CHAPTER 5.0

SUSTAINABILITY ASSESSMENT

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5.1
Sustainability Assessment
Land Reuse
The Proposed Development is located on previously vacant, developed land.

5.2
The Proposed Development provides an exciting and positive future for the long-vacant site. It will reinforce London's role as a global centre of scientific research, enable groundbreaking scientific research, and ensure that Camden and the UK are at the heart of innovation.

5.3
The site has been selected as it is both of sufficient size to accommodate a facility of the scale required to be competitive on a global level and is located at the heart of an exceptional cluster of leading research and educational institutions (refer to Figure 5-1). Its adjacency to transport connections, including St Pancras International, will facilitate collaboration and exchange with colleagues in other cities across the UK and Europe. UKCMRI will be a focal point for the extraordinary talent and knowledge in the borough and will play its part in the life of the local community.

5.4
Additionally the proposed site will allow UKCMRI to work closely with its near neighbour the British Library, to develop bioinformatic and other information resources of value to the wider biomedical research community.

Figure 5-1. Institutions local to the site

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5.5
Location and Urban Design
The Proposed Development reflects the strategic policies in the London Plan relating to innovation, maintaining London's role as a national and international centre of scientific, research and academic excellence (Policies 3B.5, 3A.22 and3A.25). UKCMRI will strengthen London's position as a centre for knowledge by providing new high quality biomedical research laboratories and associated facilities. The Proposed Development will take into account the future needs of the biomedical research sector, attracting scientists worldwide.

5.6
In compliance with Policy 4B.1 of the London Plan, the Proposed Development will:

- Maximise the potential of the site.

  The site has been selected as it is both of sufficient size to accommodate a facility of the scale required to be competitive on a global level and is located at the heart of an exceptional cluster of leading research and educational institutions. Its adjacency to transport connections, including St Pancras International, will facilitate collaboration and exchange with colleagues in other cities across the UK and Europe. UKCMRI will be a focal point for the extraordinary talent and knowledge in the borough and will play its part in the life of the local community.

- Promote high quality inclusive design and create/enhance the public realm.

  The Proposed Development addresses Midland Road with its principal entrances opening on to a generous public space mediating between the public roadway and the entrance lobby. The Proposed Development provides a new public space with access to the building for members of the public at ground level and a separate staff entrance via steps and ramps to the secure upper level.

  At Ossulston Street, the Proposed Development has been reshaped to create a new courtyard garden – a lawn framed by trees and benches benefiting from the afternoon sun.

  The staff entrance to the building will enliven the Ossulston Street side of the Institute.

  On the northwest side of the building the massing has been stepped back as a means of addressing Ossulston Street. The building is set back from the junction of Ossulston Street and Brill Place creating a sunny public space with a grass lawn and fragrant climbing plants on the west facing wall. A large plane tree will be planted on this corner to soften views of the building and to link with the existing mature street trees.

  The Ossulston Street entrance helps to pull the atrium through the building and activate the West side of the building. Pulling the southern wing back to the building line on Ossulston Street has created room for a two storey space that will be offered to the community as a neighbourhood facility.

- Contribute to adaptation to, and mitigation of, the effects of climate change.

  As set out in the 'Adapting to Climate Change' section, the Proposed Development incorporates a number of features designed to contribute to adaptation to, and mitigation of, the effects of climate change.

Figure 5-2. Townscape view from Brill Place and Midland Road intersection

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- Respect local context, history, built heritage, character and communities.

  UKCMRI is an important addition to Camden, London, and the United Kingdom. It is essential that the new building be of an architectural quality representative of a world class institute. The architecture and public realm will therefore be of the highest quality.

  UKCMRI performs two distinct but related tasks – it creates a unique platform for biomedical research and it contributes to the regeneration of a long neglected fragment of London's urban fabric.

  The Proposed Development has sought to balance the requirements of the Institute with its surroundings.

  The Proposed Development's design responds to the architectural heritage of the local area. It relates both to its large civic neighbours to the south and east - St Pancras International and the British Library - and the smaller scale residential buildings of Somers Town to the north and west.

  Through the pre-application process, from the initial feasibility study to the current design, the design team have been in discussion on the scale and massing of proposals to create a high quality development which is sensitive to its surroundings.

- Provide for or enhance a mix of uses.

