

OUTER COVER TO BE REMOVED BEFORE PLANNING SUBMISSION

# Interchange Station Design & Access Statement

For information in support of the Schedule 17 and Section 23 planning submissions for Interchange Station and car parks

Document no.: 1SN03-ARP-AR-REP-NS07-000048

Revision	Date	Author	Checked by	Approved by	Revision Details:
Co1	2019-11-15	Liam Davis	Kim Quazi	Richard Jackson	For acceptance
Co2	2020-01-29	Liam Davis	Kim Quazi	Richard Jackson	For acceptance

SECURITY CLASSIFICATION: Official

Handling Instructions: None



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# 1. Introduction

# 1.1 Abbreviations

AOD	Above Ordnance Datum
BoH	Back of House
BREEAM	Building Research Establishment Environmental Assessment Methodology
CCTV	Closed Circuit Television
CIS	Customer Information Screens
ES	Environmental Statement
EV	Electric Vehicle
EWC	Enabling Works Contract
EMR	Environmental Minimum Requirement
FPD	Final Preliminary Design
GRP	Glass Reinforced Plastic
HS2	High Speed 2
LED	Light Emitting Diode
LOD	Limit of Deviation
LRV	Light Reflectance Value
MEP	Mechanical, Electrical and Public Health
MEWP	Mobile Elevating Work Platform
MWCC	Main Works Civils Contractor
NEC	National Exhibition Centre
NMU	Non Motorised User
OCS	Overhead Contact System
PAVA	Public Address/Voice Alarm
PED	Platform Edge Doors
PRM	Persons of Reduced Mobility
PTV	Pendulum Test Values
PV	Photovoltaic
PVDF	Polyvinylidene Difluoride
SDSC	Station Design Services Contract
SuDS	Sustainable Drainage System
UGC	Urban Growth Company
WMFS	West Midlands Fire Service

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## 1.2 Executive Summary

This Design and Access Statement supports the submission to Solihull Metropolitan Borough Council for approval, under paragraphs 2 and 3 of Schedule 17 of the High Speed Rail (London - West Midlands) Act 2017 for a new HS2 station at Interchange. It also supports the reserved matters submission for long stay car parking at Interchange required due to the provisions of Section 23 of the Act.

This Design & Access Statement should be read in conjunction with the following documentation:

- Schedule 17/ 23 Application Drawings
- Written Statements
- Consultation and Engagement Report

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# 1.3 Introduction

## 1.3.1 Report Structure

The report is structured in brief as follows:

- **Introduction** explains the background of the HS2 project and the Schedule 17 application.
- **Context** explains the site, key drivers and a history of the development of the design.
- **The Design Vision** articulates the vision and how this led to the architectural concept for the station.
- **Arrangement** explains the principles used to arrange the station and the surrounding landscape within the site.
- **Appearance** details the materials and design features used across the site and the station.
- **Accessibility and Inclusivity** shows the measures taken to provide inclusive access through the site.
- **Landscape** describes the hard landscape immediately around the station and the landscape design of the car parks. It also shows the landscape treatment for the wider site which is shown for information.
- **Sustainability** highlights the measures taken to reduce energy, provide sustainable drainage, maintain biodiversity and meet BREEAM ambition for the station.

## 1.3.2 Project Summary

The Interchange station is part of the HS2 network, serving the West Midlands, Birmingham Airport and the NEC, and with seamless links to the UK motorway system.

The station sits within a green triangle formed by the M42, A45 and A452 to the east of the NEC, known as 'The Triangle' site. The station is connected to NEC, Birmingham International Railway Station and Birmingham Airport by a People Mover.

The Interchange station has two 415m long island platforms, with six tracks, two in the centre for the through trains and four serving the double-face platforms for the stopping trains. It has been designed to serve five 400m long high-speed trains per hour, in each direction.

The main station concourse sits to the west of the platforms, opening onto a public plaza to the north west and linked to the east of the trace by a pedestrian bridge. The design includes provision for car parking, taxi ranks, Drop & Go and short stay parking, bus stops and cycle storage.

The station connects to the wider road, cycle and bus networks and provides parking within three long stay car parks (Car Park A, B and C) and a short stay car park, along with cycle storage on both sides of trace. Taxi drop off and pick up facilities are provided on the east side of trace along with a Drop & Go facility.





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# 1.4 HS2 Project

HS2 is a new high speed railway that will connect major cities in Britain. It will form the backbone of the UK's transport network, connecting eight out of ten of Britain's largest cities.

HS2 will transform journey times and significantly increase rail capacity. It will free up space on the existing network for local services and freight.

