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Developing an Icon – The Story of the Shard



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Known as one of the property industry's most established and colorful personalities, Irvine Sellar has had a long, varied and successful career, spanning from market trader, to founder and owner of UK's second largest independent fashion retailer, and most recently the developer of Western Europe's tallest building.

Sellar founded Sellar Property Group in 1991 and his business experience spans over 40 years. Having built up an unrivalled contact base both in and outside the property industry, he now concentrates his efforts in the commercial property market and has built SPG into an organization with a diverse investment portfolio in the UK and Europe.

His instinctive can-do attitude to life and business is reflected in the SPG ethos. Irvine led and guided The Shard and London Bridge Quarter development team through the complex planning process and delivered financing and investments at one of the most difficult times in the global capital markets.

Note: This paper draws upon several previously published CTBUH resources, namely:

Brass, Kevin, "From 'Dry and Safe' to 'Tall and Sharp': The Story of the Shard," CTBUH Journal, Issue II (2013), p56-59.

Daniel Safarik, Antony Wood, "Day Two Plenary: London Tall," Height and Heritage, CTBUH Post-Conference Report (2013), p18.

Council on Tall Buildings and Urban Habitat, Event Archive, CTBUH London International Conference, 2013, Council on Tall Buildings and Urban Habitat. <http://www.ctbuh.org/Events/Conferences/London2013/tabid/4648/language/en-US/Default.aspx>

Abstract

London is considered one of the world's safest harbors for investment capital. However, it has also been one of the lightning rods in the rapidly developing debate over the influence of global capital on the built environment. To say that some tall buildings have recently been controversial is an understatement. But amidst this, it is worth knowing in more detail how the UK's tallest building, and one that is very much emblematic, and complementary of London, came to be. This is the story of the Shard.

Keywords: Mixed Use, Vertical City, Connectivity, Infrastructure

Introduction

The story of The Shard is much larger than the building itself. The Shard and its companion office building, The Place, anchor London Bridge Quarter, a £1 billion-plus redevelopment of a once-gritty quarter of London's South Bank. Two dated 1960s office blocks were taken down to make way for a new economic engine for the area, in addition to an extensive remodeling of the city's second-busiest railway station, turning the quarter into a thriving and energetic nexus of urban life, where before there was little to do but pass through.

The Investment Objective

We did not conceive of a tall building from the outset. We bought a property to add to our investment portfolio in November 1998. The investment property in question was the head office of PricewaterhouseCoopers, which was a 24-story building, comprising just over 200,000 square feet (18,580 square meters). Some months after we bought it, the government indicated that it would encourage high-density buildings, provided they were close to transport hubs. This building was set next to London Bridge Station (see Figure 1). Because we're developers and an experienced property company, we invest to hold, to trade, and to develop. We thus switched our thinking of investment to thinking of development.

As the government had begun to encourage high-density development, we knew we'd have to devise a particularly thoughtful scheme in order to be competitive. We developed a plan to increase the size of the building from 200,000 square feet to well over 1.5 million square feet (140,000 square meters). Our original idea was to build a tower of 400 meters in height. We realized very early on in the development process that, unless we engaged with a world-class architect, we'd have very little chance of getting consent to move forward with development



Figure 1. The Shard in its urban context (Source: WSP Group)

