



Aerial View of King's Cross / St Pancras

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King's Cross Station
Enhancement -
Design Statement

Network Rail
John McAslan + Partners
ARUP
Faithful & Gould

July 2006

Part I - Introduction



INTRODUCTION

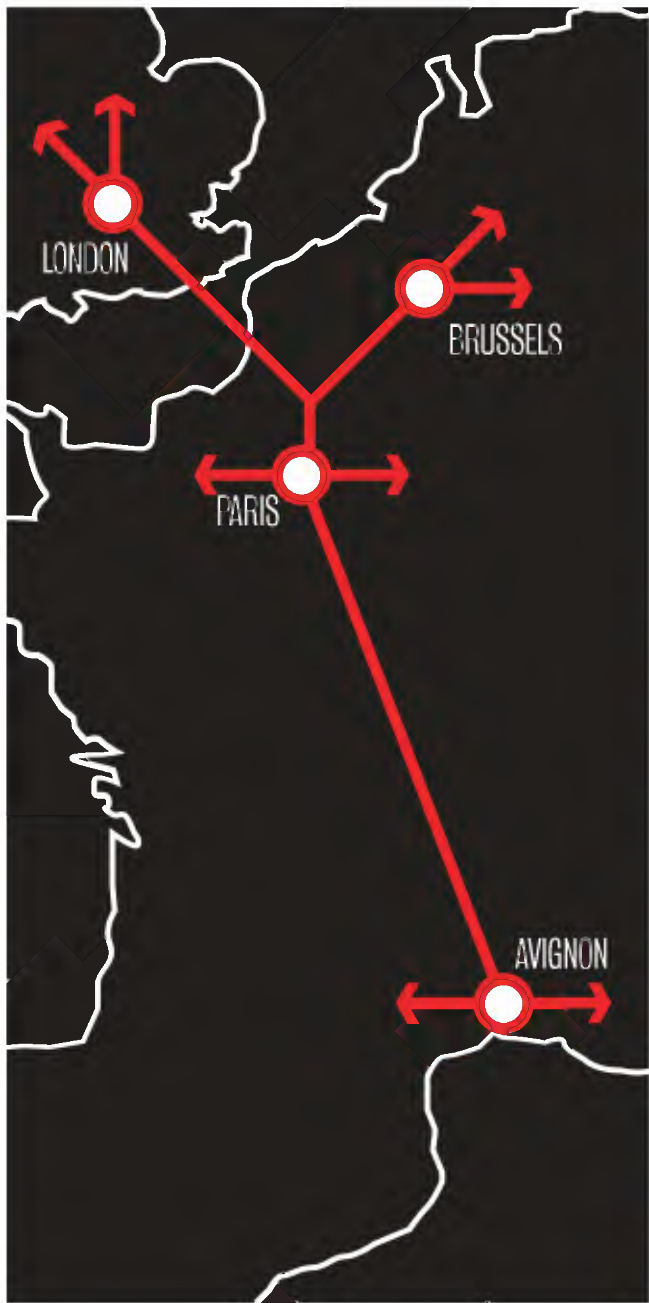
King's Cross Station is at the heart of an urban area undergoing rapid and large-scale redevelopment and regeneration. Immediately to the west, St Pancras Station and its Great Midland Hotel are in the process of being redeveloped to house national and international rail services, apartments and a new large-scale hotel. To the north, The King's Cross Central applicant's proposals for the redevelopment of the land between the two terminus stations and to the north of the Regent's Canal include 8 million square feet of commercial, residential, leisure, educational and community uses, which has recently been granted outline planning consent. Regent's Quarter to the east of the station is in the final stages of mixed-use redevelopment. The area to the south of Euston Road remains essentially unaltered, although Camden have ambitions to promote the area for regeneration, particularly for creative industries.

As part of these extensive regeneration projects, the transport-related context for the station is also shifting and the centre of gravity for people movement and interchange will alter significantly over the next 10 years. Today, the majority of all interchange movements take place along Euston Road – the two great stations were historically approached from the south, the tube station entrances are all grouped in the same area and most of the bus activity takes place in front of the King's Cross concourse. The remodelling of the underground and re-allocation of traffic as part of the St Pancras Station redevelopment will shift this focus of interchange northwards. While a large number of passengers will still enter or leave King's Cross from the south, the construction of the Northern Ticket Hall, the location of the domestic entrance to St Pancras, links to the new Thameslink Station beneath St Pancras, the proposed redirection of bus and taxi movements onto Pancras Way and the construction of the new King's Cross concourse, will mean that for many people, the 'gateway' to and from King's Cross will be from the land between King's Cross and St Pancras. This narrow triangle of land, which narrows to the south, will also need to accommodate substantial pedestrian movements between Euston Road to the south and the new development lands to the north.

This changing context has been central to the design development of the new concourse building.

The designs described and illustrated here have evolved in close dialogue with the London Borough of Camden and English Heritage, adjacent landowners and a range of local stakeholders. They represent a fittingly imaginative and elegant addition to Lewis Cubitt's masterful station which will equip it to cope with the demands of the traveling public for the foreseeable future.

1.0 Development Context



INTRODUCTION

The King's Cross Station Enhancement Project forms an integral part of the wider regeneration proposals for the King's Cross area of Central London, currently the largest single urban regeneration site in Europe.

At the heart of these wider regeneration proposals is the delivery of major new railway infrastructure to the area, including the Channel Tunnel Rail link providing services between the neighbouring St Pancras Station and mainland Europe in 2007.

The arrival of international train services, together with other transport projects such as the proposed East Coast Mainline and Thameslink route upgrades, will transform King's Cross and St Pancras into a major transport hub of both international and national importance - a gateway to the United Kingdom.

King's Cross Station is located at the centre of the wider King's Cross regeneration area. This Development Context Study sets the scene for the proposed station enhancement project, identifying the strategic importance of the site and its surroundings, from national to local scales of the urban environment.

Significantly, any proposals for the station itself must be considered in the wider context, in particular in relation to adjacent developments, to ensure that an integrated master-plan for the area is realised, both in relation to architectural form and public open space.

Accessibility, integration and connectivity are key concerns in ensuring the design response not only takes account of the station's operational requirements, but also responds to the surrounding context, it's fabric and users, whilst building upon existing regeneration initiatives in the area.

NATIONAL CONTEXT

International Gateway

The alignment study highlights the strategic importance of the site as a gateway and transport hub to both the UK and London from mainland Europe with the arrival of Eurostar services in 2007 into neighbouring St Pancras Station. Journey times to Paris and Brussels will be reduced to two hours fifteen minutes providing a high speed rail link between the United Kingdom national rail network and the French and Belgian inter-city train networks. The adjacent diagram illustrates the current Eurostar network.

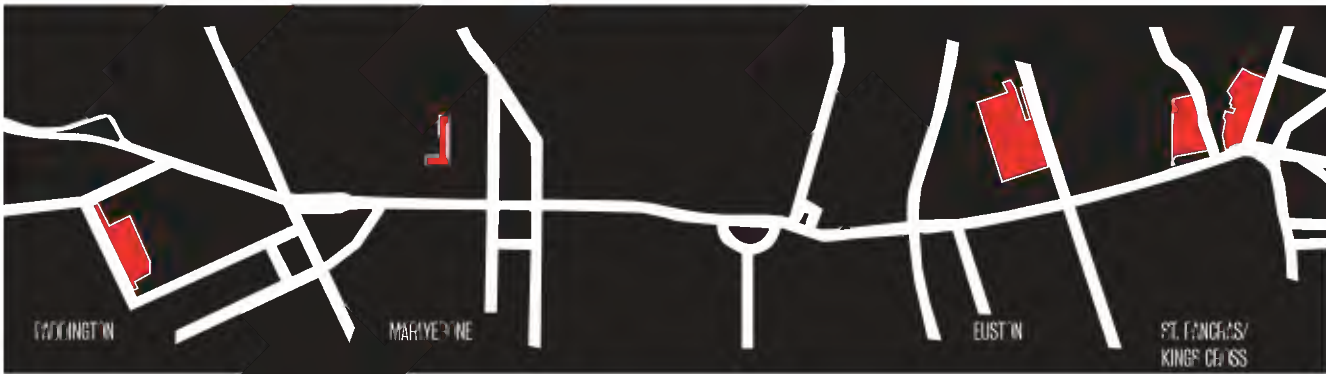
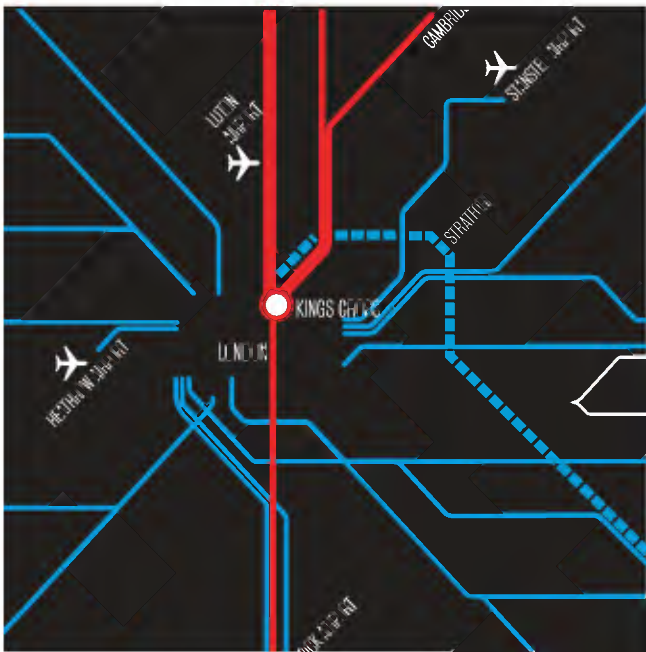
National Gateway

Various modes of travel operate and function at national, regional and local level and it is therefore necessary to consider all of these at various scales of the urban environment as well as the relationships between them.

National Rail Network

King's Cross Station is currently served by: Great North Eastern Railway (GNER) which provides national train services to Yorkshire, the North East, and Scotland; First Capital Connect which provides regional train services to Cambridgeshire, Norfolk and Huntingdonshire and Hull Trains which provides train services to Hull. The adjacent diagram highlights train services operating through London King's Cross.

The development also sits adjacent to St Pancras Station, which in 2007 will provide international train services to Paris and Brussels, as well as continuing to provide domestic Midland Mainline services to the East Midlands and Yorkshire.



REGIONAL CONTEXT

London is surrounded by an outer ring of supporting satellite towns with a direct socio-economic relationship and support function to the capital. These towns are primarily located to the north and west and include Oxford and Reading. Important road and rail infrastructure connects these towns to London, but also connect various airports along their routes. Stansted Airport is en-route to Cambridge, as Luton Airport is to Milton Keynes, and Heathrow Airport to Reading. Gatwick Airport is to the south and City Airport to the east. Movement patterns in and around London are directly influenced by the strategic locations of these airports, the M25 motorway, the associated green belt, the north and south circular roads and the River Thames.

Regional rail connections from King's Cross Station are illustrated on the adjacent diagram, with services provided north to Stevenage, Peterborough and Cambridge. Through train services are also provided via the Thameslink service from Luton and Bedford in the north to Gatwick Airport and Brighton in the south.

Local and Regional Relationships

London's capacity to sustain economic growth is dependant upon strategic infrastructure connections. The King's Cross area has a high concentration of local underground stations but more importantly has one of the highest concentrations of interchanges between underground and national rail stations. This significantly increases access, integration, land use and mobility options and opportunities for the area.

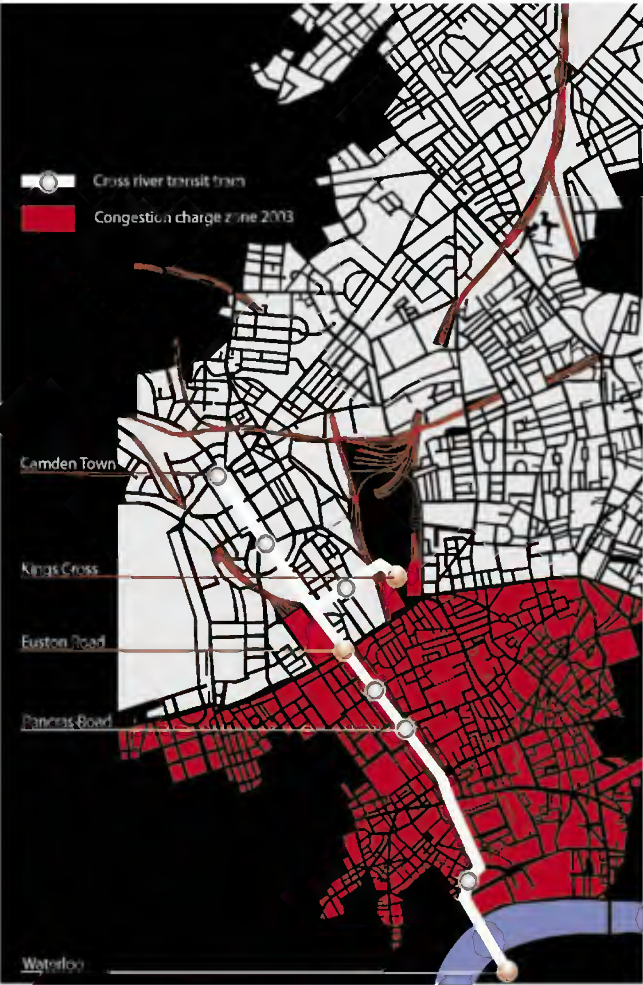
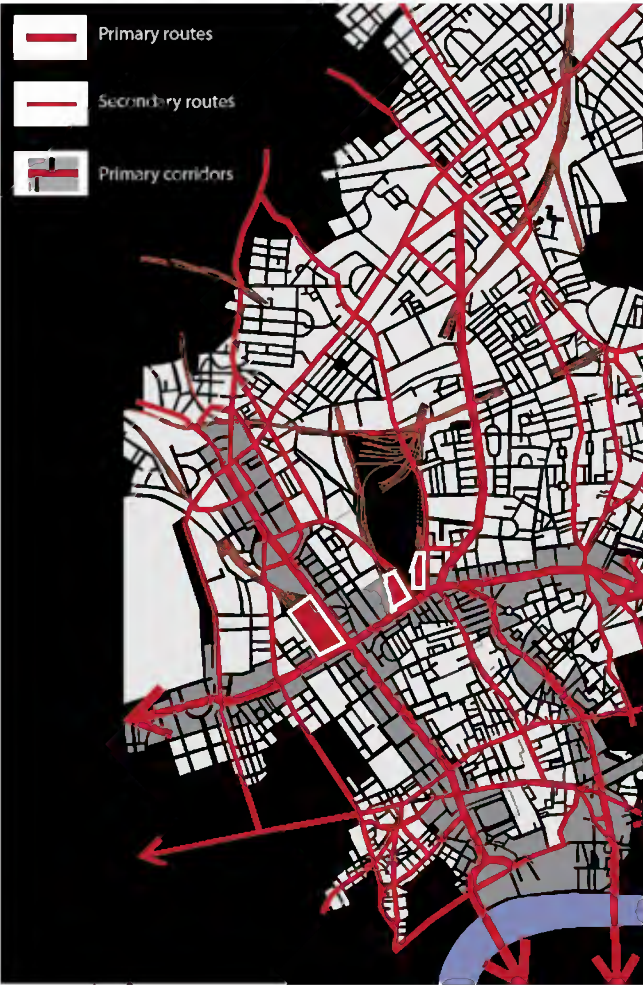
Integration within London

The diagrams on the right illustrate the integration of London's underground and over ground rail network supported by the road network.

Both Oxford Street and Euston Road are important connector roads in the east-west direction. Euston Road links a series of major railway stations from Paddington in the west, Marylebone, Euston, through to St Pancras and King's Cross Station to the east as illustrated on the bottom diagram.

However, equally important is the strategic north-south connection between Euston Road and Oxford Street through the city centre and across the River Thames linking southern and northern London.

The site for the King's Cross Station Enhancement Project is thus strategically located within the larger London context, at the intersection of these two important north-south and east-west development axes. Any redevelopment of this site should reflect this strategic significance.



LOCAL CONTEXT

Local Connections

The wider King's Cross redevelopment area (including King's Cross Central) has the potential to reconnect the urban fabric of the area through careful infill development of what is currently an under utilised brownfield site.

This development void and the associated railway lines are currently limiting movement, permeability and ultimately integration into the wider area. The site of the King's Cross Station Enhancement Project is, however, located at a strategic entrance to the proposed development to the north.

At the local scale, the concentration of infrastructure in this area remains impressive - with King's Cross, St Pancras and Euston Stations all within easy walking distance of each other. Strategically, all of these stations are located on highly integrated regional roads. Euston station is bounded to the east by Eversholt Street, which connects Camden Town to the north along Camden High Street, with strategic road connections across the River Thames to the south via Woburn Street, Kingsway and the Strand. Similarly, King's Cross Station connects the King's Cross Central development area to the north, in a north-south direction along King's Cross Road, Farringdon Road and New Bridge Street along Blackfriars, strategically across the River Thames to south London.

Local Transport Interventions

Local transport interventions in the area include the proposed Cross River Transit Scheme and the London Congestion Charge Zone.

The diagram on the right illustrates the GLA / TfL proposed 'intermediate mode' scheme referred to as the Cross River Transit in the Draft London Plan 2002 (para 2B.25). This proposal could see trams linking King's Cross with Euston, Camden Town, Holborn and Waterloo.

The Congestion Charging Scheme is now in place and Euston Road forms its northern boundary. Although Euston Road is excluded from the zone the effect of this scheme on both Euston Road and the surrounding local roads needs to be monitored over time.

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INTEGRATION RESTRICTIONS

Large mono-functional land uses (principally transport) with large development footprints in close proximity to each other, are concentrated along the western edge of Euston Road. This is limiting accessibility and integration into the wider area and every effort should be made to use these land uses into the surrounding urban context.

The strategic importance of the intersection at York Way, Euston Road, Grays Inn Road and Pentonville Road has been identified for vehicular traffic.

This intersection acts as a primary junction for pedestrian circulation, visual linkage and merger of major ongoing developments.

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PUBLIC REALM INTEGRATION

This diagram illustrates the structure of the public realm of the surrounding King's Cross area. The public realm of streets and public open spaces have the potential to be tied together through a comprehensive strategy that positively integrates and contributes to King's Cross and its surrounding context.

The connectivity between green open spaces, proposed public spaces and existing streets will be facilitated by continuity throughout the design.

Existing circulation is dictated by particular landuses, generally referred to as the city's 'movement economy' where particular land uses can be directly related to movement patterns and integration values of surrounding streets.

The proposed re-orientation of King's Cross Station entrance and the major proposed development to the North will have an impact on the existing primary junction within the public realm, shifting it northwards away from the Euston Road intersection to the west of King's Cross station.

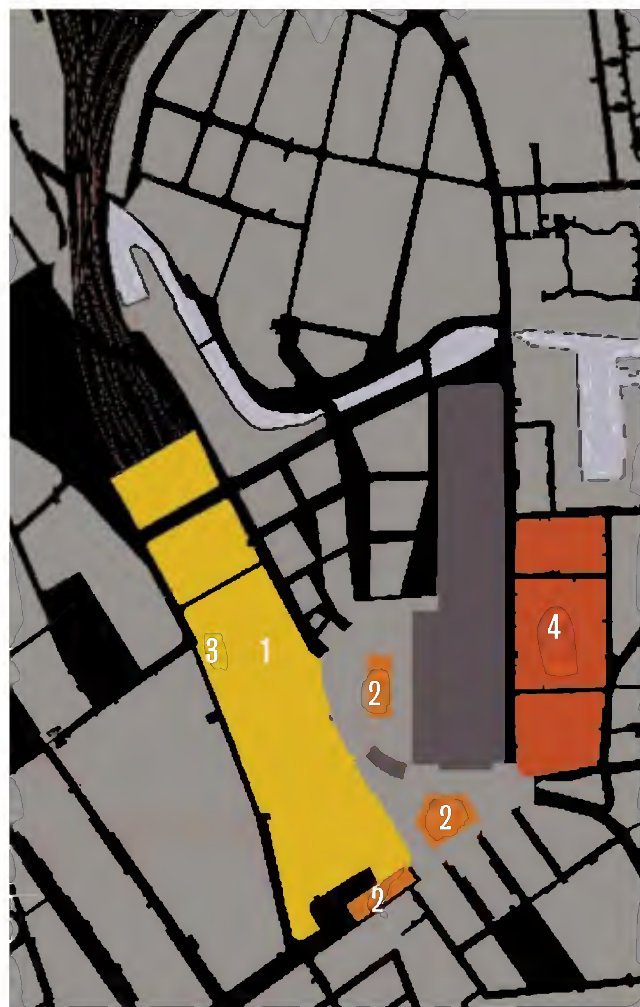
The new centre of public realm highlighted in yellow created by the transport hub will further be supported by proposed linkages to the north integrating with established open green spaces, and integrating fully into the existing main arterial streets to the south.

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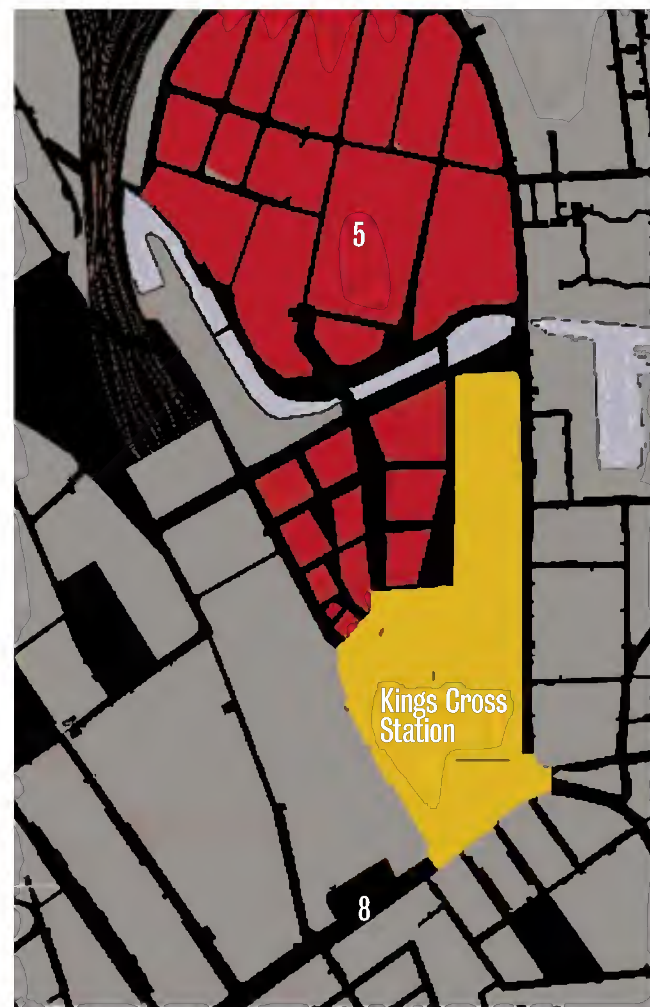
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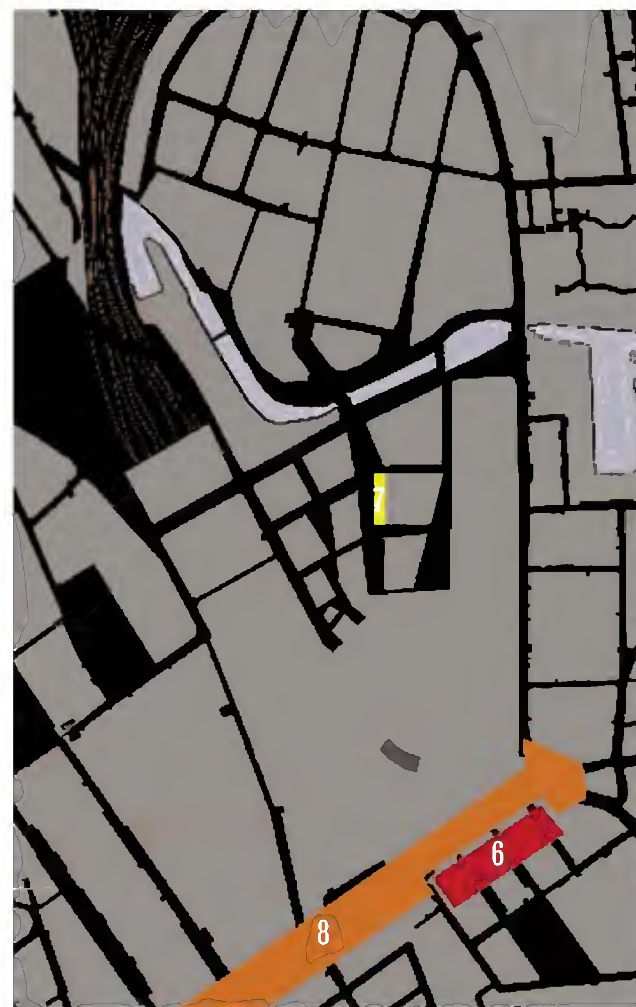
2008



2012



2020



ADJACENT DEVELOPMENTS

The redevelopment and expansion of King's Cross Station forms a major component in the wide ranging redevelopment of the area.

The success of this redevelopment will be judged by the level of integration that is achieved through the masterplan. The station (and its external space) must make a positive, indeed pivotal, contribution to the area's urban regeneration.

It will need to respond to, and negotiate between, the variety of proposed developments which will ultimately affect the usage of the spaces, movement through and across them, and the general experience of passengers connecting between the variety of transport types.

The key developments are shown in the adjacent phasing diagrams and described below:

2008

1. Channel Tunnel Rail Link
2. LUL Ticket Hall Expansion Completed.
3. Thameslink - St Pancras Midland Road Station
4. Regents Quarter Residential Development

2012

5. King's Cross Central Under Construction.

Kings Cross Station Enhancement Completed
 Euston Road Masterplan Proposals Commenced

2020

6. Proposed Cross Rail 2 station
7. Cross River Transit Tram.
8. Euston Road Masterplan Completed

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2.0 Project Objectives and Constraints



PROJECT ASPIRATIONS

This section provides a synopsis of the current shortcomings at King's Cross, sets out the project objectives and provides a summary of the development constraints that have influenced the current design proposals.

2.1 Existing Shortcomings

The challenge at King's Cross Station is to form a world-class transportation hub with St Pancras Station and to provide connections between the national and European rail networks and London's local transport systems. It must stand the test of time and work as well in 50 years as when it opens. To achieve this, the redevelopment will have to address a number of complex and inter-related issues.

There are a number of operational issues that compromise the use and capacity of the existing station and have a detrimental impact on the experience of the traveling public using King's Cross. There are also a number of external pressures now being exerted on Network Rail that require long-term resolution. The principle shortcomings are as follows:

- The long-haul rail network will need to compete increasingly with air travel to destinations in the north of England and Scotland. Upgrade of the East Coast Main Line's terminus station at King's Cross will be required if Network Rail is to achieve its long term aspirations and operational objectives.
- Capacity is very limited. By way of comparison, the current concourse of 2,400 square metres caters for the same number and type of passengers as those moving through Paddington each day, yet Paddington has over twice the circulation and accumulation space. As a consequence, congestion at King's Cross is common place and on occasions the station has to shut due to overcrowding. Managed queuing prior to train departure has also become, by necessity, common practice at King's Cross, but is considered unacceptable in other major stations.

- The Station operates with two independent concourses the larger to the south serving the main trainshed and the tiny concourse area inside the western trainshed with its separate ticket office, serving the suburban platforms. As a consequence, operational and staff accommodation have to be duplicated and for the suburban passengers in particular, there is minimal provision of support facilities.
- Passenger facilities are wholly inadequate. In an effort to ease overcrowding on the concourse large areas of retail and passenger support space have been removed and given over to accumulation space. As a consequence basic amenities for food, essential retail and customer information are minimal and well below Network Rail's standards.
- There is a severe circulatory conflict between goods and passengers moving through the station. The only route to get goods onto trains or to remove refuse from them, is to access each platform from its southern end. This is in direct opposition to passenger movements along platforms. This is particularly acute along platform 8 to the west of the station and along the narrow passageway between the platform ends and the southern gable wall of original station building.
- The interchange with existing underground and surface level transport modes will not integrate seamlessly with the current work being undertaken by London Underground to construct the new northern ticket hall, or in light of the proposal to locate taxi and car drop-off facilities on the western side of the station as part of the CTRL/Argent works between King's Cross and St Pancras.
- The planning consent for the existing passenger concourse to the south of the station has expired and Network Rail needs to secure a permanent consent for these facilities at King's Cross.

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- The public realm around the station is particularly poor. Although increased policing in recent years has resolved some of the historic vice problems in the immediate station vicinity, the spaces and pavements around King's Cross are still unsightly, congested and threatening, particularly at night.

2.2 Project objectives

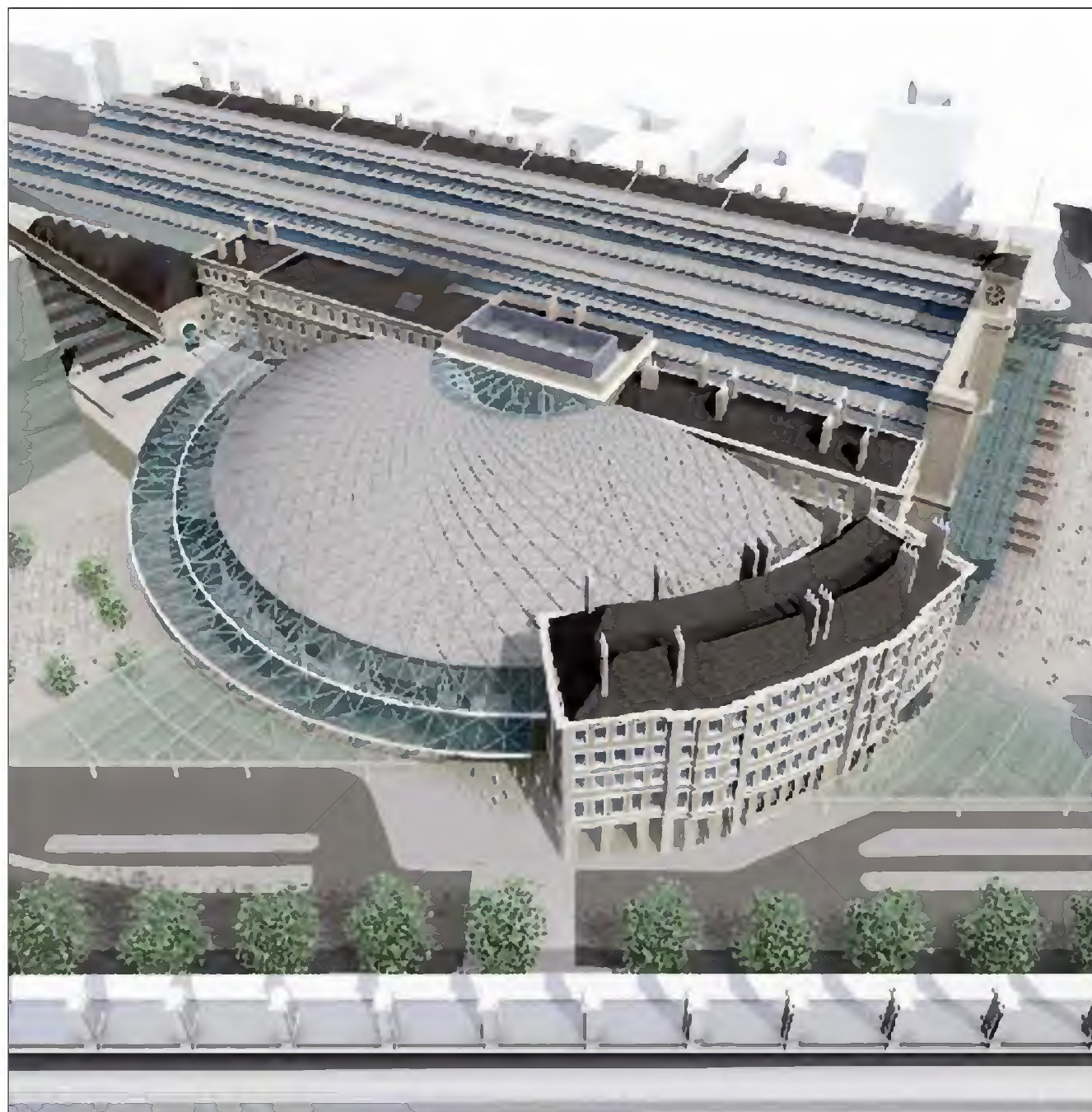
The objectives for the King's Cross Station Enhancement Project stem directly from these shortcomings and Network Rail's clear desire to make the King's Cross of the future a place where travel is a pleasant and safe experience. The objectives of this enhancement project are to:

- Provide concourse facilities to serve an interchange facility that resolves the existing problems of overcrowding, poor passenger environments and town planning restrictions.
- Provide adequate circulation, accumulation and waiting space for current train demands and to cope with the anticipated growth in passenger numbers from 50 million a year today to 60 million a year by 2020. This will require an unobstructed space in the order of 5,000 square metres for people to move between trains and other modes of transport, to gather information and to wait for departing trains or arriving passengers
- Accommodate and respond to pedestrian movements. The emerging development proposals immediately to the north of the station indicate that in future there will be major pedestrian flows in and around King's Cross Station, in particular moving from Euston Road to the King's Cross Central development on the former Railway Lands. Further, the new public spaces, primary pedestrian routes, and inter-modal links within the station and its approaches will have to help orientate, distribute and protect large numbers of pedestrians moving at street level.
- Provide fully accessible passenger facilities fitting of a 21st century city interchange including clearly visible locations for ticketing, travel information, wc's, left luggage and passenger lounges.
- Provide a clear, safe and high-quality environment for Network Rail's customers. To achieve this, both the concourse and train shed will require circulation areas of adequate size for passengers to move from one destination to the next, gathering information and tickets along their way, without congestion or confusion.
- Provide an appropriate level of retail and catering outlets to service passenger requirements.
- Develop an independent system for the movements of goods and refuse which does not share circulation routes with passengers.
- Improve interchange with other transport modes by retaining and enhancing links with the existing underground and bus services to the south of the station, but also providing seamless connections with the new tube and surface facilities planned to the west of King's Cross.
- Provide clear and well located London Underground connections. In addition to the existing tube ticket hall, the new station will need to connect neatly with the new LUL ticket hall to the west of the station. A carefully located suite of escalators and lifts located to the west of the concourse should create an obvious interchange. This will encourage rail passengers to link to the underground network via the new LUL ticket hall to the west of King's Cross, while connections with the existing ticket hall to the south of the station will be maintained by new stair and lift connections in the Southern Square.

