum water consumption of 110 litres per person per day for homes (including an allowance of 5 litres or less per person per day for external water consumption).
  - (c) Proposals for change of use to residential will be required to meet BREEAM Domestic Refurbishment 'Excellent' standard (where feasible). Reducing Carbon Dioxide Emissions

**6.5.2** Developers are required to incorporate measures to improve energy conservation and efficiency as well as contributions to renewable and low carbon energy generation. Proposed developments are required to meet the following minimum reductions in carbon dioxide emissions:

- (a) All new major residential developments (10 units or more) should achieve zero carbon standards in line with London Plan policy.
- (b) All other new residential buildings should achieve a 35% reduction.
- (c) This should be achieved by following the Energy Hierarchy:
  1. Be lean: use less energy
  2. Be clean: supply energy efficiently
  3. Be green: use renewable energy

**6.5.3** High standards of energy and water efficiency in existing developments will be supported wherever possible through retrofitting. Householder extensions and other development proposals that do not meet the thresholds set out in this policy are encouraged to complete and submit the Sustainable Construction Checklist SPD as far as possible, and opportunities for micro-generation of renewable energy will be supported in line with other policies in this Plan.

**6.5.4** Allowance has been made in the design of build components for the incorporation of carbon neutral or near neutral elements of insulation alongside the timber framing, such as straw bale or other similar plant fibre based solutions or equivalents

## **6.6 Policy LP 24 Waste Management**

**6.6.1** The Council will ensure that waste is managed in accordance with the waste hierarchy, which is to reduce, reuse or recycle waste as close as possible to where it is produced. The Council will require the following:

- (a) All developments, including conversions and changes of use are required to provide adequate refuse and recycling storage space and facilities, which allows for ease of collection and which

residents and occupiers can easily access, in line with the guidance and advice set out in the Council's SPD on Refuse and Recycling Storage Requirements.

- (b) All developments need to ensure that the management of waste, including the location and design of refuse and recycling facilities, is sensitively integrated within the overall design of the scheme, in accordance with policies on Local Character and Design.

## 7. Proposed Low Energy Design

### 7.1 Energy Hierarchy

The design shall demonstrate that the expected energy consumption and carbon dioxide emissions shall follow the energy hierarchy at set out in the London Plan as per section 6.5.2 above.

The hierarchy is be defined as “Be Lean – Be Clean – Be Green”

Be Lean – Energy Efficient Design Measures.

Be Clean – Decentralised Heating

Be Green – Designing minimum energy use and installation onsite renewable energy.

### 7.2 Fabric Performance

For compliance with Part L2A (2013) criteria, the following fabric performance will be targeting in the final design, which will confirm the minimum 35% improvement on the minimum Building Regulations Part L values:

Building Element	Part L Minimum compliance values	Target development Values
Roof	0.25 w/m <sup>2</sup> K	0.13 w/m <sup>2</sup> k
External Walls	0.35 w/m <sup>2</sup> K	0.115 w/m <sup>2</sup> k
Exposed Floor	0.25 w/m <sup>2</sup> K	0.115 w/m <sup>2</sup> k
Window Glazing	2.2 w/m <sup>2</sup> K	0.6 w/m <sup>2</sup> k
Air Permeability	10 m <sup>3</sup> /hr/m <sup>2</sup> @50Pa	5 m <sup>3</sup> /hr/m <sup>2</sup> @50Pa

### 7.3 Building Services - Heating

- 7.3.1** It is proposed that the primary heating for the property will be generated via Ground Source Heat Pumps (GSHP). We feel that Air Source Heat Pumps (ASHP) with their external units will be visually detrimental. A GSHP will not require external plant.

- 7.3.2** Ground Source Heat Pump requires long loops of pipework installed through-out the ground, and should insufficient space be available, a vertical borehole loops will be installed which will not impede local trees or the adjacent football pitches. Vertical borehole loops take up significantly less space than horizontal ground loops and are well suited for this tight site.



**7.3.3** The GSHP will provide the primarily heat source via underfloor heating throughout the property. This form of heating works well with heap pump technology due to a flow water temperature of circa 55 °C . A low surface temperature (LST) environment is a preferred solution for child-care environments.

**7.3.4** It is not envisaged to provide a gas supply to this property for the purposes of space or water heating (*Be Clean*).

#### **7.4 Building Services - Cooling**

**7.4.1** The architectural design is such that it is anticipated that the cooling requirement for the property will be minimal due to passive design measures (*Be Lean*). Cross flow natural ventilation is to be provided for the larger performance and meeting spaces. This will keep these areas fresh and comfortable for most of the year . A CIBSE TM52 overheating assessment will be carried out at detail design stage.

**7.4.2** It is to be investigated as part of the later design stages to make available underfloor cooling via the reverse cycle facility on the heat pumps. This will enable pre-cooling and a continual heat sink for the property at the height of summer conditions. (*Be Lean*)

**7.4.3** Should the internal heat load demand it, there remains the option to install targeted comfort cooling via further refrigerant split units. Although the design will make available the services provision and space for such installations they will form part of post-occupancy remedial works once the necessity is established and the requirements known.