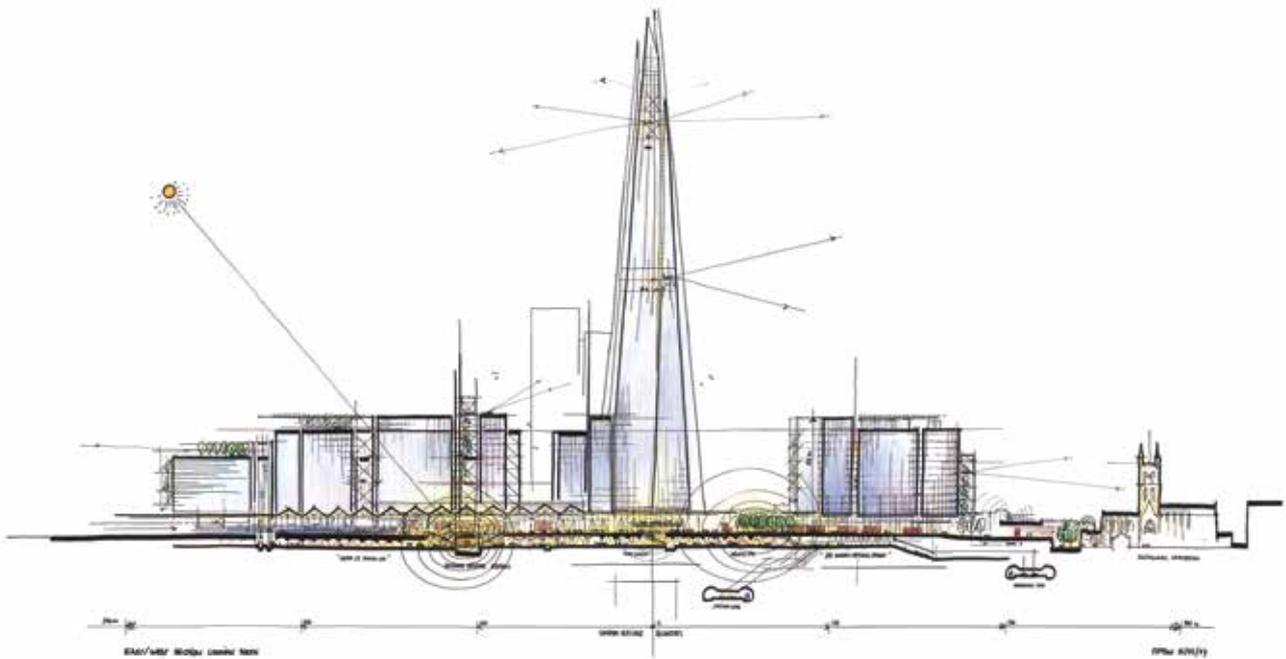


Figure 2. Working sketch of The Shard in context (Source: Sellar Property Group)

The Architecture

It turned out that one of the harshest critics of the initial plan was celebrated architect, Renzo Piano, who called the original 400-meter scheme “cold, arrogant, impenetrable, dark, and divisive.” We didn’t take it personally— instead, we put him to work designing a better one. When he saw the way the river and rail lines converge at the building site, he sketched on the back of an envelope a very close approximation of the building that exists today. The look of The Shard is inspired by church spires and sailing masts, disappearing softly into the sky (see Figure 2). In that vital way, it is very much a product of its place in London, even as its investment, development, and design team was assembled from around the globe.

we were called in for a high-profile public enquiry. Ultimately, we reduced the height of the planned tower, but were still able to fit 30 acres of property onto a one-acre site.

The Importance of Mixed Use And Transport Connectivity

In addition to having a great architect, we needed to identify as many uses as possible for the building in order to limit risk for investors. The idea of the “vertical city” began to define the program. The ultimate 306-meter scheme comprised a vertical city of 95 stories, featuring offices, a 200-room Shangri-La hotel, 6,000 square feet (557 square meters) of restaurants and 10 apartments with 360-degree views of London.

Luxury brands are admittedly essential to the financial solvency of the project, but the vision was always to create a truly mixed-use development, to be enjoyed by everybody, and not just a commercial fortress. As a consequence, more than £62 million of the project budget was devoted to the public realm, including new railway platforms and a concourse at London Bridge Station, which serves 54 million people a year.

The project spans the southerly exit of the station, with The Shard and its smaller sister, The Place, framing a public square. The Place (see Figure 3) is a massive building in its own right, about a 600,000-square foot (56,000 square meter) office development with a public plaza between the two buildings. With the two buildings combined, this has

The Approvals Process

Virtually any city in the world would have been an easier place to develop a project of this scale, although few would be as rewarding.

We knew we were in for the long haul. In total we had more than 300 meetings with the public. Overall, the project was well-received by community members, and then-mayor Ken Livingstone was also behind it. We produced 150 CGI renderings from every conceivable angle, and met with all the stakeholders. English Heritage, St. Paul’s Cathedral, Historic Royal Palaces, and CABA (the UK Commission for Architecture and the Built Environment) opposed the design, and



Figure 3. The Place building (Source: Sellar Property Group)

a hugely beneficial regenerative effect on the immediate area and beyond. The Shard is a mixed-use vertical city that blends business with stimulating architecture, tourism, mobility, recreation, lifestyle, and culture (see Figure 4).