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- Provide connections with surface-level transport modes at grade level. The new station will aim to give priority to pedestrians in the immediate vicinity of the two stations, and provide new links into the surrounding road network to improve taxi access, with sufficient space for set down and collection of passengers out of the weather. Connections with London Transport Buses must be direct and well located, and emerging proposals for the Cross River Transit Trams have been taken into account. Facilities for vehicles to access and service the station and its trains will need to be relocated and should be improved and optimised. Routes between the Main and Suburban sheds should be clear, legible and covered to facilitate interchange.
- Create new, world-class spaces around King's Cross that are a fitting national and international gateway to the capital. These spaces must also take account of King's Cross' pivotal position as an urban link to the railway lands to the north.
- Provide direct passenger connections between the stations. By 2007 St Pancras Station will accommodate new European rail services as well as upgraded Midland Mainline facilities and the new St Pancras Midland Road Station will serve the Thameslink route. Passenger connections between the two stations, and indeed to Euston further to the west, must therefore be direct, legible and form a co-ordinated network of interchange routes between these rail systems.

- Provide a building of requisite architectural quality and operational efficiency. This new building will be an outstanding piece of contemporary architecture.

The enhancement of King's Cross Station presents a highly complex and multi-faceted challenge, but one that can bring far-reaching benefits to London. These clear objectives underpin all aspects of this project.

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2.3 Design Constraints

While the project objectives are clear and based on the sound premise of resolving quite apparent existing shortcomings, there are three primary 'external' constraints that have influenced the character and disposition of new facilities.

These key constraints are as follows:

1. The existing building is Grade I listed and seen as one of Britain's most significant industrial buildings. Any alteration or extension of the Station must therefore be shown to be of long-term benefit to the sustainability of Lewis Cubitt's original trainshed and the physical impact of change must not have an adverse impact on the historic character of King's Cross. Clearly there is potential benefit in removing some of the more recent and unsightly additions, most noticeably the 1970's concourse extension, but any new structures must fit within the statutory protection measures established for historic buildings and importantly, must be of a requisite design and constructional quality. Though of lower listing status, the Great Northern Hotel is also a protected historic building and its Grade II listing requires any building that physically connects with it or influences its setting to obtain listed building consent.

2. The underground system currently comprises a complex network of tunnels, passageways and vertical shafts. The old Fleet River also runs beneath the site and there are several large utility mains running down Pancras Road. These, coupled with the new northern ticket hall extension which, is partially constructed, have a direct physical impact on the potential location of columns, foundations and sub-surface structures relating to any new building on the site. In particular, any building to the west of King's Cross. These engineering constraints have been considered with great care as the design for the new concourse has emerged and the resultant arrangement of vertical structures in particular, has very little inherent flexibility.

3. The land between King's Cross and St Pancras will, in future, act as a major urban link for the railway lands to the north. The King's Cross Central site has very limited access. It is surrounded by railways along the majority of its eastern, northern and western boundaries and urban connections along these sections of the site perimeter are heavily constrained. Entrance to King's Cross Central from the south is of paramount importance, particularly in light of the fact all of the major transport nodes are located in the vicinity of King's Cross Station. Therefore, it is important that the redevelopment of King's Cross allows intuitive and unobstructed movement for pedestrians heading north or south, to and from King's Cross Central. The designs have been developed in close dialogue with the Central development team to respond to this key urban constraint.

As the project has evolved and discussions have taken place with Camden's planning and conservation team, English Heritage's officers and the adjacent landowners and development agents, each of these three criteria have been discussed and the scheme has been constantly reviewed and refined to achieve the optimum balance between achieving the project objectives and satisfying these primary development constraints.

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3.0 Design Assumptions

The key Design and Project Assumptions are summarised below and overleaf:

Train Operations and Platforms

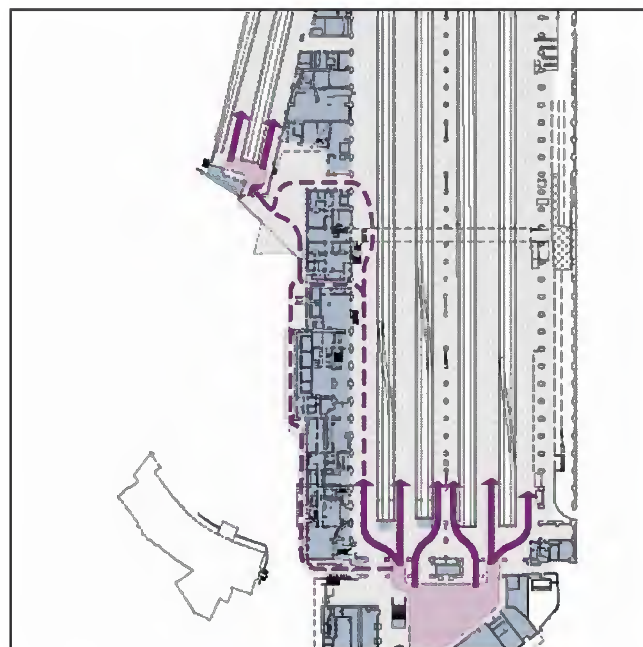
- The client project brief is to design the station to accommodate 7 Intercity & 12 Suburban trains (4no. Suburban trains consisting of 12 carriages and 8no. Suburban trains consisting of 8 carriages) in the peak period.
- The Railway Design is to be in accordance with Current Network Rail UK and EU Standards.
- The station will consist of a twelve-platform layout, which includes the construction of the new Platform Y.
- Train Operating Companies will require revenue protection for all platforms in the future which will require a strategy for the introduction of gating to all existing and new platforms
- Existing Gasworks Tunnels and platforms in the main shed are to be retained, with only minor modifications to shift platforms 5-8 slightly northwards, to create a minimum of 10m additional circulation space at the southern end.
- Main train shed platform widths will be maintained as existing platform widths, 7.4m (island) and 5.0m (single face), tapering (at a minimum of 400m Radius) to 4.0m at platform ends to allow tracks to use the existing tunnels.
- The existing Western Train Shed and platform 9-11 to be retained.

3.1 Project Interfaces

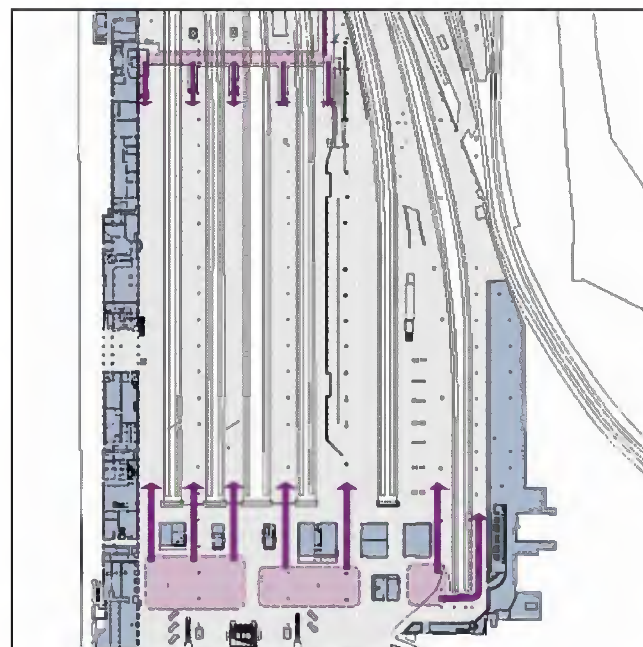
- The LUL proposals for new surface features have temporary planning permission. Therefore a set of principles have been established in order to integrate the features into the proposed Southern Square as part of a coordinated design.
- The LUL air vent to the Northern Ticket Hall will be constructed into the permanent locations in the Bomb Gap under the Network Rail contract. All works that interface with the LUL station will have to be 'Section 12' compliant.
- Pancras Road to be modified to incorporate access for the station operations adjacent to the station forecourt. This will be compliant with the CTRL alignment. Future realignment of Pancras Road and associated sub-surface services by the Kings Cross Central project is allowed for within the station design and operations.
- A new open public space will be provided to the northwest of the new concourse to suit surface level interchange between King's Cross Station, St Pancras Station, surface transport modes, and the King's Cross Central development lands. This space will be designed to accommodate the coordinated evacuation of both stations and the Underground, however primary design responsibility for this area is assumed to lie with LCS&P.
- Renewals, meaning structural works and replacement of the main will be carried out in conjunction with the enhancements.

3.2 Heritage / Listed Buildings

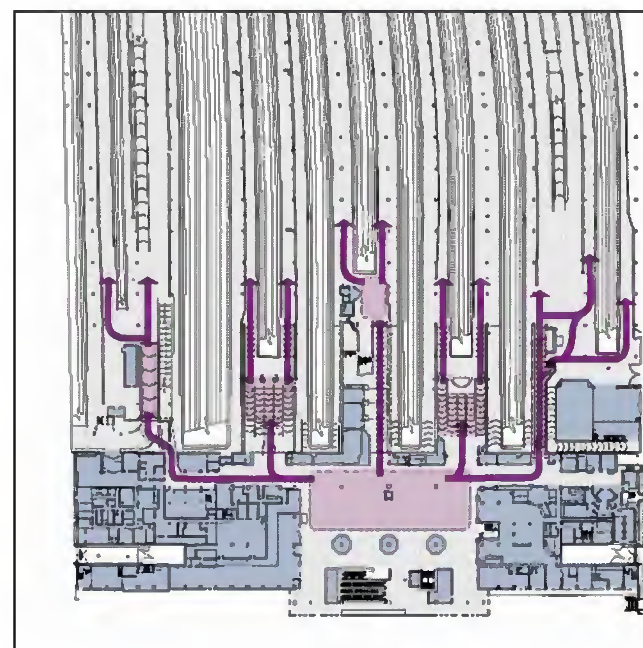
- The listed station buildings are to be refurbished to a standard acceptable to Statutory bodies.
- The Bomb Gap is to be reconstructed with an external treatment sympathetic to the existing elevation.
- English Heritage and LB Camden's primary aspiration to reveal the existing southern facade of the listed station (and create an open plaza in front of the station in place of the existing southern concourse), is to be adopted as a project aspiration, but is to be balanced against the operational requirements for the management of passenger movements around and through the main southern façade.
- External canopies are required to provide weather protection for passengers at key points of entrance, exit, and interchange within the station forecourt.
- The Great Northern Hotel is to be retained and refurbished as part of current proposals by the King's Cross Central applicants, which include the following: removal of the low-level extensions; infill of the lightwell; lowering of the ground floor slab to concourse level, and the formation of a new public arcade through the ground floor on the northeast face; re-use of the upper stories of the building.



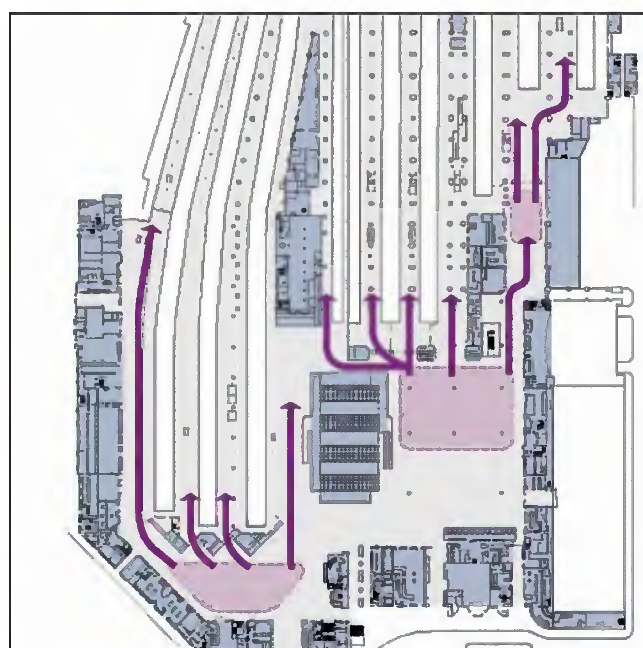
King's Cross Station. Existing Effective Concourse Area - 2,300 sq.m.



Paddington Station. Effective Concourse Area - 4,200 sq.m.



Euston Station. Effective Concourse Area - 3,500 sq.m.



Victoria Station. Effective Concourse Area - 6,210 sq.m.

3.3 Passenger Concourse Facilities

- The existing Southern Concourse is to be demolished following replacement by a new Concourse to the West.
- The new Western Concourse is to be sized to suit rail-passenger requirements as well as the requirements of non-rail related pedestrian movements around and through the concourse and station forecourt.
- Passenger volumes for the station expansion project are based on a peak service of 7 Intercity and 12 suburban trains per hour, the capacity of those trains, and likely loading scenarios. The proposals have been designed to the capacity-based peak flows to provide some spare operational size with respect to the Concourse, access to the Underground and other onward modes.
- Concourse sizing space standards have been established as follows: Fruin Level of Service B (1 to 1.2 sq.m. per person) for accumulation areas within the concourse under normal conditions; Fruin Level of Service C (0.65 sq.m. per person) for queues at ticket office, and for delay conditions in the general concourse areas; 25% of passengers with luggage require increased space allowance of 150%.
- Primary concourse facilities (ticket office, passenger accumulation, waiting and circulation etc) need to be centrally located at the main concourse (ground) level.
- Support facilities (station facilities such as left luggage, toilets, station reception, travel information etc, plus retail and catering) will be located with direct customer access as part of the main concourse, either at ground or mezzanine level, or within the Western Range. The proposals assume a minimum of one-third of support facilities are provided at the main concourse (ground) level.
- Retail and catering provision in the new concourse is to be provided as defined by the functional specification.

3.4 Station Operational Facilities

- The taxi drop-off and pick-up facility for King's Cross Station will be aligned along Pancras Road to the west.
- Future On Board Servicing (OBS) requirements per train are based on the current operation. The OBS Preparation area will also service trains on Platforms 9-11. The OBS operation shall be able to service a maximum of 19 trains (Network Rail requirement of 7/12 option) in a hour. OBS is sized for food packaging only. No on-site cooking within the OBS facility.
- On Board train Servicing facilities in the Western Range basement will be restored in its current position with upgraded layout and services. Vehicular access to the Shared Service Yard (SSY) that services the OBS facilities is to be provided off Goods Way. A link tunnel will provide access from the SSY to the OBS facility and the station servicing lifts. The Old Parcels Tunnel (OPT) under platforms 1-8 will be used for accessing the platforms.
- Great Northern Hotel Building is not serviced from the basement service area, but from a dedicated loading bay to the south of the taxi drop-off area on the station forecourt.
- Royal Mail deliveries are not handled by the service area (Outside scope).
- Network Rail, retail units, offices and OBS share loading bays and delivery routes. Deliveries for retail & OBS will be carried out at off-peak times. Dedicated goods lifts provide vertical circulation of goods. Personnel & electric vehicles (EV) use the same access routes from loading bay to OBS preparation area to retail storage area and offices.

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4.0 Options Assessment

OPTIONS ASSESSMENT

During the early stages of design development, Network Rail in close dialogue with Camden, English Heritage and the adjacent landowners reviewed a number of potential locations for the new concourse and its associated facilities. What is provided below is a brief synopsis of the primary options considered, which is preceded by a statement on land availability.

4.1 Land Availability

As an inner-city site, the land in and around the station is relatively constrained. The Network Rail land boundary (from north in a clockwise direction) runs over Goods Way above the tunnel portals, along the eastern face of the eastern range down York Way, it includes almost all of the existing concourse and pavement areas to the south of the station and along the western face of the Western Range, runs approximately 5m outside of the station façade. Along the flank wall of the suburban trainshed the ownership boundary follows the line of the trainshed wall and then continues northwards hugging the fence-line of the railway cutting. With the exception of the area to the south of the station, where the concourse currently sits, there is therefore no grade-level land within Network Rail's ownership to locate a new concourse. The consequence of this is that the location of the new concourse either has to sit to the south of the original trainshed, sit within it at ground level, above or below it, sit on a bridge above the station 'throat', or be located on land not currently owned by Network Rail. These constraints led to the following options selection process:

4.2 Concourse above or below the existing station

Engineering studies into the viability of constructing a new concourse below the existing station illustrated that as well as huge structural risks to the existing building, the plethora of utilities, sewers and Underground facilities make this all-but technically impossible and certainly not financially viable. In addition the formation of vertical connections at platform level for all, or a significant proportion of passengers, would not be possible without widening existing platforms and reducing their number. Similarly a mezzanine-type concourse would also require a reduction in platform numbers and was rejected out-of-hand by English Heritage due to its negative impact on the character of the trainshed interior. For these reasons options for a new concourse above and below the exiting station have been rejected.

4.3 Concourse to the south of the existing station

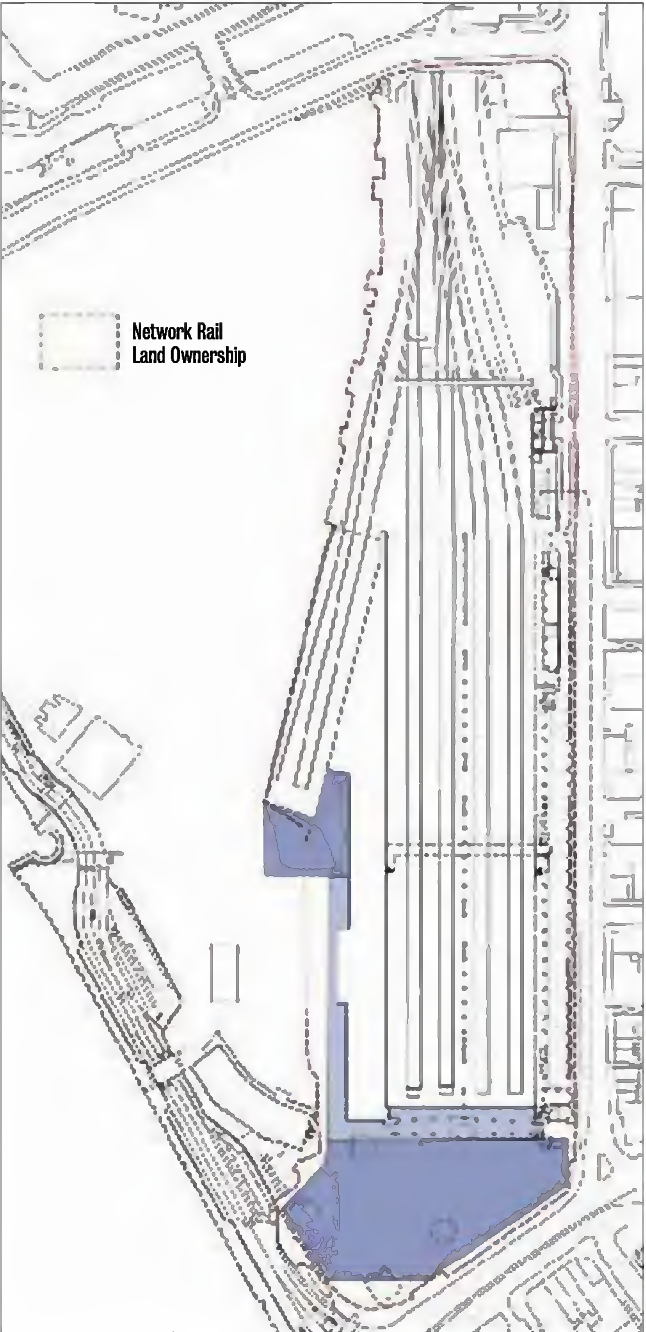
The land to the south of the station is within Network Rail's ownership and sits in the ideal operational location at the 'head-end' of the existing platforms. This location was considered as an entirely viable alternative in the initial stages of the project's development, but met a number of irreconcilable problems. First, the land on which the existing concourse currently sits is small relative to the known requirements for a new long-term concourse building. It would not be possible to create space any larger than the existing concourse (at 2,400 square metres) as pavements are already heavily congested and this falls well short of the 5,000 square metres considered necessary. Today's congestion illustrates quite clearly that there is too little room to deliver the project objectives within this existing parcel of land. It is also very clear that English Heritage and Camden would vigorously object to a new building of any scale on the south of Cubitt's gable façade and therefore achieving permanent planning consent was not considered viable. This alternative was therefore rejected. A logical progression of this option is described in the following alternative:

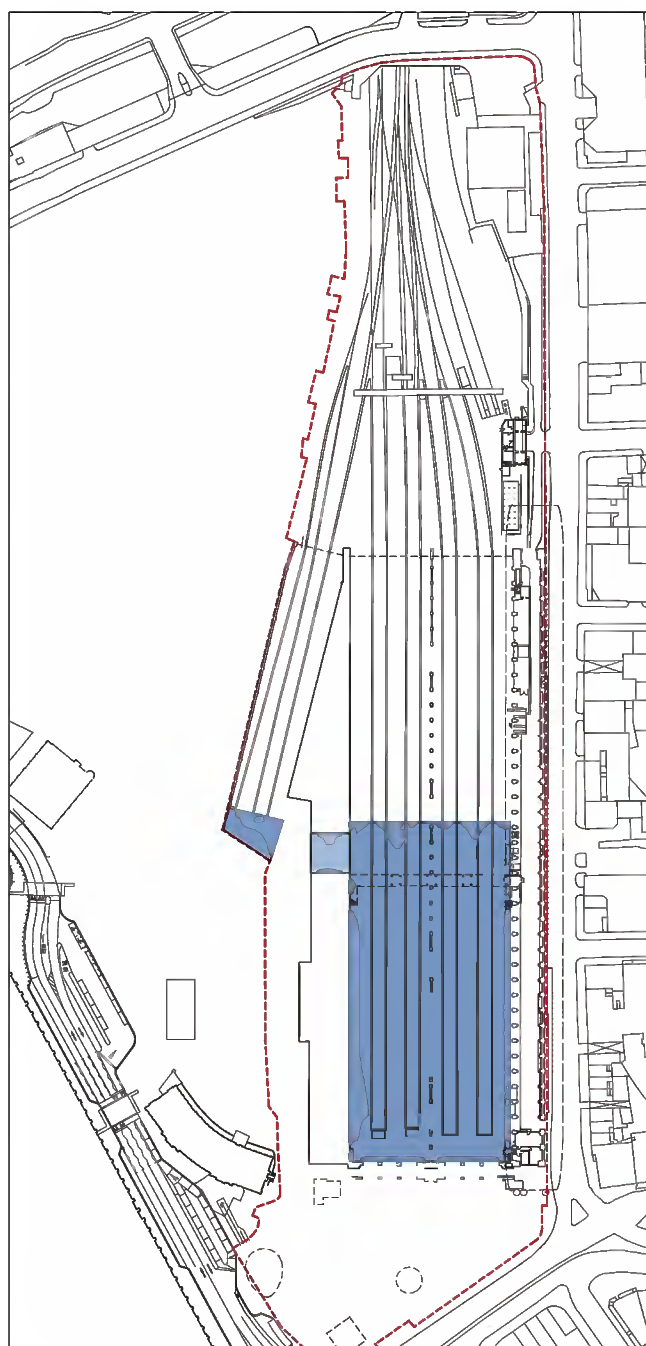
4.4 Concourse to the North

Early studies were carried out to test the viability of a new concourse to the north of the station over the 'throat'. However, it became quickly apparent that the interchange between a concourse in this location and the Underground services would not be operationally viable. In the order of 60% of all passengers arrive or depart from King's Cross by tube and locating the concourse some 150m north of the new Northern Ticket Hall and over 300m north of the existing Underground connections was rejected on operational grounds.

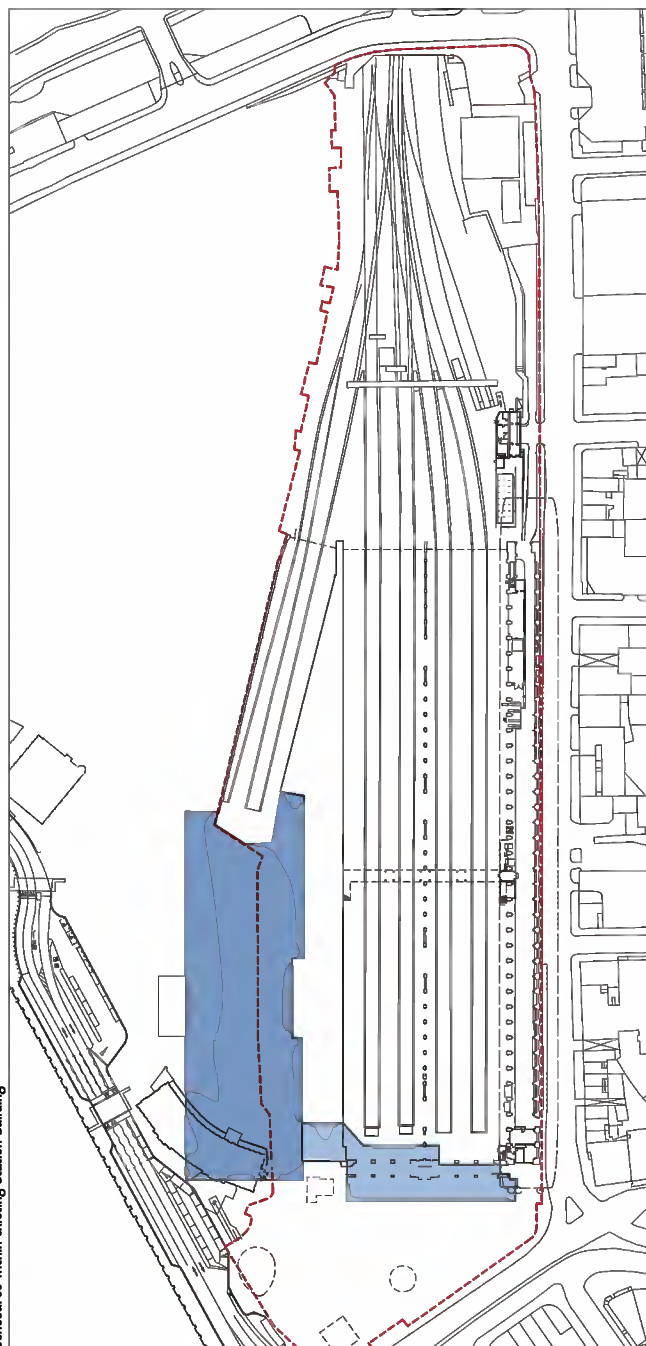
4.5 Concourse within the existing trainshed

If the platforms at King's Cross could be relocated further northwards – by 80 metres or more – it would be possible to create a new passenger concourse within the existing trainshed, much like the work carried out at Paddington in the 1990's. In operational terms this would provide an excellent alternative, but the implications on the railway infrastructure and its associated structures to the north of King's Cross are immense. The gradients between the existing platform ends and the tunnels that run beneath the Regent's Canal are particularly steep – trains have to dive below ground quickly to clear the underside of the canal bed, therefore any substantial relocation of platforms northwards would necessitate reconstruction of the railway tunnels and this in turn would mean raising the canal itself. Detailed engineering studies were undertaken to explore this option fully, but the cost was considered un-viable (in the order of £1billion – more than four times the cost of the preferred solution), the operational impact on the operating railway was significant and there was a high risk that the listed Granary Building, which sits immediately adjacent to the existing Tunnels, would have to be demolished. The alternative means of providing space at the 'head end' by reducing train lengths was reviewed, but considered non-viable at one of London's primary long-distance rail termini. For these reasons, this attractive but unrealistically costly alternative was rejected.





Concourse within existing Station Building



Concourse to the West of existing Station Building

4.6 Concourse to the West – The Preferred Alternative

In the context that the alternatives described above could not deliver a viable solution, and in the knowledge that the land to the east of King's Cross is either occupied by essential highway or existing, fully occupied and recently redeveloped buildings, the only viable alternative is to build to the west of King's Cross. In terms of interchange this location has much to recommend it. It can provide excellent connections with both the existing Underground services and direct links to the new Northern Ticket Hall. It can have direct grade level links (via crossings over Pancras Road) with domestic and international rail services at St Pancras. The redirection of Pancras Road anticipated within the King's Cross Central redevelopment programme could provide good set-down and collection facilities for cars and taxis and there is potential to link with new Pancras Road bus stands. Locating the new passenger concourse at the new 'hub' of interchange makes a great deal of sense in transport planning terms. Further, there is land available to the west, albeit that below ground the Northern Ticket Hall needs to be 'bridged'. While this land is not in Network Rail's ownership, it is controlled by the Department for Transport and it has been agreed, through detailed discussion with the Department and their development agents, to make this land available for a new concourse. This is the proposed location for the new concourse and was agreed as a project principle with Camden, English Heritage and all landowning stakeholders in 2003.

Having established this location as the ideal position for the new concourse, a range of detailed designs studies and pedestrian/passenger models were carried out to ascertain the preferred building footprint. In summary, the space needs of the new concourse, and in particular the operational sensitivity of its connection with the main trainshed platforms at the southernmost end of the western range, demonstrated that the new concourse would need to extend up to the eastern (concave) façade of the Great Northern Hotel. A key consequence of this requirement is that the ground floor level of the Hotel is to be arcaded to provide a clear and generous

pedestrian route outside the concourse perimeter, for use at times when the concourse is closed to the public. Proposals for this work are being submitted in parallel with this planning application by the King's Cross Central applicants on behalf of the building's owner (it is not owned by Network Rail). This design has been developed in close and continual dialogue between the adjoining parties and their design teams.

This preferred layout forms the basis of the proposed concourse design, which is described and illustrated in the following section.

5.0 Design Proposals



Aerial Photograph of 1:500 Context Model

Passenger facilities and station operations at King's Cross Station need to be replaced and modernised to meet the pressing needs of the station now, and to accommodate significant growth in the future.

The expanding number of passengers using future train services require well planned, clear and legible concourse facilities within which to arrive, gather tickets and train information, wait comfortably, circulate from one destination to the next, and interchange between transport modes. Front-of-house passenger support facilities and back-of-house station facilities need to be carefully planned to best utilise Network Rail's limited land at the station, and to ensure efficient operations.

In addition to the increased number of passengers within the station, emerging development proposals immediately to the north of the station indicate that in future there will be major pedestrian flows in and around King's Cross Station, in particular moving from Euston Road to the Railway Lands. The new public spaces, primary pedestrian routes, and inter-model links within the station and its approaches will have to help orientate, distribute and protect large numbers of pedestrians moving at street level.

This section describes the operational and functional station planning requirements for the proposed station development, organised under the following headings:

5.1 Concourse Size and Modal Interchange
This section explains the increase in passenger capacity that will support projected growth, the strategy for modal interchange, the impact on Pancras Road, and relationship of the project to the King's Cross Opportunity Area.

5.2 Passenger-Related Facilities
Future requirements for station facilities and support accommodation at King's Cross Station have been defined by Network Rail based on operational experience and benchmarked against equivalent major terminus stations in the UK.

This section explains the accommodation layout within a strategy to strike an appropriate balance between station facilities and passenger support accommodation within the constraints of the limited footprint.

5.3 Building Form
This section describes the proposals for a new concourse and associated station forecourt facilities, to the west of the existing station, involving remodelling and refurbishment of the existing listed station building and removal of the existing southern concourse to create a new public square in front of the historic station elevation.

5.4 Impact on Existing Station Buildings
This section outlines the likely impact of design proposals on the station buildings as a whole from the point of view of protection and long-term conservation of the Grade I listed building.

5.5 Engineering Considerations
This section sets out a summary of the engineering considerations in support of the design proposals for the station enhancement masterplan, split into the following sub-sections:

- 4.5.1 New Structure
- 4.5.2 Existing Structure
- 4.5.3 Building Services
- 4.5.4 Operational Facilities
- 4.5.5 Fire Strategy

5.6 Public Realm
This section summarises the operational requirements of the external areas adjacent to the station, presents a spatial comparison study for these spaces, and presents illustrative design proposals for the Station forecourt and its approaches.

5.7 Great Northern Hotel Interventions
This section outlines the proposed structural interventions to create a pedestrian arcade along the eastern perimeter of the adjacent Great Northern Hotel as part of the King's Cross Central development.

5.1 Concourse Size and Modal Interchange

OPERATIONAL SUMMARY

The King’s Cross Station Enhancement design has allowed for an uplift in main line operations from the current 15 trains an hour to 19 trains an hour for the peak hour morning and evening period. This is enabled by providing the new platform ‘Y’ and a new and larger western concourse. This increase in station capacity supports continued passenger growth including the requirements of the Kings Cross Central development assuming full occupation by 2020. Main line passenger capacity in 2020 within the station will increase by some 12,900 in the morning and 10,700 in the evening when compared with the 2007 operation. The King’s Cross Central development would account for some 22% of the future total station passenger flows in 2020.

The concourse design parameters are based on Network Rail Design Standards (Major Stations Design Guide, 2002) and the Fruin Levels of Service. For accumulation areas under normal conditions a Level of Service B (0.93 to 1.2m² per person) should be achieved. However, the concourse will be placed under greatest strain during train delay conditions, and therefore during these conditions the acceptable standard is reduced to Level of Service C (0.65 to 0.9m² per person).

The Western Concourse is calculated to operate at Mid Level of Service C for a brief period during the 7/12 PM peak, but otherwise will operate at LoS A (1.2 m² per person) and B (0.93 to 1.2m²). Whilst this is outside the standard for normal operations, it is a significant improvement on passenger conditions when compared to the existing station concourse for all passengers.

Perturbated train operations during the worst case 7/12 PM peak period show that the proposed Western Concourse becomes more congested than under normal conditions, with greater numbers of passengers waiting in the southern and northern accumulation areas. The total Western Concourse is calculated to operate at Level of Service C, which is calculated as an average value across the total concourse. This is considered an acceptable design standard for the station during temporary service disruption.

Passenger conditions for the Western Concourse are calculated as an average across the whole concourse area. Higher passenger densities are expected in some areas and are considered acceptable given the sufficient total amount of space available and the ability for passengers to move through or around these accumulation areas. The Station project is shown to accommodate the following:

Concourse and Public Realm

- Increased main line rail operations and support facilities for the additional passenger movements. This includes the new western concourse, interchange with other modes, and segregated pedestrian routes linked between new public realm.
- The design allows for the segregation of external passenger flows from concourse operations during perturbated conditions whilst providing clear circulation routes between the north and south squares.

Bus Interchange

- With the demolition of the existing southern concourse improved connections with bus services on both Euston Road and Pancras Road are provided through the new public realm and pedestrian connections.

Station Forecourt

- The station forecourt for the new King’s Cross Station has been designed to function with the new CTRL Pancras Road alignment, which runs to the east of the German Gym, and also with it realigned to the west of the German Gym as planned by King’s Cross Central.
- The taxi operations have been designed to operate as a single distribution system for both the King’s Cross and St Pancras Stations. This will reduce the empty taxi distances travelled in this area.
- There are 10 set down bays currently proposed for taxis and private cars, with an additional 3 places allocated for disabled parking. These are aligned adjacent to the station entrance with local canopies providing cover to arriving passengers.
- Under standard operations and good taxi supply, 8 bays are provided at the pick up. However, passenger wait times and queues can become excessive when taxi supply falls and therefore high levels of active management will be provided to maintain passenger throughput. Taxi share operations will also be considered during peak periods when taxi flows cannot be maintained. An additional 6 bays are provided for taxi share operations.
- In 2002 a taxi rank of some 27 spaces was provided on the west side of the station. A similar rank is provided for the Application Scheme with CTRL Pancras Road alignment. The rank can be increased to some 50 bays with the King’s Cross Central realignment of Pancras Road.