  Within Camden, some of the highest levels of deprivation occur within St Pancras and Somers Town wards. The high levels of deprivation in the site locality indicate that the redevelopment must enhance the quality and perception of the area. The architecture celebrates the public programme offered by UKCMRI. The Proposed Development will establish a new use in the area, which will benefit people in Somers Town, Camden and the wider London area.

  A space within the west end of the building, accessible from Ossulston Street, will be dedicated as a community facility. UKCMRI is in discussion with the Council on potential uses.

- Be accessible, usable and permeable for all users.

  The Proposed Development will be accessible, usable and permeable for all users. The 'Flexible, Inclusive and Secure Design' section outlines the accessibility and permeability credentials for the Proposed Development.

- Be sustainable, durable and adaptable in terms of design, construction and use.

  The sustainability of the Proposed Development is demonstrated throughout this Sustainability Statement. The Proposed Development will be constructed to a high standard to ensure its durability and, given the dynamic nature of research, it will be versatile and easily adaptable.

- Address security issues and provide safe, secure and sustainable environments.

  The 'Flexible, Inclusive and Secure Design' section outlines the security strategy for the Proposed Development.

- Be practical and legible.

  The atrium affords a generous approach from Midland Road, with a new public space proposed at the north east corner at pavement level so that the ground flows into the building and enhances the base of the Proposed Development's accessibility.

  The building is set back from the junction of Ossulston Street and Brill Place to create a small public space with a grass lawn and climbing plants on the west facing wall. A large plane tree will be planted on this corner to soften views of the building and to link with the existing mature street trees.

  The staff entrance to the building will enliven the Ossulston Street side of the Institute.

  A ground floor space has been created that can be offered to the community as a neighbourhood facility.

- Be attractive to look at and, where appropriate, inspire, excite and delight.

  UKCMRI's striking new building will create a state of the art research facility that supports the scientific goals of the Institute and promotes public engagement. The architecture celebrates the activities that will be undertaken within the Institute to create a richly detailed and well scaled design. Innovative architectural and engineering design will deliver a highly sustainable building.

  The Proposed Development will provide functional, effective research spaces that will promote creativity; create a high-quality built environment that will attract and retain the best researchers; and promote interaction and collaboration among scientists to reinforce the multidisciplinary nature of research.

- Respect the natural environment and biodiversity, and enhance green networks and the Blue Ribbon Network.

  The landscape design for the site has been developed following the recommendation for ecological enhancement provided by the ecology team. As such, the Proposed Development will incorporate trees, shrubs, brown roofs and bat and bird nesting boxes in the building façades.

- Address health inequalities.

  The medical research to be carried out at UKCMRI responds to the main diseases and illnesses which affect families in Somers Town, Camden, London, throughout the United Kingdom and across the world. The research programme will include study of cancer, heart disease and stroke, infectious diseases, disorders of the immune system, brain and nervous system, and the improvement of our understanding of tissue and organ development. The very purpose of UKCMRI is to drive forward better treatment and prevention of the most significant diseases affecting people today.

  The economic benefits that the Institute has the potential to generate, together with the strategic importance to the cost effective funding of treatments within the NHS, establish the Proposed Development as a once in a lifetime opportunity.

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5.7
Adapting to Climate Change
The Proposed Development has been designed to adapt to and mitigate the effects of climate change through passive design, including improved U-values and provision of shading features. The fabric of the building has been designed to be airtight and well insulated in order to minimise the heat loss in winter. Solar gains will be utilised to benefit the space in winter time and reduce space heating demand. At the same time the undesirable effects of excessive solar gains in summer time will be minimised to avoid additional energy consumption due to the need for cooling.

5.8
The Proposed Development will meet its heating, cooling and electrical demands while reducing energy consumption and associated CO_2 emissions to the atmosphere to realistic minima.

5.9
CO_2 emissions will be reduced by specifying energy-efficient building services (including heat recovery to ventilation systems, low energy water cooling to the data centre, and high efficiency lighting), an on-site CHP plant, with future-proofing to facilitate potential connection to any future Euston Road district heating scheme, and photovoltaics.

5.10
Natural lighting has been promoted throughout the design. This will reduce the energy use and associated CO_2 emissions of the building by minimising the use of artificial lighting. Additionally, a naturally lit environment will enhance the standard of indoor comfort for the users.

5.11
To encourage walking and cycling, no car parking provision will be included in the Proposed Development, apart from provision for blue badge disabled users (two for staff and three for visitors). The Proposed Development will also support cycling by providing cycle parking and associated showering and changing facilities. A Travel Plan will be produced and transport information and material will be provided to the building users and visitors to promote sustainable travel.

