RESEARCH

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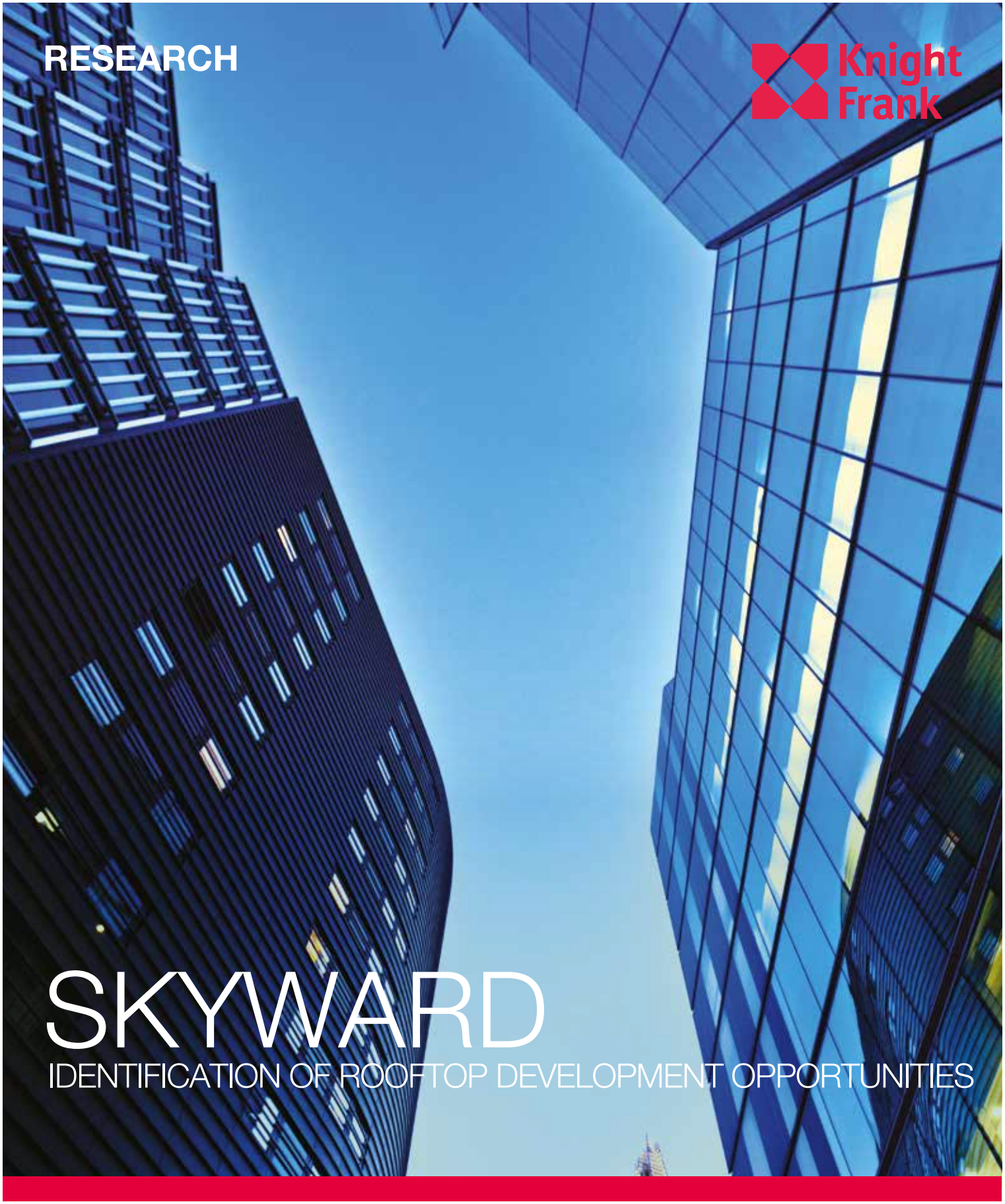


# SKYWARD

## IDENTIFICATION OF ROOFTOP DEVELOPMENT OPPORTUNITIES

## HIGHLIGHTS

A new method for identifying sites for permitted development

Size of potential rooftop development market in London identified

Over 40,000 new homes could be built without affecting London's character

Unrealised potential value of over £51 billion

## KEY FINDINGS

As many as 41,000 new dwellings could be built in central London using rooftop development space, without altering the iconic skyline

This equates to more than 28 million sq ft of potential additional residential floor area