HS2 will integrate with the existing rail network and create the foundations for Northern Powerhouse Rail to spread prosperity across the whole of the North. Alongside proposals for Midlands Engine Rail, a joined-up transport system will make it easier for people to move between towns and cities across the North and the Midlands with faster, more comfortable journeys and greater reach for businesses.

Phase One of HS2 will provide a dedicated high speed rail service between London Euston and Birmingham Curzon Street, via Old Oak Common and Interchange.

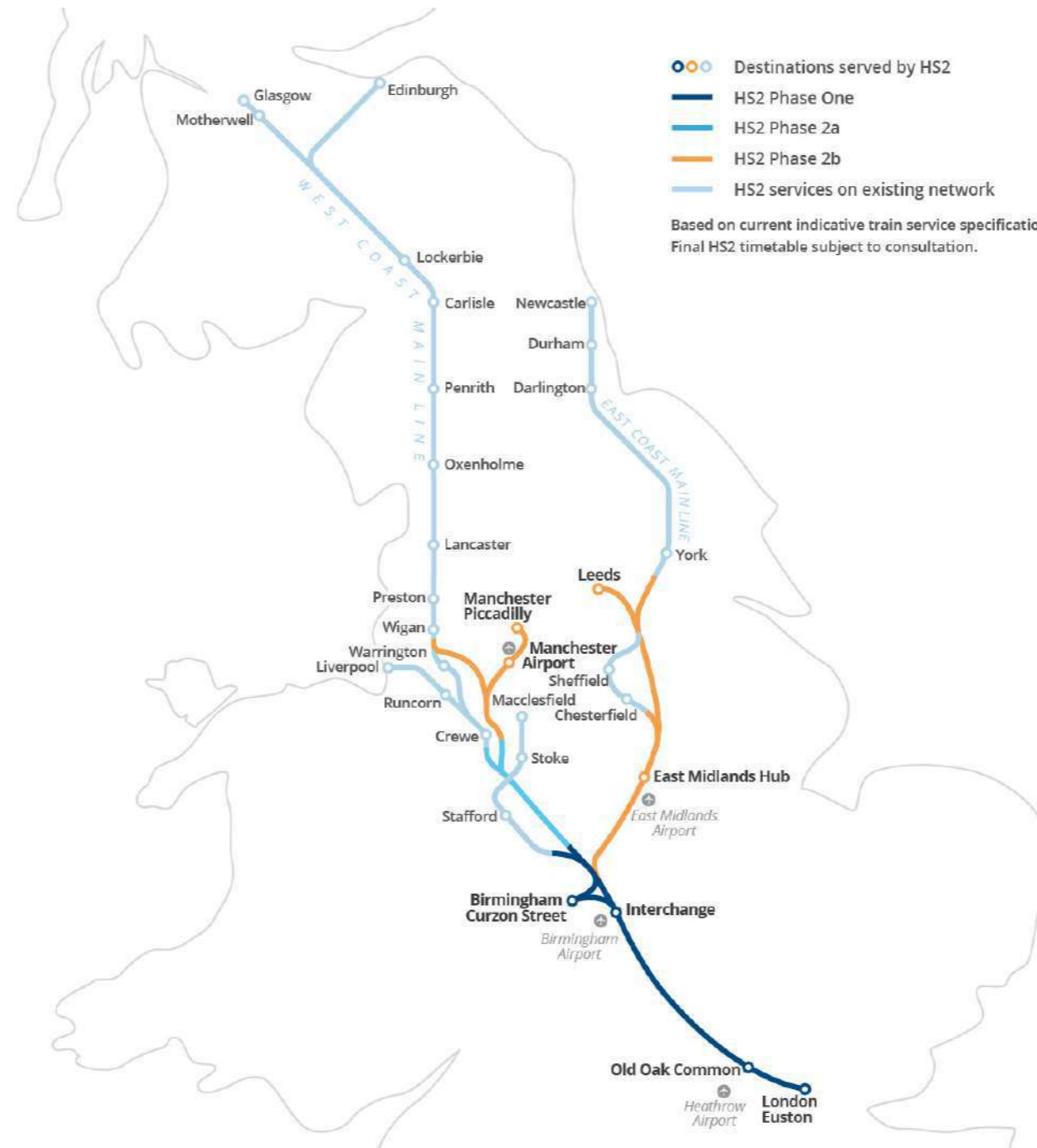


Figure 1: HS2 Route Map

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# 1.5 The Planning Regime

## 1.5.1 Schedule 17 (Interchange Station and Associated Works, excluding Car Parking)

Section 20 of the High Speed Rail (London – West Midlands) Act 2017 (“the Act”) grants deemed planning permission for the works authorised by it, subject to the conditions set out in Schedule 17 of the Act. Schedule 17 includes conditions requiring specified matters to be approved or agreed by Solihull Metropolitan Borough Council (“SMBC”).