The Role of Global Capital

In today's financial environment, a 12-to-13-year financing and development plan spans several cycles. The London Bridge Quarter is a testament to the resiliency of global finance, though I think its case is unique because of the incredible value it represented. Our initial group of investors was led by Credit Suisse, which committed £1.4 billion in 2006. During the crisis of 2008–09, they withdrew their financing. The banking crisis got worse, and my investors eventually found an independent source of capital in the sovereign wealth fund of Qatar. They stepped into the planning process and came to share our vision for the building, and they fully funded the project. I often say that "luck is where preparation and opportunity meet." But this was even better than luck—it was a miracle. Even today, we are under no pressure to speed up the leasing or rent for any lower than our business plan dictated.

The economics of tall buildings are unusual. Long-term thinking and fortitude are requirements. People like to point out to me that I have been working on this building for 15 years, which is true. On the other hand, this is a building that will last two or three centuries. Plenty of entrepreneurs spend 10, 12 or 15 years building up businesses that evaporate or are absorbed after 50 years. This one isn't going to disappear.

A large number of recognizably sane people would still not have accepted the argument that this project was a reasonable investment, and those of us who did are aware of this fact. When it was finally close to finished, Mr. Piano and I stood on the 40th floor of The Shard and looked out at the city below. We looked at each other and said, "If we were not both a little bit mad, this would never have happened."

Engineering and Construction

Lest one be left with the impression that The Shard's complexities were confined to development and planning issues, it's important to present a summary of the incredible engineering and construction process that made the dream of The Shard a reality.

Although the immediate vicinity of the site was in decline economically and in terms of urban amenities, it was anything but a wasteland (see Figure 5). The two biggest obstacles to The Shard's execution were related to a tangled web of city services and precious archaeological treasures that lay just beneath the surface of the modern city. This compounded with the need to keep London Bridge Station—a vital piece of infrastructure serving 120,000 people per day—open and running smoothly during the entire process.

Dealing with a Spider's Web of Existing Infrastructure

The Shard's foundations were affected by the piles left in the ground from Southwark Towers. This building had no significant basement, and was supported on under-reamed piles founded in the London clay. They extended only a few meters below The Shard basement slab, and so could not be reused to provide vertical support for the new building. It was not economical to remove the old piles, so the new piles were designed to pass between the old ones and their underreams.

Other existing infrastructure in the vicinity included London Underground's Jubilee Line tunnels, which were about 5–10 meters from the northwestern corner of The Shard basement, a disused stair shaft inside the site, a disused elevator shaft straddling the boundary, and a ventilation shaft to the west, on Joiner Street. The adjacent streets also contained the usual sewers, Victorian water mains, and other utilities.

Creating good-sized floor plates in the tower called for some clever structural solutions and meant building as close as possible to the underground infrastructure. Limiting ground movement was critical to protect London Underground's assets and to ensure no damage occurred to the water main. Therefore, 3D finite element analysis was used to predict potential ground movement, and to convince the regulatory bodies that it was safe to work within sensitive close-proximity zones.