The unused airspace has a potential value of £51 billion

Some 23,000 buildings could be suitable for rooftop development in Zones 1 and 2

# INTRODUCTION

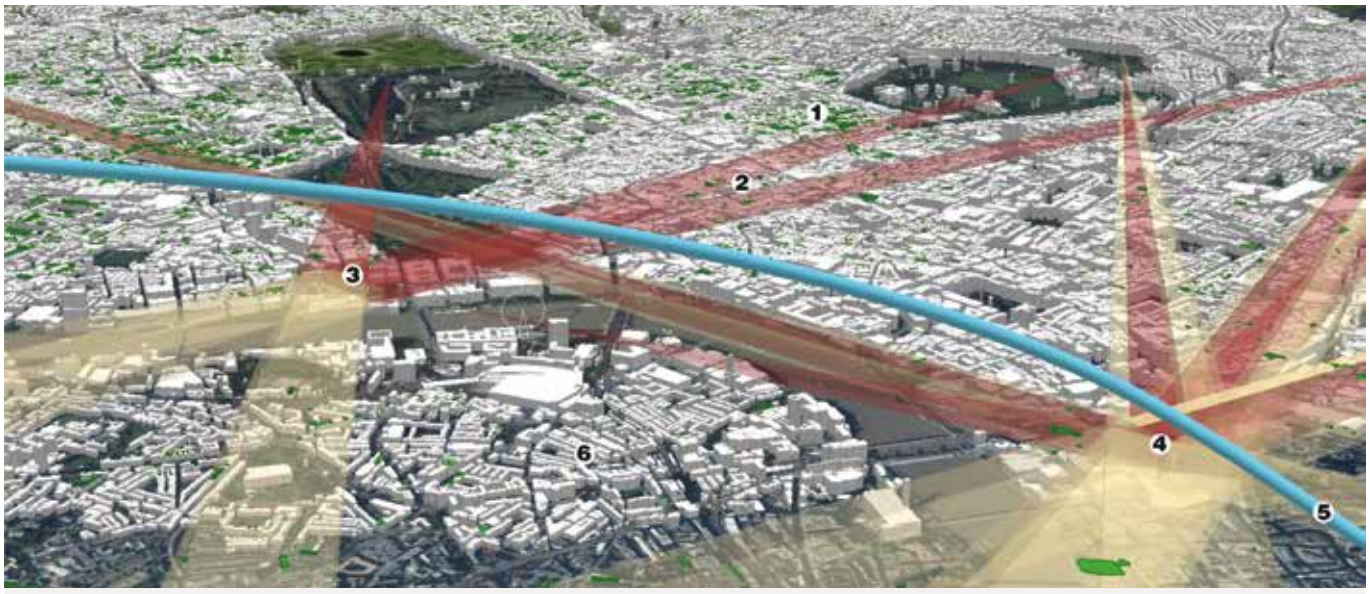
Stimulated in part by the 2017 Housing White Paper, interest is growing in quantifying the extent of rooftop development opportunity in Central London.

The Housing White Paper specifically stated the Government would seek to address the scope for higher-density housing in urban locations particularly "where buildings can be extended upwards by using the 'airspace' above them". In response Knight Frank has developed 'SKYWARD' – a method to systematically analyse the potential of each and every building. The analysis establishes a series of principles that can be replicated within planning authorities and potentially inform new planning policies. Similarly, landowners can use SKYWARD to identify opportunities and assess their potential scale and value.

We have not tried to assess the maximum potential of rooftop development. We have simply asked how much can be built without changing the character of our skyline, and we have defined that by assuming that no rooftop development can extend beyond the ridge line of its contiguous block. This intentionally underestimates the potential opportunity above existing buildings which have been considered by others. For example, WSP and UCL estimated that 630,000 residential homes could be created above London by building 6 storeys above existing municipal buildings. Separately planning consultants hta considered a series of building typologies across Camden that could reasonably accommodate 1, 2 or in some cases 3 additional floors irrespective of the heights of

FIGURE 1

**Understanding airspace development opportunity in 3D**




1. SKYWARD development opportunity modelled in 3D
2. Interaction between SKYWARD plots and protected viewing corridors
3. Convergence of protected views on the Houses of Parliament
4. Convergence of protected views on St. Paul's Cathedral
5. London City Airport runway approach corridor
6. Ordnance Survey 3D base data