Under Schedule 17 of the Act, approval is required for the following specific matters:

- Plans and Specifications for certain operations and works;
- Matters ancillary to development (“construction arrangements”);
- Road Transport (lorry routing);
- Bringing into use; and
- Site restoration schemes.

The Schedule 17 submissions being made by the Station Design Service Contractor (“SDSC”) are under the category of Plans and Specifications. It is anticipated that other subsequent Schedule 17 submissions will be made by the Station Delivery Contractor once appointed.

As part of Plans and Specifications submissions information is required in relation to landscape infrastructure although this is only provided to Solihull MBC for comment rather than approval. However, a purpose of later ‘Bringing into Use’ schedule 17 submissions is to ensure that necessary landscape infrastructure is provided before buildings etc can come into use.

The HS2 approvals regime under Schedule 17 is a different planning process to that which is usually applied in England (i.e. the Town and Country Planning Act). It is different in terms of the nature of submissions and the issues that the Council can have regard to in determining requests for approval. Schedule 17 of the Act sets out the grounds on which the Council may impose conditions on approvals or refuse requests for approval.

The matters that can be considered by the Council in determining submissions (and in imposing conditions) made under Schedule 17 of the Act must relate to one or more of the following specific items:

- To preserve the local environment or local amenity;
- To prevent or reduce prejudicial effects on road safety or on the free flow of traffic in the local area;
- To preserve a site of archaeological or historic interest or nature conservation value, (and the scheme is reasonably capable of being so modified to achieve this); and
- That the development ought to, and could reasonably, be carried out elsewhere within the development’s permitted limits.

For certain forms of development, particularly more minor works such as fencing and lighting, only a selection of these items are relevant to decision making.

## 1.5.2 Reserved Matters – Long Stay Car Parking

The Act treats car parking (other than short stay, taxi and drop-off parking) at Interchange differently to the rest of the works required for HS2. Section 23 (2) of the Act confirms that Schedule 17 of the Act does not apply to this car parking.

Section 23 (3) goes on to note that: the deemed planning permission granted for the car parking at Interchange by the Act is to be treated as an outline planning permission under the Development Management Procedure Order (“DMPO”); and that reserved matters for the car parking, relating to “access, appearance, landscaping and layout”, are to be submitted (under the Town and Country Planning Act) for the approval of the local planning authority.

The main practical difference by treating car parking in this way is that the long stay car park landscape infrastructure is to be approved whereas it is not for approval under the other Interchange Schedule 17 Plans and Specifications submission. Access, appearance and layout generally fall within the scope of what is approved under Schedule 17.

“Scale” is not specified under Section 23 (3) of the Act as a reserved matter requiring approval by the Council. Rather, Section 23 (1) of the Act specifies that the deemed planning permission (i.e. the outline planning permission) for parking provided for by the Act is limited to a maximum of 7,500 parking spaces for cars (excluding short stay, taxi and drop-off parking) and 5 parking spaces for coaches.

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# 1.6 Application Boundaries

The Schedule 17 boundary for Interchange incorporates:

- The Interchange Station building and associated platforms and overbridges;
- Areas of public realm around the station;
- Internal site road infrastructure;
- Short stay and drop-off parking areas, bus lay-bys and cycle parking; and
- Various earthworks including site-reprofiling, landscape infrastructure and the creation of balancing ponds and detention basins.

Long stay parking at Interchange, referred to as Car Parks A, B and C, are excluded from the Schedule 17 submission due to the provisions of Section 23 of the Act which excludes these car parks from Schedule 17 and requires their details to be submitted for approval as reserved matters under the Town and Country Planning Act. However, as these car parks form an integral part of the overall proposals for Interchange, the Station and all associated works, including long-stay car parks, are presented as a comprehensive scheme in this Design and Access Statement.