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5.2 Passenger-Related Facilities

PASSENGER RELATED STATION FACILITIES AND SUPPORT ACCOMMODATION

Future requirements for station facilities and support accommodation at King's Cross have been defined by Network Rail based on operational experience and benchmarked against equivalent major terminus stations in Britain. These facilities should be spread around the periphery of the core accumulation areas as evenly as possible, with a centrally located ticket office. A high proportion of facilities (most notably passenger lounges and catering) have been located at first floor level to optimise the use of a restricted development footprint for passenger support accommodation at ground floor level.

The overall concourse area requirements have been derived from a number of sources, as follows:

- Passenger Accumulation: The spatial requirements have been modeled on the basis of the 7/8/4 train service during the peak and allowance for train operations perturbation during the pm peak 15 minute period.
- Station facilities: Like for like replacement of existing facilities with upgrade to modern standards as defined by the Office of the Rail Regulator, Train Operating Companies and Network Rail as well as information contained in the Network Rail Functional Specification.
- Support Facilities: Future requirements at King's Cross have been defined by Train Operating Companies and Network Rail and benchmarked against equivalent major terminus stations in Britain, as well as information contained in The Network Rail Functional Specification.

Extensive studies have been carried out for refinement of the accommodation layouts to optimise the balance of facilities at ground floor and first floor level. Attention has particularly focused on generating maximum usable frontage around the new Western Concourse area.

This section describes the principles behind the distribution of the core passenger station facilities and station user retail and catering support facilities broken down into the following:

- Central Travel Centre
- Western Concourse Perimeter Accommodation
- Western Range Ground Floor
- Western Range First Floor
- Bomb Gap
- Northeast Building -Old Parcels Office
- Block A1 Building - Next to Western Train Shed
- Small and Mobile Retail Units
- Western and Southern Station Forecourt

Central Travel Centre

The Travel Centre is located in the Old Booking Hall, in the centre of the Western Range, close to station entrances and directly opposite the new LUL connection within the Western Concourse. This is a logical and operationally efficient position for these facilities. The new ticket office is clearly visible from the new concourse area and is permeable on three sides to provide access to all passengers arriving, regardless of mode. The central travel centre covers an internal gross area of 500m² with a provision of 24 ticket sale windows to replace the existing facility. A further 165m² of back of house are located on the first floor mezzanine area above the booking hall.

Western Concourse Perimeter Accommodation

Support facilities within the western boundary are located in a prime location in direct sight-line of the new concourse area. The overall gross area of retail accommodation in the perimeter accommodation at ground floor level is 855m² and derives from the constraints of the requirement for a pedestrian route along the eastern facade of the Great Northern Hotel, and the need for the overall concourse area under the 7/8/4 train service scenario.

During disrupted conditions the central concourse area space requirement is 3,300m², exclusive of passenger circulation and station facilities

A new mezzanine deck is located above the western retail boundary, accommodating primary catering units. This provides an internal gross area of 1160m² of catering accommodation. This area is easily accessible via escalators and lifts leading directly from the main ground floor concourse accumulation zones up to the mezzanine deck. Stairs to the deck are also provided along the access routes within the perimeter accommodation at ground floor level. The deck will also provide ample seating areas overlooking the activities of the concourse, and in clear sightlines of the main customer information boards.

A new passenger link bridge connects the mezzanine accommodation in the western concourse to the Western Range and onto a new platform over bridge in the main train shed, providing direct access from accommodation at first floor in the concourse and western range, directly down to the mainline platforms.

Western Range Ground Floor

The ground floor of the Western Range north and south of the new central Ticket Hall has been modified to offer some retail frontage facing the new western concourse.

Core passenger station facilities, such as station WC's, and left luggage are located away from the main concourse to the north, where they are easily accessible for passengers' needs.

A total internal gross area of 1310m² of retail/catering support and key passenger station facilities can be provided at ground floor in the Western Range.

Western Range First Floor - Passenger Support, Station Facilities and Passenger Lounges

The first class passenger lounge and a business centre are located at first floor level within the Western Range adjacent to the Old Booking Hall overlooking the new Western Concourse. The spaces within the Range are generous in scale and afford good views over the concourse. All passenger facilities on the first floor level will be easily accessible via stairs and lifts from ground floor level adjacent to the old booking hall.

Bomb Gap

Detailed discussions between the design teams were undertaken to revise the location of the bomb gap vent. An alternative location to the west of the new concourse had been considered but rejected by all parties due to the complex interfaces and design compromises that this creates. The proposed location for this vent is therefore to re-instate it in the bomb gap, towards the western face of the Range, which avoids any major impact on the OBS facilities below. The entry level of the vent has also been raised to avoid complex underpinning associated with the previous, low-level solution. It is assumed that the original façade of the Western Range will be reconstructed after the vent has been constructed and that the intake and extract grilles will be located at roof level of the Range, with the majority of venting facilities facing to the east, where their visual impact is minimised. This design has been reviewed with the relevant conservation officers and is considered as an acceptable solution.

Northeast Building -Old Parcels Office

The structure of this building provides a good opportunity to accommodate large sized open plan units at ground level, currently allocated as a stationers, left luggage and WCs. The Old Parcels Office on the first floor above, with original timber features around a central atrium, is an ideal location for a good sized traditional pub with an internal gross area of approx. 690m² including back of house areas. It is visible from the main concourse and directly accessible via new stairs leading to a balcony which will serve as additional seating area overlooking the concourse activities.

Small and Mobile Retail Units

Mobile retail units or barrows will be accommodated within the central area of the new western concourse between the two main accumulation zones in front of the CIS screens.

A total zone of 100m² has been allocated - final size and number will be subject to agreement on precise location as informed by dynamic pedestrian modelling at the next stage of design.

Small support components, for instance photo booths and ATM's, can be comfortably located in left over corners such as under the staircases leading up to the mezzanine, or the pub terrace.

Western and Southern Station Forecourt

The external zone along the western retail perimeter is utilised as the primary station forecourt along the periphery of Pancras Road and is covered to provide a protected pedestrian environment. This area will provide for a generous north-south pedestrian route around the external perimeter.

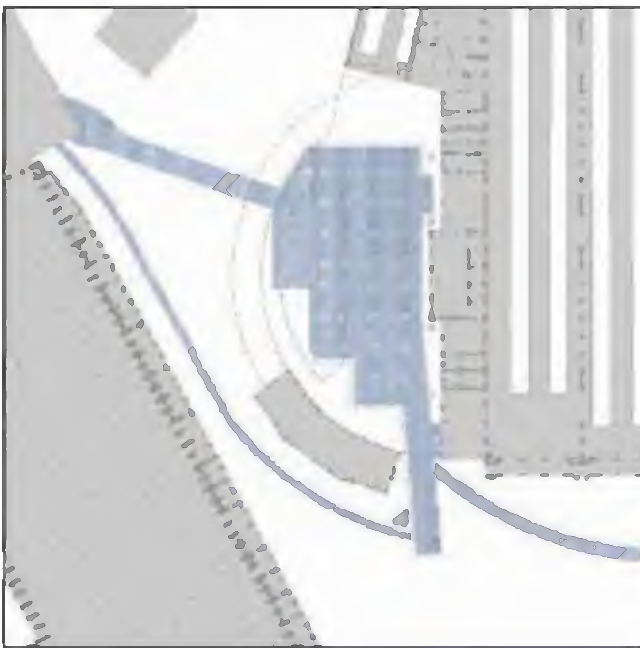
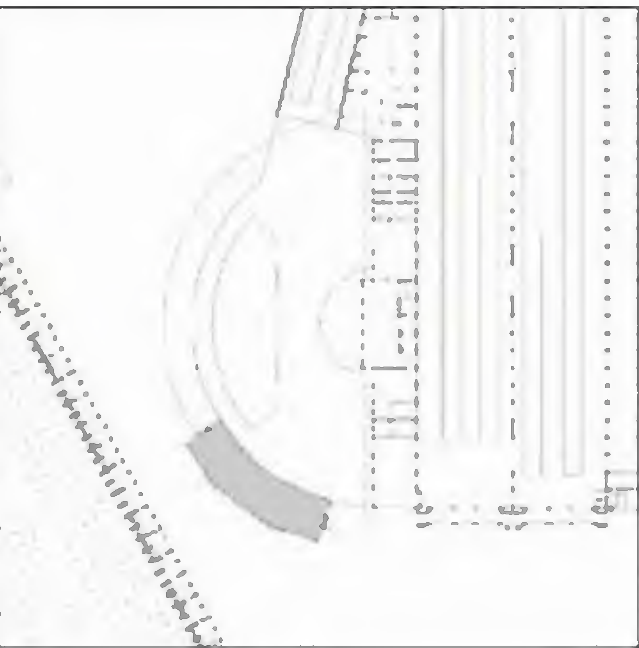
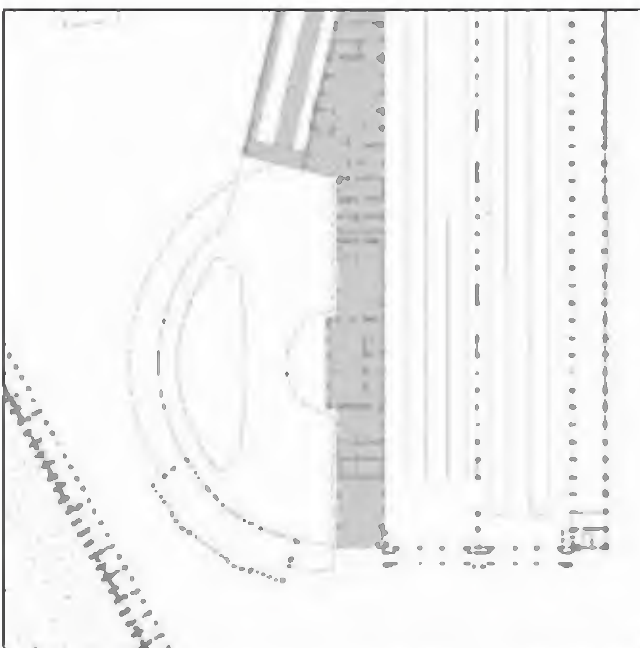
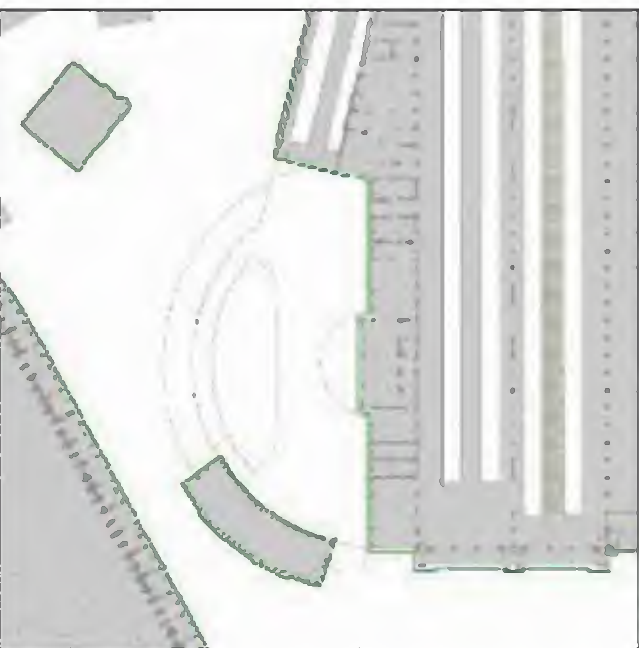
It is anticipated that some small retail outlets will be provided on the southern station forecourt, as currently proposed around the existing LUL vent.

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5.3 Building Form



CONSTRAINTS

Design development of the Network Rail (NR) Western Concourse has been informed by three key constraints.

LUL Northern Ticket Hall

Covering a broad area beneath ground level immediately adjacent to the Western Range, the LUL Northern Ticket Hall (NTH) has an irregular plan arrangement, structural grid and series of adjoining link tunnels. Additional load-carrying capacity has been designed into this structure to accommodate overhead development, however the capacities are variable and the structures irregular grid is particularly difficult to coordinate with the above-ground setting out criteria. The adjacency of the LUL NTH to the Western Range also leaves a limited zone between these structures for any additional new overhead development structure to be located. Four safeguarded pile groups have been constructed in this zone as part of the LUL works, though their use is constrained by lateral load-bearing limitations.

Western Range

The development's relationship with the Grade I listed fabric of the existing King's Cross Station buildings along its eastern side is a further constraint. The significance of these buildings in heritage terms requires careful consideration of any interface between old and new, to ensure an appropriately sensitive and responsive relationship is established between the two. The new development is entirely structurally self-supporting, with the majority of interventions within the listed building fabric determined by operational requirements.

Great Northern Hotel

Retention of the Grade II listed Great Northern Hotel (GNH) introduces an important 'pinch-point' at the southern end of the proposed new concourse. The fourteen metre gap between the GNH and the Western Range creates a physical constraint at the point where a number of anticipated pedestrian movements converge. Analysis of anticipated pedestrian flows indicates that in the peak 3 hours, some 6,200 people will move between the new concourse, LUL, buses and other destinations by foot through this 'gap'. Of these some 3,000 non-station related pedestrians will also wish to move between the Southern Square and the development lands.

The natural desire-line for pedestrians moving from the south of the GNH (via LUL, bus and on foot) to the King's Cross Central development lands is predominantly between the GNH and the Western Range, complimented by a secondary route to the west between the GNH and Pancras Road.

The movement of pedestrians between the GNH and the Western Range is complicated further by the need to get passengers from the new concourse into the Main Shed. The link between the two can only be located at the southern end of the Western Range, creating a third and conflicting movement of passengers in an east-west direction.

Pedestrian flow analyses carried out to date identify that if all the development-generated movements occur to the east of the GNH this will create unacceptable congestion at the southern end of the concourse and around the link to the long platforms during peak periods.

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DESIGN RESPONSE

The proposals have been developed to create an aspirational new Western Concourse building that responds positively to a range of design considerations.

Setting-Out

The partially arcing footprint of the Great Northern Hotel has been adopted to generate a radial geometry symmetrical about the Western Range's central section, responding to the listed building's heritage significance as former station ticket hall, and creating a dynamic form which functions as a gateway and pivot between King's Cross and St Pancras.

Structure

A number of options have been worked through during the course of the design development. In summary these options have followed a course of investigation from short through intermediate to long span structure, and from orthogonal to radial setting-out.

The current proposal creates a dynamic new volume of the Western Concourse with a roof structure that spans clear across the LUL NTH following a radial plan arrangement. The concourse is defined by the sweeping form of a radial diagrid shell, which provides lateral loading stability to the whole roof structure whilst describing a strong arcing form in both plan and section. Supported around its perimeter on a series of piers with diagonal bracing struts, the diagrid projects beyond the concourse envelope to form a canopy protecting the concourse forecourt. The diagrid oversails the threshold between outside and inside, opening up strong visual and physical connections. Inside the concourse, the diagrid structure is extended down to ground as an elegant funnel form to support the roof adjacent to the listed building façade. The plan-form sector above this funnel zone is utilised to introduce natural daylight to the concourse and create the lightest of visual interfaces between old and new structures.

The mezzanine accommodation is supported on independent columns, which transfer the load down to the supporting columns within the Northern Ticket Hall.

Envelope

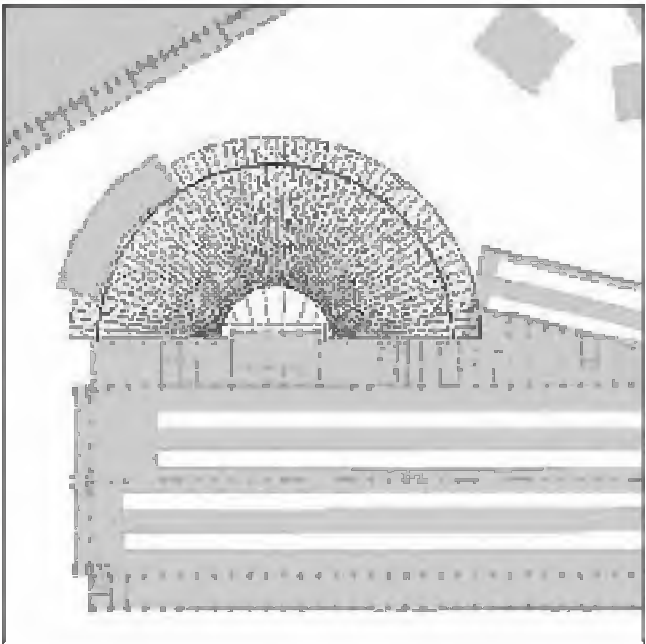
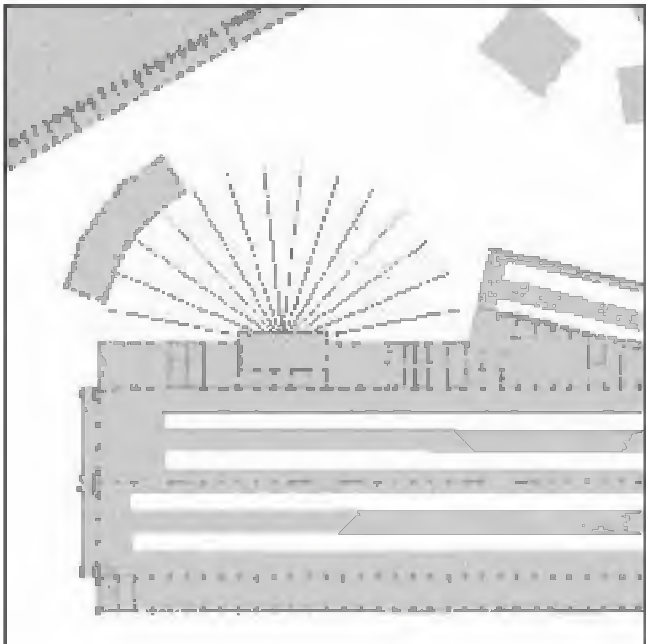
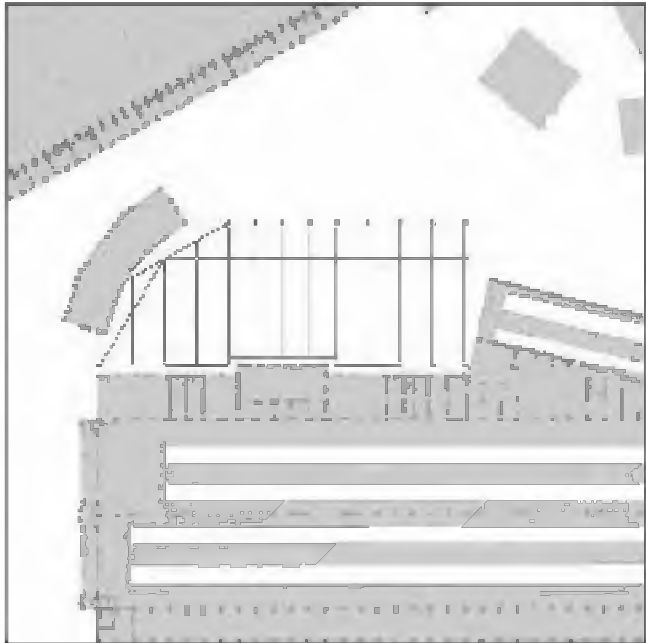
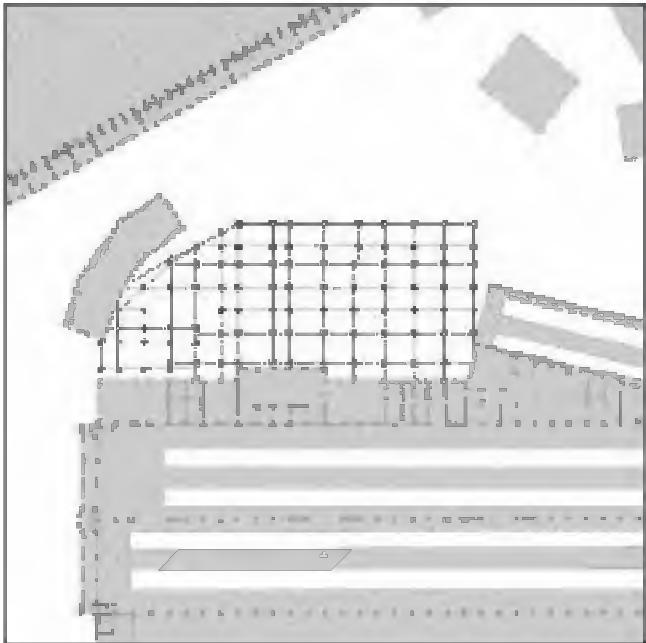
The sweeping form of the roof covers both concourse and mezzanine, and peels away from the elevation to create a canopy around the building's perimeter. This element of roof is solid clad to the topside, as a panellised rainscreen cladding system, with the diagrid fully expressed to the top and underside to reveal its structural form. An area of clear glazing, is defined by the arcing plan-form around the Western Range's central section, providing a window to the sky through which the St Pancras clocktower is visible. A glass slot is also introduced to either side of this section to complete the enclosure against the Western Range.

The elevation to the west along Pancras Road is glazed and offset from the structural piers, creating an enclosed pedestrian arcade which facilitates circulation around the concourse perimeter. The elevation to the south towards the Southern Square is a glazed wall that forms the concourse's main entrance, protected and signified by a higher-level extended canopy that reflects the diagrid form of the concourse roof.

Townscape

The Western Concourse responds to significant 'external' drivers as well as 'internal' criteria. The space occupied by the concourse, between King's Cross and St Pancras, is of considerable importance in urban planning terms.

Through its radial form, the concourse expresses itself as a pivot between the two stations, responding to their conflicting geometries and engaging with the Great Northern Hotel. The curvature of the concourse's perimeter will also encourage movement and connectivity between the newly created Southern Square, which defines the eastern termination of the Euston Road corridor, and the major new Argent St George development to the north, King's Cross Central, signifying the concourse as a major urban gateway.



5.4 New Station Concourse and Related Facilities



DESIGN PROPOSAL

This section provides a written summary of the primary characteristics of the design, which is now being submitted for planning consent.

5.4.1 Organisational Principles

The primary ground plan of the new concourse is semi-circular in plan, with its centre aligned with the mid-point of the Western Range façade. On its western edge this semi-circular form follows the concave façade of the Great Northern Hotel and continues round until it meets the suburban trainshed at its northern end.

Within this semi-circular planform, the distribution of accommodation is set out in response to the way in which passengers accumulate, wait for trains and access the platforms. All supporting accommodation and secondary facilities respond to this basic functional requirement. The primary accumulation and circulation space occupies a 5000 square metre zone that runs the full length of the Station's Western Range. This space is linked to the existing long platforms in the main trainshed at its southern end, via an arcade formed in the Western Range, and it is connected to the suburban platforms at its northern end through the gable wall of the existing western trainshed.

Access to this circulation space from street level is provided by a new primary station entrance located between the Western Range and the Great Northern Hotel and a sequence of entrances located on the concourse's curved western perimeter. The primary link with the Underground is located on the west of the new concourse building and there are secondary connections to the Underground in front of the suburban platform gateline and to the south of the Western Range gable end. Passengers arriving by long-distance train will also be able to walk out of the main gable frontage of the station towards bus stands and the Underground entrance adjacent Euston Road.

The most important passenger support facilities are grouped on the east and west sides of this accumulation zone. On the east, within the Western Range itself, the travel centre occupies the old booking hall and will provide ticket counters, ticket machines and travel information. Immediately to the north and south of this, smaller scale cellular spaces will be for convenience retail operators. Further north, at the point where the Western Range meets the suburban trainshed, wc and left luggage facilities are provided along with a station reception. On the western side of the accumulation area, a 'pod' of accommodation houses a group of retail outlets, cash machines and ticket machines arranged around the main Underground escalator and lift link. This zone also accommodates stairs and lifts connecting down to the Underground and up to first floor level.

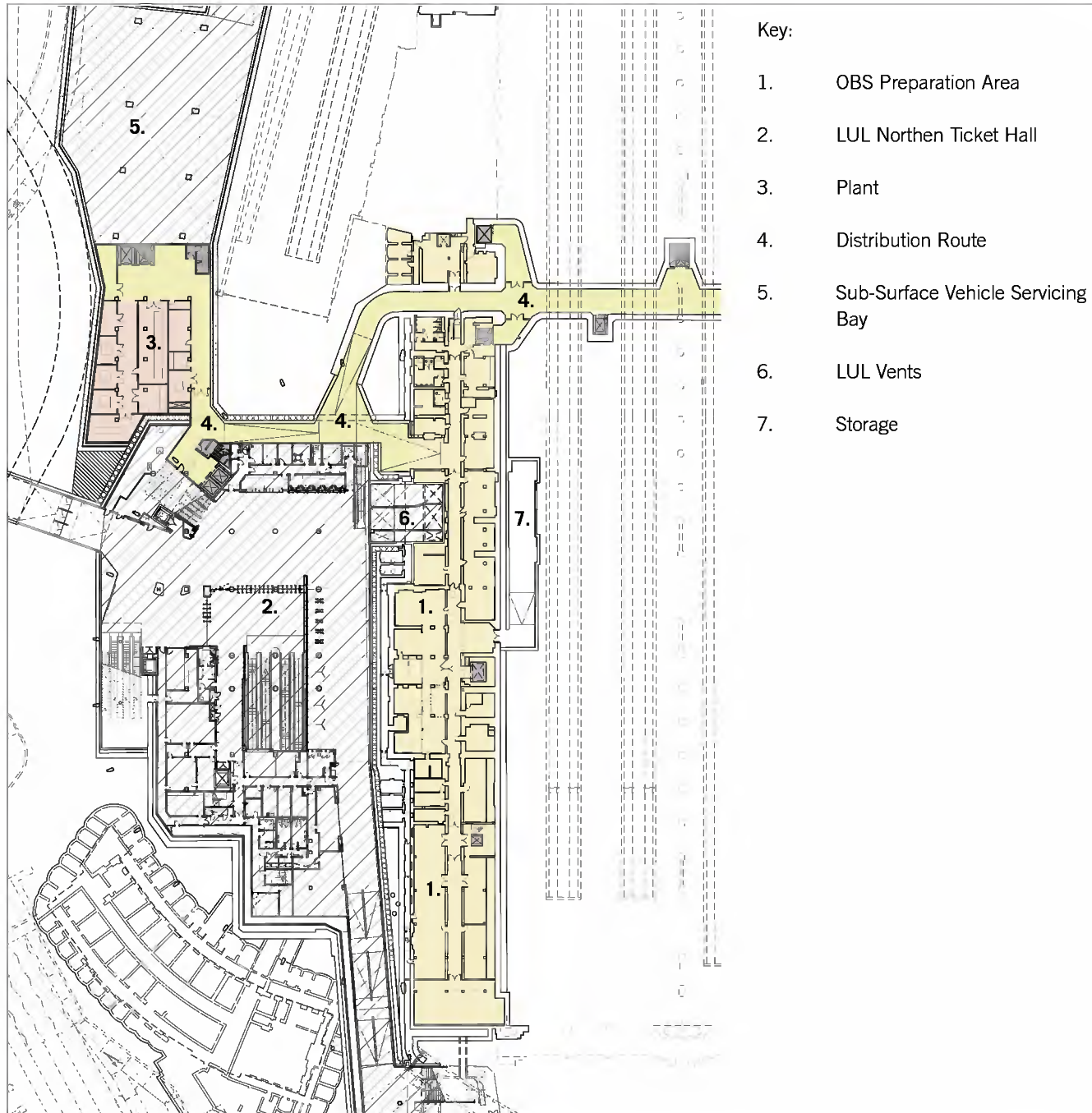
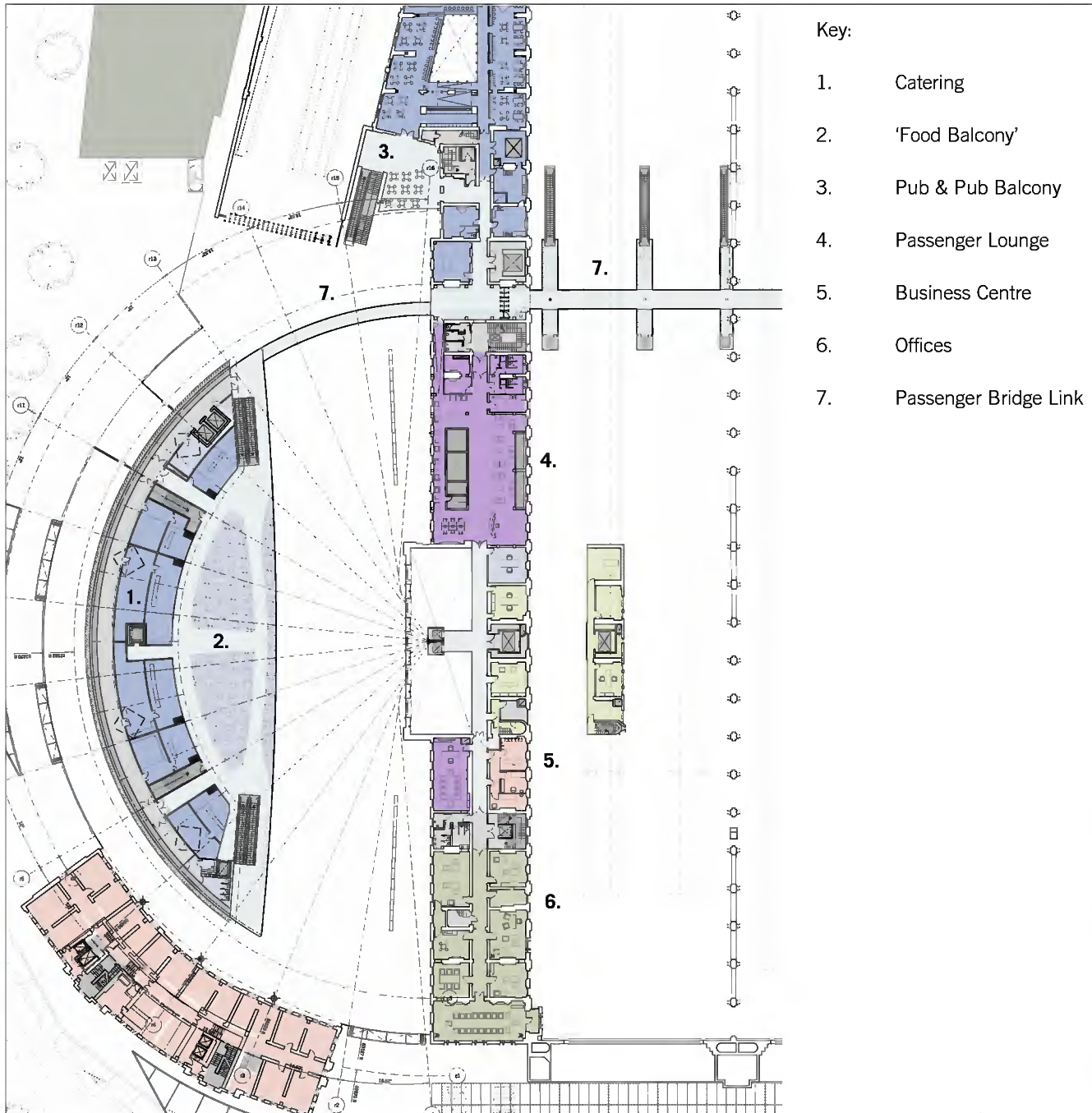
At first floor level to the west of the concourse, a group of cellular spaces will house the primary catering outlets, each facing onto an open food balcony with clear views over the concourse and passenger information boards. The first floor of the western range will house a pub towards the north, first class passenger lounges in the central section and a business centre and offices at its southern end. A new passenger bridge will link these two public first floor areas with the main trainshed, via a new overbridge with escalators and stair links down to each of the existing platforms. The levels of the western range above first floor level will not be in public use and operate as either station-related accommodation or rented office space.

Below ground, the basement of the western range will provide kitchen and storage space for on board servicing for the trains. The area immediately below the main concourse is occupied by the Underground's new Northern Ticket Hall and to the north of this a new basement will provide plant space, distribution routes for goods and a connection to a sub-surface vehicular servicing bay, which has discrete access for delivery vehicles accessed from Goods Way, running beneath the proposed Kings Cross Central development.

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5.4.2 Pedestrian Movement

There are three key types of passenger movement that have influenced the layout of the new concourse and the way in which it connects to the adjacent buildings. First, there is the movement of rail passengers on and off trains. Secondly there is the interchange between the station and other transport modes. Third there is non-station related movement through and around the concourse for people moving through the city. Each of these has a specific influence on the station layout and is summarized below:

- Rail-Related Movements

Passengers waiting for trains will be encouraged to do so in the new accumulation zone to the west of the western range. From this location they will be able to access the main platforms through a new arcade at the southernmost end of the Western Range through a controlled gateline. This may be manned or incorporate automated ticket machines but either way, the control of this zone is fundamental to the way in which the station operates. If this area were to be left for free movement, or indeed if people could walk in without tickets through the main station gable frontage, the narrow zone at the south end of the platforms would quickly become congested and unsafe. In this instance the station would have to close. However by managing this connection and controlling train information within the main concourse, passengers will only move through the gateline and into this zone once their train has been called, thereby drastically reducing the numbers of people accumulating in this highly sensitive zone. To alleviate the potential ‘pinch-point’ adjacent to the southern gateline, gated pedestrian links are also located half way along platform 8 (adjacent to the station reception) and at first floor level where the overbridge crosses through the western range.

Passengers wishing to use the suburban rail services will also wait in the main concourse area and move through to the platforms.

For passengers arriving by rail, those coming in through the main trainshed will pass straight through the main station frontage if they wish to walk to Underground and bus services located on Euston Road. Those wishing to catch taxis, meet someone collecting them by car, or who wish to walk to the north or west, will be able to move from east to west through the gateline in the western range. In normal conditions this will not lead to congestion. However in inclement weather passengers will be less willing to walk to the Euston Road Underground entrance and to avoid putting unacceptable pressure on the main gateline, a new canopy has been provided along the southern façade of the original station building. This will allow those passengers to walk, protected from the rain, to the Underground entrance just to the south of the Western Range.

- Interchange Movements

Movements from people to and from the Underground will be balanced equally between those coming from the southern tube entrances (south of the western range or adjacent to Euston Road) and those using the new western escalator and lift bank. In both instances those coming in to King’s Cross will move directly into the new concourse accumulation area and move onto trains as described above. For those coming off trains and wishing to enter the Underground system, passengers arriving on the suburban services will enter the tube via a single escalator to the south of their gateline. The movement of people moving from trains in the main shed to the Underground is explained above. Bus interchange is dispersed around the station with stops on Pancras Way, Euston Road and York Way and passengers will use the station exit closest to the appropriate bus stand. Passengers arriving by taxi will be dropped off on the western edge of the concourse in a set down zone north of the Hotel. Those waiting to pick up a taxi will move through to a weather-protected queuing zone located south of the Hotel. Interchange with rail services at St Pancras will not be significant in terms of numbers, but there is a pedestrian crossing over Pancras Way this is specifically located to allow

passengers to move to and from either station following their approximate desire line.