5.12
The Proposed Development has been designed to be versatile and adapt to changes in climate and research methodologies, technology, equipment and processes so as to facilitate flexibility over the long term.

5.13
To successfully achieve the flexibility goal, UKCMRI will respond to current and future research needs in terms of space, environmental control, support services, function, security, and energy conservation. The fundamental element of flexibility is modularity through use of a standardised planning module which provides a high degree of convertibility between for example wet and dry laboratory functions.

5.14
To maximise the long-term usability of the facility, an approach which balances fixed elements of infrastructure with movable elements that are readily reconfigurable by the user in response to changes in scientific processes, equipment and staffing, will be implemented.

5.15
The laboratory space will adapt to different uses without requiring physical changes to the construction. Modular and adaptive laboratory furnishings comprised of components and accessories that are easily adaptable and interchangeable will be considered. To allow for adaptability, building services will be uniformly distributed to each laboratory and designed to provide simple extension into the laboratory without disruption to adjacent modules.

5.16
Additionally, the Proposed Development will provide flexibility for converting some of the non-laboratory spaces such as offices, support areas or storage rooms into laboratory or vice versa as changes are needed.

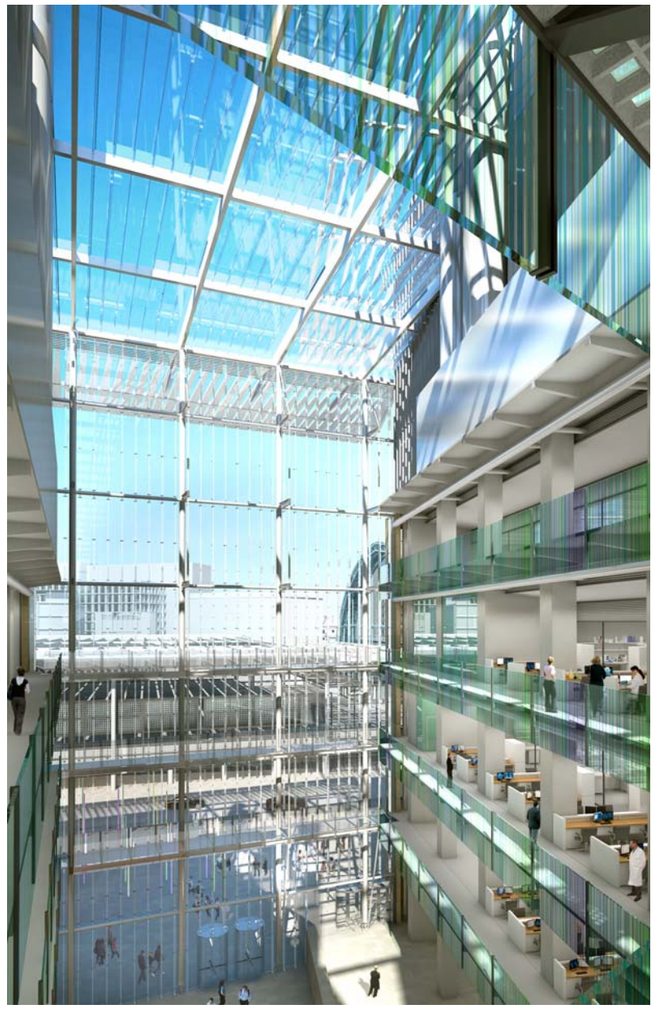

Figure 5-3. View towards Eurostar through entrance atrium

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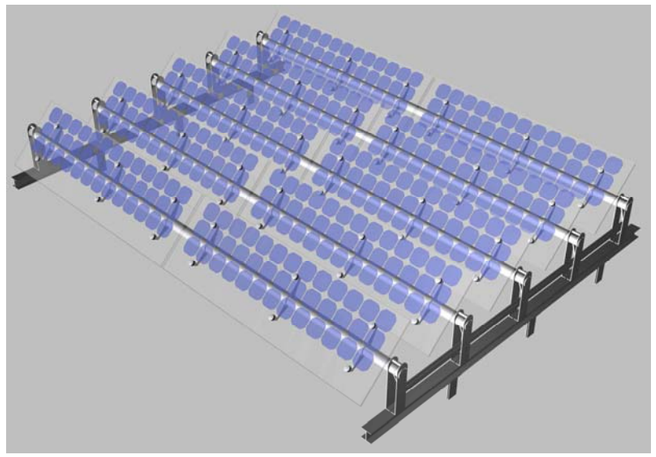

5.17
Energy
An Energy Strategy has been prepared in support of the planning application for the Proposed Development.

5.18
In compliance with the GLA and the LBC guidance, UKCMRI intends to achieve energy consumption reductions for the Proposed Development through the implementation of passive design and energy efficiency measures and meeting part of the remaining energy demand through the incorporation of low and zero carbon (LZC) technologies.