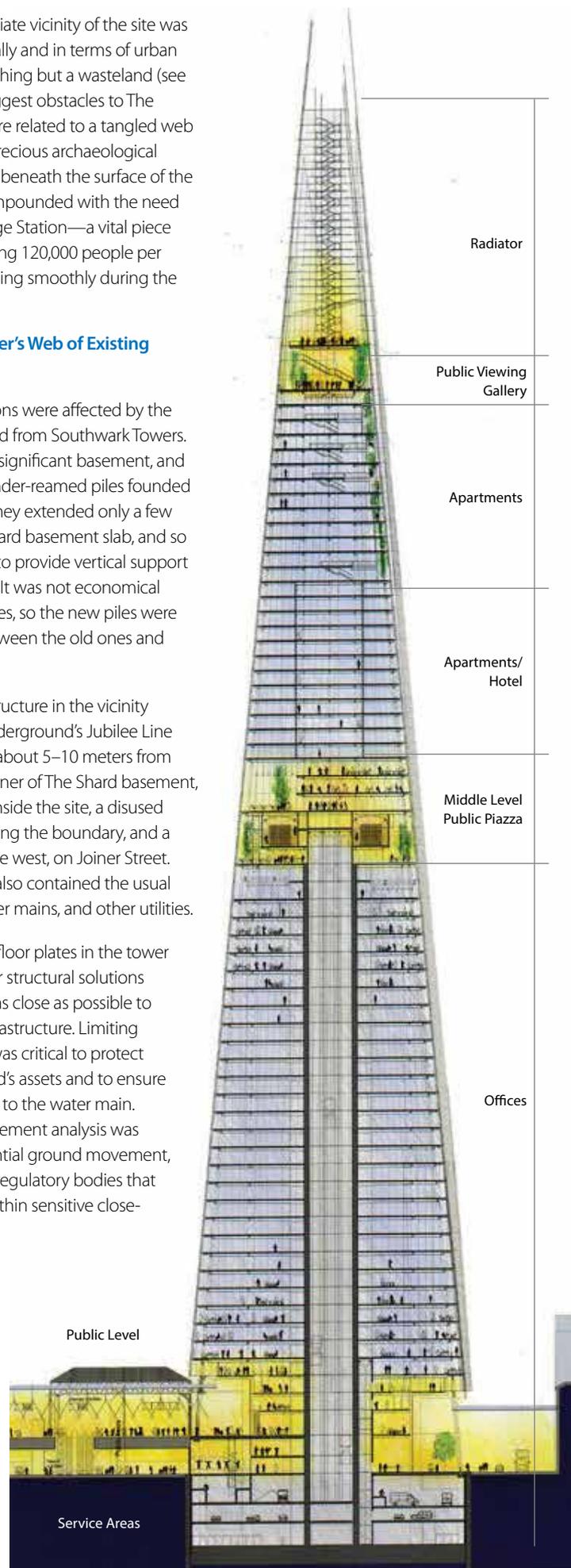


Figure 4. Section drawing of The Shard (Source: Renzo Piano Building Workshop)



Figure 5. Immediate vicinity of the Shard (Source: Aurelien Guichard)

Achieving a Modern Vertical City Despite Substantial Constraints

At The Shard, the vision of a “vertical city” within a constrained area set into ancient street patterns inspired the tapered shape of the building. Large floor plates were preferred for offices because of their suitability for commercial operations (see Figure 6). Intermediate levels were allocated to restaurants, and the luxury Shangri-La hotel, which required a corridor near the core and suites around the perimeter, was located nearer the top. Very large floor plates would not have been suitable for the hotel because each room required a view. Exclusive residential apartments were positioned at the top of the building, occupying entire floor plates in most cases and, in some cases, two floors.

Navigating Around Sensitive Buried Secrets

Smaller buildings covered the site for The Place at London Bridge Quarter, and Roman remains had been left undisturbed. The time needed for the archaeological dig threatened to delay construction in the ground. Engineers knew that time lost in the ground is rarely recovered. In the interest of minimizing risk to the program, the team responded with the rather drastic measure of reducing the depth of the basement by one entire level.

How could the team deal with losing a whole basement in a project of this scale? In some ways, the answer was a combination of Building Information Management (BIM) software and “top-down” construction. The software was used to adjust plant positions and to package the plant rooms more efficiently, resulting in reduced excavation and construction costs, and program risks.

“Top-down” construction is essentially a time-saving methodology, wherein construction takes place from the ground level downwards, rather than excavating to the bottom of the basement and working up. At The Place, 500-by-500-millimeter steel columns were lowered or “plunged” from ground level through empty pile bores into freshly poured concrete. The ground-level slab was then cast on grade. Once it had gained strength, the slab was capable of propping the perimeter embedded walls and could be supported on the plunge columns, allowing excavation to commence below the slab.

Through top-down construction, the risks posed by archaeological works to the program were circumvented. This enabled the superstructure and basement works to proceed simultaneously. The slip form for casting The Shard’s concrete was set up at the second basement level, and while the core was being built upwards, basement construction continued beneath.

The vision to create this mixed-use vertical city and the desire for the tapered shape informed the choice of building materials and the plan’s structural system. At The Shard, the lower level floors were framed in steel to accommodate large spans, while in the upper levels, the spans are smaller, and post-tensioned concrete was more suitable. Spans were sufficiently low in the top few concrete floors, to allow the use of normal reinforced concrete construction. The spire was framed in steel to streamline construction.