- Pedestrian Movements

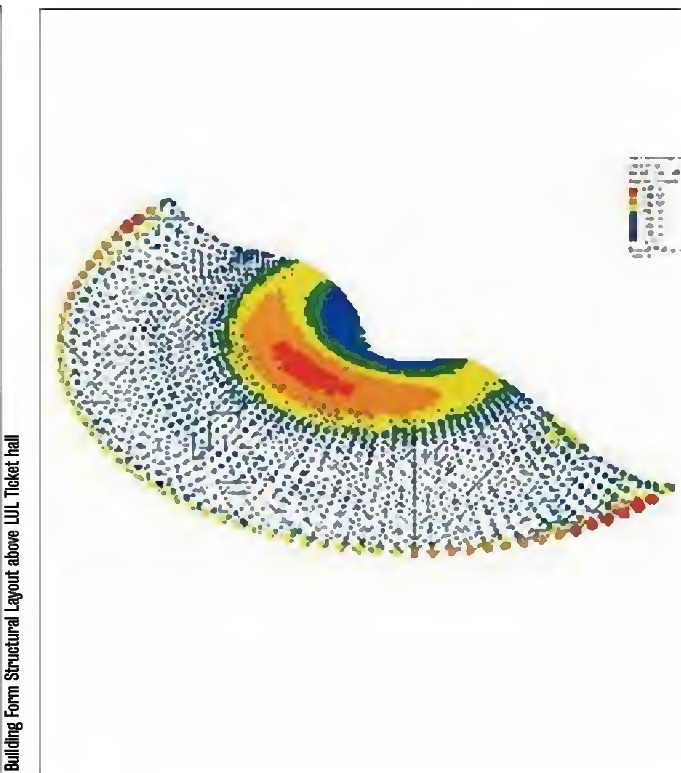
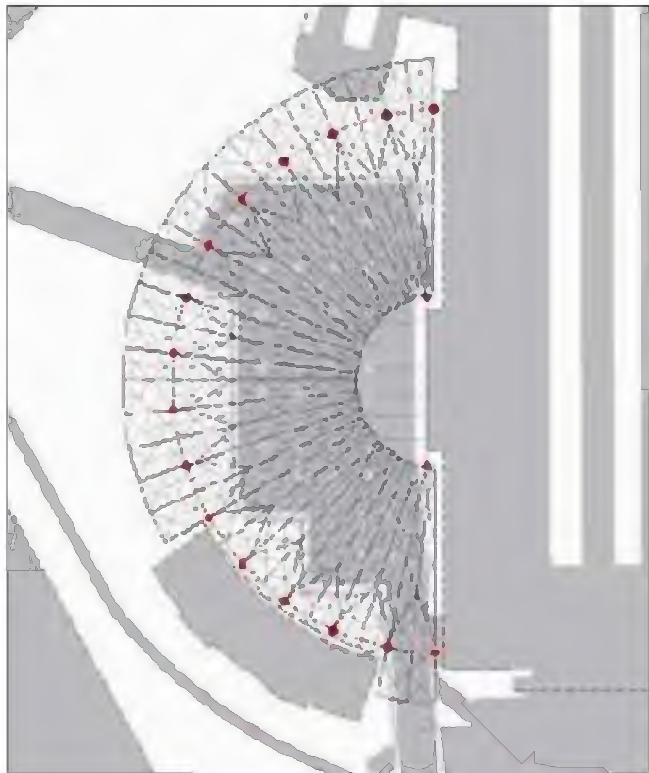
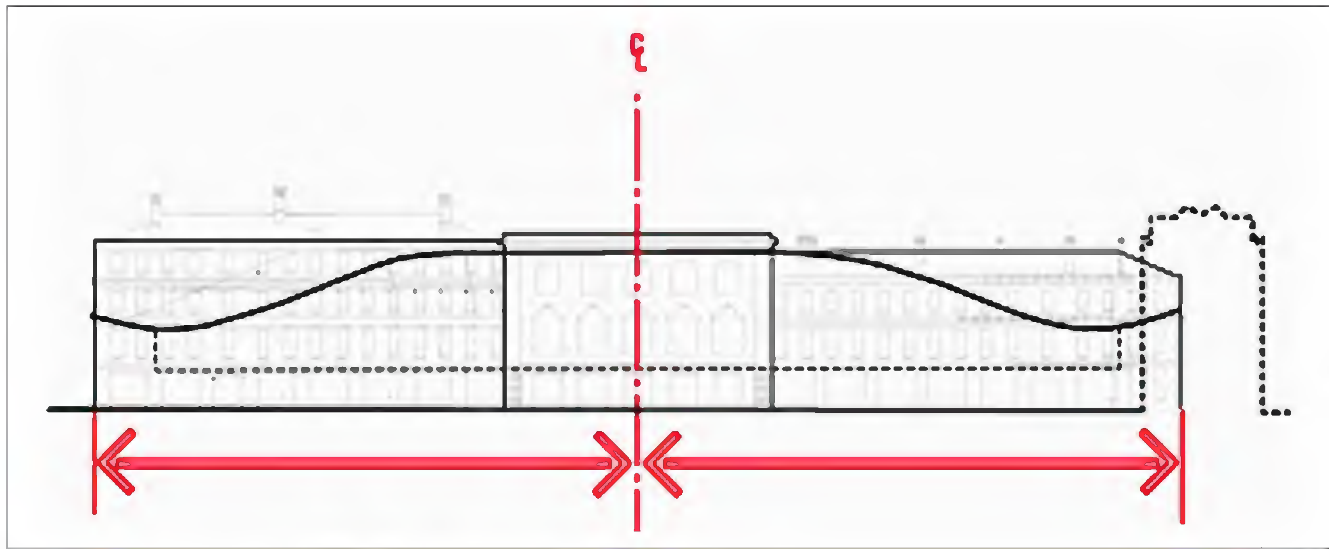
As well as catering for 60 million rail passengers each year, a huge number of people will move through or around the station as a way of getting from north to south through the city. Many of these people will have no intention of using any of the transport modes but they too must be provided with clear and unobstructed waking routes, particularly between Euston Road and the Boulevard being created as part of the Kings Cross Central development. To allow for this, a clearly delineated and day lit perimeter route has been formed around the perimeter of the new concourse building. The columns holding the concourse roof have been deliberately moved 8 metres inboard of the building perimeter to reinforce this route. During quiet times of the day it is anticipated that many will move right through the concourse as a ‘covered square’ – as they do at Liverpool Street – but in more busy periods this perimeter route will provide a clear and unobstructed route away from the main accumulation zone. Externally, the pavement between Pancras Road, the new concourse and the Hotel will be quite narrow and the proposal is to alleviate this route by providing a new arcaded walk beneath the Hotel itself. Proposals for this have been submitted under a separate application by Argent, but the design solution has been developed jointly with Network Rail and is fully supported by this project team.

This complex network of pedestrian flows has had a major impact on not only the primary organization of the station’s accommodation, but also on the detailed location of stairs, exit and entrance routes, canopy locations and a whole range of smaller design decisions. Detailed dynamic pedestrian modeling has been carried out for both the station and its multi-modal external environment and the outputs of these models have been shared with Camden, English Heritage and the adjacent landowning stakeholders.

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5.4.3 Building Form

The three dimensional form of the new concourse is driven by the structural characteristics of the new concourse roof. A range of potential alternatives for providing a clear-span structure over the semi-circular planform was investigated. The clear span is primarily in response to the structural limitations imposed by the Northern Ticket Hall below, but also help keep internal accumulation and circulation routes free of obstruction. Of these alternatives, only a diagrid roof lattice could provide the adequate roof stiffness within a shallow roof structure that would sit comfortably against the Western Range and the Great Northern Hotel. These options were shared in some detail with Camden and English Heritage during earlier stages of the project's development. The preferred diagrid shell is highest in the centre of the plan and rises up to meet to top cornice of the old booking hall frontage. It drops down towards the perimeter, following an 'S' form in section, to meet the Hotel between ground and first floor windows and to create a building perimeter with a scale consistent with the flank wall of St Pancras station on the opposite site of Pancras Way. Accommodation for retail, catering and support accommodation is located within 'pods' that sit beneath the primary roof form and allow this to be seen to float over these secondary elements. The pure geometric form of this new station roof creates a unifying element, which draws together the disparate geometries of the existing station, the Hotel, the suburban trainshed and the orientation of St Pancras and Pancras way.

5.4.4 Building Materials

The roof of the new concourse will be covered predominantly in triangulated and coated aluminium roofing panels, coloured metallic gray to sit comfortably with the slate and glass roofs of the two great railway sheds of King's Cross and St Pancras. In the very centre of the new roof, and around its perimeter, triangulated glass panels will allow daylight to fall down the façade of the old booking hall and to flood along the perimeter circulation route. The vertical facades of the new concourse will be glass, as will the roofs of the canopies over the taxi

areas and the walkway along the southern gable. Flooring materials outside the station will be gray natural stone and the predominant flooring material in the concourse and for the platforms will be terrazzo. This material palette has been chosen to be simple, of high quality, durable and easy to maintain.

5.4.5 Access For All

Throughout the design development process, access for all including those with mobility impairments or with sensory difficulties has been considered. Every change of level by stair or escalator is accompanied by a fully accessible lift as close as is practically possible. Facilities such as WC's, left luggage, travel information and ticketing have all been deliberately located at the same level as the main accumulation zones to avoid the need for passengers to negotiate steps, ramps or lifts to access these facilities. In terms of interchange with Underground facilities, the station will provide two new methods of accessing the tube system by lift. For taxis and cars, drop off and set down areas are on level with the concourse and easily accessed – there is also provision for three short-stay (20 minute) parking bays strictly for orange badge holders. Full details for the use of distinct colours and textures to aid the partially sighted have not been developed at this stage, but the Network Team are fully committed to incorporating the appropriate provisions during the detail design stage of the project. Initial specifications for public address and ticket office information systems have paid particular regard to those with speech and hearing impediments.

5.4.6 Sustainability

The proposed design is, inherently, a model of sustainable urban development. The very nature of the project will promote the use of public transport and thereby encourage commuters and visitors to travel by train rather than car. Despite some pressure from the train operators, no provision has been made for long-term parking at King's Cross in an effort to discourage the use of private cars.

Of course the station is also a significant local employer, particularly for lower-income groups working in maintenance and servicing teams on the station or for its tenants.

In terms of energy use, the building is also highly efficient. From the outset Network Rail and its design team have taken the view that the main concourse area should not be heated or cooled. Natural ventilation through the building perimeter and at the top of the roof will allow heat to dissipate in the warmer months and roof glazing has been kept low to avoid levels of thermal heat build-up that would necessitate cooling. In winter it is assumed that the main concourse will get cold, though the details of the building edge canopy, door locations and details have been wind-modelled and adjusted to ensure that the spaces are not unpleasantly drafty. Only the relatively small cellular spaces housing retail, catering outlets or passenger support functions are heated or cooled, where this is considered unavoidable. Therefore, given the station's scale and the number of station users, the building's energy use and carbon footprint is abnormally low.

The approach of Network Rail and its design advisors is to focus efforts on reducing energy use and developing an inherently sustainable project, rather than progressing renewable energy sources that offer limited benefit and are in many respect non-viable in this location in a project funded by the public purse. Detailed consideration of renewable energy sources has been given. However the nature of the station, its listed building status and the operational demands make this approach difficult to integrate. As examples, wind turbines would not be acceptable because of their negative impact on the historic character of the site; biomass heating becomes problematic because the high-level flues required again conflict with listed building consent requirements. The use of photovoltaics on the roof do offer potential but with current technology, the economic payback period is very long while the design life of the equipment is much shorter – as a publicly funded project that has been under great pressure to reduce capital cost, this is not considered a viable option. However, all options for renewables will be appraised during detailed design and where viable will be included. 5.4.7

Public Realm and Landscape

Removal of the existing southern concourse creates the opportunity to form a major new public space addressing Lewis Cubitt's remarkable gable elevation. This new space will need to be robust and predominantly open. Pedestrian flows are high and desire lines are diverse. It will operate as a space to move through, rather than to linger. It should, however, be a space of intense activity and be thoroughly urban in character. Finishes will be tough but of high quality. Stone will form the primary paving material and benches, lighting and signage will be fully integrated with the intention of minimising clutter. A lightweight, glazed canopy will extend along the main building frontage to provide a rain-protected link between the station frontage and the Underground entrance to the south of the western range.

There are a number of Underground-related elements that have to sit within this space. Immediately in front of the Hotel a large vent and stair structure has recently been constructed and has to be retained. To the south of the main station frontage, a vent shaft that is currently 'cloaked' by the existing concourse will be exposed when this building is demolished and has to stay. The intention is to group a small number of information and retail pavilions around these vents, to animate the public realm and provide travel support services. There are also enclosed entrances to the Underground adjacent to Euston Road and in front of the western range.

To the west of the Station, Pancras Road will operate as a surface interchange zone for passengers moving from taxis, cars and buses to rail services. Immediately to the south of the Hotel, a taxi pick-up area will be provided with a covered canopy. To the north of the Hotel and following the alignment of Pancras Road, set down facilities for taxis, cars and three disabled parking bays will also be covered with low-level canopies.

This layout has been coordinated fully with Argent, London Continental Stations and Properties and Camden's highways officers and in dialogue with Transport for London.

5.4.8 Historic Fabric

Impact on the historic fabric of the station will include a number of alterations to the Western Range including new lifts in the Booking Hall, formation of new openings at ground floor and first floor level towards its northern end and at ground floor level to its southern end, as well as the provision of roof-top ventilation.

The King's Cross Central applicants have proposed the creation of a arcade through the ground floor of the Great Northern Hotel by removing internal walls and making openings in the external facade. However there are several beneficial implications including removal of the 1970's Concourse and enhancement of the setting of the south gable elevation, reconstruction of the Bomb Gap, reinstatement of the former Booking Hall, reinstatement of the Parcels Office atria and enhancement of the setting of the Western Range. Detailed discussions commenced in April 2003 with Camden and English Heritage - all impacts have been discussed during the Stage D design stage in order to secure in principle agreement.

During the subsequent study period, the design team met with both Camden's Conservation Officer and English Heritage's case office. The Network Rail client team also met with these bodies independently at the outset of the study, to set the context of the joint working arrangement. Both of these heritage advisory bodies have expressed support for the joint working arrangement and are generally supportive of the objectives of the study. In particular, the reduced intervention into the basement of the Western Range and the re-establishment of the former booking hall as the main ticket hall for the concourse were welcomed. The proposed treatment of the bomb-gap and confirmation that the original façade of this element of the station will be reconstructed also gained support.

Detailed discussions about the nature and impact of the proposed concourse and train shed over bridges were held with English Heritage, the Victorian Society, the London Advisory Committee and the London Borough of Camden in November and December 2005.

All parties expressed support, in principal, for the link bridge and overbridge following clear presentation of the functional benefits and from a heritage perspective in particular, the reduced visual impact of a new over bridge in the main train shed was welcomed.

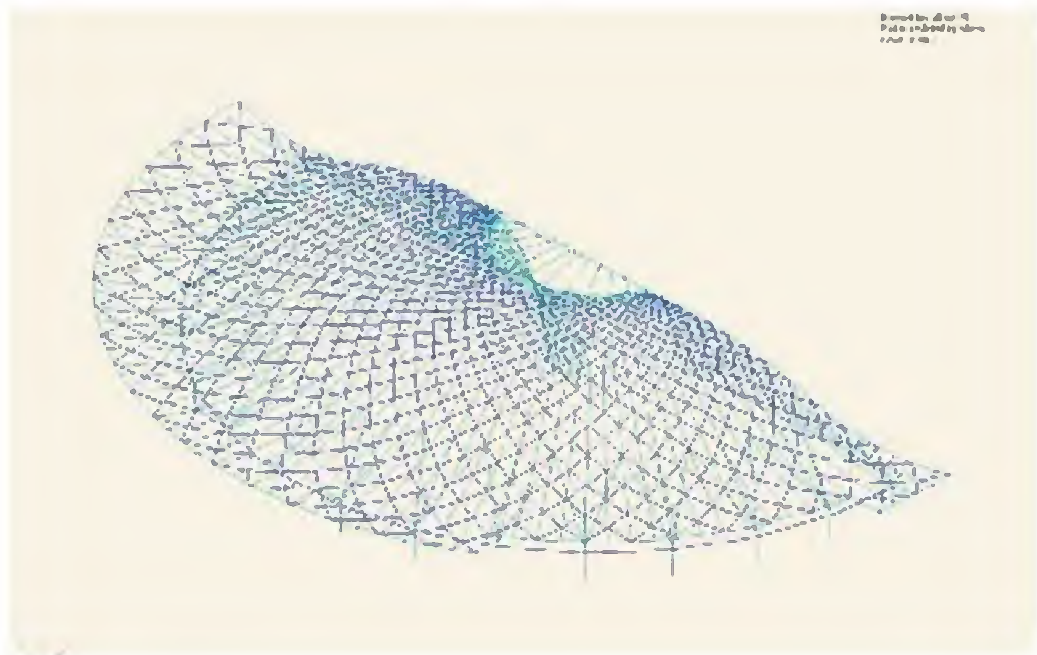
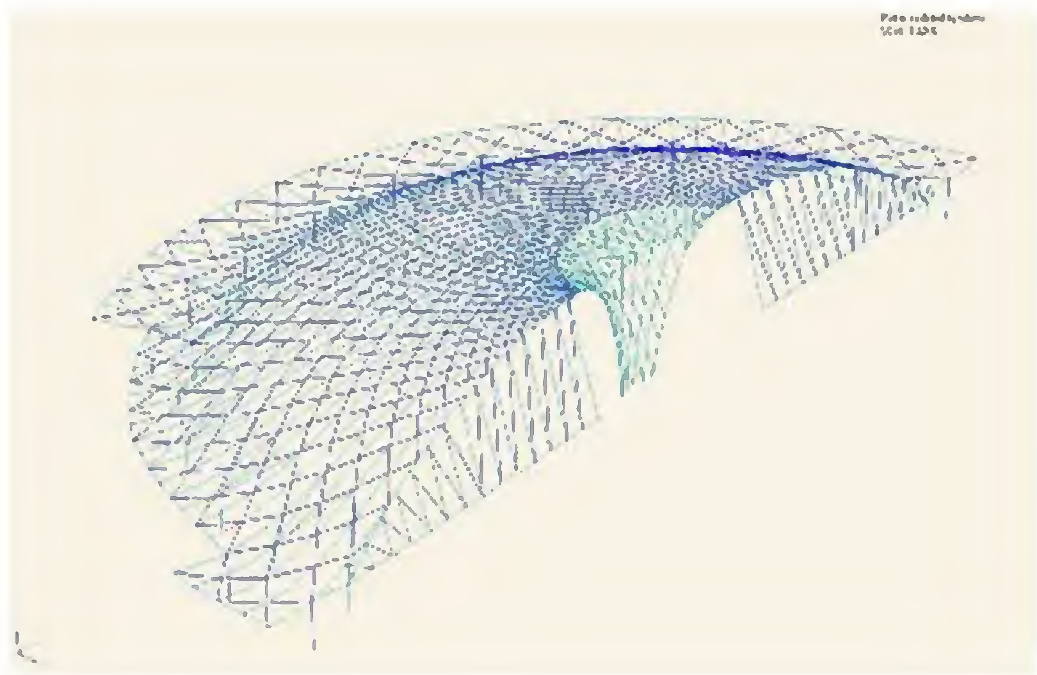
5.4.9 Consultation Status

There is now broad support for the scale, organisation, form and architectural treatment of the project from Camden's officers, English Heritage, Department for Transport, London Continental Railways and Properties and Argent. A full public consultation started in late November 2005 and will continue throughout the determination period.

5.4.10 Construction Programme

A detailed construction programme and site logistics phasing sequence has been developed, with accompanying report, for the Enhancement Project. It assumes LUL's Northern Ticket Hall opens in September 2009 and that Network Rail construct the Shared Service Yard north of a main route of nearby services from early 2007 to early 2008. Network Rail's Enhancement Works contractor would be appointed in October 2007, the Western Concourse would open four years and six months later in April 2012 and the Southern Concourse would be redeveloped in the twelve months immediately after the 2012 London Olympics.

6.0 Structural Engineering- New Structure



New Structure

The primary elements of new structure are as follows:

- Main concourse roof
- Mezzanine floor structure within the main concourse
- Link Bridge and Platform Over Bridge
- New roof and support structure to the southern end of the Suburban Shed
- External canopies

Main Concourse Roof

The geometry of the main concourse roof has been developed in response to a number of key constraints. The resulting building form offers large, clear spans to allow foundations to be predominantly situated outside the extent of the LUL Northern Ticket Hall and minimises vertical support structure adjacent to the historic façade of the Western Range building.

The concourse building superstructure consists of two interdependent structural systems. The first system is a doubly curved diagrid shell structure set out on a radial geometry and covers the majority of the concourse space. The shell structure sweeps upward at its lower perimeter to form the external canopy roof to the building. The outer edge of the shell is propped off the ground by tree-like structures, each comprise vertical columns and 4 inclined struts, three to the front and one to the rear. The second structural system forms the flat D-shaped skylight zone adjacent to the Western Range façade and comprises horizontal beam elements set out on an approximately radial grid propped from the funnel lattice-like structure, which connects the inner edge of the diagrid roof down to the concourse level.

The geometry of the main roof curve is created by the tangential intersection of two different radius circles to form the S-shape. By rotating this simple curve about a point in plan to create the overall building form a high degree of repetition is achieved both in terms of the elements used and the connection details adopted. The setting out principle for the funnel is similar to the diagrid, using arcs from three tangential circles rotated about a vertical axis.

In order to achieve shell action in the diagrid roof, stiff edge structure is required. As the roof is effectively only half a dome these forces are resolved through circumferential ground beams acting as tie elements between the main column bases and a further straight tie at concourse level connecting the two columns adjacent to the Western Range, thus forming a closed structural system.

The interface between the main concourse roof and the Western Range is addressed by an open area formed by a warped glazed wall. An opening is introduced in this glazed wall at its northern end allowing the link bridge to connect with the Western Range.

Mezzanine Floor Structure within the Main Concourse

A mezzanine structure is provided in the western quadrant of the concourse area to provide retail provision at ground and first floor levels. Pedestrian access to the first floor level is provided by 2 escalators and MIP lift, at the southern and northern end of the structure. A curved link bridge, along the northern boundary of the concourse, provides direct access to the platform overbridge.

The mezzanine is a semi circular plan shaped single level steel framed concrete deck structure supported above the concourse level; on a non-regular grid of columns. These columns are supported from the roof structure of the LUL NTH, the locations of which together with the loads have been agreed with LUL in a series of coordination meetings. Lateral stability of the steel frame is provided by in-situ reinforced concrete shear walls forming staircase and lift enclosures from the concourse level. The mezzanine is partially covered with a vertically curved steel canopy forming an enclosure to the retail areas. This canopy is formed in structural steel beams and columns and supports a maintenance walkway over for servicing of the proposed flood lights illuminating the concourse roof. The canopy is clad in PPC aluminium panels with thermal insulation and penetrations are provided for tenant air extract vents through the main concourse roof. The main first floor deck and canopy structures will be designed to carry loads from lightweight services for tenants fitout.

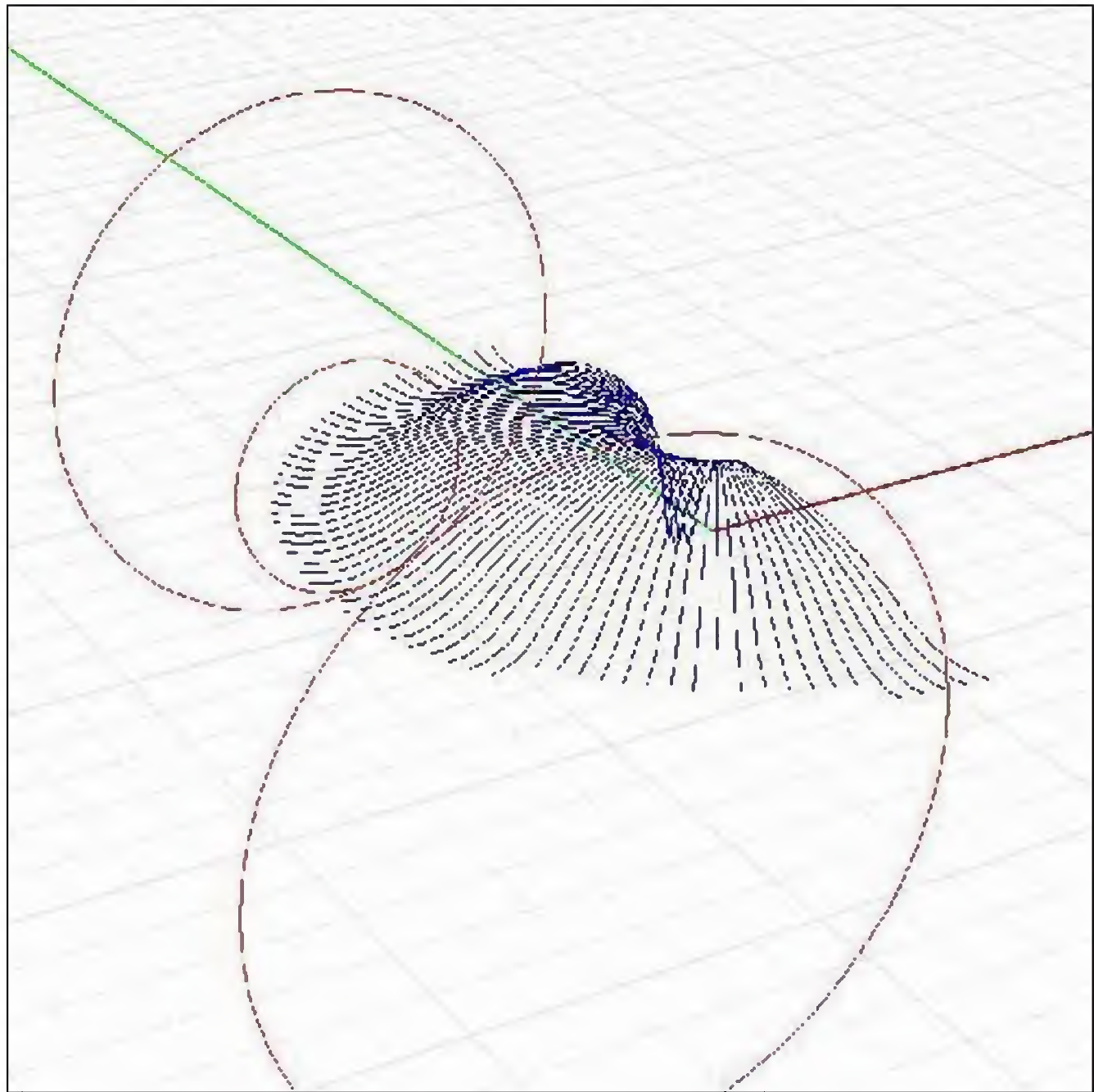


Diagram showing how the diagrid shell geometry is created by two tangential circles rotated about a vertical axis

Link Bridge and Platform Over Bridge

The Over bridge decks spanning the tracks are proposed as steel decks consisting of longitudinal edge beams with a transverse spanning stiffened deck plate. At each platform the bridge decks are extended along the platform line from the main over bridge span to give access to escalators and lifts to platform level. These access decks are supported at each at end by twin columns and additionally by a single central column in the centre line of the track over bridge. It is proposed that the twin column supports to the ends adjacent to the lift will also form part of the lift enclosure and provide support to the escalator. The over bridge sections take support from these access decks and the entire construction provides for a shallow structure maximizing the clearance to the existing OLE. The deck structures to the over bridge and access decks are designed to accommodate the fixing of a glazed balustrade screen bolted to the longitudinal edge beams. Foundations for the steel columns are provided underneath platform level in form of mass concrete pad foundations. Escalator – and lift pits are reinforced concrete structures with mass concrete pad foundations underneath.

New Structure to Southern End of the Suburban Shed

In order to provide a clear link from the existing suburban platforms, nos 9, 10 and 11, the existing last two roof bays will be demolished together with their supporting masonry walls. A new roof will be provided that will be a stand-alone structure between the remaining suburban roof and the new concourse roof. The main part of the roof consists of a lightweight deck, with stability provided by two portals in the east-west direction and by bracing in the north-south direction. The columns are carried down to two concrete walls at ground floor level, founded on piled strip footings, which are designed to carry any impact loading arising within the railway influence zone. The floor to the pub mezzanine is provided by a composite concrete and steel structure.

External Canopies

There are four canopies, which include the southern canopy, main entrance canopy and the two western taxi pick-up and drop-off canopies. The main entrance canopy, acts to highlight the entrance to the concourse. The design of the canopies will be developed further with Camden.

7.0 Structural Engineering - Existing Structure

This section covers the development of the Stage C Structural Outline Proposals to Detailed Proposal stage for the alterations to the existing Grade I listed Western Buildings to accommodate circulation and concourse provision associated with the new Western Concourse and the reconfigured southern end of the suburban Train Shed.

The principal elements of the structural work to the existing buildings are as follows:

- Western Range
 - Introduction of structural framing of the basement and ground floors of the southern wing, including reinforced concrete new stair/lift cores and stability system.
 - Construction of a new flat roof structure to the Old Booking Hall, supporting light mechanical equipment; together with the introduction of new lift shafts including a steel framed shaft serving the balcony level of the refurbished Ticket Hall.
 - Reconstruction of the 'Bomb Gap' incorporating the LUL Vent Shaft, as a shell and core' structure procured under the LUL NTH Phase II works, together with construction of the facades, the fitting out of the structure and the reconstruction of the adjacent north wing gable end bay.
 - Construction of new ground floor and mezzanine links to the north wing, together with works associated with the lowering of adjacent first floor and corridor construction.
 - Formation of a service duct under Platform 8 between the existing Gentlemen's toilet chamber and the Old Parcels Tunnel

- Link and North West Buildings
 - Lowering of the basement and construction of a new stair lift core to the Link building.
 - Extensive strengthening of the North West Building and introduction of a new lift and stair core.
- Northern Building
 - Formation of new openings through existing crosswalls
- Old Parcels Tunnel
 - Alteration and extension of western end of Old Parcels Tunnel to provide OBS link with the Northern Ticket Hall.

The preliminary appraisal of the structural sensitivity of the existing buildings to the proposed alterations includes an overall assessment of the transverse structural performance of the Kings Cross Station Train Shed roof .

The integration of the design with the LUL Northern Ticket Hall development, (which includes the location of the LUL Vent within the Western Range bomb Gap) and the development of the function and planning of the buildings and on-board service facilities, has resulted in changes and modifications to the configuration of the structural works previously adopted. The principal changes are listed below.

- Retention of the Western Range basement OBS corridor as an operational facility during the works.
- Reuse of the Old Booking Hall as a two storey height ticket hall and the introduction of a new lift within the hall serving the existing first floor balcony.
- Relocation of the lift shafts in the central Old Booking Hall area and southern wing of the Western Range
- Inclusion of the 'Bomb Gap' reconstruction works as part of the LUL Phase II works, as a 'shell and core' structure.

- Omission of the OBS tunnel under Platform 8 and the substitution of a narrower services tunnel, which continues to utilise the existing underground toilet and barbers shop and links the southern spur of the Old Parcels Tunnel with basement areas of the Western Range central area.
- Demolition of the bomb damaged and incomplete southern bay of the North Wing of the Western Range, and its reconstruction as a framed structure monolithically connected to the 'Bomb Gap' structure.
- Introduction of pedestrian and mezzanine bridge links into the penultimate bay of the North Wing; and the formation of an OBS basement entrance from the NTH concourse level into the gable end bay.
- Omission of the new Southern Stair and lift to the east side of the NTH /TTH link passageway from the NR King's Cross Station Enhancement project and inclusion in the LUL Phase II works.
- Lowering of the southern end of the Link Block basement to the level of the adjacent Old Parcels Tunnel, formation of a new entrance and construction of a new lift shaft and staircase.
- Formation of a new stair core within existing loadbearing masonry walls to the north end of the Link Building.

8.0 Proposed Alterations to Listed Buildings



8.1 PROPOSED ALTERATIONS TO LISTED BUILDINGS

Policy Context

From the outset the design team have recognised that the collection of rail related historic industrial buildings at King's Cross is unparalleled. Any alterations have to be carefully assessed to ensure that the minimum level of interventions take place and these are justified in accordance with national and local policy, in particular PPG 15 (Planning Policy Guidance 15: Planning and the historic environment) and the Camden Unitary Development Plan.

A central theme of PPG15 is that 'there should be a general presumption in favour of the preservation of listed buildings, except where a convincing case can be made out, against the criteria set out in this section, for alteration or demolition' (para 3.3 PPG15). Further guidance on the criteria against which applications for listed building consent are to be assessed is also provided. These are:

- the importance of the building, its intrinsic architectural and historic interest and rarity – both locally and nationally
- the particular features of the building(s) that justify its inclusion in the list and the extent to which any change affects this value
- setting and contribution the building (or item) makes to the local scene, its grouping, landscape or townscape effect
- the extent to which the proposed works would bring substantial benefits to the community by contributing to economic regeneration or the enhancement of the environment (including other listed buildings).

In addition to these criteria, there is a range of relevant policies affecting the application to demolish these items which are included in:

- The London Plan February 2004
- Camden Replacement Unitary Development Plan June 2006
- The King's Cross Planning and Development Brief
- The King's Cross Conservation Area Statement.

The design process has considered a wide range of options to achieve a high quality design for the new station within a unique heritage environment. This process has sought to minimise interventions in the building fabric and to the ancillary structures affixed to the Grade 1 Listed King's Cross Station building, and to the Grade II listed Great Northern Hotel. A Listed Building application is required for any works to or within the curtilage of both the King's Cross Station and the Great Northern Hotel. This assesses the introduction of new development in terms of its impact on the listed buildings. However, it has also not been possible to retain some of the building fabric, or re-use specific items previously affixed to King's Cross Station and the Great Northern Hotel, however where materials cannot be re-used in-situ, their salvage for long term use will be agreed with LB Camden.

