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Planning, Directorate for Economic Growth and Neighbourhood Services
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Dear Alison,

Reading International Business Park – Application Ref: 192054

Thank you for your time on the phone on 23rd September with ourselves and Barton Willmore.

As discussed, you wanted to understand if green roofs could be implemented within the scheme that we have put forward. As explained during our call, this causes a number of issues that affect the deliverability of the scheme and instead we have focused on other sustainability measures to ensure the highest quality of development for this site.

It must also be noted that we are only aware of one warehouse scheme of an equivalent scale to those proposed for this development that has a green roof, this being Adnams Brewery distribution centre. This was a bespoke building built as an exemplar of sustainable construction, with the UK's largest span Glulam Wood frame and lime/hemp walls. At just 4,400 sqm it has the largest Sedum Roof in the UK, demonstrating just how unusual it is. It shows what is possible, but it's been developed without the constraints of institutional and financial viability. This is very much the same case when looking into Brown Roofs. Their use of crushed concrete as a substrate makes them even harder to integrate into the design of a warehouse, such that we have been unable to find any specific examples of this scale.

We have highlighted some issues that would be presented if we were to look to create green or brown roofs on the proposed scheme.

Structural / Foundation Issues:

The portal frame structure would need to be strengthened to accommodate the increased roof load and require additional columns which makes the buildings inflexible and not designed to meet the needs of future occupiers. This can easily make a building un-lettable and inefficient leaving a hindered building that either commands less rental income or has no demand at all leaving a vacant unutilised property.

Additional foundations would be required to support the additional load, which, like the additional steel proves to be an environmental dis-benefit, as well as expensive. Of most importance, this conflicts against the climate change policy as this degree of additional foundations/piling will require

significantly more building materials and also require more of the existing material to be taken off-site and disposed of.

We fully understand the ecological benefits of a green roof and have on other developments implemented these in part however not on a warehouse.

Our structural engineers have undertaken a full re-evaluation of the structure and have set out the increases in steel and concrete that would be needed in order to make it possible for the buildings to be strong enough to hold the capability of incorporating a green roof. These figures have been set out below:

Cold rolled steel (purlins)

Increase in steel weight 85%.

Equates to a total increase of 46 tonnes, 6.0m³ of steel.

Main steel portal frame including valley beam

Increase in steel weight 46%.

Equates to a total increase of 172 tonnes, 22.2m³ of steel.

Concrete for foundations

The additional volume of concrete required in the foundations should a green roof be incorporated would be an increased volume of 230m³ of concrete.

Ultimately the above figures cause a number of issues which need highlighting. The first of which is clearly the increased cost of construction which would lead to an unviable scheme. However, the most significant issue given the overall aims of planning policy seeking the consideration of green roof is the amount of energy required, by the steel and concrete production when applied to the construction of a warehouse. A roof is normally a relatively small component of the overall structure, except when applied to a warehouse when it becomes the most dominant one. As we noted on the call and have now demonstrated above, the increased steel and concrete required would be substantial, such that its incorporation into the scheme would have a far greater disbenefit to the environment than could be offset by the green roof it would support.

Perceived Reduction in Surface Water Run-off:

Green roofs can only provide interception of 5mm of rainfall and only in the summer when the substrate is dry. It would most likely struggle to meet the interception requirements during cold, wet winter periods which are typically longer than summer periods. Hence, once saturated the hydraulic performance of green roofs tends to be fairly similar to standard roofs. This eliminates one of the primary reasons of green roofs which is reduction of surface water runoff.

In addition, the SuDS techniques proposed already deliver the performance a green roof could achieve during those summer months without the additional steel and foundations.

As maintenance needs to be kept to a minimum and having already incorporated permeable surfaces capable of superior hydraulic performance compared to green roofs, adding a green roof would achieve no net gain.

Maintenance Issues:

The design of each building is such that the only access for cleaning the gutters and rooflights is via mobile elevating work platforms externally. A brown/green roof will require regular maintenance, which will require a permanent access provision and additional land to provide that access, which will reduce the amount of employment floorspace we can deliver. This will also introduce a health and safety risk of working from height.