To create extra space in a constrained site, there was no need for a large ceiling void at The Shard’s upper levels, because the service routes were installed above the corridor around the core. A 200-millimeter thick post-tensioned flat slab reduced the structural depth and this, together with shallower finishes in the upper levels, reduced the floor-to-floor height by 550 millimeters, compared



Figure 6. Interior office space view (Source: Steven Henry)



Figure 7. The Shard under construction, with London Bridge Station and the Thames (Source: Sellar Property Group)



Figure 8. Placing last piece of steel on the spire (Source: Sellar Property Group)

to the composite steel floors in the office levels. This allowed two floors to be added without changing the height of the building. The thicker, normal-weight concrete slabs in the upper levels provided additional mass, as well as the necessary acoustic separation between hotel and apartment floors.

Constructing the spire at the very top of The Shard, while 120,000 people per day were using the London Bridge station at its feet, presented a considerable challenge (see Figure 7). The steel frame was more than 60 meters tall, and there was no lay-down space at ground level to assemble structural elements. The spire was therefore designed so that it could be fabricated in modules; each module was the maximum size that could be transported by road and lifted by the tower crane (see Figure 8). Because the spire contained the viewing gallery (see Figure 9), The Shard's engineers worked closely with the steel fabricator to ensure that there was no reduction in aesthetic

quality from the use of modular construction. A trial assembly of the spire was carried out at the fabricator's yard in order to ensure the modules could be erected rapidly and safely when they arrived on site.

The below is an extract of an interview CTBUH conducted with Irvine Sellar, published in the "Talking Tall" section of the CTBUH Journal, Issue II, published in May 2013:

Q: With hindsight as an advantage, what were the key factors in making the economics of The Shard in London work?

IS: The PricewaterhouseCoopers building we bought was a very safe investment, with 90 years left on the lease to PwC. It was very dry, but very safe.

But when we realized the potential that would be unleashed by the government's advocacy

of mixed-use transit hubs, we thought, "Now we've got the opportunity (to turn) this investment property into something much larger: a high-density development."

Q: How did you make it economically feasible?

IS: Originally the plan was for 400 (meters), but we knew we'd have to reduce it. Still, if I can get 1.3 million square feet (120,773 square meters) of gross space replacing a building we bought with 212,000 square feet (19,695 square meters) of space, the economics are pretty obvious.

Q: Do you see a change in the willingness of government bodies to give their consent to tall buildings of this variety? Has there been a change in attitude?

IS: No. I think there's always been a resistance in London. It's one of the most historic cities on the planet, and there are many protected views: views of St. Paul's, views of Westminster, and views of Tower Bridge. All across central