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King's Cross Station c.1852

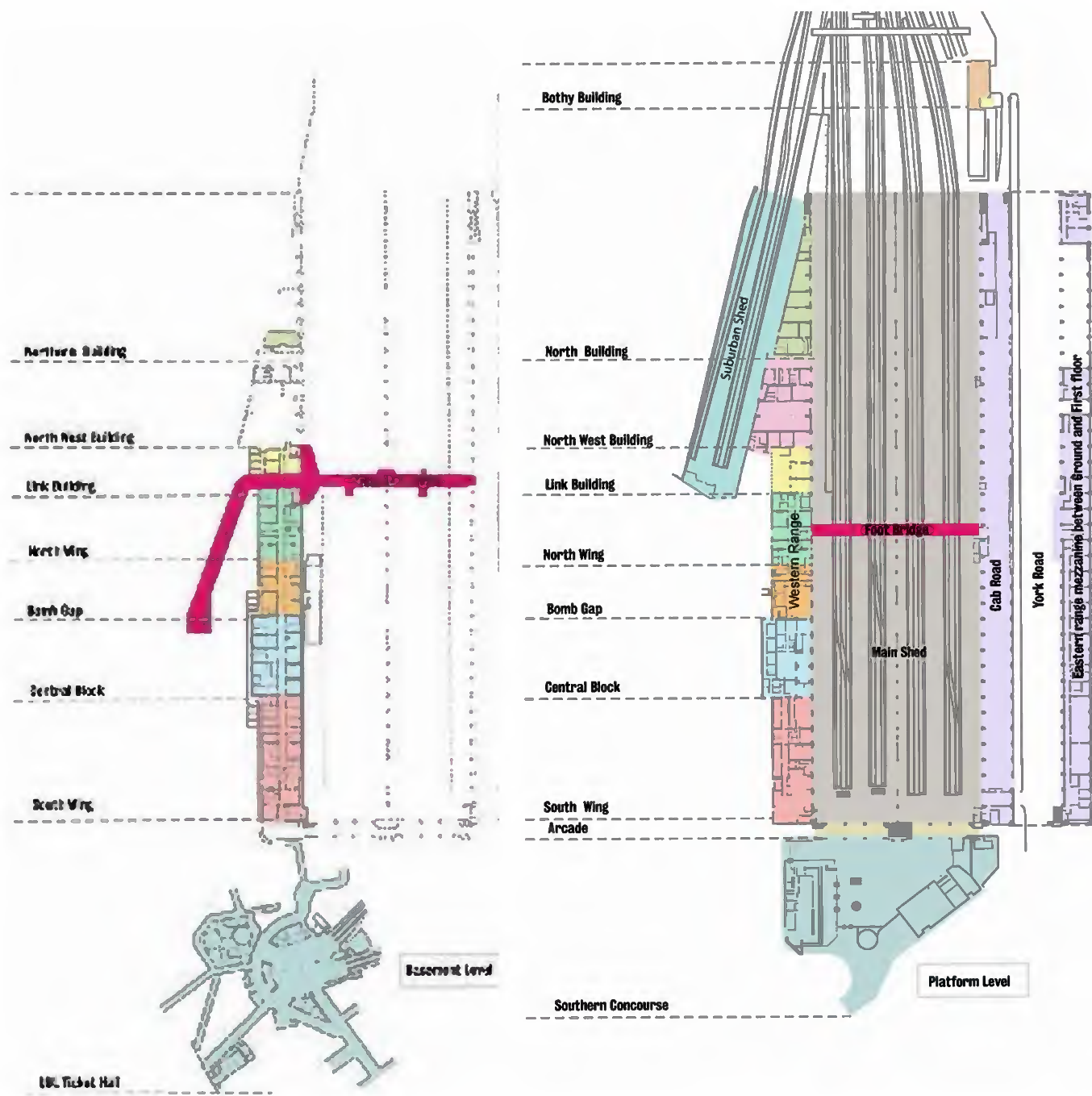
King's Cross Station Listing Description

Railway terminus. 1850-52 by Lewis Cubitt (architect), and Sir William and Joseph Cubitt (engineers). Yellow stock brick. 2 train sheds (originally 1 for arrivals, the other for departure) closed by monumental plain brick screen of 2 glazed semi circular openings, framed with recessed arches (echoing the train sheds behind) with central and flanking towers; ground storey obscured by late C20 additions. Central towers with rectangular clock turret with pyramidal roof, eaves, cornice and weather vane. To the west, 3 storey 3 window office block with booking hall and service rooms at rear. 1st floor level with thin, debased Venetian windows, cornice at 2nd floor level, 2nd floor segmental-arched sashes (flanking bays tripartite), cornice. On east side, an extension with archway the Cab Road (now bricked up); rusticated surround to arch and quoins; cornice above with 3 tripartite sashes and parapet. INTERIOR: train sheds separated by round-arched brick colonnade. Originally train shed roofs of laminated wood, inspired by the Crystal Palace, but these rapidly deteriorated and were replaced by the present iron -ribbed roofs to the eastern shed 1869-70, to the western 1886-7. (Laminated wood trusses used successfully at 26 Pancras Road (qv). HISTORICAL NOTE: when opened as the terminus of the great Northern railway, it was the largest station in England and is the earliest great London terminus still intact. The contrast of its functional simplicity with St. Pancras next door (qv) is powerful (Hunter and Thorne R: Change at King's Cross: London:-1990:59-64).

King's Cross Station
Enhancement -
Design Statement

Network Rail
John McAslan + Partners
ARUP
Faithful & Gould

July 2006



KING'S CROSS STATION CONSERVATION PLAN

The starting point for any proposed changes has to be a clear understanding of the structure or building both in terms of its historic significance and evolution. Annex C of PPG15 reinforces this message and to assist the design team in the development of the new western concourse a Conservation Plan was commissioned at the outset of the project (included for information as a supporting document with this application) which provides a definitive history of the stations development as well as an assessment of its cultural significance and the development of heritage sensitivity plans. It also defines clear conservation policies against which the new Western Concourse is designed and integrated with the main station buildings and adjacent Great Northern Hotel.

Alterations to King's Cross Station
The parts of the Station and the Great Northern Hotel that are proposed to be altered or demolished are as follows:

- Parts of the Western Range;
- The existing footbridge over Platforms 1-8, and its replacement with a new bridge;
- Porte Cochere to the Western Range (already removed as part of LUL works);
- Canopy and southern part of the Suburban Train Shed;
- The Engineers 'Bothy', parts of the Cab Road and walls (for Platform Y);
- Porch to the Great Northern Hotel western façade.
- Existing temporary southern concourse

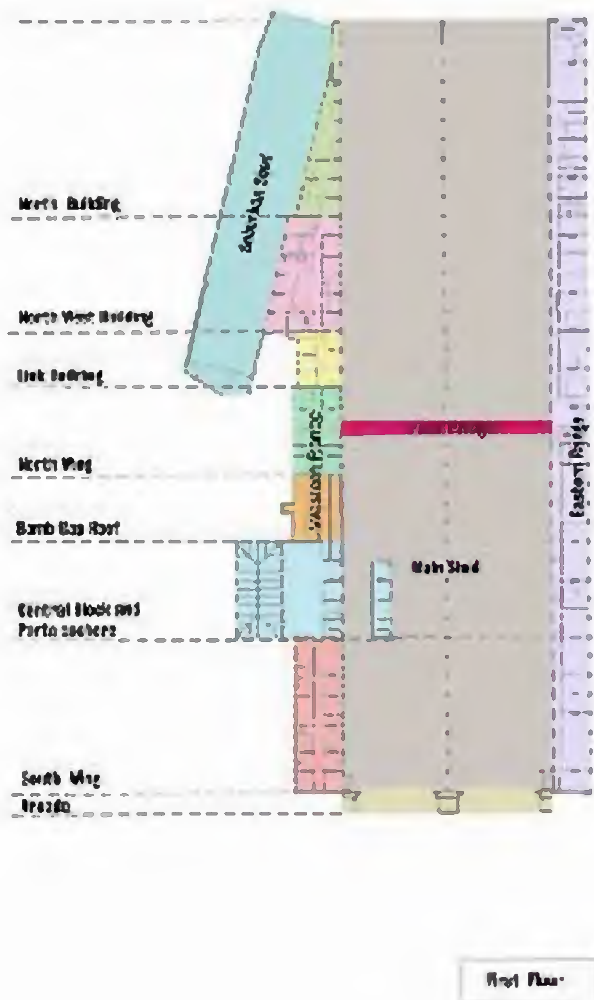
This section concentrates on the design considerations that have lead to the decisions to apply for the demolition of the heritage items.

ALTERATIONS TO THE WESTERN RANGE BUILDINGS

The Western Range extends along the full length of the Main Train Shed. The Western Range is largely part of the original construction of the early 1850s, and much of its plan form remains (and will continue to remain after the new concourse is constructed). Its partial devastation in the Second World War has never been fully repaired. It is made up of seven components that, starting from the southern end, comprise of: the south wing: Old Booking Hall: the Bomb Gap (caused by Second World War bomb damage): the north wing: the Link Building: the northwest building and the northern building. As a direct consequence of the need to demolish the existing southern concourse and its relocation to the west of the station the Western Range becomes a critical interface between the old and the new. Historically this range housed the most important station offices and passenger facilities, with the central block providing the original point of entry to the station for departing passengers including the Booking Hall. With the development of the new Western Concourse this range once again becomes the focal point for passengers using King's Cross station, however to provide for the level of passengers and modern day facilities expected at mainline stations interventions to the original fabric is required.

South Wing

In the development of the new Western Concourse the South Wing, at ground floor level, is altered to provide the primary ticket barrier access from the new concourse to the Main Train Shed platforms, and a new stair and lift core to serve the upper storeys of the Wing. This area was significantly altered in 1975 to accommodate a restaurant and works then included introduction of new steel frames supported on piled foundations, which is reflected in the Conservation Plan's assessment that this area is of low historic significance. The internal structure of the basement underneath will also be altered to accommodate the ground floor framework structure and new piled foundation.



Western Range Building Parts, Location Plan, Upper Floors

Old Booking Hall

Within the old booking hall the plant installed in 1977 will be removed. Demolition is restricted to a central area of the ground floor and basement to house a new lift structure serving new first floor passenger accommodation. One simple bay of floor construction to the rear of the Old Booking Hall is to be removed at each level to accommodate a new goods lift core structure and foundation. The more recent staircase introduced to serve the basement, ground and first floor is to be removed, and floors in-filled with appropriate materials.

Bomb Gap

The existing post war single storey construction is to be demolished. Extensive areas of the basement will be excavated to accommodate the new 'shell and core' LUL vent and associated superstructure to be constructed by Metronet under the separate LUL Northern Ticket hall Phase II works. The existing central basement corridor and eastern wall forming the Main Train Shed flank wall are to be retained. The Bomb Gap facade will be re-instated.

North Wing

Bomb damage occurred to extensive areas of the North Wing, particularly to the gable end bay (immediately north of the Bomb Gap) and substantial wartime repairs remain evident. The gable end bay structure was weakened as a result of the destruction of stiff intermediate cross wall construction to the South. The reconstructed structure of the gable end bay would be monolithically connected to the new 'Bomb-Gap' structure. The existing eastern wall, which forms the Main Train Shed flank wall, will be retained and incorporated into the new structure, and the western façade rebuilt to match the existing façade.

The western basement area will be substantially reconfigured to accommodate the OBS link from the corridor within the Northern Ticket Hall serving the shared service yard areas.

A new structure and associated piled foundation will be introduced to accommodate the new platform, and the platform bridge link between the Western Concourse and Main Train Shed. Works include some demolition to areas of the first floor to incorporate a level link between the platform bridge and the mezzanine bridge link. In addition, both the eastern and western facades will be altered to accommodate the link access route from the mezzanine to the Main Train Shed Platforms. The two northern bays' at first floor levels will be altered to provide level access to the platform bridge link.

Link Building

The basement level is to be lowered to gain level access with the adjacent old Parcel's Tunnel OBS link, and to serve a new lift and stair core serving all levels of the link building. The new core will require the demolition of a small area of the floor at each level.

North West Building

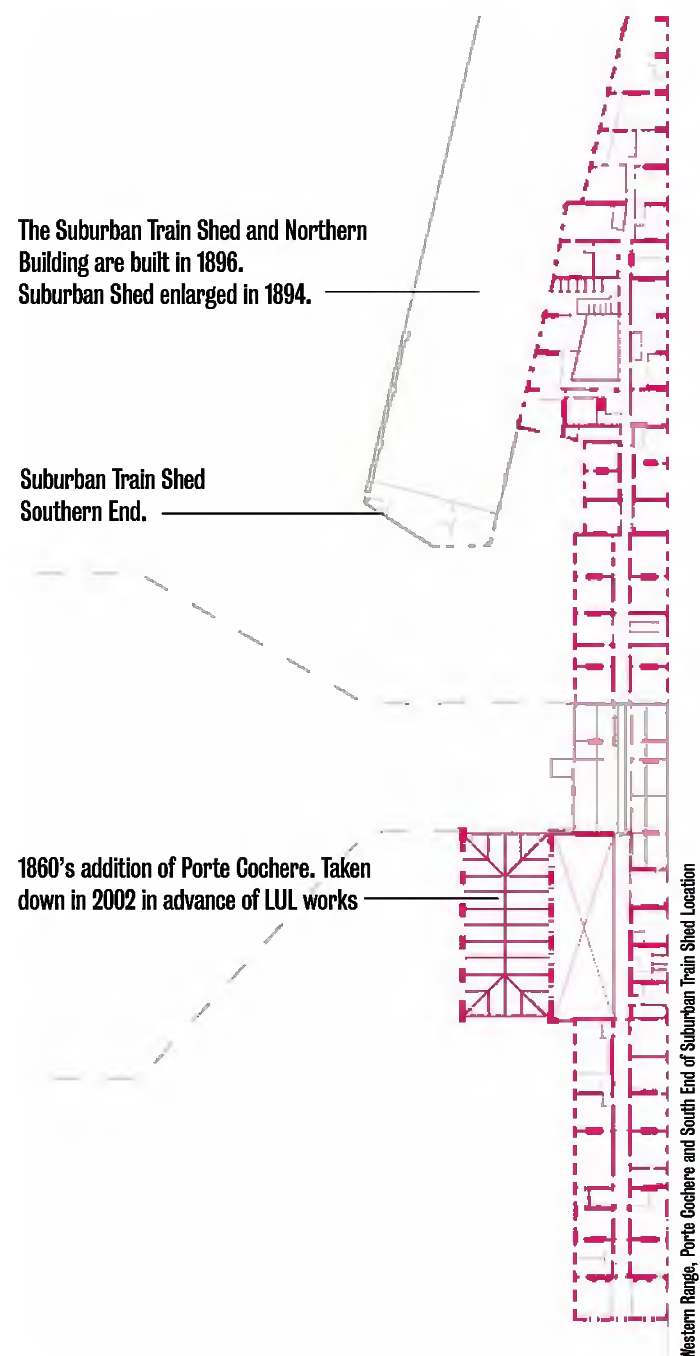
Minor demolition only will be undertaken to accommodate new passenger facilities at ground and first floor levels and to reveal the original features to the Old Parcels atria. Extensive strengthening and stiffening of the North West building is required. The works will be designed as 'reversible' to enable the existing timber structure to be retained in its original form.

Northern Building

Alterations and demolition works to the existing building are limited and principally restricted in the provision of corridor openings through the western section of the masonry cross walls.

Footbridge over Platforms 1-8

The ornamental wrought iron footbridge, which is not original to the opening of the station, was constructed in about 1873 and spans Platforms 1-8. The footbridge appears to have been constructed in two halves – the section from Platforms 1-4 of wrought iron, and the section over platforms 5-8 of steel. The difference is possibly due to post war repairs after the bridge sustained some bomb damage. The footbridge is currently clad with corrugated, glass and reinforced plastic sheeting fixed to balustrades. Landings and treads are a mixture of early timber wood block flooring or PVC rubber tiles laid on concrete. At the centre of the bridge is an historical analogue clock. The bridge provides access to Platforms 1 and 8 but not to the other platforms in the Main Train Shed.



The Porte Cochere to Western Range

A Porte Cochere was constructed on the front of the Old Booking Hall in the Western Range in the 1860's. This structure, which measured 14.5 metres by 31.3 metres was bracketed off the wall on the booking office side and rested on a brick wall on the other (although it is thought it would originally have had separate upright support). The Porte Cochere is considered a significant item in the Conservation Plan.

The Porte-Cochère was removed to accommodate the London Underground works in the area, and by agreement, is required to be reinstated to its former location. Previous sections detailed the options considered for the location of the new concourse, resulting in the early decision to build to the west of the Main Train Shed (Section 4.6). The concourse size has been determined by the operational needs to accommodate the large passenger flows through the station. Section 5.2, 5.3 and 5.4 have already discussed the operational and design elements for the concourse.

A significant reason for demolition is the aim to create a concourse building of the highest design quality which integrates yet stands as a landmark building within the historic precinct. The new structure has simple and clean lines, which are very carefully integrated with the Western Range. The V-shaped funnel structure that extends to the ground floor from the central roof light in front of the Old Booking Hall is generally in the area previously occupied by the Porte-Cochère.

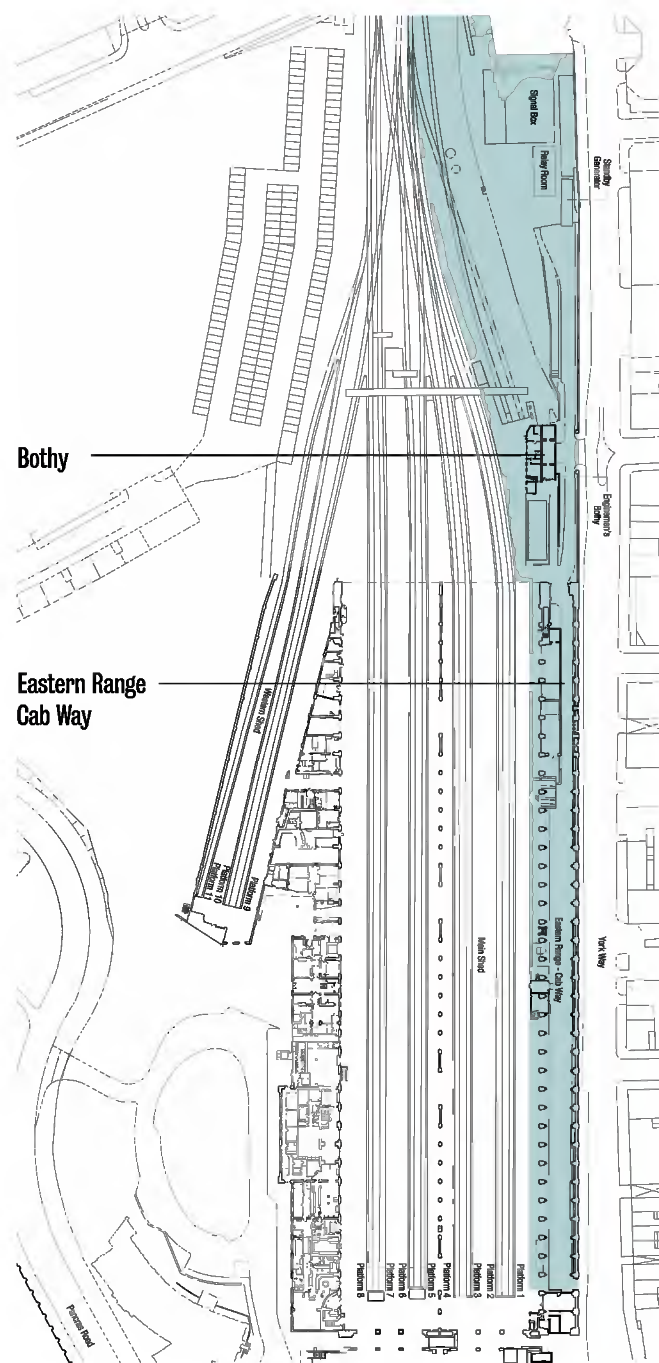
Suburban Train Shed Southern End and Canopy

The Suburban Train Shed was originally opened in 1876 and enlarged to its present form in 1894. The Suburban Train Shed is located to the northwest of the Main Train Shed and houses platforms 9 to 11. The southern walls of the Suburban Train Shed enclose a two-storey office building that extends over the full width of the shed. The southern gable end of the shed has parapet detailing similar to the German Gym although the southeast corner was modified sometime around 1917. This part of the train shed has historic significance due to this fact. The modern shed roof is a light steel trussed pitched and hip structure, supported on lattice girders spanning between the western boundary wall of the station and the west walls of the North East Block and the northern building. The internal elevation to platform 9 (Western Range) is of various phases of construction and original openings form the North West and Northern buildings have been heavily modified.

The area between the Suburban Train Shed and the Western Range was covered by a canopy described variously as the Parcel Yard Canopy or the 'northern' canopy. This canopy is believed to date from 1894. The Suburban Train Shed is connected to the Main Train Shed but it is not specifically referenced in the listing description.

The Conservation Plan describes the front ground and mezzanine portion of the train shed and the roof as having low significance in heritage terms due to the modifications that have occurred over the years. The walls and the northern canopy (or Parcels canopy) are identified as having some significance in terms of surviving decorative finishes of historic interest.

Part of the northern canopy has been dismantled and stored to make way for London Underground works in the area. This structure is also conditioned to be re-instated to its previous position.



The Engineers 'Bothy',
Parts of the Cab Road and walls (To Facilitate Platform Y)

The two storey building that is now known as the engineer's Bothy stands at the point where the Battle Bridge Road viaduct once crossed over the tracks to join York Way with Pancras Road, and at the point of access via ramped roads down to the main station cab road to the south and to the former York Road Station north to the north (opened in 1866, now demolished). The 'Bothy' was originally a small, possibly single roomed red brick building with slated hipped roof and chimneys tack referred to in an early plan as a Policeman's Bothy. It originally stood adjacent to the cobbled road over Battle Bridge and was built on top of the vaulted brick abutments for the iron bridge structure. In recent years the structure has deteriorated.

As far as the main line station is concerned, no original drawings have survived which show the north portal of the Cab Road or the appearance of the York Way elevation when first built. The change in brickwork on the north elevation of the Eastern Range clearly shows the 1895 extension upwards for new offices and the original rustication of the side-walls. Although there is no firm evidence, it is thought that the Cab Road entrance portal was originally constructed as a brick arch, possibly with simulated voussoirs (wedge shaped elements), with plain brick banding above, possibly topped by a cornice and matching the south elevation. These features were lost when the north stair was constructed to serve the new offices.

The Cab Road itself has undergone significant changes over the past 150 years, most significantly through the construction of the offices mentioned above and the installation of the mezzanine. It is also thought that the arcade elevation on to York Way was originally much more permeable, with openings onto York Way at regular intervals along its length, an arrangement which implies that York Way has been raised since the building was first constructed.

Platform Y, highlighted in blue

This elevation is also thought to have housed original water closets at intervals along its length, remembering that early carriages had no on-board services and this was the point of arrival for passengers from the north, many of which would have travelled long distances. The appearance of the Cab Road has been degraded over the years by ducting, barriers, cable runs, sundry station furniture and the mezzanine structure. This has reduced the apparent importance of this part of the main line station and it has consequently become something of an eyesore and a 'back-water'. It is nonetheless an important part of the station, particularly because it still retains its original carriageway function and because of the appearance of the round-arched brick arcade and its contribution to the architectural articulation of the main shed.

Great Northern Hotel - Porch

The Great Northern Hotel (GNH) is a much smaller building than either of the train sheds, and it is less dominant than St Pancras Station. It is Grade II listed and has a much stronger relationship with King's Cross Station, and for this reason its setting is primarily related to the inner arc focusing on the Western Range. The listing description for the GNH states:

Hotel. 1854, by Lewis Cubitt. Yellow stock brick with stucco dressings. Slate roof with pedimented dormers. Crescent shaped building. Concave main façade towards King's Cross Station, Euston Road (qv). Exterior: 5 storeys, attic and basement. 18 windows wide; southern return 5 windows with slightly advanced central bay. Sixth and thirteenth bays slightly advanced with tripartite windows and stucco dressings; 1st and 2nd floors, triangular pediments and segmental pediments respectively. Below that to left hand side, the main entrance with cast iron and wood portico; round arch glazing. Round-arched ground floor openings with stucco keystones and impost bands. Plain stucco bands at 1st, 2nd and 3rd floor levels. Other windows square-headed, 1st to 3rd floor with stucco architraves. Modillion cornice. Prominent slab chimney stacks. Road façade similar. INTERIOR: not inspected. SUBSIDIARY FEATURES: attached cast-iron railings of geometric design to areas.

HISTORICAL NOTE: curved plan reflects the original

alignment of Pancras Place, now Pancras Road. The hotel was one of the first to include rooms on the "continental system" with bedrooms en suite with sitting rooms. The company prided itself on the fire proof construction of the hotel, with thick walls dividing every room and with the corridors constructed of brick arches supported by iron girders. Hunter M and Thorne R (eds): Change at King's Cross: London:-1990: 77-79.

Southern Concourse

The 1970's Southern Concourse is also listed by virtue of its location. Its demolition and replacement by a new 'World Class' square is a long held ambition of both LB Camden and English Heritage

8.2 JUSTIFICATION FOR ALTERATIONS AND DEMOLITIONS

Creation of World Class New Western Concourse

It is clear to all that the existing sub-standard southern concourse facility is life expired with poor passenger facilities that detract from its status as one of the key London main-line train stations and interchanges. The evolution of the new concourse and its relocation from its current position to a new location to the west of the station has already been explained within this design statement; however this re-orientation ensures that the stations front door returns back to its original position and the importance of the Western Range for important railway functions returns.

More importantly it is the intention that with the new concourse will resolve current overcrowding and allow for projected growth in a safe customer environment, in which connections with LUL and surface-level transport modes are fully integrated, and becomes a world class space. It also allows for full integration with the adjacent Great Northern Hotel and the wider regeneration of the King's Cross Central Lands, which is in clear accordance with national and local policy.

Creation of a new Pedestrian footbridge

From the early stages of the Western Concourse design, it was apparent that large numbers of station passengers would need to be accommodated on the mezzanine floor while waiting for trains. Safe and legible access to all platforms in the Main Train Shed is needed to alleviate flows through the ground floor southern gate line. It is estimated that 20% of the total departing passengers will access the platforms using this high level route. One of the main design constraints has been the off-set angle between the existing bridge and the new concourse mezzanine area, as well as a desire to retain an existing Venetian window.

A number of potential locations for this link were examined to balance the visibility of the entrance from the concourse and the impact on the Western Range. Three options for the location of this bridge were assessed:

1. Re-use of existing over bridge with offset connection to the Western Range

The bridge only has connections to platform 1 and 8, and does not serve platforms 2 to 7. Historically there have been stairs to the island platforms but these have been removed. At either end of the structure, the bridge steps down as it meets the Eastern and Western Ranges. Re-using the bridge in its present location would require substantial structural alteration to each of the Ranges to form the new escalator and lift connections and it will also be necessary to re-level the lower end sections of the bridge.

This option assumed a 'cranked' off-set connection at the junction of the Western Range, to allow the new bridge linking with the concourse mezzanine to connect one bay further to the north. This option, while workable structurally, compromises station operability by its cranked platform, which creates a bottleneck for departing passengers. The works to the existing bridge are also likely to be of high risk. It is probable that significant strengthening will be required to ensure that the bridge is structurally adequate and serviceable for crowd loading. The bridge supports would require strengthening to carry new escalators and additional supports as all station platforms need to be accessed via this structure. Foundations would need to be incorporated where escalators and lifts do not coincide with previous platform stair positions. Two additional columns would be required to support the northern side of the existing bridge on platform 6/7 in addition to re-leveling the lower end sections of bridge.

2. Re-use of existing over bridge with a straight connection to the Western Range and new concourse

This option investigated the potential to create a direct and aligned link with the main concourse to achieve the operational performance requirements for this important access route. In this instance, the connections through the Range would require removal of a fine existing stair and puncture the eastern façade of the Western Range through an ornate and finely detailed Venetian window. The structural works to the footbridge outlined in the first option, would also be needed. This option was discarded as it required the demolition of the fine stair and Venetian window details in the Western Range which are specifically identified in the listing description for the Grade I Station Building.

3. New Train Shed Over Bridge to North of Existing Bridge

The option of a new over bridge in the Main Train Shed, one structural bay to the north of the existing over bridge creates a direct and clear link between the concourse and the platform access route. This alignment has two benefits. Firstly, in terms of customer orientation, the common vertical alignment between the bridge and the platform 8 link at grade level will provide one clear point of access to the Main Train Shed platforms from the northern end of the concourse, helping with way finding and orientation. Secondly, in order to reconcile the levels between the concourse mezzanine and the Main Train Shed over bridge it will be necessary to reconstruct and lower the floor slab in the Range where the two bridges meet. If the ground and first floor levels are aligned, the structural interventions into the range are consolidated in one area, which will have significant heritage benefits. This option was the optimum operational solution as the link is clearly visible from the main concourse (it sits within the main ring of columns that support the concourse roof).

A replacement footbridge will be provided as an important secondary access from the upper mezzanine level of the new concourse to the mainline platforms. This secondary access will help to alleviate potential congestion in the waiting areas and at the gate lines in the main western concourse. The replacement footbridge will itself be a light weight steel and glass structure, but has to incorporate escalators and lifts down to each platform. It will be sited approximately 10 m further away from the station front and will require the removal of an existing, unsightly, OLE gantry. It may be possible to replace this with OLE fixings direct to the bridge. The escalators will face north, unlike the existing stairs, which faced the station entrance. The new platform bridge link will connect into the Eastern Range one bay north of the present entrance. In order to form the new connection an entrance opening will be formed using the existing window opening in this bay. The level difference of approx. 150mm between the Eastern Range and the Link Bridge is minor and will be compensated by a ramp.

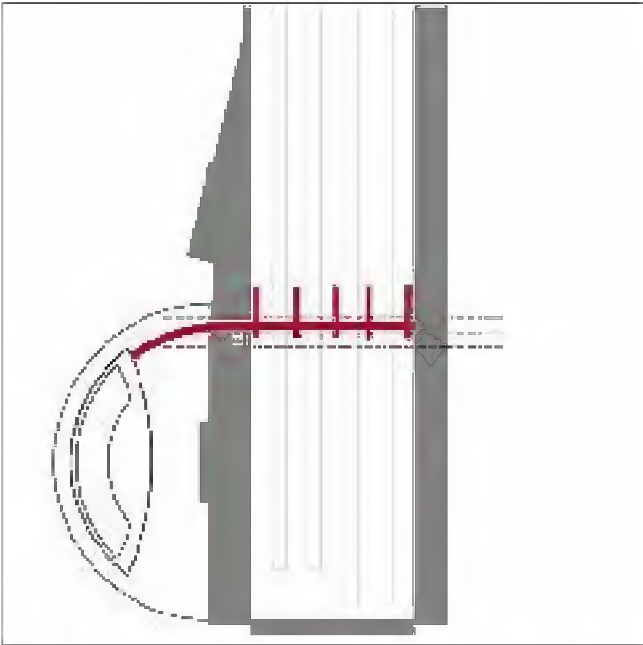
The advantages of the new link are: the continuous straight connection to platforms; new construction throughout designed for loadings and to meet accessibility standards and legislation.

Suburban Train Shed Alterations

The reasons for the alterations to the southern end of the Grade 1 listed Suburban Train Shed are to accommodate the circulation associated with the new Western Concourse. The southern end of the Suburban Train Shed requires to be opened up to allow for the inclusion of a new gate line to the south of platforms 9-11. The first floor extension of the North West Building is to provide a new mezzanine balcony to the proposed 'public house', situated within that area. In addition during consultation it became apparent that there is a desire to be able to view trains from within the new concourse itself into both the main and suburban sheds. At present such a view is difficult and obscured.

There was also a strong desire to unite the two existing separate concourse areas into one unified spectacular space within the new concourse. The removal of the southern wall is a significant component of the unification.

Finally the justification for the introduction of new reinforced concrete flank walls at the southern end is to resist collision forces arising from train derailment on adjacent tracks, falling within the railway impact zone, in addition to resisting gravity loads and lateral loadings in both principle directions applied by the supported roof and mezzanine structures.



3. New Platform Over-Bridge



New Platform Over-Bridge, Visual

Provision of Future Rail Capacity (Platform Y Design Options)

Platform Y is required to provide additional capacity at King's Cross Station to support increased capacity of trains on the East Coast Main Line (ECML), to meet both current and future demand. It will also provide a more robust performance to the route by provision of capacity for both long and additional train (interoperability) turn-rounds and recovery from disruptions and delays.

The Railways (Interoperability) (High-Speed) Regulations 2001 implement EU Directive 96/48/EC on the interoperability of the trans-European high-speed rail system. Under the Treaty of Rome the UK is obliged to implement the Directive in full. The main implication arising from interoperability is the requirement to provide 300m long platforms. At King's Cross Station there are very limited possibilities to provide this apart from the Platform 'Y' proposal, which will result in two 300m long platforms, 'Y' and '1'.

Platform Y will also assist in providing platform capacity for the major interchange between International and domestic train services and the LUL. Increasing the capacity of the station meets many national and local policy objectives relating to sustainable development, improving transport infrastructure and urban regeneration.

There are no real options to consider in terms of alternative platform locations. The only possible alternative would be to move the entire station northwards, introduce additional sub-surface platforms, and a new 'bore' under the Regent's Canal. All these alternatives have been discounted due to prohibitive difficulty and cost of associated engineering works, and for operational reasons (integration of the platform with the main station).

The designers essentially had to consider alignment options that minimised intervention in the Eastern Range, while still providing fully operational track that meets relevant national and international standards.

There are a number of design constraints which determine the available options for the alignment of the proposed Platform Y. The alignment is fixed by the existing tandem turnout and the turnout for the proposed new East sidings: an existing signal gantry stanchion approximately 30metres north of the end of the existing Platform 1, the existing Portal for entry to the Cab Way, the position of existing sewer surge chambers and clearance at critical points along the Cab Way.

The proposed design for Platform Y avoids alterations to the existing portal. The track alignment achieves the minimum clearance to the Platform Y edge at the north end of the train shed and avoids the need to demolish part of the York Way platform. This meets the requirements of the relevant railway standards without affecting the building structure. In addition, passenger flow in this area will be reduced as the narrow area is towards the north end of the platform and passenger flow is likely to be lower, with an alternative route along Platform 1 available.

The drainage along the east side wall will be disturbed by the provision of the new track and impact wall. Because of the restricted space between the impact wall and existing mezzanine supports, the southern part of the drainage needs to run along the top of the impact wall and discharge into the existing outfall at the south end. Maintenance manholes along the inside of the east flank wall will be located between the piers.

Great Northern Hotel Porch

The main entrance to the Great Northern Hotel was previously along the concave elevation, within the southern staircase bay. Sheltering this entrance was a small glazed canopy and enclosed porch of cast and wrought iron and timber. The canopy and porch were dismantled by London Underground and placed into storage. London Underground is under an obligation to reinstate the canopy and porch upon completion of these works. However, the development of the new western concourse will prevent the reinstatement of this canopy and porch as the concourse roof touches the GNH and the areas below will be used as the inner pedestrian route for both station and north-south pedestrian traffic to/from the King's Cross Opportunity area.

Early decisions about the location of the new concourse lead to much thought about how it would best integrate with the GNH. The treatment of the public realm area around the GNH becomes very critical with the new concourse design. The new concourse also had to minimize the impact on the historical importance and distinctive character of the GNH.

A fourteen metre gap between the GNH and the Western Range creates a physical constraint at the point where a number of anticipated pedestrian movements converge. Pedroute monitoring for normal operations shows a distribution over the 3 hour evening peak period of just over 40% (around 3,300 people) using the concourse route, just under 40% (around 2,900) using the GNH arcade, and the remaining 20% (around 1,500) on the Pancras Road pavement. Key objectives for the regeneration of the area and for the enhancement of the interchange are to achieve high levels of connectivity and visibility between the interchange and the wider area.