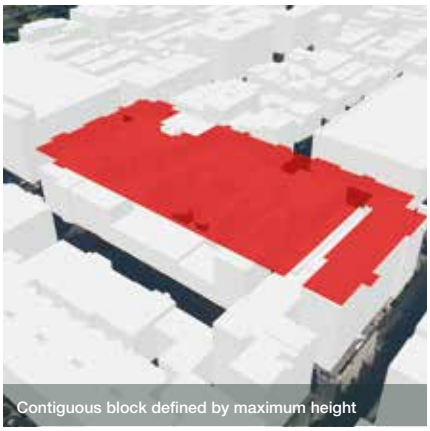
**Source:** Knight Frank Research

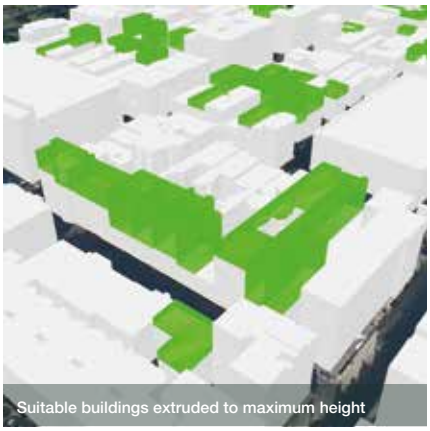
neighbouring buildings. Planning consultants hta then extrapolated its study area of Camden across the wider London area to conclude 179,126 new homes might be possible on this basis.

All this development may indeed be possible, but it would unquestionably have an impact on the street scene and would need to be judged on a case-by-case basis by planners. The SKYWARD tool is intended to identify those opportunities that would not negatively impact the street scene; indeed in many cases we would expect the development to enhance the street scene, for example by forming continuous ridge lines along residential terraces. In doing so we believe SKYWARD could be used by Local Planning Authorities to define permitted development for rooftop development.

## Methodology:

SKYWARD systematically analyses 3D spatial data from the Ordnance Survey, cross referencing Land Registry data to assess ownerships and Historic England data to filter out Listed buildings. Its approach is objective and comprehensive in that it assesses every building within its study area rather than extrapolating from a smaller study area. We have decided to limit our study area to Zones 1 and 2 as our analysis demonstrated that coherent principles of rooftop development reduce dramatically as densities fall away beyond Zone 2. This highlights the benefit of a fully comprehensive study and the potential inaccuracies that may be suffered if smaller study areas are extrapolated from.


Contiguous block defined by maximum height


Suitable buildings extruded to maximum height

SKYWARD initially defines each contiguous block by its maximum height, then excludes unsuitable buildings (Listed buildings and those where historic airspace rights are recorded by Land Registry), before extruding all remaining buildings up to the maximum height. Only those that can be extended by a minimum of 3 metres are deemed to be potential SKYWARD developments.

As an example, SKYWARD identifies airspace over 42 Reeves Mews in Mayfair, as shown below, as suitable for development of an additional floor. Planning history confirms in 2014 Westminster Council approved: *"reconfiguration of the building to provide two self-contained flats one on lower ground floor & ground floor the second on first floor & extension into the roof space on second floor including the creation of a terrace area at second floor roof level."* (See image bottom of page 3).