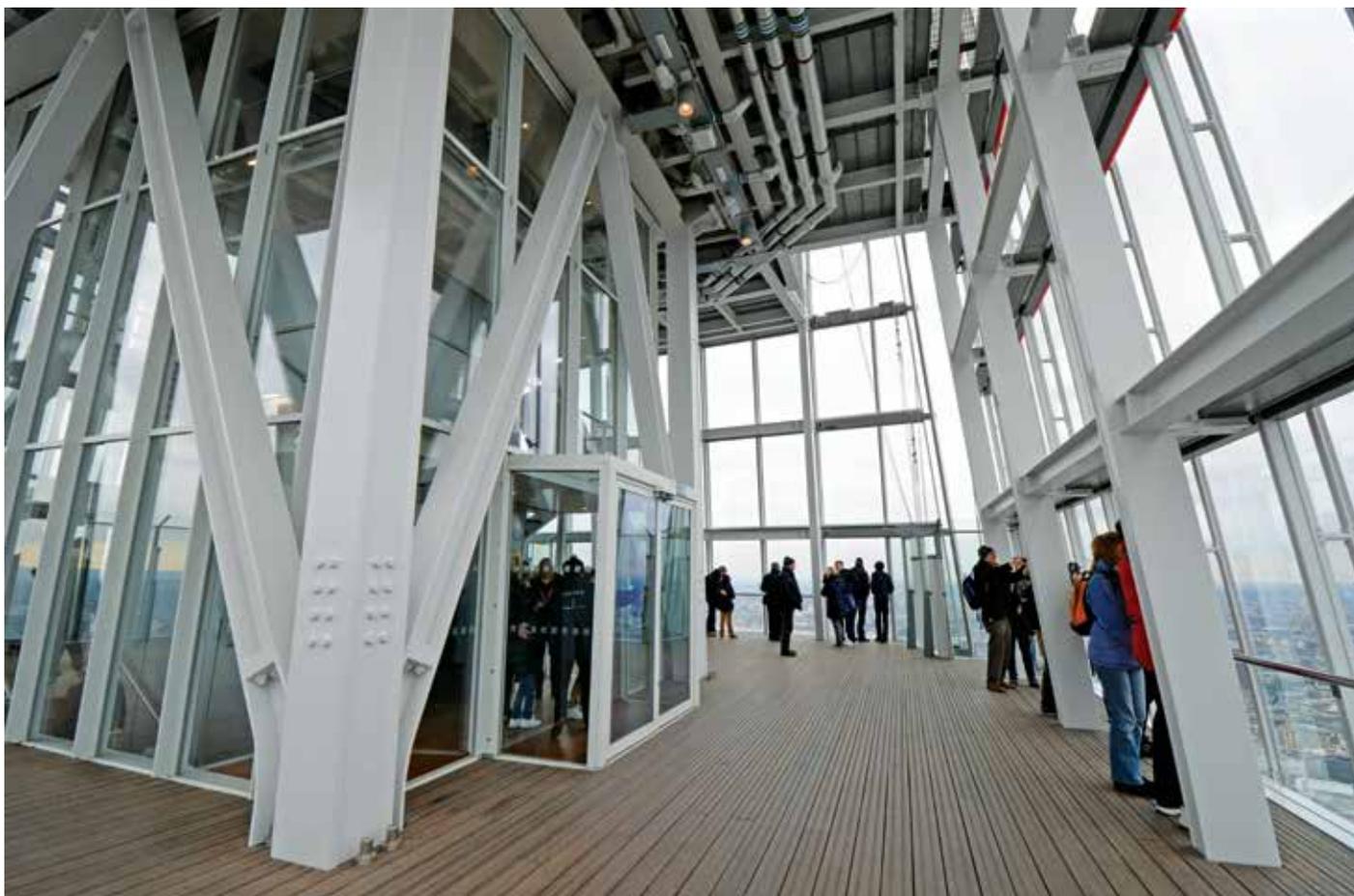


Figure 9. Viewing gallery of The Shard (Source: Terri Meyer Boake)

London you've got to be careful. I mean there are some particular parts of London that are very strict about height, such as Mayfair, Kensington, etc. You've got all the issues of rights of light and viewing corridors, etc., generally in conservation areas. So, it is not an easy situation.

Q: Does London encourage tall buildings?

IS: I don't think that it does, but it doesn't discourage them, either. It's got to be a special set of circumstances. And believe me, we had to work extremely hard and face a major public enquiry, probably the most important taking place in London, to get through and win that particular planning battle.

Q: So, in a general sense, you certainly answered the critics about your own building, but what's your response to those that feel in a general way that tall buildings are not good for London and don't fit its historic skyline?

IS: My view is that populations in capital cities around the world generally do better living in a confined area than in a spread-out area. Look at "the Los Angeles effect," where it's spread out and not particularly attractive, nor particularly clean, nor particularly green, because of the smog effect. If you can build tall and avoid sprawl, I think it's better for the

population. People want to live in city centers because they find them more attractive. Hence there have been a lot of new high-quality residential towers being built in parts of London and they've been extremely popular.

Q: Can you build tall in London without doing what you did, which of course is integrating with a larger redevelopment project, and a neighborhood? Does building tall make economic sense as a stand-alone?

IS: Land in London is expensive, particularly in prime locations. So the greater the density you can get on it, the better, provided you're developing to very high standards. That means you respect energy, you respect the green factors, you respect design and quality. It's all got to work for you to get more out of your land.

Q: Given all that you went through, would you do a tall building of this scope again in London?

IS: Yes, I would. Why? Because it's profitable.

Q: Do you expect to see that continual flow of foreign capital that has been such a driver for development in London, and why?

IS: Yes, I do, because it's considered to be one of the safest places on the planet. London has got what so many cities do not have, including America. You've got a split, with the center of government in Washington and a center of finance in New York. Here, they're both in London.