5.19
The proposed energy strategy demonstrates how the development considers the aspirations set in the London Plan Policy 4.1: Tackling Climate Change by following the Mayor's energy hierarchy and the detailed guidance provided in the GLA Energy Team Guidance on Planning Energy Assessments and including:

- Passive design and energy efficiency (i.e. use less energy – Be Lean);
- Energy efficient supply of services (i.e. supply energy efficiently – Be Clean); and
- On site renewable energy technologies to provide energy (i.e. use renewable energy – Be Green).

5.20
The Proposed Development will meet its heating, cooling and electrical demands while at the same time reducing to realistic minima its energy consumption and associated CO_2 emissions to the atmosphere. In particular, UKCMRI is being designed to comply with Building Regulations Approved Document Part L 2010(ADL2A) (Ref. 26), which involves an aggregate 25% improvement in CO_2 emission over the current 2006 Building Regulations (Ref. 27).

5.21
Additionally, the Proposed Development seeks to achieve a BREEAM Excellent rating, which includes a mandatory requirement for an Energy Performance Certificate (EPC) rating of less than 40.

5.22
Baseline
The baseline scheme is defined as meeting the requirements of Building Regulations ADL2A 2006. Baseline energy consumption and CO_2 emissions have been calculated on a 'whole energy' basis and include both regulated and non-regulated loads.

5.23
The CO_2 emissions of the baseline scheme are approximately 32,000 tonnes CO_2/year. The energy consumption and CO_2 emissions of the baseline scheme for the Proposed Development are shown in Table 5-1.

5.24
Be Lean
It is proposed to reduce the energy demand of the Proposed Development by incorporating passive design measures, including:

- Improved insulation in order to achieve an enhanced U-value performance for the building fabric;
- Incorporation of the necessary construction details to reduce the air infiltration rate below the requirement of ADL2A;
- Integration of facade shading features to minimise solar heat gains in summer in order to reduce the need for cooling; and
- Incorporation of high performance glass throughout the building.

5.25
It is proposed to achieve a further reduction in the energy demand of the Proposed Development by providing energy efficiency measures, including:

- Energy efficient lighting and lighting controls;
- Optimisation of fresh air supply rates in laboratory areas;
- Variable volume flow, allowing variable speed drives to be fitted to fans to reduce power consumption;
- Heat recovery systems wherever feasible (Atrium, Biological Research Facility (BRF), laboratory areas, lecture theatre, etc.);
- Variable Flow Hydronic Systems;
- Economisers on steam and Low Temperature Hot Water (LTHW) boilers;
- Reverse Osmosis (RO) steam boiler feedwater treatment;
- Energy efficient cold storage systems, fume cupboards and vertical transportation;
- Energy metering of all of all major equipment and sub-circuits;
- Power factor correction equipment as necessary;
- Low water consumption sanitary appliances, such as dual flush WC cisterns, and low flow showers and taps;
- Energy efficient laboratory instruments;
- Building Management System (BMS) to ensure an energy-efficient operation of the systems; and
- Building Users Guide giving the facility managers and occupiers information on energy-efficient features and strategies relating to the building.

5.26
The resulting savings in CO_2 emissions due to incorporation of passive design and energy efficiency measures are approximately 5,400 tonnes CO_2/year, which corresponds to a 17% reduction compared with the baseline scheme.

5.27
The energy consumption and CO_2 emissions of the enhanced ('be lean') baseline scheme, which includes the energy consumption reductions and CO_2 emissions savings from energy efficiency and passive design measures, are shown in Table 5-1.

5.28
Be Clean
It is proposed to incorporate a CHP unit in the plant space, located at Basement Level -1. The proposed CHP unit has 1,822 kW electrical output and 1,463 kW heat output.