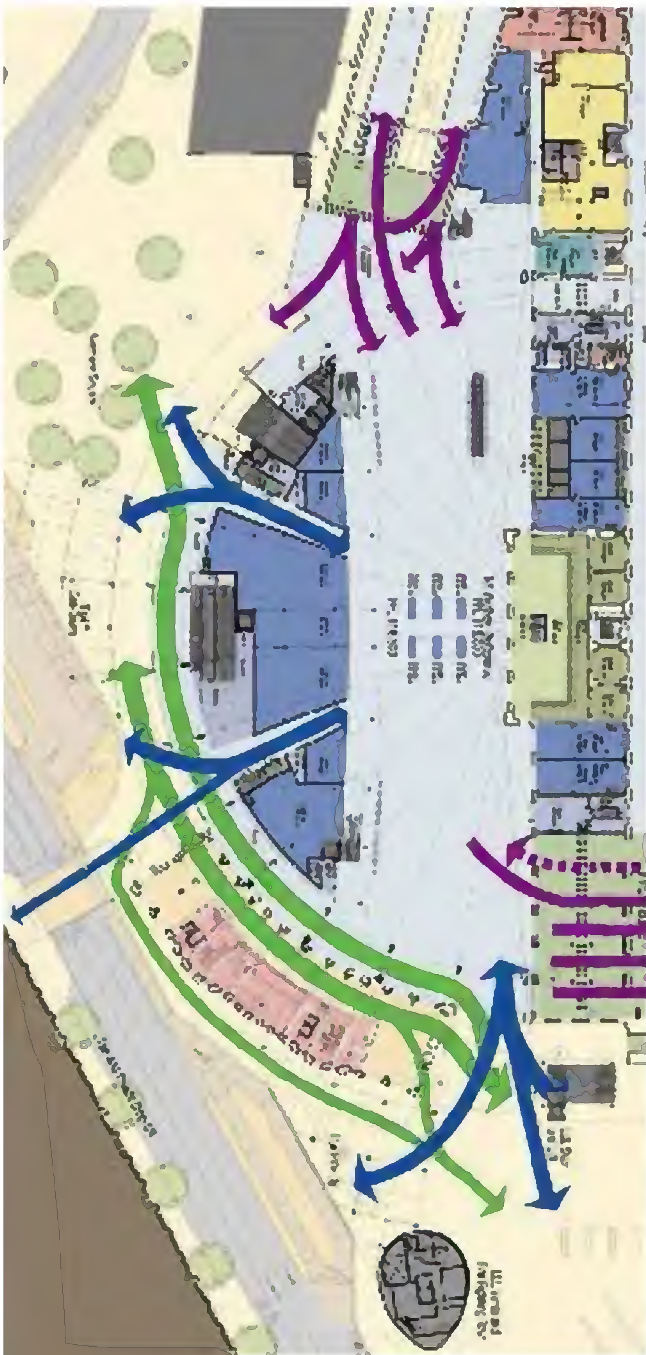
The natural desire-line for pedestrians moving from the south of the GNH (via LUL, bus and on foot) to the King's Cross Central development lands is predominantly between the GNH and the Western Range, complimented by a secondary route to the west between the GNH and Pancras Road.

The movement of pedestrians between the GNH and the Western Range is complicated further by the need to get passengers from the new concourse into the Main Shed. The main link between the two can only be located at the southern end of the Western Range, creating a third and conflicting movement of passengers in an east-west direction, to and from the taxi areas, crossing to St Pancras (or vice versa) or walking to Euston Road and the wider area. In essence, the entire area around the GNH will be needed to facilitate pedestrian movements in the least obstructive way possible.

The design of the concourse building provides a circular pedestrian route (5 metres) around the perimeter of the concourse. This route will blend seamlessly in terms of level, with an arcade (5.8 metres, narrowing in parts to 3.9 metres) in the ground floor of the GNH. An application to carry out the arcading of the GNH will be lodged by Argent and is both complementary to and integrated with the concourse design.

A key aim in the design of this area has been to create a world class public realm area that integrates with the listed stations of King's Cross and St Pancras, the GNH and with the public realm spaces to the north and south. Providing very clear and unobstructed pedestrian routes enhances the legibility of the area to meet these access needs.

In view of the scale of the pedestrian flows that will occur around the GNH, and through the concourse, it is considered that returning the porch to its previous location would create an obstruction to smooth flows and decrease the legibility of this area. As virtually all the areas at ground floor level adjacent to all the façades of the GNH are going to be heavily used by pedestrians, an alternative location would have similar negative effects.



Great Northern Hotel, Western Concourse Flow Diagram

9.0 Building Services Engineering

Electrical

The incoming power supply from Electricite de France (EdF) requires an increased capacity from 2 to 3 Mega Volt Amperes (MVA). The interim substation installed as part of the LUL works needs to be relocated and a new intake room is planned in the service bay area to the west of the suburban shed at sub-basement level. This is referred to as the link building. Low voltage power is derived from transformers feeding the western range and new concourse and the retail units.

A new low voltage power system is installed throughout the Western Range, Concourse, main and suburban shed. New lighting and small power is installed in all station functional areas and made available to office and retail tenants for future connecti

Lighting

The lighting of the new concourse takes advantage of the high degree of daylighting to minimise energy costs. Daylighting will provide sufficient illuminance for 80% of the daylit periods and is supplemented during these periods with 50% of the artificial lighting. For the remainder of the time the illuminance is provided by high-powered metal halide uplighters that provide an even wash of light over the concourse roof and by reflection over the main floor plate. This lighting is supplemented by downlights in areas below the mezzanine that will not receive the reflected uplight component. The route around the concourse perimeter is also illuminated by downlights. Decorative lighting is provided to accentuate the historic building facades. Lighting to the staff areas is provided by standard fluorescent luminaires.

The external lighting to the main entrance is a combination of high and low level luminaires. A single light tower with a reflector system will provide the general lighting to the exterior space, while the entrance will be highlighted with integrated downlights and low level marker lights. The external lighting strategy shall draw people to the main entrance and allow visitors to orient themselves when outside the station.

Lighting control is a simple on/off system controlled by contactors and initiated by the BMS system to provide simple time switch functions and the capability of over-riding the time component where applicable by strategically located photosensors. Emergency lighting is generally provided by dedicated luminaires fed from a central battery system with automatic testing and fault reporting functions.

The lighting of the main and suburban train shed is not included in the scope of this report.

Acoustics

A new Public Address/ Voice Alarm (PA/VA) system is proposed for the whole of the public areas of the station including the main and suburban sheds. The Western Concourse and platform areas will be covered by digitally controlled, packaged loudspeaker arrays. The system in the main shed relies on acoustic absorption, which will be undertaken by the architect of the main shed roof renewals works and is not detailed in this report.

Communications

A new Passenger Information System (PIS) is proposed for all public areas of the station. The PIS displays include the two main screens in the concourse, an arrivals display, platform displays and summary screens located in areas such as the Ticket Office and mezzanine where the public could congregate awaiting train departure or arrival.

Passenger Help Points (PHP) will be located throughout the station including the Western Concourse and along each station platforms allowing passengers to communicate with the station operator(s) in the Station Communications Room (SCR).

A new data network supporting communication systems, CCTV and plant monitoring is proposed throughout the station.

Fixed telephones will be provided and supported by a radio system to enable voice communication throughout the station.

The existing heritage clock will be driven by a GPS time signal as will all the other clocks in the station.

The Station Communications Room (SCR) located on the second floor in the Western Range will be the command and control centre for the entire station where interfaces to all required communications systems will be presented to the operator(s).

Mechanical Services

The loading bay, OBS and Western Range basements will require new mechanical ventilation systems for both outside air ventilation, fume extraction and smoke removal to meet the requirements of the Building Regulations Approved Document B.

Where natural ventilation to windows above the roofline of the main shed is not possible the Western Range will require new shell and core mechanical supply air ventilation. Air handling units will supply filtered and heated outside air for conditioning by room located heat pump air conditioning units. Toilets will be mechanically extract ventilated.

To minimise the impact of ad hoc roof mounted heat rejection equipment a common condenser water circuit will be run to all major retail, TOC and Network Rail spaces to enable tenant fit out of local water cooled heat pump air conditioning units. All tenant connections will be heat metered and linked to the BMS. The heat rejection plant will be located on the roof of the old booking Hall and rated at approximately 3MW.

In winter background heating will be provided from the roof plant room gas fired boilers to the heat pump circuit for tenant connection and extraction of heat via heat pumps. The boilers will also serve a low temperature hot water heating circuit for Network Rail air handling plant and circulation area radiators. The boiler plant capacity will be 2MW.

The main services distribution routing from the central heating and cooling plant at roof level in the western range will be to drop to the basement of the western range and then to run below platform 8, through the OBS area at high level and then buried externally to the west of the concourse before entering the concourse floor deck and rising to the concourse mezzanine level.

In the major concourse and Western Range food outlet riser or louvre provision will be made for the connection of tenant kitchen extract plant as described in the Retail Engineering Services Strategy Report.

Public Health Services

A new metered mains water connection will be brought in through the sub basement to serve the western range and concourse. A potable water storage tank and water boosters will be located at sub basement level to serve toilets and kitchenettes in the Western Range and provide supplies to retail tenancies. Retail tenancies and concourse kiosks will be sub metered.

Hot water service (HWS) will be generated by local electric heaters with the exception of the public toilets/showers. Primary LTHW from the central boilers shall heat storage calorifiers adjacent to the ground floor public toilets/showers.

A syphonic rainwater system will drain the concourse roof. Drainage from the suburban shed will be required to be pumped to the west of the Station. Cavity drainage from below ground will also be pumped discharge. Drainage connections will be provided in all retail units and on a grid in the concourse for Kiosks. Occasional cleaning points and drainage gullies will be provided at Concourse level.

A sprinkler protection system with associated storage tank and booster pumps will distribute to the escalators, core station facilities, support services, retail tenancies and loading bay.

A new gas main will be brought in to a meter room at basement level before distribution to sub metered catering retail tenancies and the central boiler plant.

Two dry risers are to be provided in the western range fire fighting staircases. Hose reels are not required.



New Western Concourse Roof, naturally ventilated throughout.



British Museum, Great Court, displacement ventilation and mechanical extract is required to control the environment.

Concourse Environment

The concourse will be unheated in winter. The requirement for permanent openings to facilitate pedestrian access from Euston Road to Pancras Road results in internal temperatures similar to external conditions. Automatic opening doors have been incorporated in certain locations to mitigate the effects of wind.

In summer, additional sections of the facade are to be left open and this assists in achieving effective natural ventilation throughout the space. Permanent openings at high level have been designed to meet the RSPG requirement for the concourse to be no more than 5°C above external temperature.

Smoke ventilation will be achieved through a combination of the high level natural ventilation openings and purpose designed electrically operated openings in the concourse skylight.

Concourse Roof

The Western Concourse roof largely consists of a 70mm rockwool layer sandwiched between two 4mm thick aluminium panels. In the summer, the solar radiation will cause the external surface to heat up. The insulation is essential to ensure that the internal roof surface temperature is kept within acceptable limits. The other major function of the insulation is to contribute to achieving the desired acoustic conditions in the space.

The roof glazing amounts to 30% of the total internal roof area. This amount of glazing represents the optimum balance between maximising daylight and limiting solar gains into space. It is distributed at high level in the form of horizontal skylights and at low level as a strip on the roof perimeter. It is expected that no solar control will be implemented on the glazed areas to minimise costs, and the glazed surfaces have been modelled as single glazing.

British Museum - The Great Court

In comparison the environment in the Great Court is engineered to accommodate a range of mechanical and passive systems to ensure that the public areas are comfortable from the basement auditoriums to the restaurant, which is directly under the glass roof.

A massive 45 cubic metres of air is introduced every second into the Great Court, galleries, retail areas, education areas and Reading Room, and exhausted by the ingenious re-use of spiral stair shafts within the historic porticos.

Systems range from tight control full air conditioning for the exhibition gallery areas, achieving tolerances of within 1 degree centigrade and 5% relative humidity, to the tempered environment of the Great Court itself.

The courtyard is the largest volume in the building and has been covered with fritted double-glazing to optimise solar control with heat loss and appropriate daylight penetration. Peak summertime heat build up is limited by an integrated design of perimeter displacement ventilation, natural ventilation and some mechanical extract. Chillers used to facilitate air conditioning are also used during off peak hours to actively pre-cool the concourse slab thus adding a significant cooling effect to the courtyard. To provide the different conditioning requirements four plant rooms have been integrated into the basement of the Museum with minimum of intervention to the building fabric.*

*Information extracted from the Buro Happold website, <http://www.burohappold.com/> (Engineers of the Great Court, British Library)

10.0 Operational Facilities

LOGISTICS SUMMARY

The overall logistics strategy aims to provide the most efficient service movements in terms of personnel and equipment avoiding conflicts with passenger flows, to improve safety. It sets out the servicing and waste strategies, design and operational requirements to sustain a sound operation of the train station.

Calculations done using the proposed area schedule indicate that there will be approximately 60 delivery vehicles accessing the site per day, which equates to a requirement of 6 loading bays. The review of a number of servicing options highlighted the use of a central service area to serve the Western Range and the New Concourse and the use of an on-street loading bay on York Way to service the Eastern Range as the most suitable solution for the site.

The service area is to be located in a sub-basement adjacent to the suburban shed at FFL 113.700mm AOD. The On-Board Servicing (OBS) preparation area is located in the existing basement of the Western Range.

The goods are moved to the upper levels from the sub-basement service area using 2 No goods lifts. Dedicated goods lifts are provided to move goods and waste to/from all locations throughout the station.

A concept operation and timeline for servicing the trains from the OBS is described. However, the OBS operator will be responsible for finalizing their operation and transfer equipment (trailers and EVs) with the infrastructure and constraints provided.

The waste collection strategy proposed makes use of interim waste rooms where tenants can deposit segregated and non-segregated waste. It is proposed that a waste contractor then takes this waste to a central waste area in the main sub-basement service area, which includes a 30 m³ compactor and a segregated waste storage room.

11.0 Public Realm

OPERATIONAL REQUIREMENTS

In order for King's Cross Station to operate efficiently and effectively, there are a number of operational requirements which the design of the external spaces must accommodate.

In summary, these operational requirements are as follows:

Passenger Movement

- sufficient capacity for the external works design to provide a legible series of open spaces, which help to orientate, distribute and provide appropriate weather protection to large numbers of passengers moving at street level
- predicted passenger flows, calculated by Arup Transport and included in the transport section of the Environmental Report.
- legible routes for interchange between the different modes of transport, both above and below ground need to be provided and limit conflicting flows

Station Related Issues

- to provide the required access for emergency service vehicles
- to ensure the efficient servicing of the station and its associated facilities with access provided for refuse collection, station deliveries and OBS servicing
- to provide access for London Underground vehicles and parking for British Transport Police

Station Evacuation

- to provide the necessary external evacuation space for the station

Surface Transport Interchange

King's Cross is a key transport hub, with interchange facilities required for international, national and local train services, london underground, buses, taxis, minicabs, bicycles and potentially the Cross River Transit Tram and Cross Rail 2 in the future.

The external works design seeks to provide the following to the various transport modes requirements

- an efficient station forecourt in close proximity to the western concourse, which allows for pick-up and set down of passengers from other modes of transport.
- disabled parking and access to the station
- to provide legible routes for interchange between the different modes of transport, both above and below ground, with a clear way-finding strategy, and passenger transport information systems

London Underground

London Underground are currently undertaking works to King's Cross St Pancras Underground Station in order to accommodate increased passenger numbers as a result of the Channel Tunnel Rail Link project.

The below ground ticket halls, and above ground stair and lift access, vents and emergency service access points need to be accommodated within the external works design, which should also optimise access arrangements to facilitate passenger movement from the relocated concourse.

LANDSCAPE DESIGN

Setting and Site Heritage

In addition to the operational requirements, the external spaces need to address the following issues:

- to engage positively with the urban fabric and the wider urban context
- to establish a new 'gateway' to London of city-wide and national importance
- The listed King's Cross and St Pancras Stations, as well as the new infrastructure and architectural components
- to establish a highly legible spatial and visual framework, integrally linked to adjacent areas
- to facilitate and guide surface circulation

Visual and Spatial Structure

The visual perception of the urban realm linking Euston Road in the south to the new King's Cross Central in the north is an important element of the urban pedestrian link, responding to the findings of pedestrian movement modellings.

Environmental Quality

The existing open space to the frontage of King's Cross Station is dominated by constant and intense traffic noise. The public realm is extremely degraded because management of the area has focused on the management of vehicular congestion rather than on the pedestrian environment.

The proposed redesign of the public realm will need to achieve the following:

- robust hard and soft materials
- shelter where necessary for pedestrians and intermodal passengers
- enhanced seasonality and experiences of the space from day to night, summer to winter
- mitigated traffic noise pollution and the associated poor air quality of the Euston Road corridor
- safe, legible open spaces, where the potential for anti-social behaviour is reduced through the design of structures and furniture elements located within the space
- CCTV integration

Landscape Elements

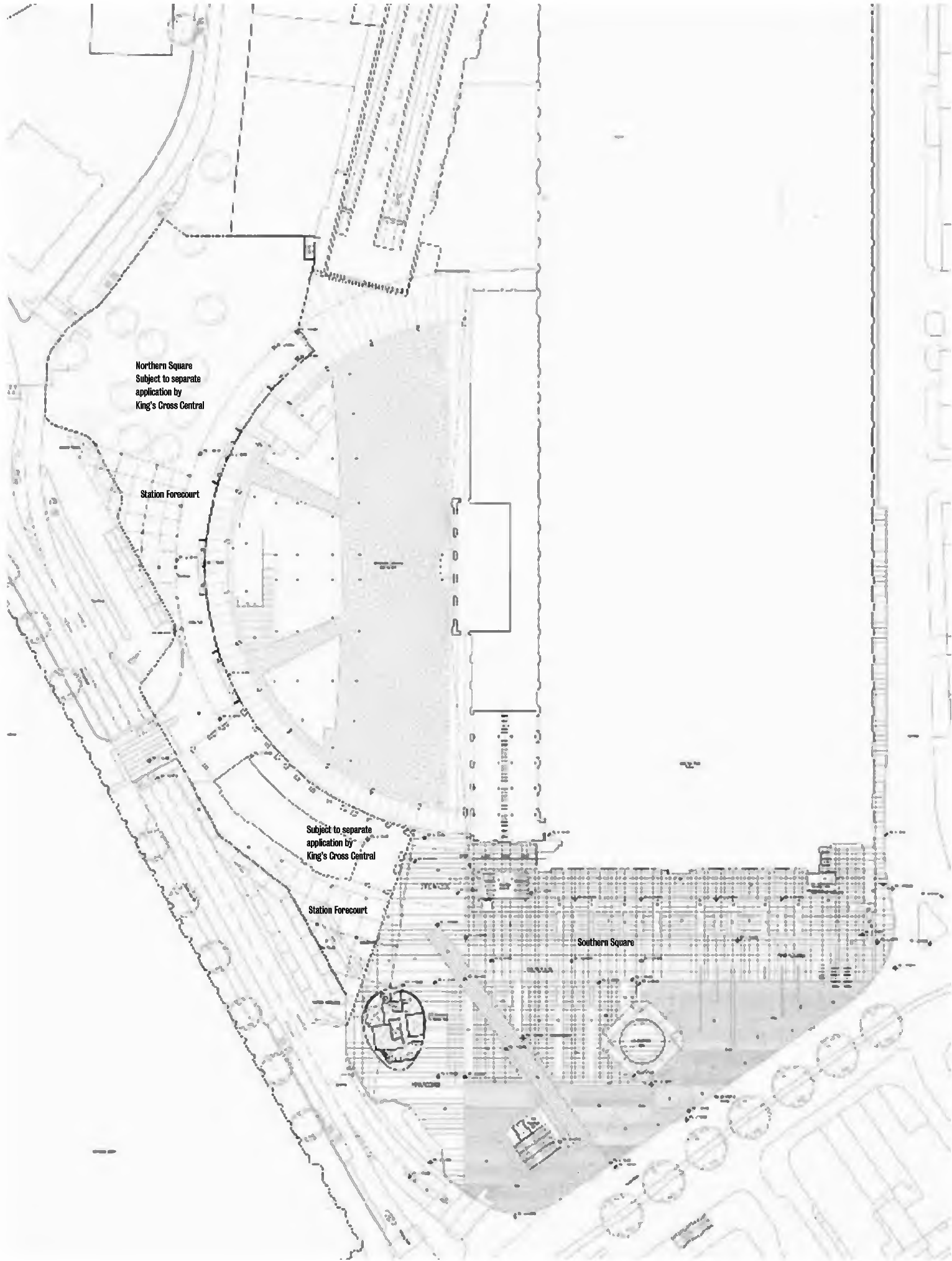
Overall, the landscape design for the external spaces will respond to the operational and design requirements through the creative use of the following landscape elements:

- providing a legible ground plane which defines the open spaces
- accommodating and rationalising existing and proposed structures contained within the external spaces
- providing clutter free spaces through considered use of street furniture
- providing safe spaces which function 24 hours a day, seven days a week, supported by imaginative lighting design
- incorporating structural tree planting to define space and principle routes across the site and beyond

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King's Cross Station Enhancement - Landscape Sketch Design

LANDSCAPE DESIGN PROPOSALS

The illustrative design proposals for the public realm to King's Cross Station responds to the operational and design requirements established with the design team and seeks to provide a series of external spaces which contain the required station forecourt and approaches. It also responds to the scale and history of King's Cross Station and its city-wide, regional and national importance as a transport interchange. The design response for each of the newly formed external spaces is documented below:

Southern Square

- provides an extensive new public space, reinforcing the sense of place of King's Cross and the linkage with the surrounding urban context. Use of appropriate materials and design defines usage, articulates routes through the area and responds to the scale and enhances the historic importance of the facades.
- will create a memorable space both during the day and at night through sculptural elements and imaginative lighting design.
- provides the critical evacuation areas required for the station and underground expansion.

Station Forecourt

- provide a clear, defined pedestrian link between the southern and northern squares, and the wider city space beyond.
- provides clear and legible areas for set down and pick up facilities, minimising transfer distances for passengers.
- provides generous shelter and information facilities to inform arriving and departing passengers.
- utilises high quality materials and uncluttered arrangement of element to provide clear wayfinding and minimises the need for unnecessary signage.

Northern Square (in collaboration with King's Cross Central)

- provides an ordered space, acting as a gateway to King's Cross Central utilising high quality materials that relate to the Station Forecourt and Southern Square beyond.

12.0 Outline Specification

ARCHITECTURAL METALWORK			ESCALATORS - NEW CONCOURSE		
AM-1	NEW TOUGHENED LAMINATED SAFETY GLASS BALUSTRADE AND STAINLESS STEEL HANDRAIL TO FIRST FLOOR WESTERN PERIMETER ACCOMMODATION, PUB BALCONY, BOOKING HALL, ESCALATOR SURROUND, OVER BRIDGES AND FIRST FLOOR TRANSITION BRIDGE IN BOOKING HALL.		ESC-1	4 NO GROUND TO MEZZANINE 30 DEGREE SPEED CONTROLLED MULTI DIRECTIONAL ESCALATOR, H 4500 mm.	
BRICKWORK AND BLOCKWORK			ESCALATORS - WESTERN RANGE		
BLK-1	ALL EXISTING BLOCKWORK / BRICKWORK TO BE CLEANED AND REPAIRED WHERE NECESSARY.		ESC-2	1 NO GROUND TO PUB BALCONY, 30 DEGREE SPEED CONTROLLED MULTI DIRECTIONAL ESCALATOR, H 4500 mm.	
BRICK/BLOCK WALL ACCESSORIES			ESC-2	5 NO PLATFORM TO OVER BRIDGE, 30 DEGREE SPEED CONTROLLED MULTI DIRECTIONAL ESCALATOR, H 4500 mm.	
MORTAR/ MORTAR POINTING TO MATCH EXISTING MATERIAL.			EXTERNAL WALL/CLADDING SYSTEMS		
CEILING SYSTEMS (INTERNAL) - EXISTING			EWS-S1	ALL EXTERNAL BRICK FAÇADES TO BE MADE GOOD, REPAIRED AND CLEANED TO THEIR ORIGINAL CONDITION. WHERE BRICKS REPLACED TO MATCH EXISTING BRICKS IN COLOUR TEXTURE AND SIZE.	
CLS-0	EXISTING SOFFITS, TO BE FILLED, MADE GOOD, SKIM COATED AND PAINTED.		EWS-S2	BOMB GAP INFILL BUILDING FAÇADE TO MATCH ORIGINAL WESTERN RANGE BRICK FAÇADE.	
CLS-1	EXISTING LATH & PEASTER / PLASTERBOARD CEILING TO BE FILLED, MADE GOOD, SKIM COATED AND REPAINTED, IN LANDLORD AND PUBLIC AREAS ONLY.		EWS-W2	ALL EXISTING WINDOWS TO BE REPAIRED AND RESTORED AND APPLIED WITH A PROTECTIVE BOMB BEAST FILM.	
CEILING SYSTEMS (INTERNAL) - BASEMENT			EWS-D1	ALL NEW WINDOWS TO EXISTING BUILDINGS TO MATCH ORIGINAL TIMBER FRAME WINDOWS AND APPLIED WITH A PROTECTIVE BOMB BLAST FILM.	NOTE: BOMB BLAST SHEETING INCLUDED AS NOMINAL COST ALLOWANCE
CLS-2	EXPOSED SOFFIT TO ALL OBS AND STORAGE AREAS.		EWS-D2	ALL EXISTING DOORS TO BE REPAIRED AND RESTORED.	
CEILING SYSTEMS (INTERNAL) - CONCOURSE			EWS-D3	DOOR TO MIP/SERVICING ACCESS ROUTE BETWEEN NEW CONCOURSE AND PLATFORM 8 TO BE A MOTORIZED DOUBLE DOOR ELECTRONICALLY OPERABLE. FINISH AND MATERIAL OF DOOR TO BE FIT FOR PURPOSE.	
CLS-4	ACOUSTIC TREATMENT TO CONCOURSE CEILING TO BE PERFORATED METAL PANELS WITHIN STRUCTURAL DEPTH ONLY WHERE THERE IS SOLID CLADDING.		FITTINGS AND FIXTURES		
CLS-5	CEILING IN CONCOURSE PERIMETER BOUNDARY ACCOMMODATION TO BE ADJUSTABLE SUSPENDED METAL CEILING SYSTEM WHICH ALLOWING FOR INDIVIDUAL PANELS TO BE MANUALLY REMOVED IN LANDLORD AND PUBLIC AREAS ONLY.		F1-G	NEW TICKET OFFICE TO BE SUPPLIED WITH COUNTERS INCLUDING 24 TICKET SALES WINDOWS WITH A TWO WAY SPEECH SYSTEM. ALLOW FOR 12 FAST/TICKET ON DEPARTURE MACHINES AND AUTOMATED INTERNET TICKET RETAILING POINTS.	NOTE: PROVISION OF TICKET SALES WINDOWS DEPENDING ON TERMS OF NR/OC LEASE AGREEMENTS
CLS-5	TWO LAYER SUSPENDED PLASTERBOARD CEILING FINISH, SKIM COATED AND PAINTED, WITH PROVISION RECESSED DOWNLIGHTERS.		F2-G	ADDITIONAL PROVISION FOR FACILITIES FOR THE INSTALLATION OF FAST/TICKET ON DEPARTURE MACHINES TO BE PROVIDED WITHIN THE NEW CONCOURSE ACCOMMODATION. No TBC. MACHINES TO BE PROVIDED BY TOCS.	
CEILING SYSTEMS (INTERNAL) - WESTERN RANGE			F3-G	MODULAR STAINLESS STEEL SEATING SYSTEM WITH ARMS WITHIN CONCOURSE AREA. NO OF SEATS TO BE CONFIRMED.	
CLS-6	ALLOW FOR LANDLORD AND PUBLIC AREAS TO HAVE AN ADJUSTABLE SUSPENDED METAL CEILING SYSTEM WHICH ALLOWS FOR ALL INDIVIDUAL PANELS TO BE MANUALLY REMOVED.		FLOOR FINISHES - BASEMENT		
CLS-7	ORIGINAL COFFERED CEILING IN BOOKING HALL RE-INSTATED.		FLS-B1	ALLOW FOR HARDWEARING RESIN FLOOR FINISH TO ALL OBS AND STORAGE AREAS.	
CLS-8	SUSPENDED PEASTERBOARD CEILING FINISH, SKIM COATED AND PAINTED, PROVISION FOR RECESSED DOWNLIGHTS		FLOOR FINISHES - WESTERN RANGE		
CLS-9	NEW CONCRETE SLAB AND COFFERED CEILING.	ALTERNATIVES: SUSPENDED METAL	FLS-W1	HIGH QUALITY HARD WEARING CARPET TO FIRST FLOOR PASSENGER LOUNGE.	
CLS-10	ALLOW FOR 60 MIN FIRE RATED SUSPENDED CEILING SYSTEM.		FLS-W2	HARDWEARING CARPET TO ALL LANDLORD OFFICES, ALLOW FOR RAISED FLOOR WITHIN THE STATION MANAGERS OFFICE.	
CEILING SYSTEMS OBS SUB-BASEMENT AND BASEMENT			FLS-W3	FLOOR FINISHES IN RETAIL UNITS AT GROUND FLOOR SUBJECT TO TENANT FIT OUT. NR TO PROVIDE SCREED FLOOR ONLY.	
CLS-11	ALLOW FOR FIRE RATED SUSPENDED CEILING SYSTEM.		FLS-W4	FLOOR FINISH TO FIRST FLOOR PUBLIC AREAS AS CONCOURSE.	
CURTAIN WALLING SYSTEM - CONCOURSE			FLOOR FINISHES - NEW CONCOURSE		
CWS-S1	CONCOURSE PERIMETER ENCLOSURE TO BE SELF SUPPORTING BESPOKE UNITIZED GLAZED CURTAIN WALLING SYSTEM, PROVIDED WITH A STAINLESS STEEL CLAMP MOUNTING AND TIE SYSTEM INCORPORATING STAINLESS STEEL LOUVRES.		FLS-C1	CONCOURSE TERRAZZO PAVING IN A POLISHED NON SLIP FINISH ON A SAND AND CEMENT BASE IN ALL LANDLORD AND PUBLIC AREAS WITHIN THE CONCOURSE AND CONCOURSE PERIMETER ACCOMMODATION AT GROUND AND FIRST FLOOR. NONSLIP AGGREGATE TO BE ALUMINIUM OXIDE OR CARBORUNDUM PARTICLES, (GRADING TBC NORMALLY FROM 0.8mm TO 6mm).	
CWS-D1	CONCOURSE PERIMETER ENCLOSURE ENTRANCE OPENINGS TO BE FULLY GLAZED TOUGHENED GLASS DOOR SYSTEMS CONSISTING OF TWO FIXED SHEETS AND TWO AUTOMATIC SLIDING DOORS RUNNING IN A TRACK LAYOUT FIXED TO HEAD OF OPENINGS.		FLS-C2	FRAME WORK FOR INSPECTION AND ACCESS COVERS TO TERRAZZO PAVING TO BE STAINLESS STEEL RECESSED TRAYS WITH A STAINLESS STEEL SUPPORTING FRAME WORK. RECESSED FLOOR BOXES WITH STAINLESS STEEL TRAYS TO TAKE FLOOR FINISH. FLOOR FINISH TO WITHSTAND HEAVY PEDESTRIAN USE, ELECTRIC BUGGY TYPE VEHICLES, HEAVY POINT LOADS AND POSSIBLE MOTORBIKE AND AMBULANCE VEHICLES.	
CWS-D2	TICKET OFFICE TO BE PROVIDED WITH A FULLY GLAZED TOUGHENED GLASS MANUAL SLIDING DOOR SYSTEM CONSISTING OF INDIVIDUAL PANELS OF GLASS RUNNING IN A TRACK LAYOUT FIXED TO THE CEILING.		FLS-C3	ALLOW FOR 3mm EXPANSION JOINTS BETWEEN TERRAZZO PAVINGS.	
CWS-D3	SOLID METAL PANELS TO NON-GLAZED AREAS ON CONCOURSE ACCOMMODATION IN LANDLORD AND PUBLIC AREAS ONLY.		FLS-C4	ALLOW FOR STAINLESS STEEL EDGE TRIMS TO ALL ABUTMENTS.	
DEMOLITIONS			FLS-C5	LOW SMOKE RUBBER MATWELLS WITH STAINLESS STEEL TRIM AND INTEGRAL DRAINAGE SYSTEM TO ALL STATION ENTRANCES.	
DEM-1	REFER TO DEMOLITION DRAWINGS.				
DOORS AND SCREENS (INTERNAL)					
DR-1	ALL EXISTING TIMBER DOORS TO BE REFURBISHED WHERE NECESSARY IN LANDLORD AND PUBLIC AREAS ONLY.				
DR-3	ORIGINAL TIMBER GLAZED SCREEN WALL IN PARCELS OFFICE TO BE REPAIRED AND RESTORED TO THEIR ORIGINAL CONDITION.				