In addition, we've got an international language, we've got a legal system that people trust, and quite frankly our education is spread through almost every corner of the world. The wealthy, whether they're Chinese, Indian, Russian or Middle Eastern, they're hugely attracted to our language and our education system. What more can we ask? We're fortunate. We're in the right spot.

Q: Looking back at the development of The Shard, what would you have done differently, if you could go back, either in the development process or the design?

IS: There are very few projects I have carried out, after which I have said during the post mortem: "What would we have done differently?" In this particular case, it's fairly early to judge. From a design point of view, other than getting away with it being a bit taller, there's nothing I would have done differently.



Figure 10. The Shard in the context of London overall (Source: Sellar Property Group)

It's turned out to have captured the public's imagination, from small children to mature politicians. We've received letters from almost every sector, saying they think it's a wonderful addition to the skyline. And I think, yeah, it's got its critics, but I think we're 90% positive on it. And it's one of those projects that turned out better than even our highest expectations, and they were quite high to begin with.

Q: What do you hope to bring to the operations of The Shard to help make it more sustainable?

IS: We've achieved a BREEAM Excellent rating so, from that point of view, I think it's efficient.

We're employing 12,500 permanent staff. We're attracting probably 1 million visitors to the viewing galleries, and tens of thousands

of people to the restaurants and the hotel we'll have there. So it brings a hugely beneficial financial regeneration to the immediate area and beyond.

I don't think The Shard's a bad thing to bring to a part of London that a long time ago was very popular but had gone downhill at the time we bought it. I think this is already creating a huge uplift. It is already creating enormous excitement, and generating income.

Q: So is it fair to say The Shard has an "icon bump?" Does it demand more because of the iconic status of the building?

IS: Oh yes, definitely. I mean if you're an occupier or potential occupier, it'll be quite nice to say, "My office is in The Shard, London." You don't have to be any more specific than that, because it's known globally (see Figure 10).

Q: What advice would you give to anyone who's interested in building tall in a historic city at this point?

IS: Think very hard. Prepare in great detail, because you can never prepare too much for a project like this. Prepare for every contingency. Make sure that you're quite clear on your objective.

You look at any deal: You say, "What am I doing it for?" Sometimes you get so immersed in the deal you almost forget what the original objective was, which generally is "to make money." In that particular case, it's a question of how you make it, and it is a question of preparation. In terms of tall buildings or any major development, be prepared to talk to all the local stakeholders, all the local residents and all the politicians. Carry out detailed presentations so you've got them on your



Figure 11. The signature spire at the top of The Shard (Source: Sellar Property Group)

side. And, if you have to make changes because there's resistance, make them early on.

Take the public and stakeholders with you. You're going to face the planning process, and you'll need to feel confident when you go in for planning hearings that you can say, "this is welcomed by the local residents, the local businesses, and all the other stakeholders within the area." That's what I would advise.

Q: Do unique tall buildings detract from the historic feeling of a city?

IS: No, I think they complement it. There's a certain compatibility. If you're looking at some of the viewing points: Parliament Hill, Primrose Hill, St. Paul's, and The Shard, and they look pretty close together, I mean, it's a

great thing. Here you're looking at a 21st-century building which appears to be pretty close to a building that was built 350 years ago. I think that works, provided it's not a tasteless modern new building. And I think that style will never go out of fashion.

Q: Should buildings in London grow taller?

IS: I see no reason why they shouldn't, but there is one obstacle. London sits in the middle of a lot of airports: Heathrow, London City, and Gatwick. So you've got a lot of air traffic that has to come in and out, so there is a glass ceiling, which is 1,000 feet (305 meters) now. I think (the government will) object to building in the center of London higher than that, quite frankly, because of aviation reasons.

I think maybe there's a tendency towards a more three-dimensional exploration of the life between the buildings, not only at street

level, but higher. I think maybe also you will see a lot more effort in the transition from the streetscape to the tower. You might have a more gradual, more three-dimensional way of inhabiting space at the base of the tower.

Conclusion

The Shard has redefined London's skyline. It's a symbol, not just of global capital, but of the capital city of London, that is recognizable throughout the world (see Figure 11). A fuller appreciation of the obstacles overcome, and the tenacity employed in bringing it to fruition, helps cement its place in London's built history.