The General Arrangement plan shown on the next page identifies the application boundaries for the Interchange Schedule 17 submission and associated long-stay car parking reserved matters submission. For completeness and context, the plan also shows the boundaries / anticipated boundaries of:

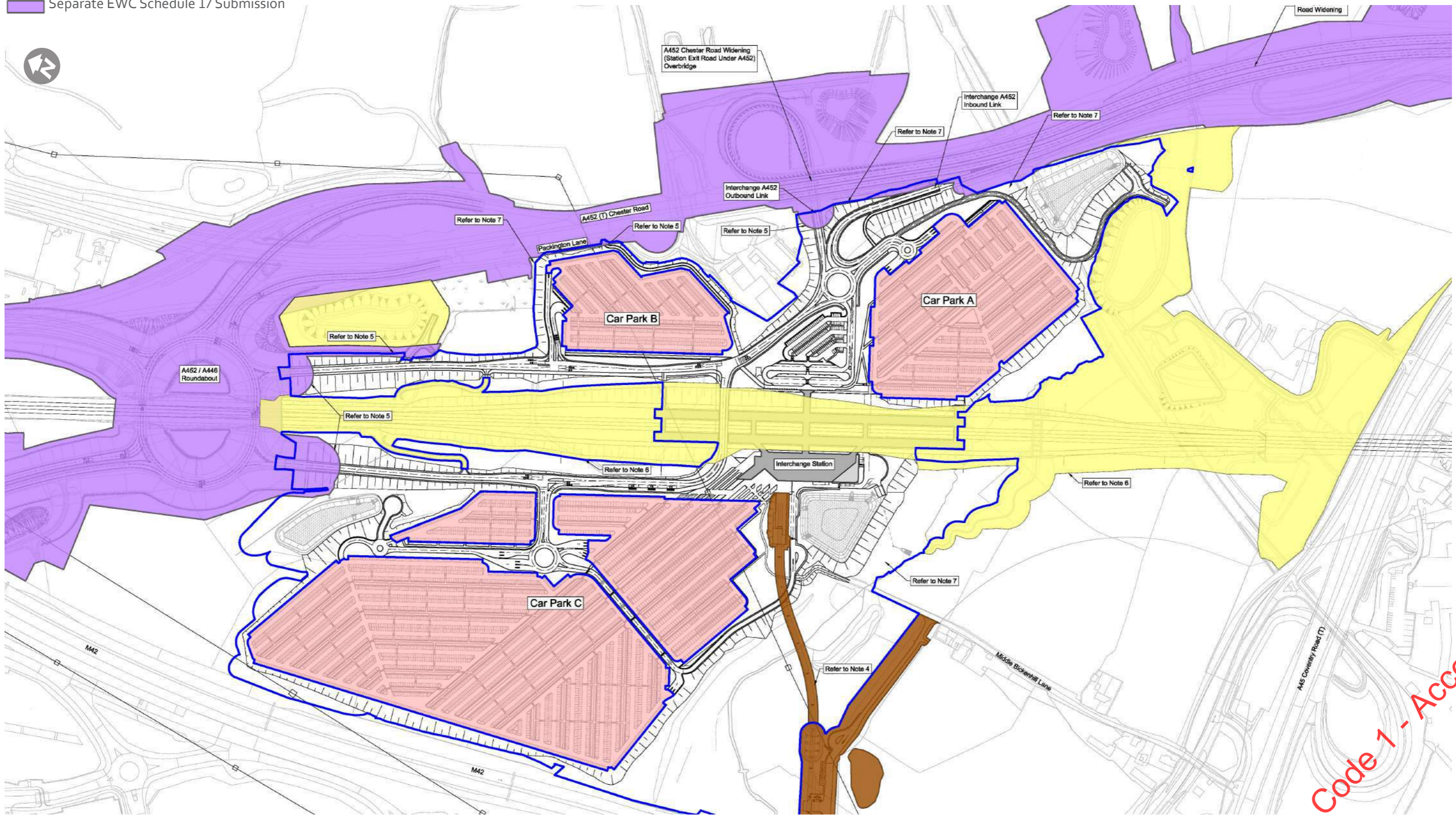
- The separate Schedule 17 submission also being made by the Station Design Services Contractor (SDSC) for the proposed people mover to link Interchange to the NEC, Birmingham International Railway Station and Birmingham Airport;
- The two Schedule 17 submissions consented in July 2019 for works to highways around the Triangle, being progressed by the Enabling Works Contractor (EWC); and

- The approximate extent of the Schedule 17 area for works associated with the provision of the Trace (the HS2 tracks), being progressed by the Main Works Civils Contractor (MWCC).

The proposals for Interchange have been developed with full regard to the people mover and also the other works in and around the Triangle being designed and delivered by the MWCC and EWC. This is to ensure that the respective submissions and works are properly co-ordinated and interface with each other.