42 Reeves Mews in Mayfair

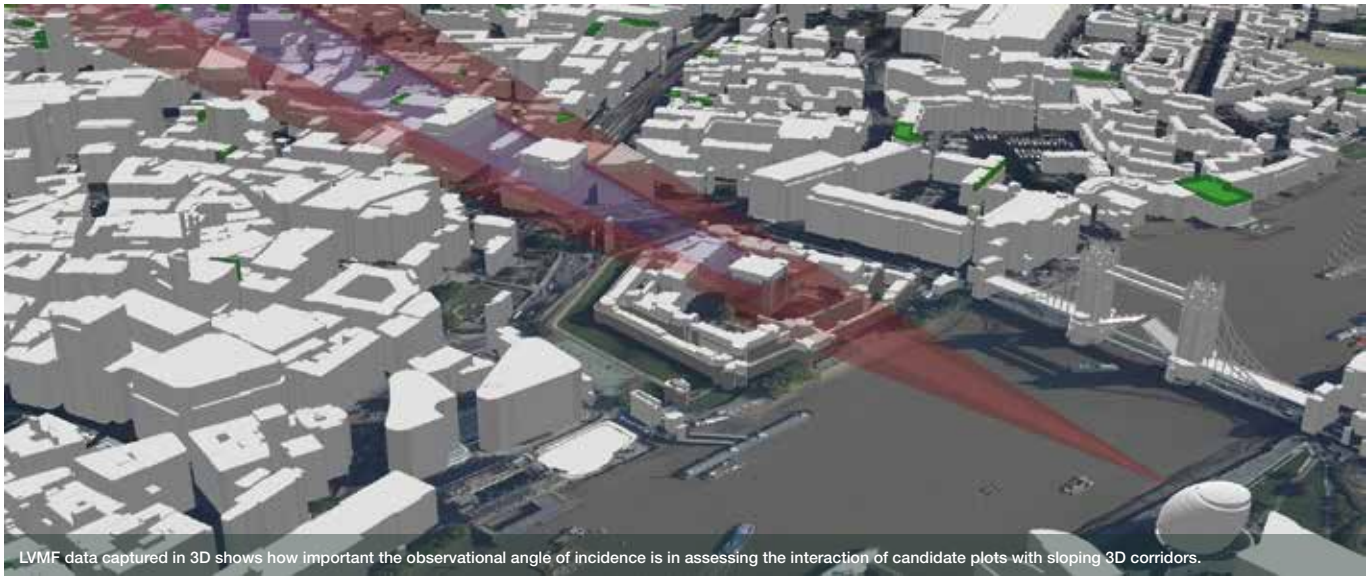

42 Reeves Mews in Mayfair

"3D data visualisation is key to understanding wider context and setting."

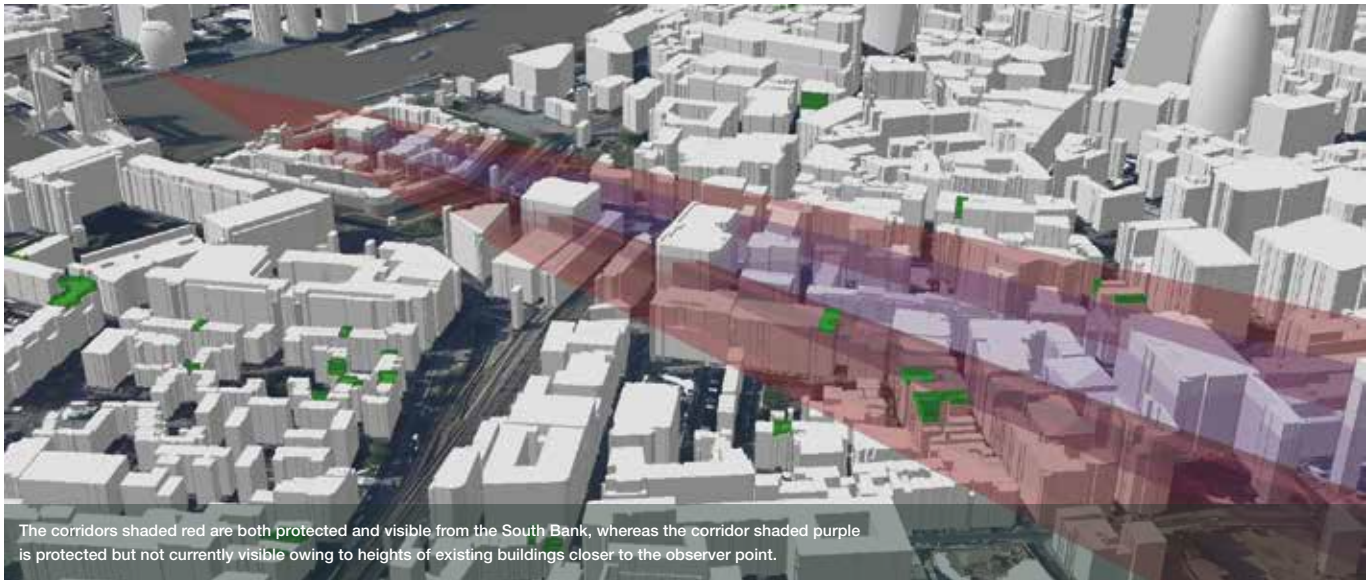
SKYWARD establishes a working baseline figure on airspace development opportunity differentiated by location, scale, value and ownership. This assessment, while systematic and comprehensive to the edges of Zone 2, remains malleable and can be remodelled to incorporate additional planning constraints shared by industry partners or otherwise created as bespoke model elements.