#### **7.5 Building Services - Ventilation**

**7.5.1** The property has been designed with non-openable windows. This is for security reasons as well as to provide thermal stability

**7.5.2** In key areas, a natural cross flow ventilation system will be deployed and controlled depending on both internal and external conditions

**7.5.3** Throughout the rest of the development a low noise mechanical ventilation system with heat recovery with a minimum of 75% efficiency will be deployed so to provide the required fresh air. These units will be time /PIR controlled with variable EC motor speed drives so to deliver the fresh air volumes in accordance with zonal CO2 readings.

**7.5.4** Fan power for mechanical systems shall be proposed to have a minimum specific fan power (SFP) of 1.8w/l/s

**7.5.5** The toilets and other public health areas will be provided with a simple extract system with PIR control. The make-up air to these areas will be from the 'conditioned' occupied spaces within the property via suitable door grilles or 'undercuts'.

**7.5.6** The kitchen ventilation is unknow at the stage but will form part of the overall kitchen design and be aligned to low energy best practice.

## **7.6 Building Services - Lighting**

**7.6.1** The architectural design has provided many features which will maximise the use of natural daylight for the internal spaces.

**7.6.2** This will be complemented by a simple low energy lighting system.

(a) LED low energy fittings throughout internal and external areas.

(b) Local PIR detection and ambient light level switching

(c) Manual switching ONLY on key areas , eg : reception and kitchen

External lighting will be focused to provide suitable safe access and to compliment the external security installations

(d) External lighting will be time clock controlled with ambient light level switching .

(e) Manual switching will be available, but this will have pre-set time durations installed

Note : the minimising of 'light pollution' will be a key consideration in the design

## **7.7 Building Services - Power and Data**

**7.7.1** Small power will be provided to suit the design. The majority of outlets will be twin 13 amp plug outlets PLUS twin USB power outlets .

**7.7.2** Each electrical distribution board will have an addressable 'smart' consumption meter as part of the installation. These 'sub-meters' along with the primary billing meter will be connected to a simple energy management system which will record and archive the energy consumption throughout the property.

**7.7.3** Data connectivity shall be provided via a wi-fi system, there is no data cabling to be installed.

**7.7.4** The kitchen will be fully electric and as part of the catering design low energy appliances will be mandatory, e.g. : halogen hobs

**7.7.5** Electric producing photovoltaic panels are planned for this project, due to the shape and size of the external areas, particularly the curved roof, we will install transparent photovoltaic solar windows to all external windows, these will remove the need for separate roof-top panels.

## **7.8 Building Services - Public Health**

**7.8.1** Potable cold water shall be provided through in accordance with the relevant British Standards.

**7.8.2** All toilet cisterns will be dual flush

**7.8.3** All urinals will be waterless

**7.8.4** All wash hand basins will have temperature blending plus PIR activation at the tap

**7.8.5** As part of the design a rainwater storage system will be investigated. This is to provide a separate cold water supply to toilet cisterns and external landscape watering points

**7.8.6** The domestic hot water shall be provided via a heat pump arrangement and topped up to optimal storage temperature by electric immersion elements.

**7.8.7** As part of the design the provision of solar domestic hot water will be investigated. Roof space

for solar collectors is limited but if possible, the inclusion of solar generation to compliment the heat pump system will be implemented.

**7.8.8** Apart from the primary water meter, cold water sub-meters will be installed at key locations. These will be 'smart' meters and their consumption data will be collected and made available for analysis.

## **7.9 Control Systems**

**7.9.1** The building services will be connected and controlled via a Building Management System (BMS). The scope and nature of this system will be determined as part of the design process however the output features will include :

- (a) Start / Stop parameters for the building services systems
- (b) Visibility of operational real time data and trend logging for the systems both locally and remotely
- (c) Warning and alarm signals for faults , failures or 'out-of-scope' situations to be made available to local staff and as a 'dial-out' feature

**7.9.2** It is envisaged that the energy management / recording facility will be included in the BMS scope

**7.9.3** In accordance with WELL Building practices the internal conditions of the space shall be monitored and recorded. The final scope and specification will evolve as part of the detailed design however it is envisaged that the following data points will be collected at various locations

- (a) Temperature (internal and external)
- (b) Humidity (internal and external)
- (c) Carbon Dioxide
- (d) VOC's (Volatile Organic Compounds)
- (e) Particulate matter

**7.9.4** This information will be collected and analysed to form the driver for optimising the building services performance.

## 8. Sustainable Construction Checklist

**8.1.1** Final calculations confirming the carbon reduction rates and including the minimum 35% improvement on Building Regulation Part L standards will be provided in due course, the below table sets out how the improvements will be achieved with the current design. The Sustainable Construction checklist will be completed and submitted for approval prior to Construction.

Building Element	Part L Minimum compliance values	Target development Values
Roof	0.25 w/m <sup>2</sup> K	0.13 w/m <sup>2</sup> k
External Walls	0.35 w/m <sup>2</sup> K	0.115 w/m <sup>2</sup> k
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