5.29
The CHP plant's heat output will meet part of the LTHW and steam demand. Operation of the CHP plant will result in a CO_2 emissions savings of about 4,400 tonnes CO_2/year. This equates to approximately a 17% savings in CO_2 emissions over the enhanced baseline ('be lean') scheme.

5.30
It is anticipated that the CHP electrical power output will meet approximately 50% of the electrical demand of the development.

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5.31
The use of Combined Cooling Heat and Power (CCHP) in the Proposed Development has been assessed but found to be less feasible than the use of CHP.

5.32
The energy consumption and CO_2 emissions of the 'be clean' scheme, which includes the CO_2 emissions savings from CHP technology, are shown in Table 5.1.

5.33
Be Green
To further reduce CO_2 emissions an analysis of the use of renewable energy technologies for UKCMRI has been undertaken and photovoltaics have been identified as feasible (refer to Energy Strategy for further detail).

5.34
The Proposed Development has an architectural structure which encloses the upper plant levels. It is proposed to install approximately 1,700m_2 of Photovoltaic (PV) arrays (with a minimum efficiency of 15%) on the south facing area of this roof structure. This area is the maximum practicable, as it ensures optimal orientation, and is free from overshadowing from plant enclosures, and risers, etc.

5.35
This installation would displace a total of 125 tonnes CO_2/yr, equating to approximately 0.6% savings in CO_2 emissions over the 'be clean' scheme.

5.36
Incorporation of the proposed energy strategy will result in approximately a 31% saving in the total CO_2 emissions over the baseline scheme. This corresponds to 9,950 tonnes CO_2/year savings. The energy consumption and CO_2 emissions of the Baseline, Lean, Clean and Green scheme, including the CO_2 emissions savings from on site renewable energy technology, are shown in Table 5-1 and Figure 5-4. Figure 5-5 shows the improvement in CO_2 emissions of the regulated energy uses of the Proposed Development.

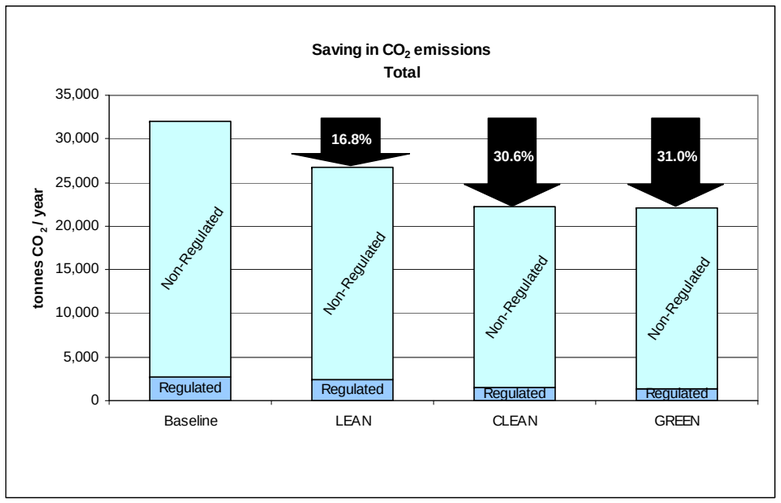

Figure 5-4. Total savings in CO_2 emissions for the Energy Strategy stages

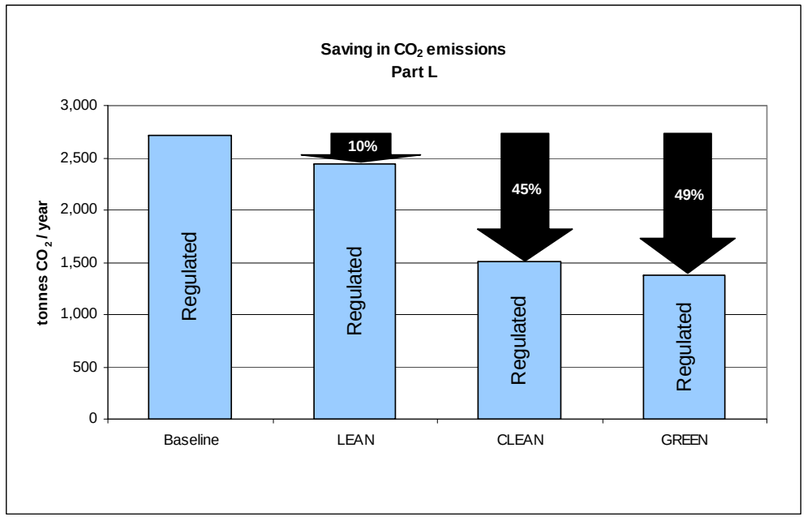

Figure 5-5. Regulated (ADL2A 2006) savings in CO_2 emissions for the Energy Strategy stages