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LIFTS			SCREED			
LIF-NR1, NR 2	OBS SUB-BASEMENT, 1500 KG, 1800mm x 2700mm CAR SIZE MOTOR-ROOMLESS. LIFT SHAFT TO BE OF A SELF SUPPORTING STEELFRAME SYSTEM ENCLOSED BY A LIGHT WEIGHT BLOCK WORK STRUCTURE.	REFER TO ARUP LIFT SCHEDULE FOR DETAILS ON DISTANCES, MOTOR ROOMS, SHAFT SIZES ETC.	SCR-1	SEALED SCREED FLOOR FINISH TO ALL PLANT AREAS.		
LIF-S1, S2	OBS SUB-BASEMENT, 2500 KG, 1800mm x 2700mm CAR SIZE TRACTION GOODS LIFTS. LIFT SHAFT TO BE OF A SELF SUPPORTING STEELFRAME SYSTEM ENCLOSED BY A LIGHT WEIGHT BLOCK WORK STRUCTURE.		SCR-2	SCREED TO ALL RETAIL UNITS.		
LIF-E	LINK BUILDING, 1600 KG, 1400mm x 2400mm CAR SIZE MOTOR-ROOMLESS CATERING GOODS LIFTS. LIFT SHAFT TO BE OF A SELF SUPPORTING STEELFRAME SYSTEM ENCLOSED BY A LIGHT WEIGHT BLOCK WORK STRUCTURE.		STAIRCASES			
LIF-F	WESTERN RANGE NORTH WING, 6700 KG, 3000mm x 5000mm CAR SIZE HYDRAULIC OBS LIFT. HYDRAULIC. LIFT SHAFT TO BE OF SELF SUPPORTING STEELFRAME SYSTEM ENCLOSED BY A LIGHT WEIGHT BLOCK WORK STRUCTURE.		STC-1	EXISTING STONE STAIR TREADS AND METAL BALUSTRADE TO BE REPAIRED AND RESTORED WHERE NECESSARY.		
LIF-J	WESTERN RANGE CENTRAL BLOCK, 2700 KG, 1600mm x 2700mm CAR SIZE. LIFT MOTOR-ROOMLESS. LIFT SHAFT TO BE OF SELF SUPPORTING STEELFRAME SYSTEM ENCLOSED BY A LIGHT WEIGHT BLOCK WORK STRUCTURE.		STC-2	FEATURE STAIR TO PUB MEZZANINE AND PLATFORM 1 ACCESS TO BE STEEL FRAMED WITH NATURAL STONE INSET TREADS, WITH TOUGHENED SAFETY GLASS BALUSTRADE AND STAINLESS STEEL HANDRAIL.		
LIF-K	WESTERN RANGE SOUTH WING, 1000 KG, 1400mm x 2400mm CAR SIZE MOTOR-ROOMLESS SMALL GOODS/PASSENGER LIFTS. LIFT SHAFT TO BE OF SELF SUPPORTING STEELFRAME SYSTEM ENCLOSED BY A LIGHT WEIGHT BLOCK WORK STRUCTURE.		STRIPPING OUT/ALTERATION WORKS			
LIF-M, N	BOOKING HALL, 1000 KG, 1100mm x 2100mm CAR SIZE MOTOR-ROOMLESS PASSENGER LIFTS. LIFT SHAFT TO BE OF SELF SUPPORTING STEELFRAME SYSTEM ENCLOSED BY A GLAZED PANEL SYSTEM.		REFER TO DEMOLITION DRAWINGS.			
LIF-G	WESTERN RANGE NORTHERN WING, EXISTING PASSENGER LIFT TO BE REFURBISHED.		WALL SYSTEMS (INTERNAL)			
LIF-H	WESTERN RANGE NORTHERN WING, EXISTING SCISSOR LIFT MAINTAINED.		WS-2	EXISTING PLASTER WALL TO BE REPAIRED AND RESTORED WHERE NECESSARY.		
LIF-P	NORTH WEST BUILDING, 1000 KG, 1100mm x 2100mm CAR SIZE MOTOR-ROOMLESS MIP LIFTS. LIFT SHAFT TO BE OF SELF SUPPORTING STEELFRAME SYSTEM ENCLOSED BY A LIGHT WEIGHT BLOCK WORK STRUCTURE.		WS-6	INTERNAL WALL FAÇADE TO BOOKING HALL STRIP OFF PLASTER AND REVEAL ORIGINAL FEATURES AND BRICKWORK WHERE POSSIBLE, MAKE GOOD AND CLEAN. ORIGINAL COFFERED CEILING RE-INSTATED.		
LIF-OBS 1,2,3,4	OBS TUNNEL UNDER PLATFORMS Y-8, 2000 KG, 2350mm x 1700mm CAR SIZE OBS PLATFORM LIFTS. SHAFTS FOR OBS 1,2 & 3 ARE EXISTING, NEW SHAFT CONSTRUCTION FOR OBS 4 UNDER PLATFORM Y REQUIRED.					
MIP-1	BY LUL					
MIP-2	CONCOURSE PERIMETER LUL ACCESS LIFT, 1000KG, XXXXmm x xxxmm CAR SIZE HYDRAULIC LIFT. LIFT SHAFT TO BE OF SELF SUPPORTING STEELFRAME SYSTEM ENCLOSED BY A LIGHT WEIGHT BLOCK WORK STRUCTURE.					
LIF-MIP3	CONCOURSE PERIMETER ACCOMMODATION, 1000 KG, 1100mm x 2100mm CAR SIZE MOTOR-ROOMLESS LIFT. LIFT SHAFT TO BE OF SELF SUPPORTING STEELFRAME SYSTEM ENCLOSED BY A LIGHT WEIGHT BLOCK WORK STRUCTURE.					
T1, T2	SECOND FLOOR WESTERN RANGE, 400 KG, 900 mm x 1400mm PLATFORM LIFT.					
ROOF BUILT-UP WATERPROOFING SYSTEMS - EXISTING						
RFS-1	REPAIRS TO ALL EXISTING FINISHES AND SLATE ROOFS, REPLACE TILES WITH NEW MATCHING ROOF TILES WHERE NECESSARY.					
ROOF BUILT-UP WATERPROOFING SYSTEMS - NEW CONCOURSE						
RFS-2	METAL ROOF CLADDING SYSTEM, CURRENT PRICED OPTION: ALUMINIUM POLYESTER POWDER COATED PANELS INCORPORATING THERMAL AND ACCOUSTIC INSULATION. SUBSTRUCTURE AND PERFORATED ALUMINIUM BOTTOM PANEL CONNECTED TO SYSTEM OF STEEL GUTTERS WITH SILICONE GASKET AND SEALANTS FIXED TO THE DIAGRID STEEL STRUCTURE.					
RFS-3	GLAZING TO DIAGRID 'D' SECTION TO BE TOUGHENED AND HEAT SOAKED LAMINATED SINGLE GLASS PANELS SUPPORTED ON A STEEL STRUCTURE SYSTEM SPANNING BETWEEN DIAGRID CONSTRUCTION AND WESTERN CONCOURSE BOOKING HALL INCORPORATING STAINLESS STEEL METAL LOUVRES FOR VENTILATION.	NOTE: ALTERNATE OPTION; ETFE CUSHIONS WITH PROVISIONS FOR SMOKE VENTING .				
RFS-4	GLAZING TO DIAGRID CANOPY TO BE TOUGHENED HEAT SOAKED AND LAMINATED SINGLE GLAZING PANELS (IN A FRAMED SYSTEM) CONNECTED TO SYSTEM OF STEEL GUTTERS WITH SILLICONE GASKETS AND SEALANTS.					
RFS-5	ROOF GLAZING SYSTEM WITH NATURAL VENTILATION ABOVE THE ATRIUM WITHIN THE NORTH-WEST BUILDING, INCORPORTAING MECHANICALLY OPERATED LOUVRES OPERABLE IN THE EVENT OF AN EMERGENCY.					
RFS-5	VERTICAL (ANGLED) GLAZING TO INFILL BETWEEN WESTERN RANGE AND DIAGRID ROOF STRUCTURE TO BE SINGLE GLAZED TOUGHENED HEAT SOAKED AND LAMINATED GLAZING SHINGLES SUPPORTED BY A STAINLESS STEEL CLAMP MOUNTING AND TIE SYSTEM.					
RFS-6	ROOF GLAZING ABOVE PUB BALCONY AND WESTERN TRAIN SHED ENTRANCE AREA TO BE SINGLE GLAZED TOUGHENED HEAT SOAKED AND LAMINATED GLASS SUPPORTED ON A TRANSVERSE STEEL TRUSS SYSTEM.					
RFS-7	ROOFING ABOVE WESTERN TRAIN SHED ENTRANCE AREA TO BE ASPHALT TYPE INSULATED ROOFING WITH FLASHING AND UPSTAND SKYLIGHTS.					

Part I

12.0 Outline Specification

King's Cross Station Enhancement – Design Statement

Network Rail

John McAslan + Partners

ARUP

Faithful & Gould

July 2006

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OUTLINE MATERIAL SPECIFICATION
(LANDSCAPE SCHEME)

ARCHITECTURAL METALWORK			STRUCTURE		
AM-2	BESPOKE STAINLESS STEEL CURVED TROLLEY STANDS TO BE LOCATED BETWEEN STATION ENTRANCES AND SET DOWN AREA AND NEXT TO TAXI PICK UP ZONE.		STR-1	BUS SHELTER (TO BE DEVELOPED IN CONJUNCTION WITH LONDON TRANSPORT), TOUGHENED GLASS AND STAINLESS STEEL FRAME WITH DOT MATRIX INFORMATION SYSTEM.	NOTE: BUS SHELTERS TO BE PROVIDED E TO BE DESIGNED IN CONJUNCTION WITH
AM-3	ACCESSIBILITY RAMP WITH TOUGHENED GLASS BALUSTRADE WITH STAINLESS STEEL HANDRAIL SYSTEM TO SOUTH EAST ENTRANCE OF SOUTHERN SQUARE.				
AM-4	STAINLESS STEEL QUEUING SYSTEM FOR TAXI PICK UP AND TAXI SHARING WITH EXTRA BARS TO PREVENT CHILDREN RUNNING BENEATH AND PAVEMENT MARKERS.				
CANOPIES					
CAN -1	CANOPY DESIGN SHOWN ILLUSTRATIVE ON DRAWINGS, TBC				
CAN-2	CANOPY DESIGN SHOWN ILLUSTRATIVE ON DRAWINGS, TBC				
DEMOLITIONS					
DEM-1	REFER TO DEMOLITION DRAWINGS AND PART 1 OF OUTLINE SPECIFICATION.				
FURNITURE					
FURN-1	SEATING TO SOUTHERN SQUARE AND NORTHERN SQUARE TO BE OF A CONTEMPORARY DESIGNED STONE BASE TO MATCH GROUND MATERIAL WITH STAINLESS STEEL FIXINGS AND TIMBER SEATING WITH INTEGRAL LIGHT FITTINGS AROUND THE BASE.				
FURN-2	CONTEMPORARY DESIGN SECURE BICYCLE PARKING FINS TO PROVIDE FOR APPROX. 150 BICYCLES.				
FURN-3	6 No GALVANISED STEEL FRAME SYSTEMS TO TREES TO ALLOW FOR NATURAL STONE INSERTS TO RUN UP TO TREE TRUNK.				
LIGHTING					
LIGH-1	NORTHERN SQUARE AND MAIN STATION FORECOURT ILLUMINATION TO BE HIGH LEVEL LARGE AREA STAINLESS STEEL COLUMNS TO NETWORK RAIL SAFETY ILLUMINATION STANDARDS.				
LIGH-2	LOW LEVEL FAÇADE ILLUMINATION TO MAIN KING'S CROSS SHED.				
LIGH-3	FEATURE LIGHTING TO ALL MAIN ENTRANCES AND EXITS.				
LIGH-4	INTEGRAL LIGHT FITTINGS BUILT INTO STEPS AT SOUTH EASTERN ENTRANCE CORNER TO SOUTHERN SQUARE.				
LIGH-5	23 No UPLIGHTERS TO TREES.				
LIGH-6	HIGH LEVEL UPLIGHTERS MOUNTED ABOVE MEZZANINE PERIMETER ACCOMMODATION. REFER TO ARUP SPECIFICATION				
LIGH-7	UPLIGHTING TO INTERNAL FACADES OF LISTED BUILDINGS. REFER TO ARUP SPECIFICATION				
LIGH-8	DOWNLIGHTING TO PERMITER CIRCULATION ZONE SUSPENDED FROM ROOF STRUCTURE. REFER TO ARUP SPECIFICATION				
PAVING (External)					
PA-1	GRANITE STONE ON A SAND -CEMENT MIX ON A WATERPROOF TANKING LAYER ON A RIGID CONCRETE BASE CONSTRUCTION SUITABLE FOR TEMPORARY VEHICULAR ACCESS.				
PA-2	KERBS TO MATCH PAVING MATERIAL AS SOLID PIECES.				
PA-3	PEDESTRIAN CROSS OVERS TO MATCH PAVING MATERIAL.				
PA-4	FORECOURT TAXI SET DOWN AND COLLECTION TO MATCH PAVING SUITABLE FOR REGULAR VEHICLE USE - UTILISING MIXTURE OF GRANITE TO MATCH PAVING WITH DARKER GRANITE TO MASK STAINING.				
PA-5	CYCLE WAYS TO BE RESIN BOUND.				
PLANTING					
PL-1	7 No SEMI - MATURE (60 - 70 cm CIRCUMFERENCE AT 1.5 m HEIGHT) LONDON PLANE TREE WITH CLEAR STEM HEIGHT OF 4.5M MIN. TBC.				
SERVICES					
SERV-1	FRAME WORK FOR INSPECTION AND ACCESS COVERS TO NATURAL STONE PAVING TO BE STAINLESS STEEL RECESSED TRAYS WITH A STAINLESS STEEL SUPPORTING FRAME WORK				
SERV-2	DRAINAGE TO NATURAL STONE PAVING TO BE STAINLESS STEEL ACO SLOT DRAINS.				
SERV-3	ALLOW FOR RECESSED 'POP-UP ELECTRICAL CONNECTION POINTS IN NATURAL STONE PAVING.				
SIGNAGE					
SIG-1	SIGNAGE TO BE INTEGRATED INTO CLADDING SYSTEMS TO MINIMIZE INDEPENDENT STREET SIGNAGE.				
SIG-2	INTEGRATED STREET SIGNAGE AND LIGHTING TOTEM SYSTEM IN STAINLESS STEEL.				

Part II

Selected Drawings & Illustrations

1.0 Selected Drawings and Illustrations

The development of the proposal to extend King’s Cross has taken place in the context of broad consultation with all major stakeholders and members of the public. It is a highly complex and layered project with a range of often conflicting requirements and constraints. The drawings and three dimensional illustrations included here show how these criteria have been synthesised into a design that is elegant in its architecture and efficient in its operation. It is a remarkable piece of engineering in line with the great works of Cubitt and Barwell that provide its context and it will provide a convenient, comfortable and uplifting experience for the travelling public for many years to come. The summary visual information provided here, which is documented more fully in the main planning application drawing packages, is as follows:

- Visualisations (for illustrative purposes only)
- Proposed Site Plan
- Basement, Ground, First Floor and Roof Plans
- Sections
- Elevations
- Accommodation, Ground and First Floor Plans

Visualisations



King's Cross Station Enhancement - Design Statement

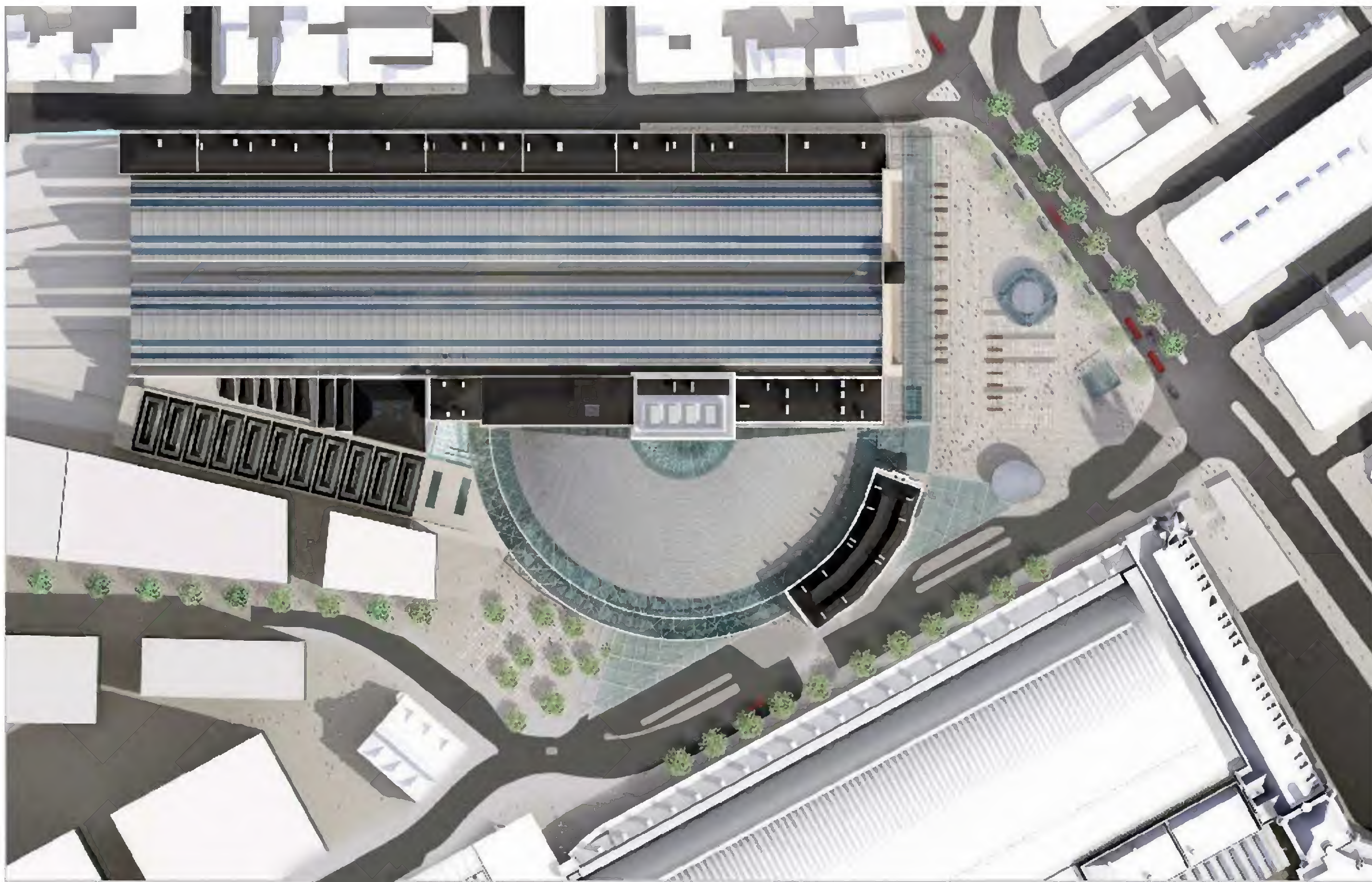
Network Rail
John McAslan + Partners
ARUP
Faithful & Gould

July 2006

**King's Cross Station
Enhancement -
Design Statement**

Network Rail
John McAslan + Partners
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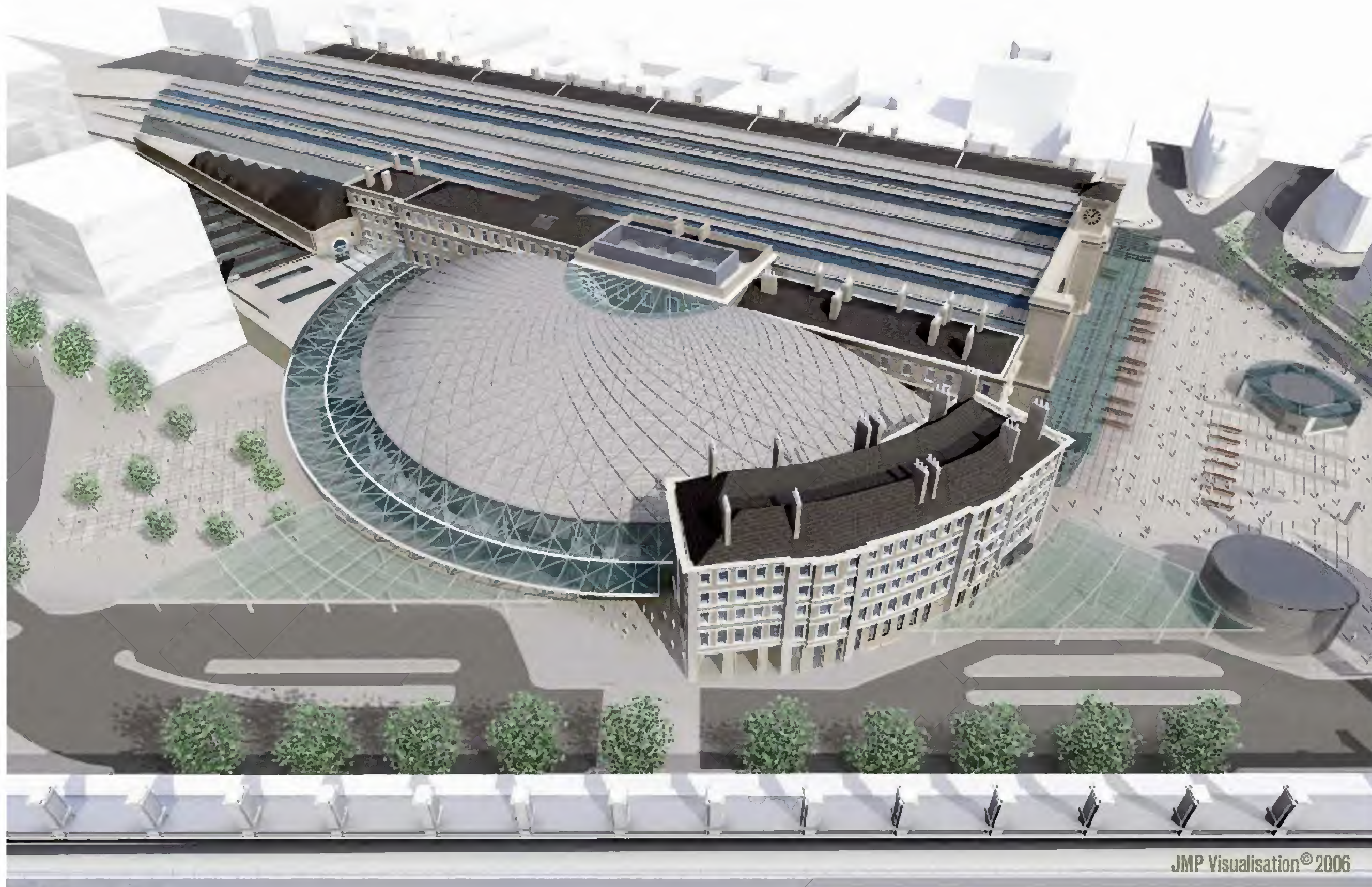
For illustrative purposes only.

Plan View

**King's Cross Station
Enhancement -
Design Statement**

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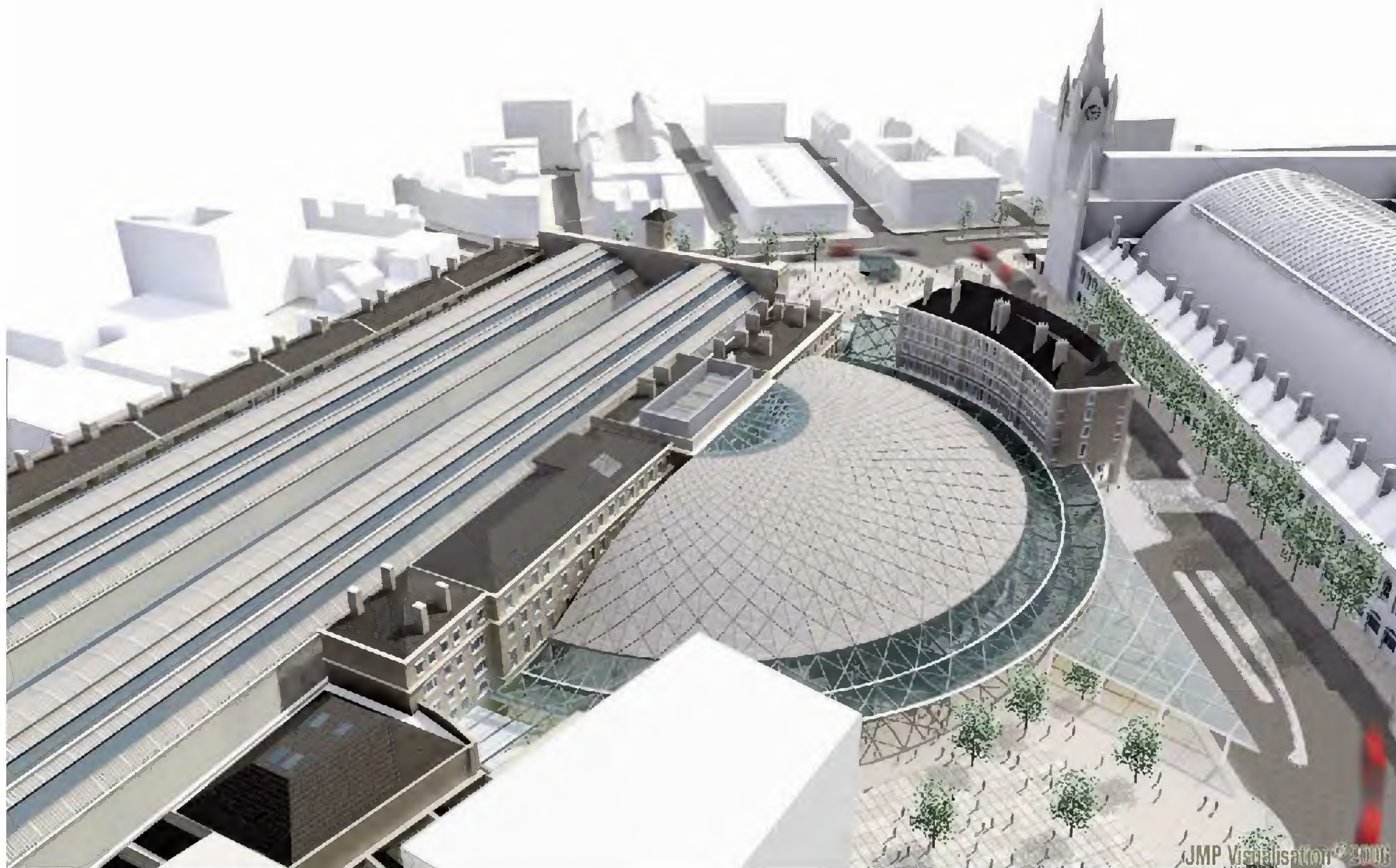
JMP Visualisation © 2006

View from St. Pancras

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Aerial View Looking South

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Internal View looking North

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Southern Exit and Entrance Canopy

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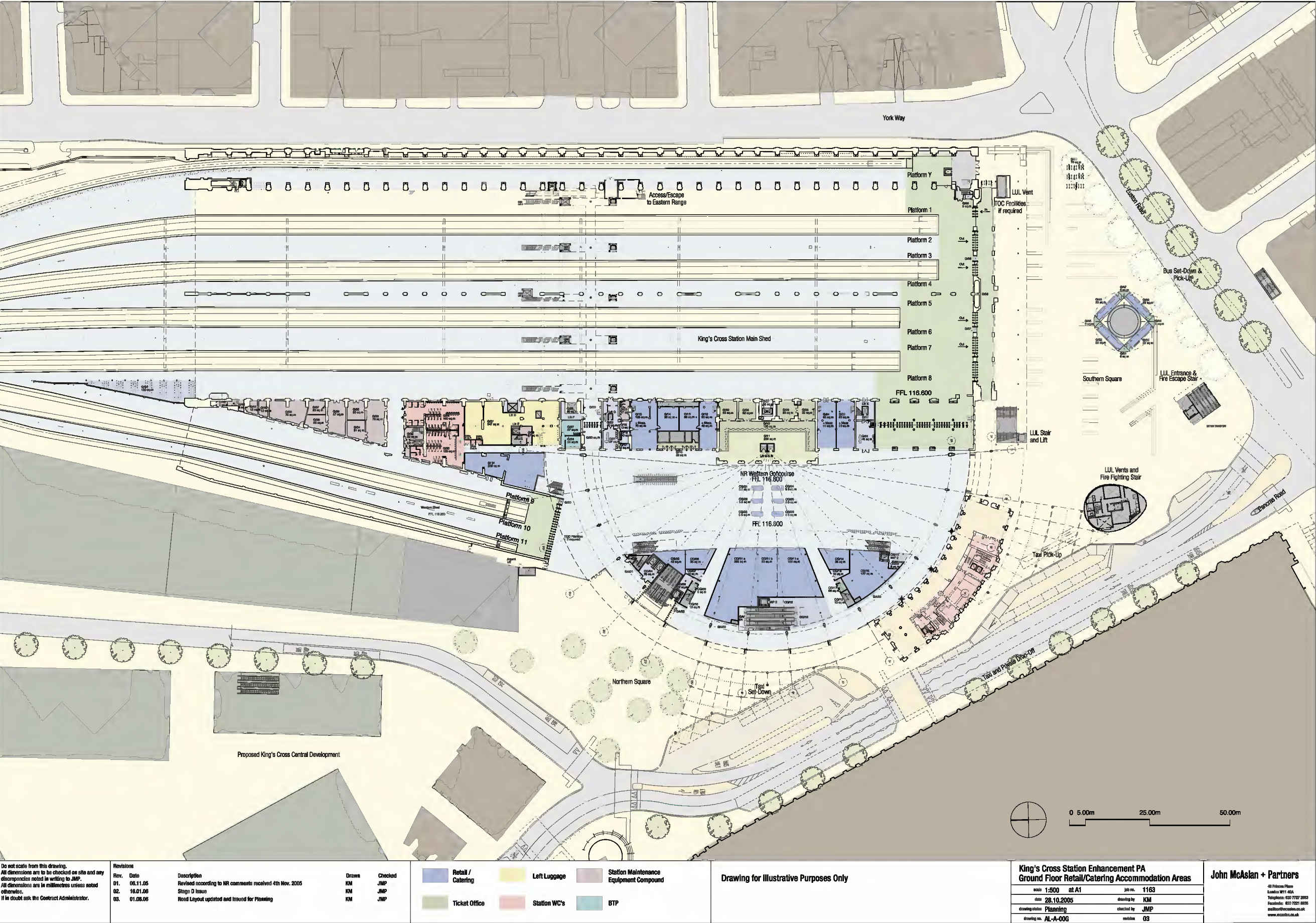
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New Platform Over-Bridge

For illustrative purposes only.

Ground Floor Accommodation Plan



Part II
Selected Drawings &
Illustrations

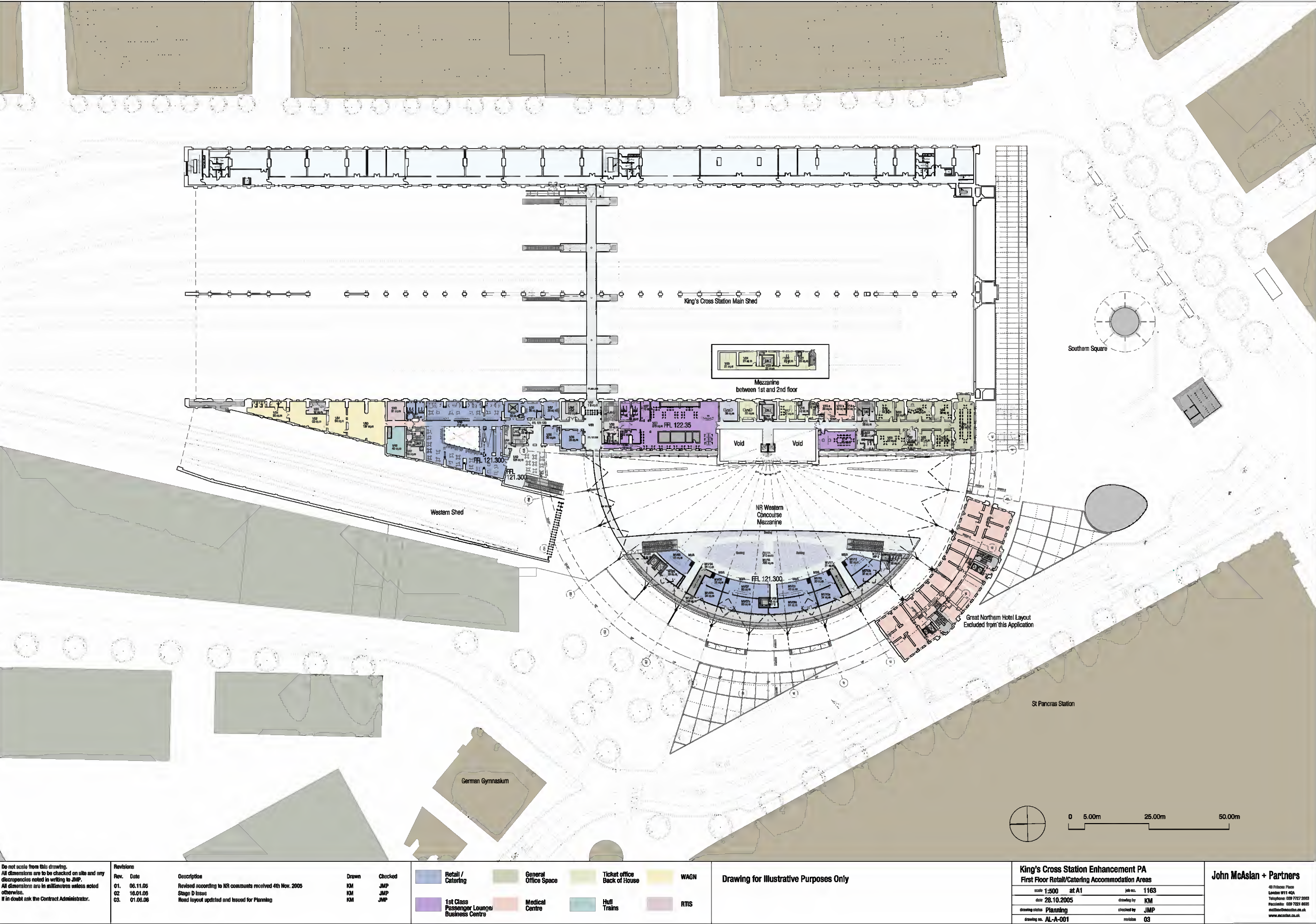
Ground Floor
Accommodation Plan

King's Cross Station
Enhancement -
Design Statement

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First Floor Accommodation Area Plan



Part II
Selected Drawings &
Illustrations

First Floor Concourse
Area Plan

King's Cross Station
Enhancement -
Design Statement

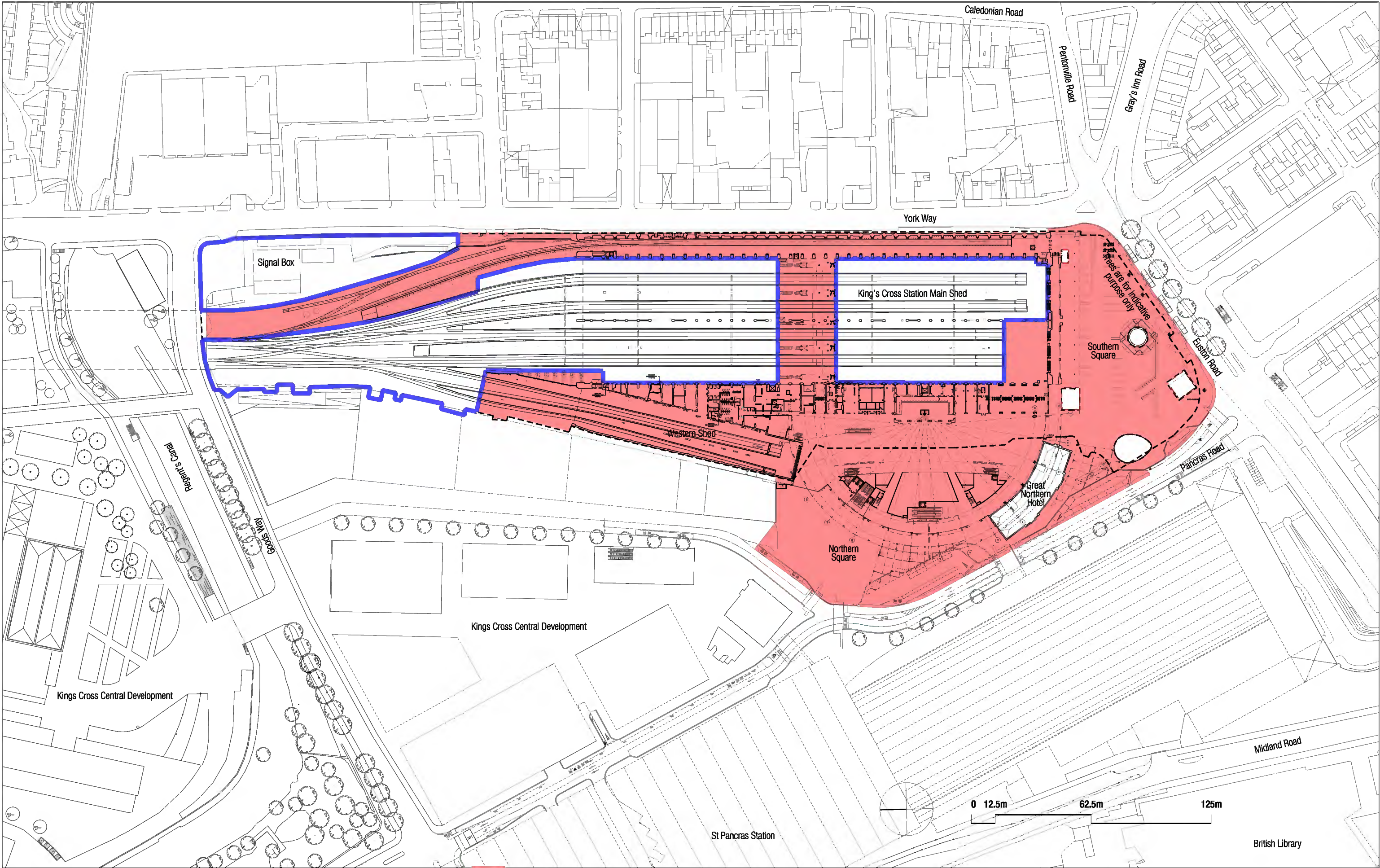
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DRAWINGS

- Proposed Site Plan
- Basement, Ground, First Floor and Roof Plans
- Sections
- Elevations



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All dimensions are in millimetres unless noted otherwise.
If in doubt ask the Contract Administrator.