Future tenants/occupiers would be required to take on the responsibility of the maintenance of the roof – which will put them off taking the space in favour of warehouses with standard roofs. Operators of buildings of this type seek to keep ongoing maintenance and expenditure to a minimum. We have green roofs on some of our office buildings and unfortunately, a properly maintained green roof requires substantial ongoing maintenance to prevent the plants from dying, becoming unattractive and needing to be replaced at considerable expense and disruption.

A green roof system will also mask any defect within the roof cladding, making any leak detection and subsequent maintenance very difficult.

Although we understand that the purpose of the green roof is not completely for aesthetic reasons it is worth mentioning that the clean contemporary design of the buildings which include a parapet, will mean that the roof would not be visible from ground level.

Arlington have extensively considered the overall sustainability of the scheme and are well advanced with the scheme design to achieve a BREEAM rating of Very Good along with a target EPC rating of A across each of the units. This is achieved by incorporating the following sustainability measures:

Energy Performance

The initial outline specification for the scheme suggested an EPC rating of B could be achieved. The potential to improve the energy performance was investigated, concluding that the most effective way to do this would be by the introduction of Photovoltaic arrays to the energy strategy of each building.

The anticipated annual generation from each PV array is as follows:

Unit 1	30 MWh/Yr
Unit 2	50 MWh/Yr
Unit 3	18 MWh/Yr
Unit 4	21 MWh/Yr

Electrical Vehicle Charging infrastructure

A total of 16 individual electric vehicle charge points (EVCP), which is more than is required by policy, shall be provided across the site.

Water Conservation

The current scheme is designed to ensure the domestic water system provides a good level of water conservation.

In-order to achieve this the sanitary ware standard specification has been enhanced by the introduction of reduced flow capacity equipment. Equipment such as infrared dual flush toilet systems, basin tap with Aerator nozzles and ECO showers are now being provided.

Other water conservation initiatives being provided for this project include the monitoring of the water supply to each building via dedicated metering connected to the building management system, and major water leak detection to main water supply and flow control to WC areas when un-occupied to comply with (NB I think some text might be missing).

Lighting Controls

The proposed scheme provides for Automatic lighting controls such as presence and absence detection through-out the building.

The automatic controls system within the office areas is enhanced further offering a higher level of presence detection, daylight detection, zone control and multifunction operation such as scene setting. One of the major benefits is the ability to monitor the lighting levels across the whole floor, sensing the occupancy levels and adjusting the lighting accordingly. The system is adaptable and can be finely tuned to give greater energy saving over standard automatic presence controls.

As each light fitting has its own independent detector the system can be easily adapted to suit office modifications such as the introduction of cellular offices or change of operation without alteration to the electrical wiring systems.

The enhanced system will monitor energy use and trends, can link to room booking and Building Management Systems, and also provides remote controls via a web portal.

Automatic monitoring and Targeting

An automatic monitoring and targeting system (Am&T) will be provided for each building. This will monitor energy usage against the energy strategy, design criteria and energy targets.

This system will monitor the main incoming electrical, water and gas services as well as specific individual parts of the installation such as lighting systems and heating/ cooling plant.

Reports can be sent via email to individuals responsible for the maintenance and operation of the building.

Ventilation systems

Internal and external air handling plant shall utilise heat recovery technology such as thermal wheels and air source heat pumps to condition incoming supply air to the building.

Energy Efficient lifts

The Lifts provided shall be highly efficient with variable speed controllers of the drive motor and LED lighting.

The above sets out the extra steps that Arlington has taken to invest in a sustainable development beyond the level required by occupiers and also by building control. Several of the systems put in

place are also transferable to an ingoing occupier to have access to, in order to micro-manage the sustainability of some parts of the buildings.

I trust this demonstrates the genuine depth of thought we've put into the sustainability of the scheme, providing the context around which a green/brown roof was discounted. Rather counterintuitively perhaps, it shows that green/brown roofs are in fact detrimental to the environmental footprint of the scheme as a whole. I hope that this shows the extent of Arlington's ambition to produce high quality, attractive, sustainable and operational warehouses that will attract the best occupiers to the town considering the prominent nature of the site as a gateway to Reading.

Yours Sincerely,



George Wilson
Development Surveyor