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- Schedule 17 - Application Boundary
- Section 23 Area
- Separate People Mover Schedule 17 Submission
- Separate MWCC Schedule 17 Submission
- Separate EWC Schedule 17 Submission



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# 1.7 Visualisation Viewpoints

Within this Design and Access Statement, a number of computer generated images of Interchange Station have been included for illustrative purposes. Viewpoints have been selected to present key design features.

The viewpoints have been located as follows:

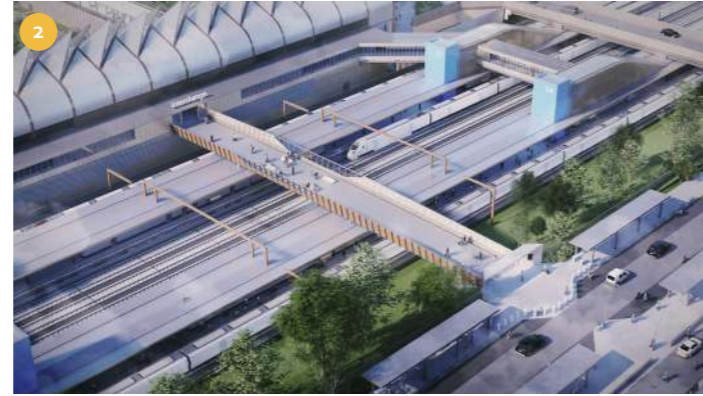
1. Aerial view from North West
2. Aerial view of central pedestrian bridge from the East
3. Eye level view of central pedestrian bridge from the East
4. Eye level view of staff area at South end of station building
5. Eye level view of West Plaza and main entrance from Car Park C
6. Eye level view of entrance portal at the East Plaza
7. Eye level view of covered blue badge parking bays in Car Park C
8. Eye level view of the station from the landscape to the South West
9. Eye level view of the West Plaza from the North
10. Elevated view of the West Plaza at night time
11. Elevated view of the South Terrace
12. Eye level view of the central pedestrian bridge at night time

In addition, SMBC has requested verified views which are included in the appendix. See section 10.1.



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# 1.8 Stakeholder Engagement

## 1.8.1 Overview

HS2 has placed importance on using engagement to understand the views of stakeholders, communities and wider third parties throughout the design of Interchange Station and the People Mover.

Extensive engagement with stakeholders has been undertaken as the design of Interchange Station progressed. Engagement has been an integral part of the design process, and critical to understanding views and concerns, with the ultimate aim of creating a design which responds to stakeholder aspirations as far as possible.

As part of the design development, designs were shared and discussed with Solihull Metropolitan Borough Council (SMBC) and a range of other stakeholders including the HS2 Interchange Station Independent Design Panel, The Arden Cross Consortium of Landowners (who represent the Packington Estate, Coleshill Estate and Birmingham City Council), UGC, NEC, Birmingham Airport, Highways England, Transport for West Midlands, Environment Agency and Historic England.

Design updates have also been shared with wider regional stakeholders through the UGC Infrastructure Coordination Board forum, and with local stakeholders and businesses in the Interchange area through HS2's Interchange Plus Construction Working Group.

Presentations to key regional stakeholders including the West Midlands Mayor, West Midlands Combined Authority, MPs and Elected Members from SMBC have taken place.

Design development has also complied with the Undertakings and assurances agreed with various stakeholders during the Hybrid Bill process.