One such layer that Knight Frank has modelled is the strategic viewing corridors from the London View Management Framework (LVMF); itself a Supplementary Planning Guidance document issued as part of the London Plan. The LVMF defines 12 tapering 3D corridors from a number of vantage points, and aims to protect views of major London landmarks. While the corridors have been mapped and made generally available in 2D, the same has not happened for 3D data. As Table 1 on page 6 shows, the distinction between the two is key to properly understanding and quantifying airspace development opportunity.

3D data visualisation is also key to understanding wider context and setting, and ensuring that proposals under SKYWARD do not adversely affect London's unique character.



LVMF data captured in 3D shows how important the observational angle of incidence is in assessing the interaction of candidate plots with sloping 3D corridors.



The corridors shaded red are both protected and visible from the South Bank, whereas the corridor shaded purple is protected but not currently visible owing to heights of existing buildings closer to the observer point.

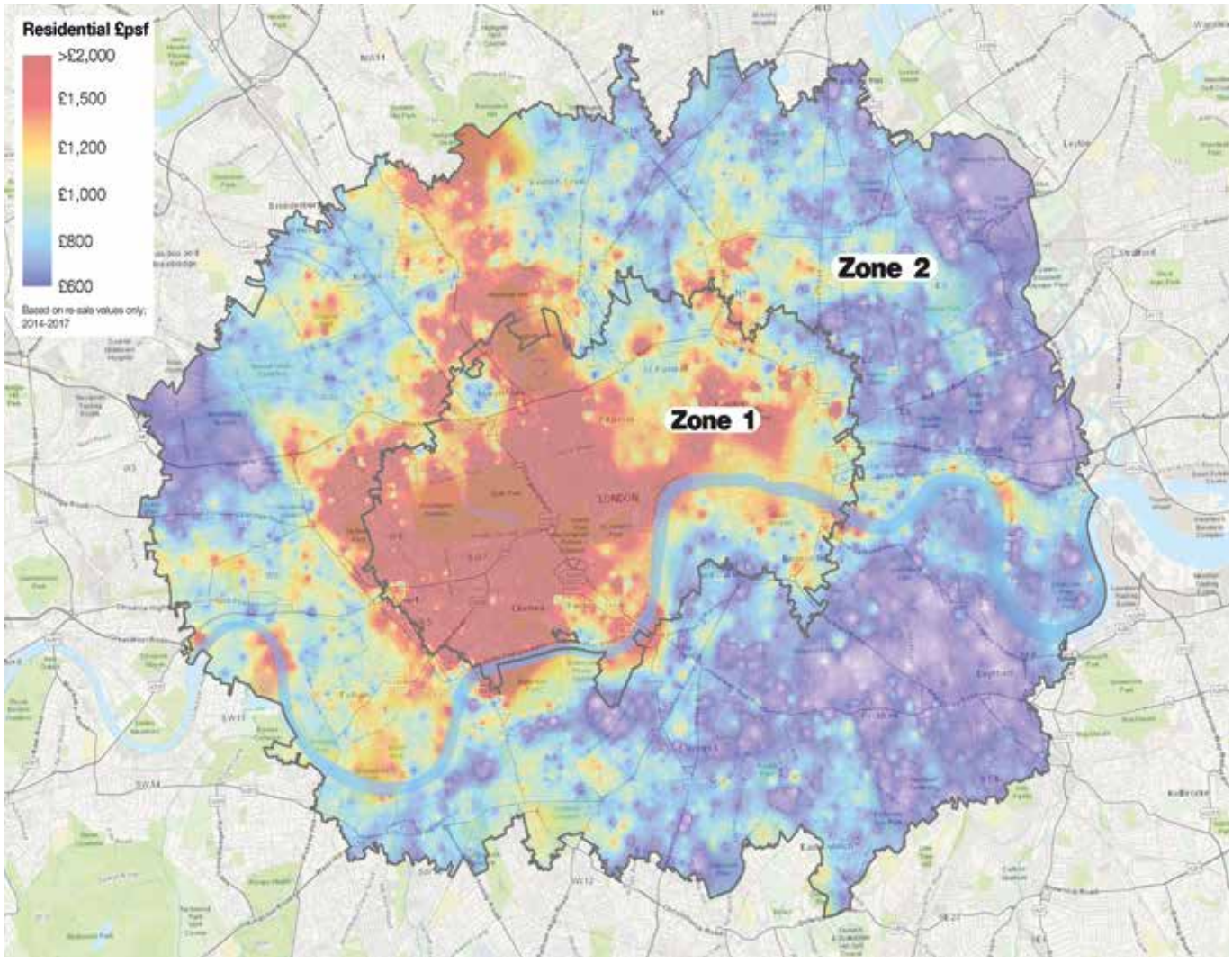
TABLE 1
## Summary

| Borough | Skyward development potential (sq ft) | Protected views removed (2D) (sq ft) | Protected views removed (3D) (sq ft) |
|---|---|---|---|
| **Zone 1** | 17,267,036 | 15,814,735 (-8.4%) | 17,196,991 (-0.4%) |
| **Zone 2** | 11,192,500 | 10,631,842 (-5%) | 11,191,465 (-0.01%) |
| **Total** | 28,459,536 | 26,446,577 (-7%) | 28,388,456 (-0.2%) |

**Source:** Knight Frank Research

Table 1 shows why 3D analysis is key to accurately quantifying airspace development opportunity. Once the floor areas and number of floors have been identified, SKYWARD converts the areas to Net Sales Areas. This floor area is translated into potential value by multiplying through by a real-time value per square foot database created and maintained by Knight Frank.

FIGURE 3
## Illustration of the £psf surface showing the area studied




**Source:** Knight Frank Research / Land Registry / DCLG

A systematic approach to the SKYWARD analysis means data can be related to other geographies easily, including against specific ownership portfolios. In this visualisation, all individual site opportunities within Zones 1 and 2 have been highlighted, revealing a starting point of 28.4 million square feet of development potential. This is apportioned 17.2 million square feet in Zone 1 (60%) and 11.2 million square feet in Zone 2 (40%).

Zones 1 and 2 results: 28.4 million square feet of SKYWARD development potential identified

Volumetric assessment can be used to quantify this opportunity. The volume of unused SKYWARD plots in Zones 1 and 2 is equivalent to 8 Burj Khalifa towers, without the corresponding impact on London's skyline.

An alternative illustration of 28.4 million sq ft in Central London

Knight Frank provides unrivalled insight and access to both residential and commercial markets, including tailored portfolio analysis based on the short and longer term investment objectives of our clients.