	CO_2 Emissions (tonnes CO_2/year)			Energy (MWh/year)		
	Regulated	Non-Regulated	Total	Regulated	Non-Regulated	Total
Baseline	2,714	29,356	32,070	8,289	114,711	123,000
LEAN	2,441	24,247	26,688	7,488	98,085	105,573
CLEAN	1,507	20,739	22,245	8,499	101,865	110,365
GREEN	1,381	20,739	22,120	8,278	101,865	110,144

Table 5-1. Energy consumption and CO_2 emissions for the Energy Strategy stages – for regulated and non-regulated energy

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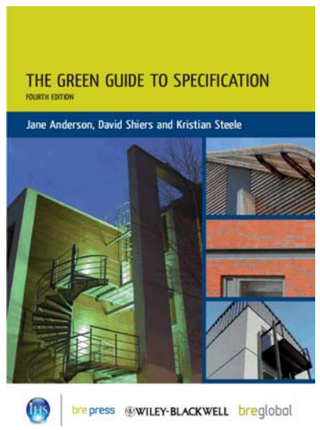

5.37
Materials
The selection of the materials employed in the exterior of the Proposed Development will respect the setting of the surroundings. On that basis, the materials will be suitable and robust, with durable long-life properties.

5.38
All materials employed in key building elements (roof, external walls, internal walls, etc) will be selected in line with the Green Guide to Specification (Ref. 28). Wherever feasible, locally-sourced, low embodied energy materials with an A+ rating will be employed. At least 80% of the combined areas of external hard landscaping and boundary protection specifications will achieve a Green Guide A or A+ rating.

5.39
Materials currently specified include:

- Brown roof;
- Aluminium curtain wall with projecting horizontal mullions;
- Terracotta panels with terracotta and window infill;
- Roof screen of large scale metal louvre elements;
- Profile-faced Trimo panels with feature fins; and
- Photovoltaic panels.

5.40
Materials will be procured from responsible sources. Where timber products are used, they will be obtained from sustainable sources, either Forest Stewardship Council (FSC) or Programme for the Enforcement of Forestry Certification (PEFC) approved sources.

5.41
All insulating materials specified will have a low embodied environmental impact relative to their thermal properties and will be responsibly sourced.

5.42
The specification will include casework laboratory furniture and countertops with high recycled content like steel casework, renewable wood species for wood casework, and phenolic resin countertops. Laboratory furniture will generally be prefabricated from steel framework and to standard modular dimensions.

5.43
To minimise the need for replacement of materials, suitable durability and protection measures/design features will be specified to prevent damage to the vulnerable parts of the Proposed Development such as areas exposed to high pedestrian traffic, vehicular and trolley movements. These will include:

- Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc);
- Protection against any internal vehicular/trolley movement in storage, delivery, corridor and kitchen areas; and
- Protection against or prevention of damage from any potential vehicular collision in delivery areas.

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5.44
Water
Water conservation will be promoted throughout the Proposed Development. The Proposed Development will incorporate water efficient fittings and sanitary ware (e.g. low-water, dual flush toilet cisterns, low-pressure spray taps, and showers with flow regulators) and proximity detection shut-off (via proximity infra-red and solenoid valves) to all toilet areas. Low flow showers and taps will reduce the domestic hot water heating demand and the associated CO_2 emissions, saving therefore, not only water, but also energy.

5.45
During the design evolution, the implementation of greywater and rainwater recycling has also been considered:

- Greywater recycling

  Greywater is the term given to waste water collected from showers, dishwashing and laundry (this does not include waste from toilets which is known as black water). Typical greywater recycling systems use a combination of biological and physical cleansing processes to enable the water to be used to replace the use of potable water in WCs and sinks etc.

  Due to the limited quantity of waste water for washing generated in the Proposed Development, the collection and reuse of greywater is not considered practicable.

- Rainwater recycling

  Rainwater falling on the north and south block roofs and the atrium roof could be collected into a storage tank located in the basement (or buried externally). The rainwater would need to be filtered to remove any litter/debris before storage and then the stored rainwater can be treated, ready to be reused for non-potable purposes.