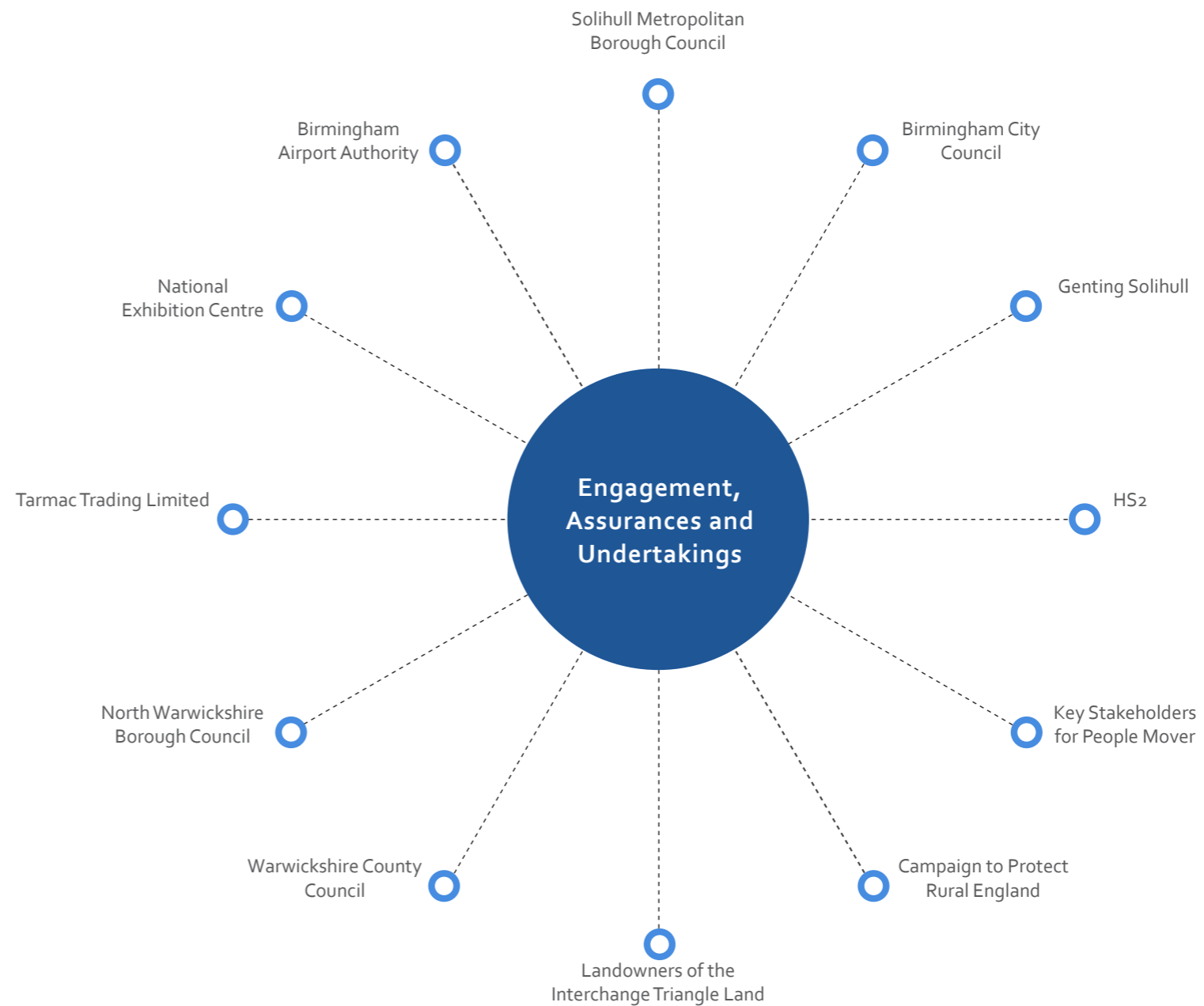


Figure 2: Engagement, assurances and undertakings

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### 1.8.2 Engagement with Solihull Metropolitan Borough Council

Ongoing engagement has taken place with SMBC since the start of the design process for Interchange Station. The design has been carried out in accordance with a number of design principles which were agreed with the planning authority during the Hybrid Brill process. These design principles have been used to help shape the design of the station.

Some of the key issues which have been discussed in respect of the design of Interchange Station are as follows:

- Development of design in a way which has regard for the Prospectus and Masterplan for the surrounding areas
- Station architecture, context and design rationale
- Proposed materials
- Landscape proposals
- Highways and traffic modelling
- Cycling provision
- Flood risk and drainage features
- Comments in relation to the pedestrian bridge into the station from the East.
- Passenger experience
- Car parking provision
- Station sizing and futureproofing

Design engagement has also been undertaken with other key stakeholders and the local community. A full summary of all of engagement that has been undertaken, including a summary of the feedback raised and design response to those issues, can be found in the Consultation and Engagement Statement.

### 1.8.3 Engagement with the Independent Design Panel

Throughout the design process, a number of Independent Design Panels and Design Panel mentoring sessions have been held where the emerging scheme designs have been presented for feedback. The comments received from the Design Panel sessions have been carefully considered by the station design team. A summary of the session held, and key feedback which has influenced design, can be found in the Consultation and Engagement Statement.