Our research guidance combines expert market understanding with detailed data analysis and visualisation. Knight Frank's award-winning Geospatial Team has been shining light on new opportunities for clients through site targeting and selection analysis, where factors that weigh on the viability of an individual site are assessed methodically in Geographic Information Systems (GIS).

In addition to Knight Frank's proprietary in-house data covering a range of market indicators, we also draw on data sets covering demographic characteristics, commutability, site utilisation, and building volume and efficiency.

Clients now using this insight include developers, technology companies, central and local government, emergency services, logistics and distribution companies, financial services and media agencies.

Knight Frank developed the SKYWARD methodology in order to demonstrate how geospatial tools and data can provide a considerably more detailed picture of development opportunity in the capital.

Figures and estimates used in the report are calculated against two constraint layers; listed buildings and historic freehold airspace reservations. The subsequent analysis revealed and quantified the extent of the opportunity; however the assumptions informing the methodology require wider collaborative development and refinement.

For example, constraints arising from existing rights to light, as well as the associated mitigation, need to be quantified against the capital raised. The model Knight Frank has built does not provide a London-wide overview of windows, and so assessment of opportunity at this level of detail should be made on a case-by-case basis.

However, even in its current form the model already provides a suitability matrix based on the capital value unlocked for a given portfolio, and this puts freeholders in the best possible position to engage with planning authorities on viable and context-appropriate development. Some development constraints that appear prima facie to be site-specific (such as leasehold terms, building age, whether the site forms part of a mews or is within a conservation area) can already be incorporated into the geospatial analysis.

Knight Frank continues to engage public and private sector partners and clients in exploiting the increasing supply of high quality geographic data now available to the industry. This report demonstrates how our understanding of development opportunity can be re-framed with new data, tools and insight.

Knight Frank welcomes the opportunity to collaborate with industry partners on new approaches to addressing housing supply, realising additional value for freeholders, and contributing to public policy debate on sustainable urban development.

St John's Wood Court, by First Penthouse

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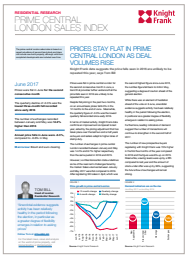


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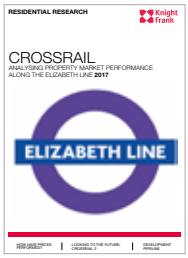


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