Revisions		Description	Drawn	Checked
Rev.	Date			
01	14.07.2006	Issued for Planning / Listed Building Application	JMP	NR

PLANNING APPLICATION - SITE AREA

STATION ENHANCEMENT	33,890 sq.m
PLATFORM Y	6,810 sq.m
TOTAL	40,700 sq.m

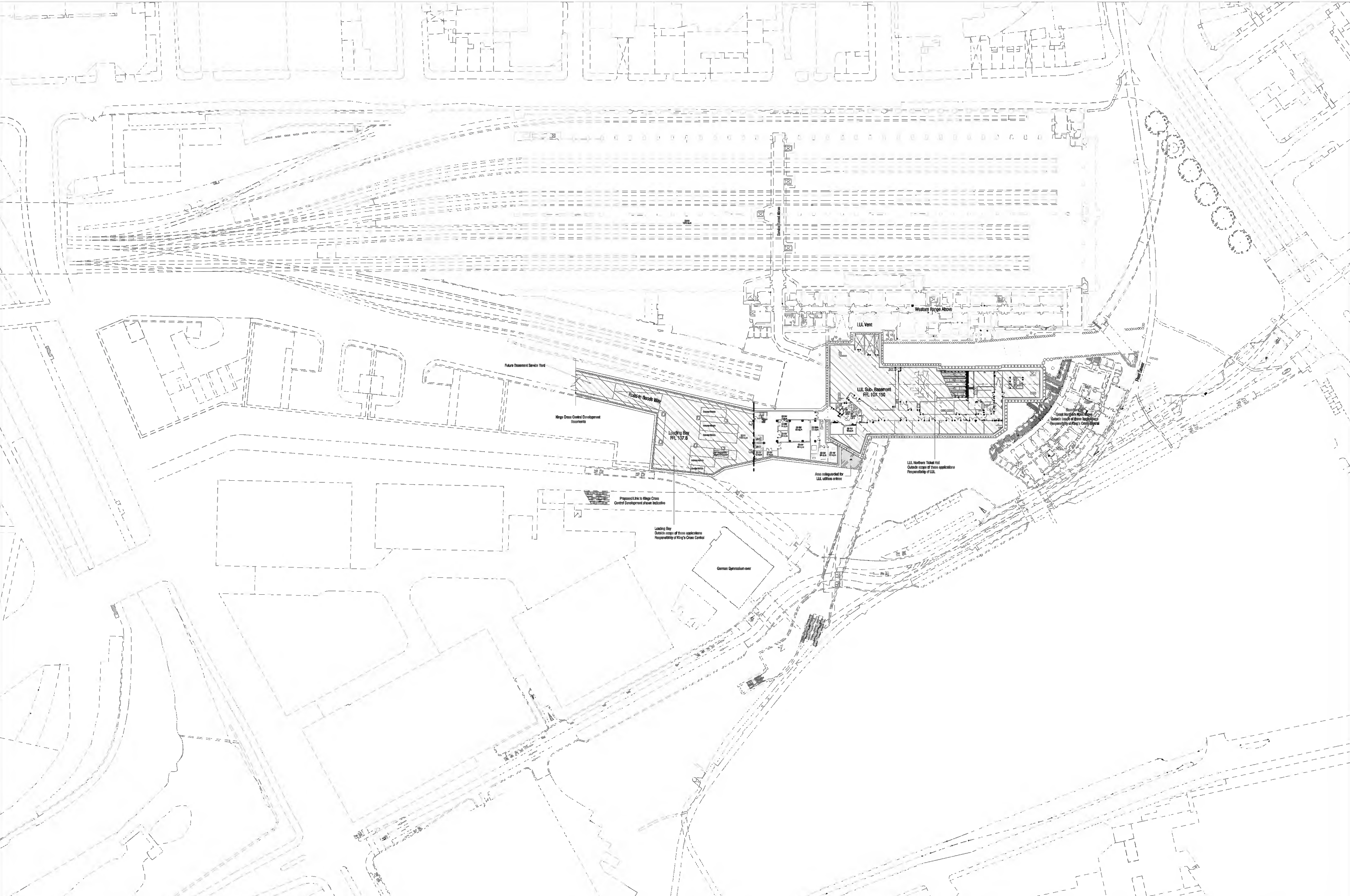
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FREEHOLD BOUNDARY

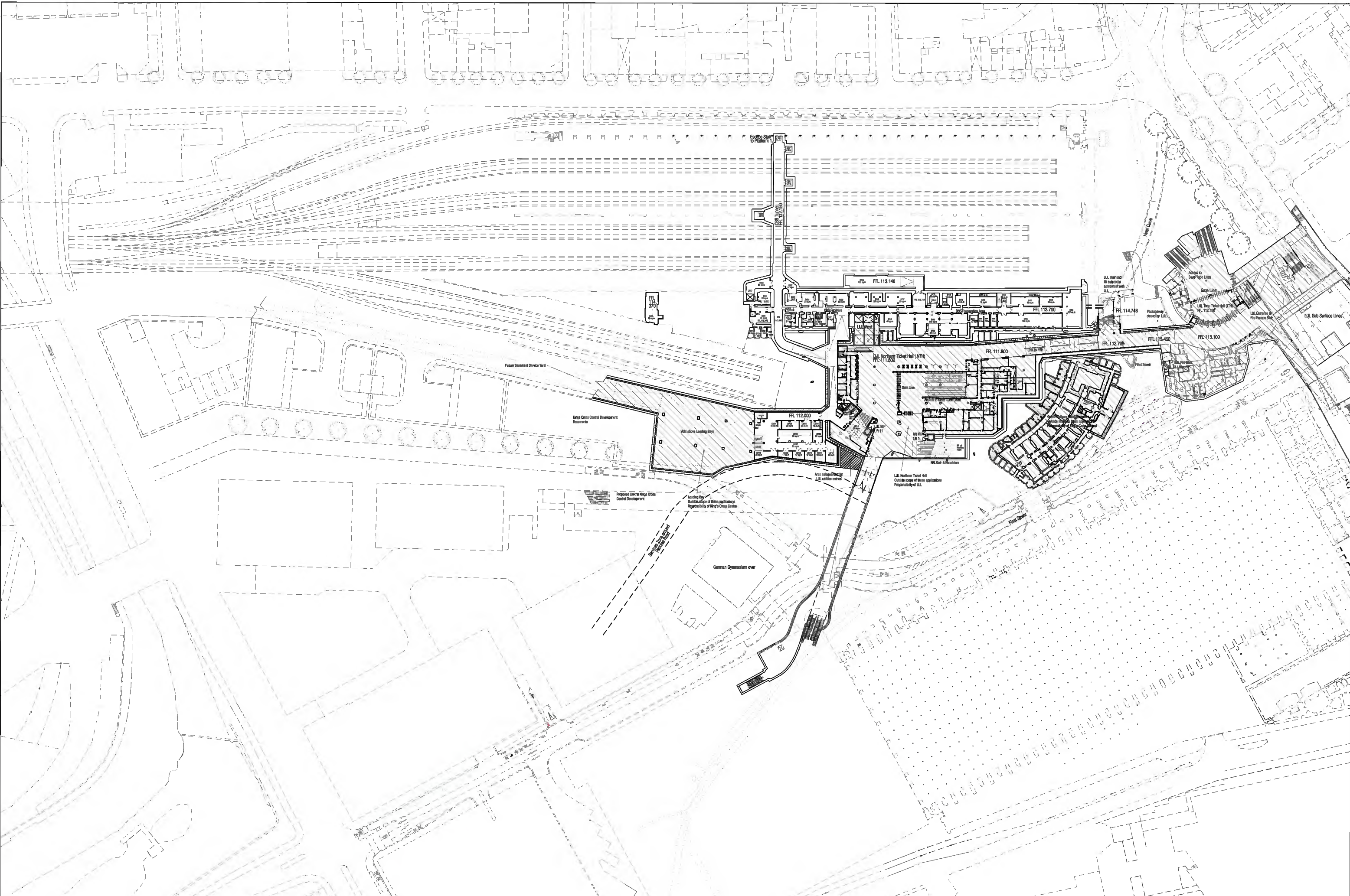
King's Cross Station Enhancement PA
Application Site Plan

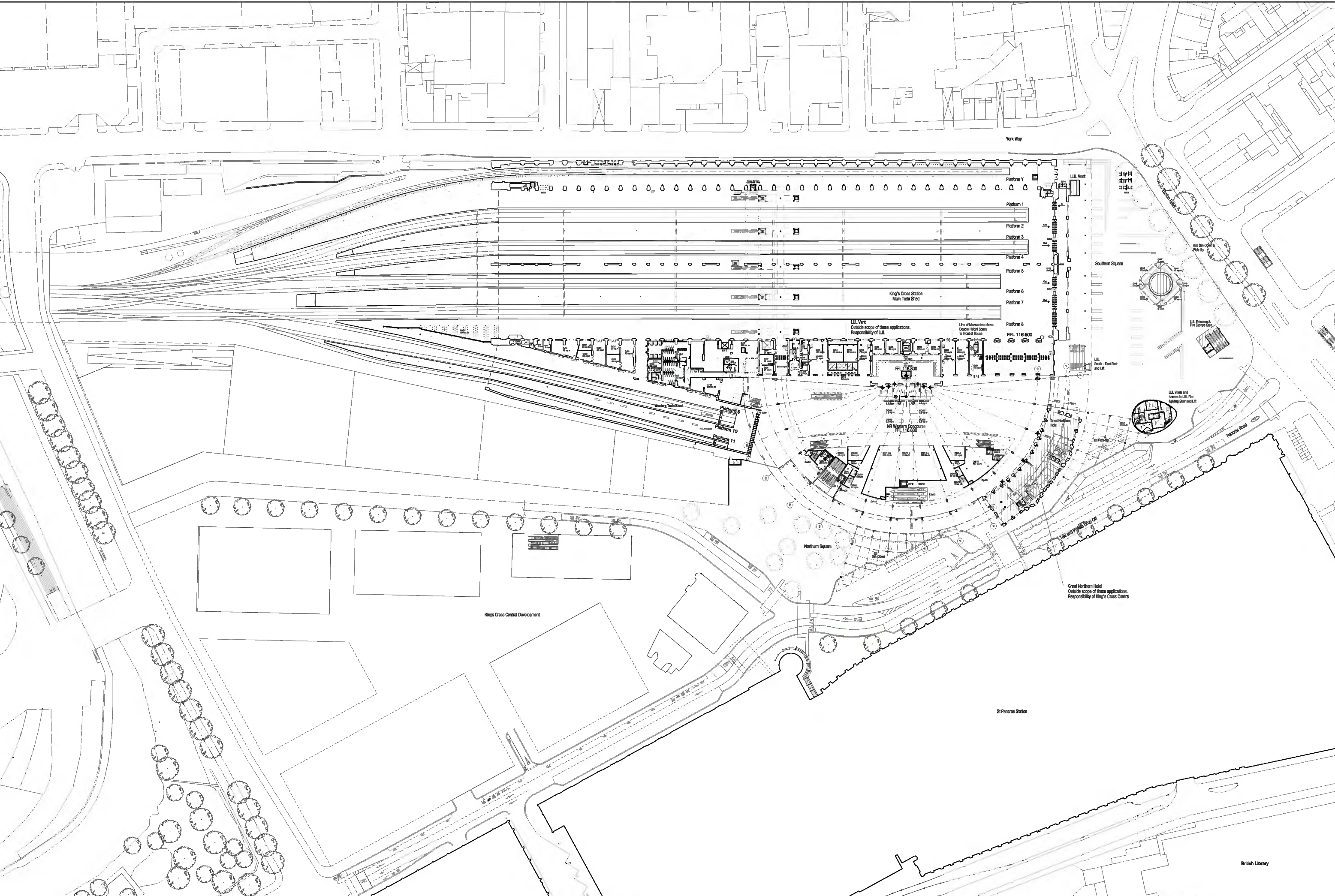
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drawing status	Planning / Listed Building Application	checked by	NR
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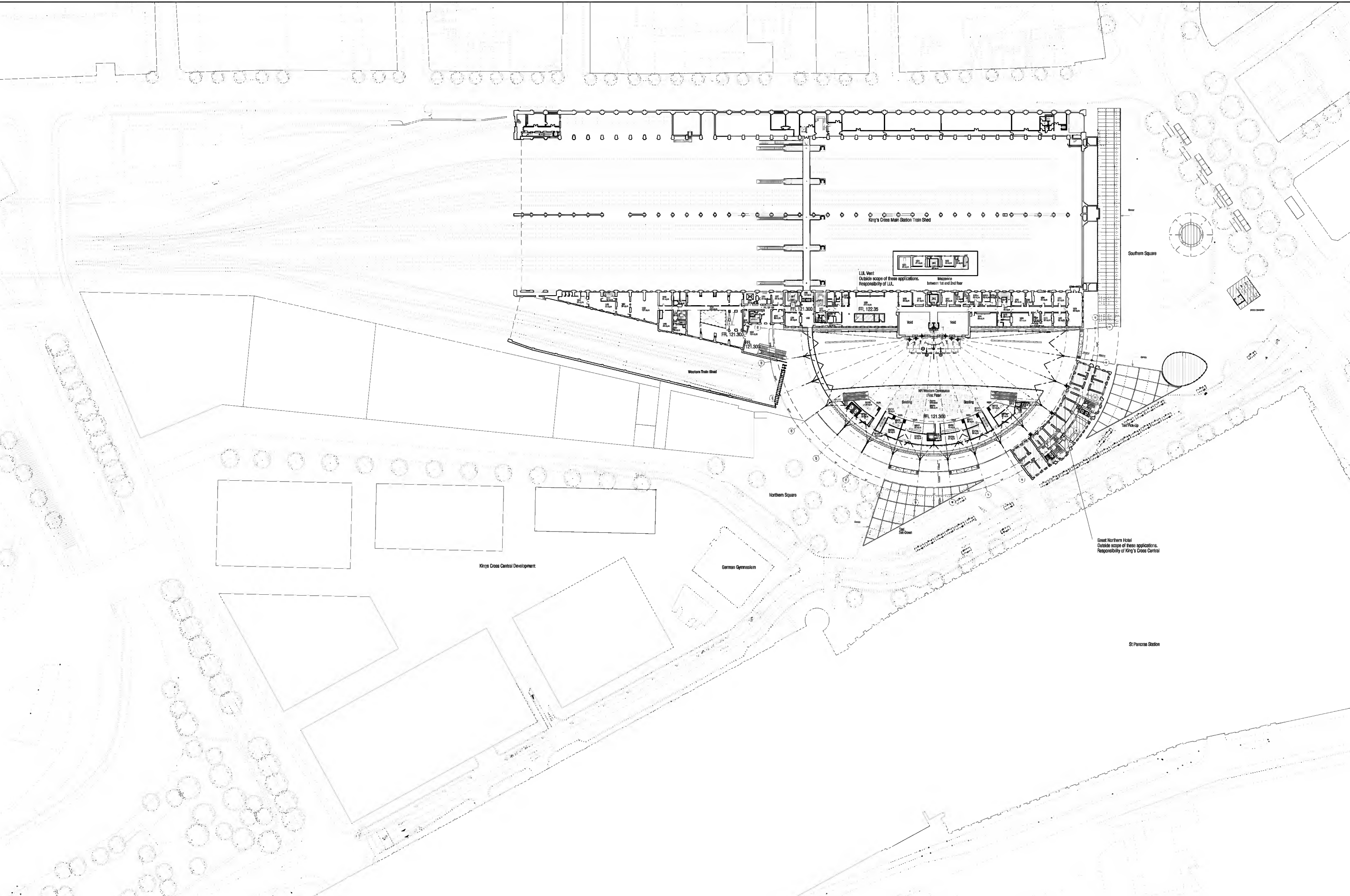
John McAslan + Partners

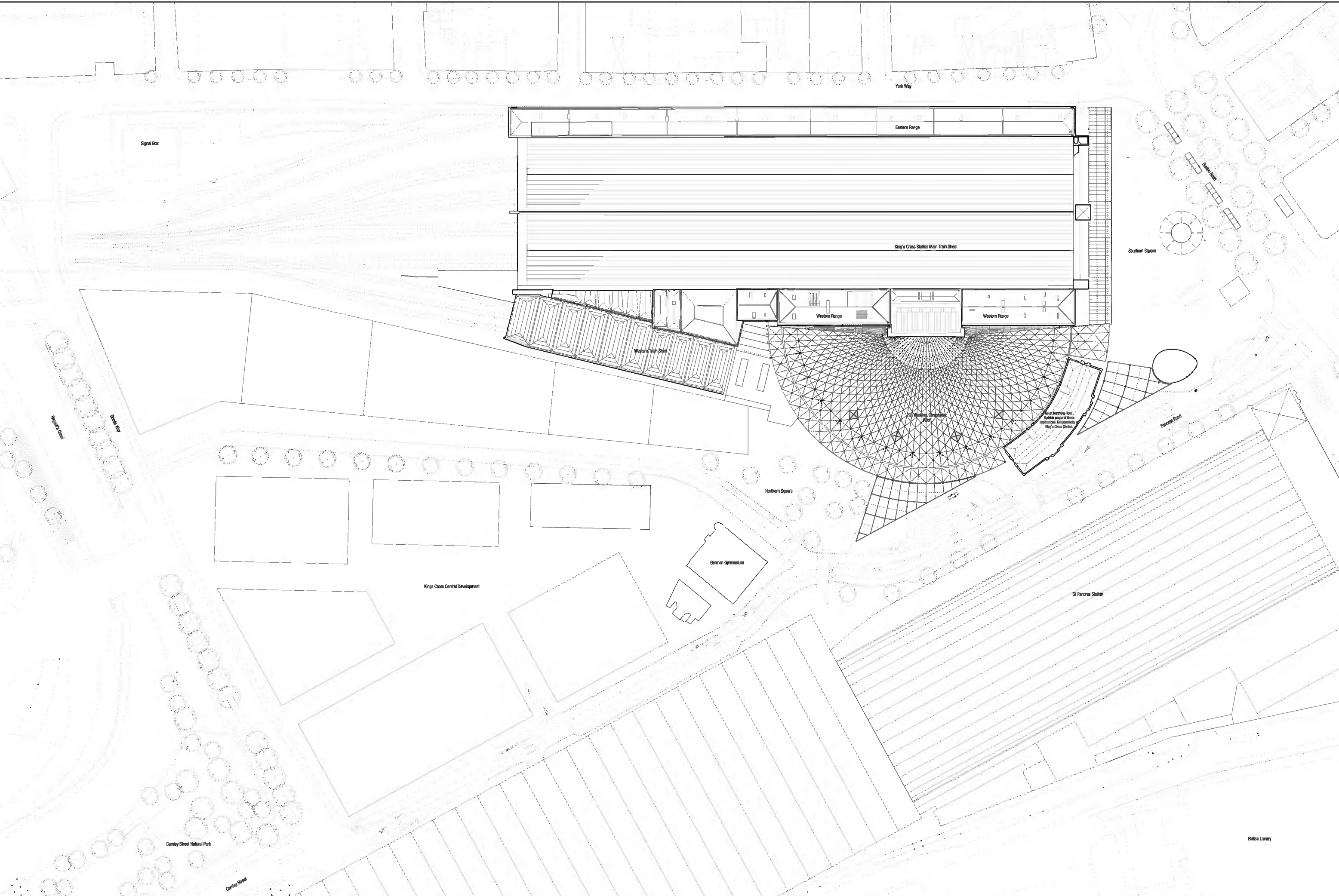
49 Princes Place
London W11 4QA
Telephone: 020 7727 2663
Facsimile: 020 7221 8635
mailbox@mcaslan.co.uk
www.mcaslan.co.uk

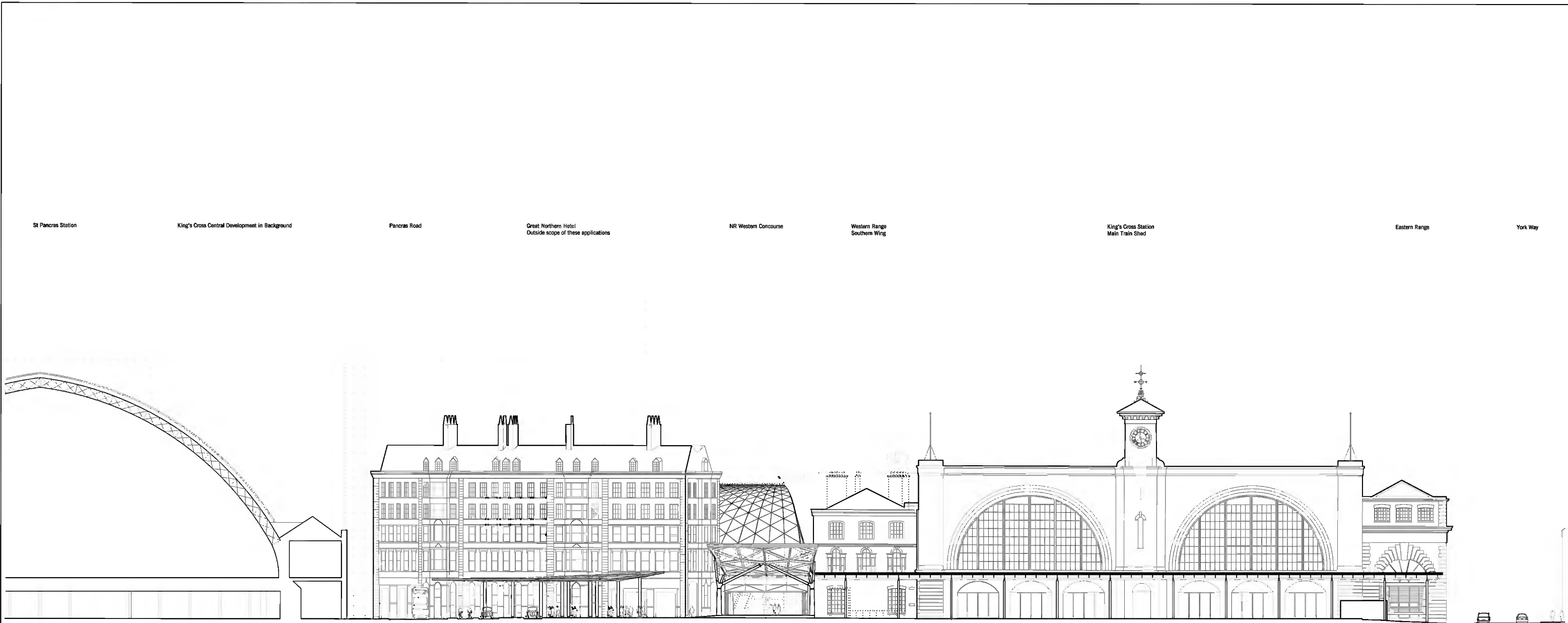












St Pancras Station

King's Cross Central Development in Background

Pancras Road

Great Northern Hotel
Outside scope of these applications

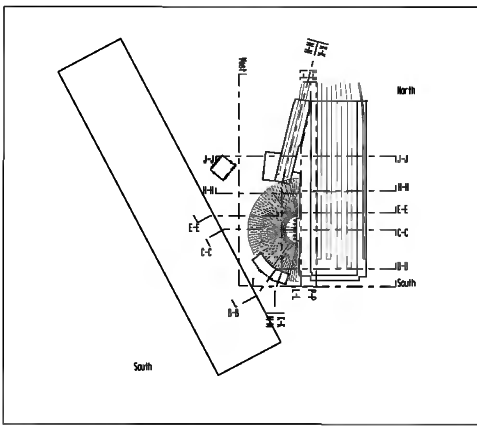
NR Western Concourse

Western Range
Southern Wing

King's Cross Station
Main Train Shed

Eastern Range

York Way



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All dimensions are in millimetres unless noted otherwise.
If in doubt ask the Contract Administrator.

Revisions		Description	Drawn	Checked
Rev	Date			
00	18.12.2005	Stage D proposal	J&P	AB
01	18.03.2006	Stage D proposal, canopies, annotation amended	J&P	HA
02	14.07.2006	Issued for Planning / Listed Building Application	J&P	HA

0 2.00m 10.00m 20.00m

King's Cross Station Enhancement PA South Elevation.			
Scale	1:200	ref AD	1:100
Date	18.12.2005	drawn by	J&P
Drawing title	Placemaking Building Application	checked by	HA
Drawing no	KL-Q01	revision	02

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40 Rensselaer Place
London W11 4QA
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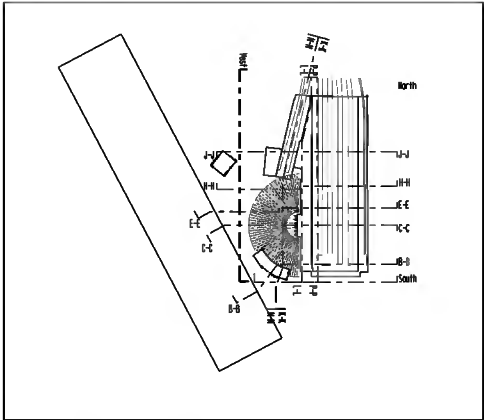
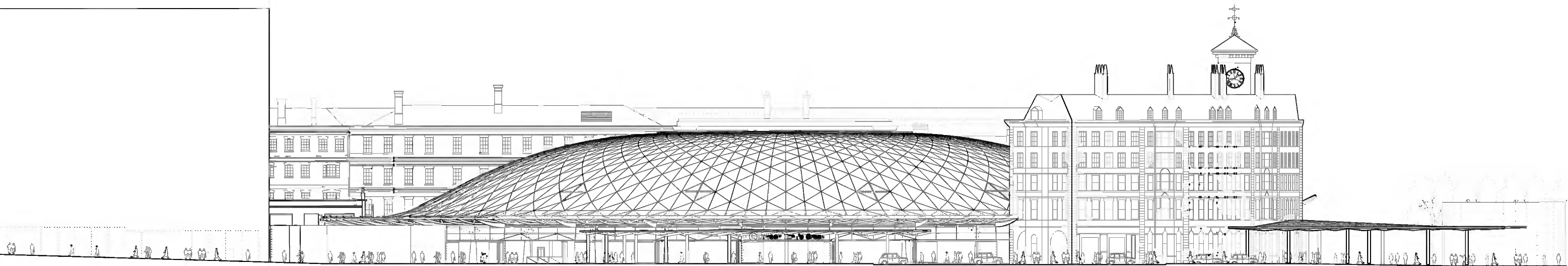
King's Cross Central Development

Western Range in Background

NR Western Concourse

Great Northern Hotel
Outside scope of these applications

Southern Square



York Way

Eastern Range

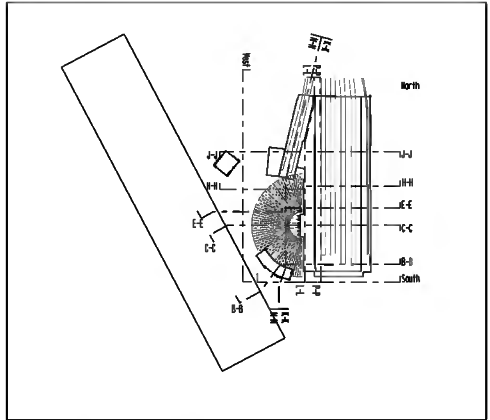
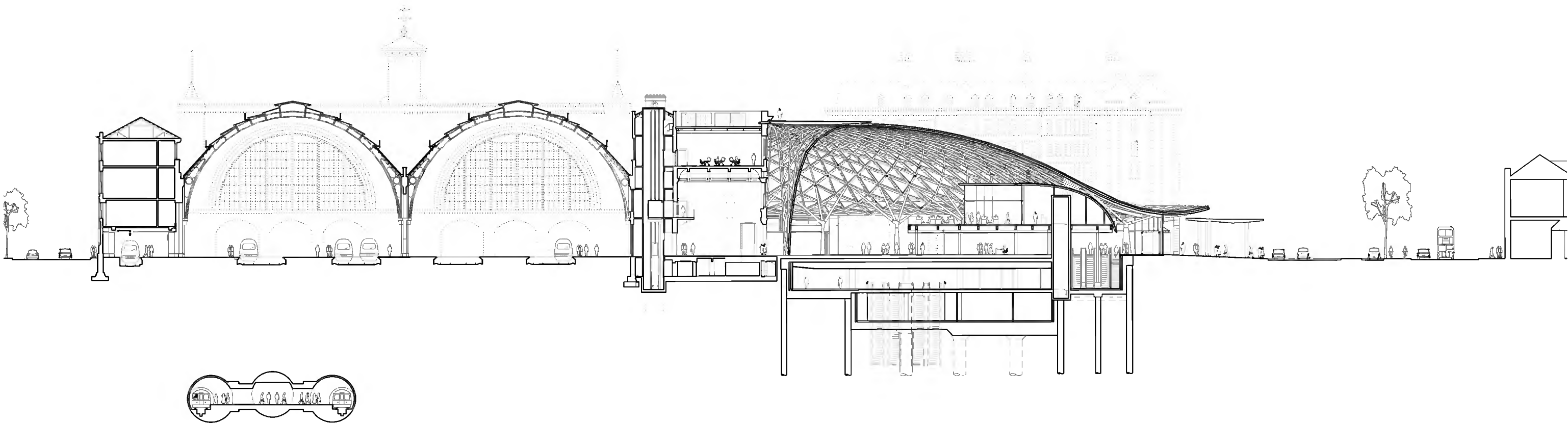
King's Cross Station Main Train Shed

Western Range
Central Block

Great Northern Hotel
Outside scope of these applications

Pancras Road

St. Pancras



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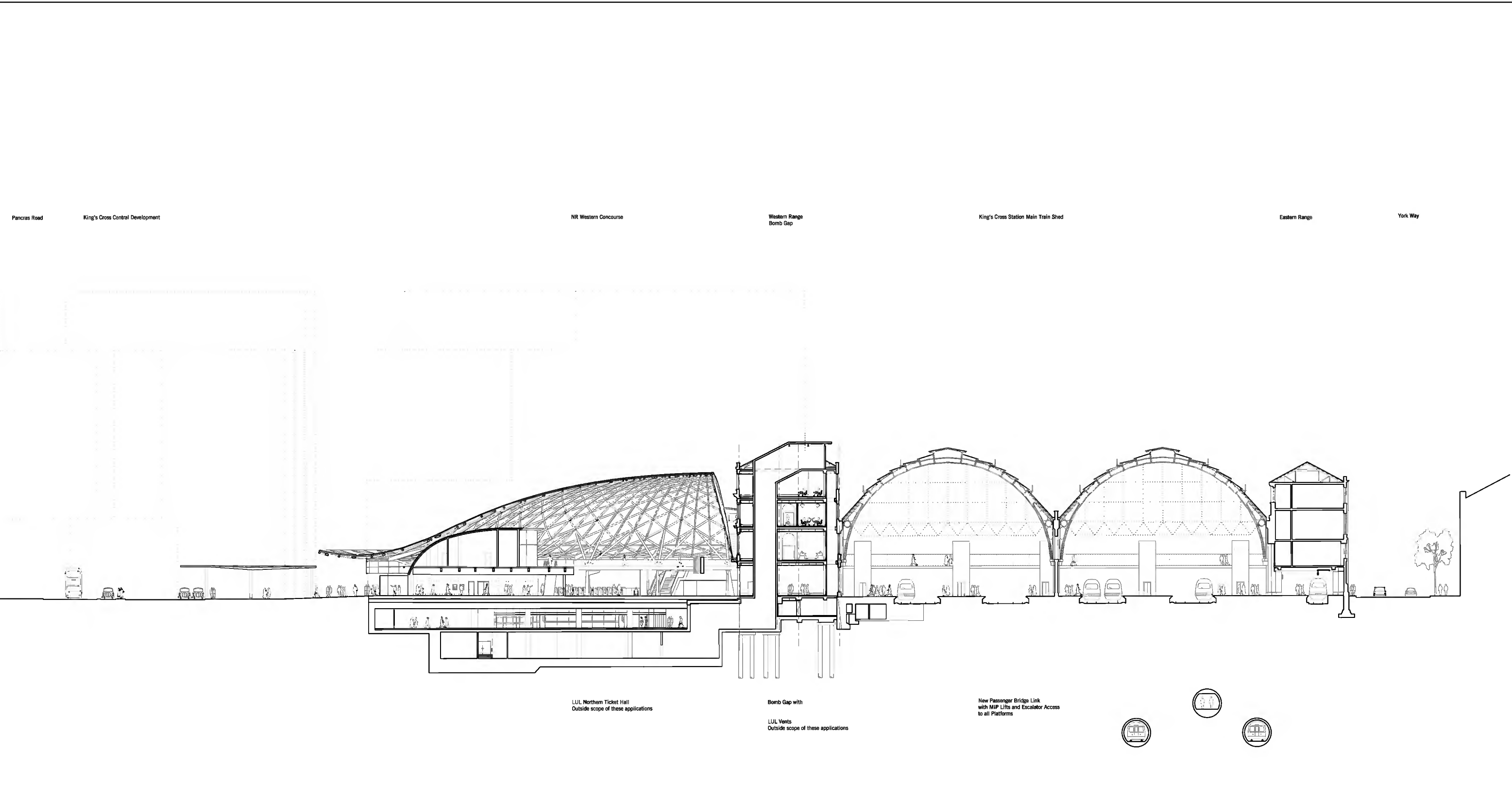
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01	19.09.2006	Stage D proposal, canopies, CIB boards, annotation amended
02	14.07.2008	Issued for Planning / Listed Building Application

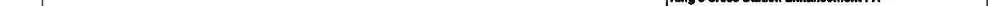
Drawn	Checked
JMP	AB
JMP	HA
JMP	HA

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King's Cross Station Enhancement PA Section C-C			
Scale	1:200	at A0	Sheet 1193
Date	18.12.2005	Drawn by	JMP
Drawing title	Planning Listed Building Application	Checked by	HA
Drawing No	AL-063	Revision	02

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Facsimile 020 7291 8853
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