  There are, however, a number of technical issues associated with this option such as the constrained site space which allows, at best, a maximum of 50% of the roof runoff to be harvested as there is no space to run drainage externally to the north and east of the Proposed Development to where the rainwater harvesting tank would be located. This complexity would mean that the outfall from the rainwater harvesting tank would potentially not connect at the soffit of the attenuation tank but at mid level. In the occasion of a high rainfall event this would result in surcharging of connecting rainwater pipes (which run from the building), which would put the Proposed Development at risk of water ingress.

  On the application site it is estimated a rainwater harvesting system could save approximately 1,600 m^3 of mains water per year, achieving annual savings of £1,600 in utility costs. The pumping of rainwater from the collection tank to the WCs within the Proposed Development would however incur extra running costs.

  Considering the constrained space within the site alongside the added complexity of a rainwater system, against the relatively small water saving/payback that would be achieved with such a system, rainwater recycling was not recommended for the Proposed Development.

5.46
Other ways to reduce water usage were investigated. These include providing treated water feeds for the steam boilers and cooling towers which will serve to reduce blowdown from the equipment.

5.47
The major water consumption item in the Proposed Development is the blow down from the steam boiler system. As steam is generated, water evaporates and leaves behind dissolved solids in the boiler shell. The Total Dissolved Solid (TDS) concentrations must be controlled to a maximum allowable level within the boiler, or scale will form on the shell and tubes as well as in valves, sensors, etc, severely reducing the efficiency and life of the boiler. The TDS concentration within the boiler is controlled by continuously “blowing down” water from the shell (i.e. continuously bleeding water from the shell), thus losing a considerable amount of heat, energy and treated water with each “blow down”.

5.48
The blowdown rate can be minimised by supplying feedwater with a minimum TDS. Two different types of feed water treatment have been considered:

- Softened water – minimal treatment (softening) of feed water will give a relatively high feedwater TDS concentration (approximately 330ppm), hence a larger blowdown volume will be required to control shell water concentration; and

- Reverse osmosis (RO) – more intensive treatment of the boiler feedwater will afford a much lower TDS concentration (approximately 8ppm), so less blowdown will be required to control shell water concentration.

5.49
Based on current estimates, reverse osmosis would provide annual water savings of about 2,600 m^3 (approximately twice as much as the savings that could be achieved by rainwater recycling), corresponding to approximately 92 tonnes of CO_2 per year. Reverse osmosis would also provide gas and operating cost savings (approximately 480 MWh/yr and 20,000 £/yr, respectively). It is therefore proposed to employ reverse osmosis technology at the Proposed Development.

5.50
Ways of reducing water usage in cooling towers have also been considered. As cooling towers reject heat, water is evaporated and replaced by make up water. This is fed into the cooling towers where the cycle of evaporation and replenishment raises the concentration of TDS and other aspects of water quality. To maintain acceptable levels of water quality it is necessary to blow off the water when it reaches certain levels. The blowdown rate and feedwater volume can be controlled by using feedwater with lower quantities of TDS, hardness etc.

5.51
Table 5-2 shows cooling tower supply requirements for untreated raw water and softened water (with reduced hardness content).

Feed water type	*Cycle of Concentration*	*Make up water required at peak flow (m^3/hr)*	*Bleed off water at peak flow (m^3/hr)*
Untreated water	2.7	38.4	12.74
Soft Water	4.63	31.4	6.06

Table 5-2. Untreated and Soft Water Makeup Up Supply for Cooling Towers

5.52
Based on peak flow rates, untreated water had the lowest (and therefore least desirable) cycle of concentration which would result in the most water being required (38.4 m^3/hr) whilst also having the highest bleed off figure. The softened water increases the cycle of concentration to 4.6 by reducing the hardness within the water. This reduces the bleed off rate and the make up water required at peak flow. Softened water is therefore the proposed option.

5.53
Major water uses in the Proposed Development (e.g. cooling tower feed, boiler feed, hot and cold laboratory water usage, treated water feed to laboratories, hot and cold kitchen water usage, hot and cold cage wash water usage, and central glass wash water usage) will be individually metered and linked back to the BMS, allowing water usage monitoring and usage patterns to be identified. Software linked to water meters will identify any ‘over-usage’ in major water uses, connected to an alarm system to notify in case of potential leaks.

5.54
Additionally water efficient landscaping systems will be specified. This will entail drip feed subsurface irrigation incorporating soil moisture sensors. The irrigation control will be zoned to allow variable irrigation to different planting assemblages.