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# 1.9 Key Station Terminology

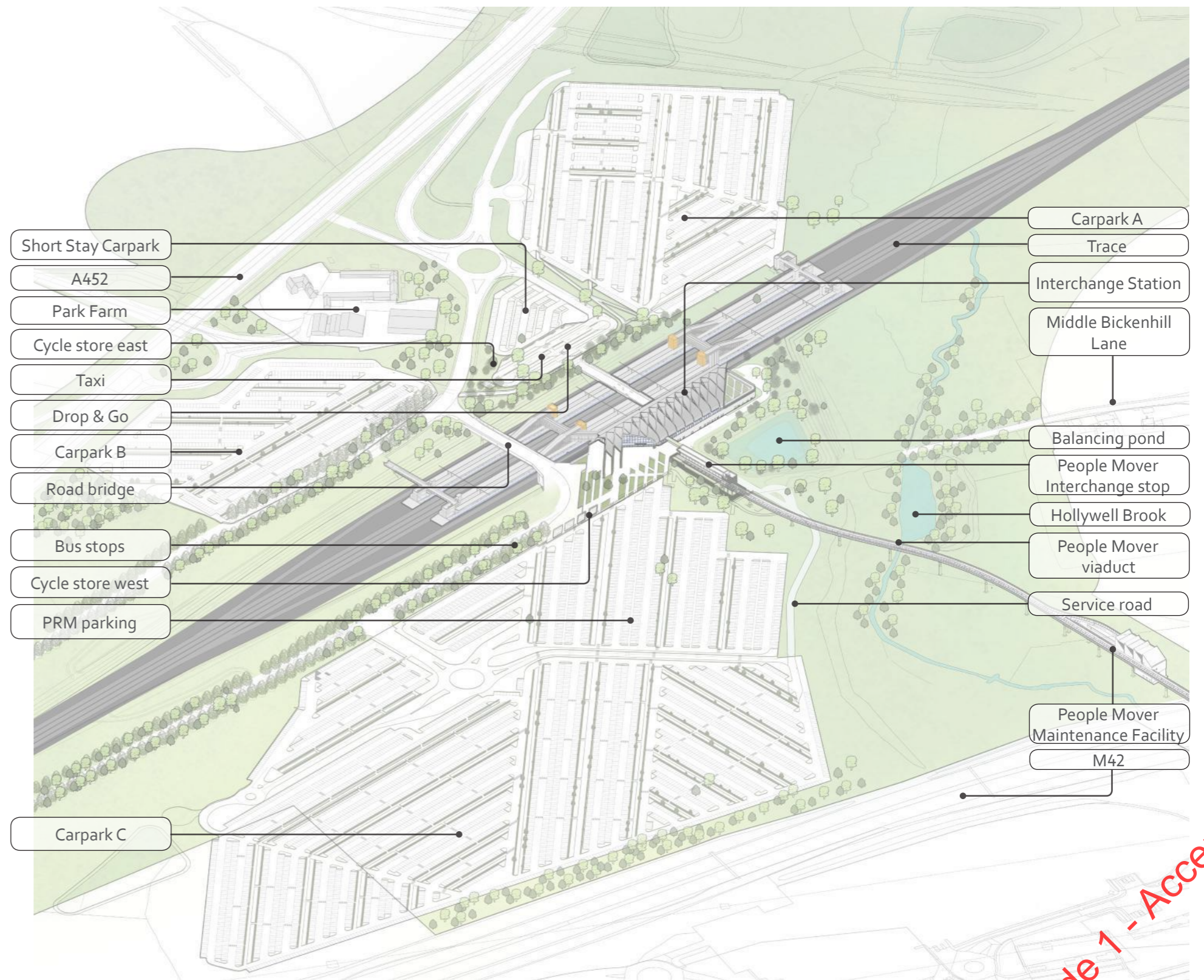


Figure 3: Key station terminology

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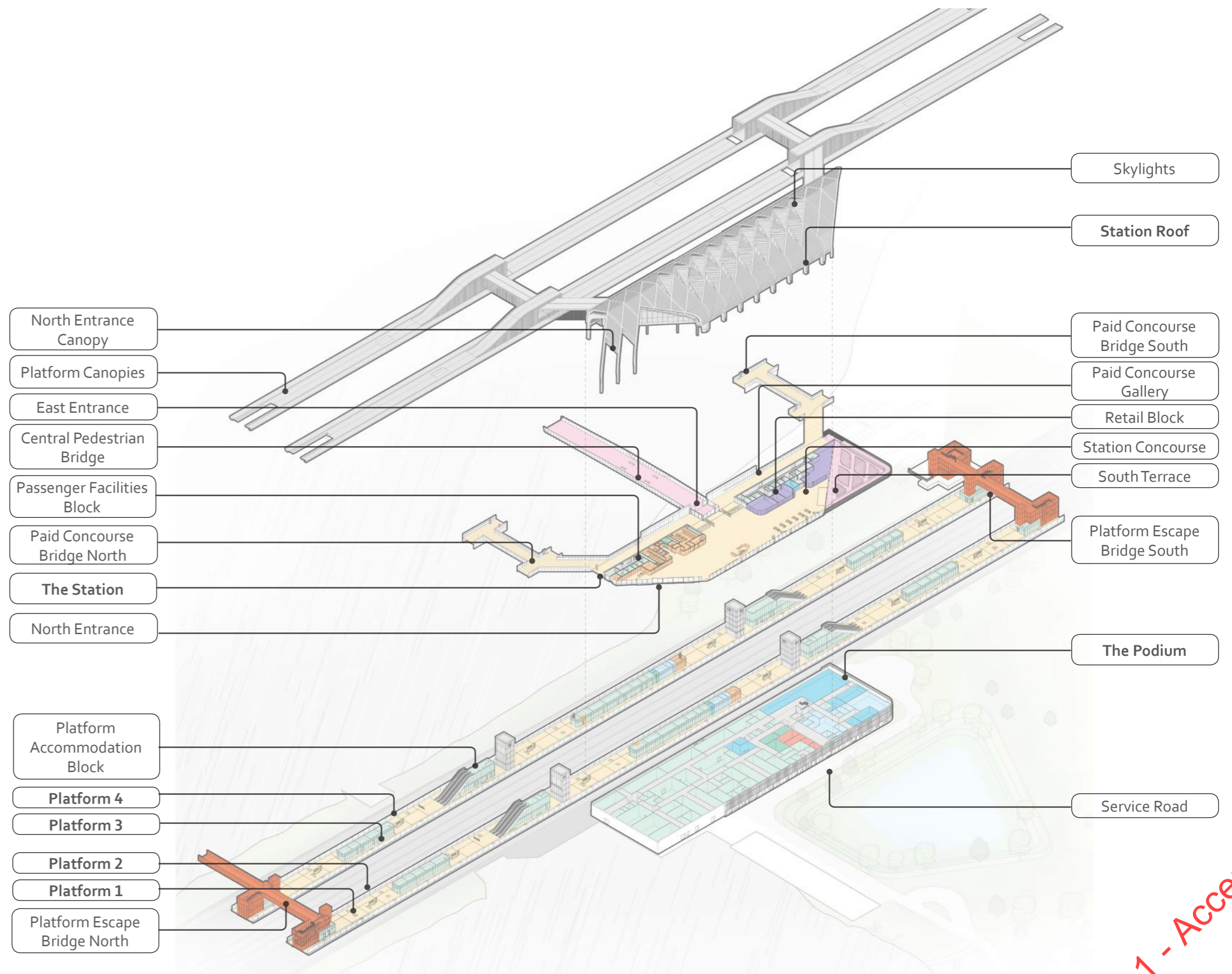


Figure 4: Key station terminology

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## 2. Context

## 2.1 Site

The station is situated within a triangle of land, which is located in the Meriden Gap, a predominantly rural area, approximately 20km to the south east of Birmingham city centre, close to Birmingham Airport and the National Exhibition Centre (NEC).

The site is completely surrounded by roads, with its boundaries determined by the M42 to the west, the A45 Coventry Road to the south and the A452 Chester Road to the east. The triangular site measures approximately 1.4 km along the southern and widest edge and 2.1 km from south to north.

The HS2 railway line crosses under the A45 to the south of the site while to the north at the apex of the triangle, the line crosses over the M42. Due to this and the site topography, the line sits on an embankment at the south of the triangular site and in cutting at the north.

The site rises gently to the north and mainly comprises of open fields with mature trees along an east-west running river valley towards the southern end of the site. Hollywell Brook is a tributary of the River Blythe that lies within this valley and is characterised by broad-leaved woodland and marshy grassland with associated habitats. A disused railway line runs across the south-eastern corner of the site.

A Grade II\* listed building (Park Farm) and a locally designated wildlife site (Denbigh Spinney) are located within the east of the site adjacent to the A452 Chester Road. In addition to Park Farm, other properties within the site are limited to residential dwellings located along on Middle Bickenhill Lane on the south side of the Hollywell Valley.

Further site characteristics include sand and gravel pits (associated with Stonebridge Quarry) within the eastern section of the site, the Olympia Motor-Cross Track, an existing road (Middle Bickenhill Lane) running between the A452 Chester Road and the A45 Coventry Road, and a line of electricity pylons crossing the middle of the site from southwest to northeast.

Interchange station provides for a travel market including Solihull, Coventry, Kenilworth, the east side of Birmingham, Sutton Coldfield, Tamworth and Nuneaton with local access to the National Exhibition Centre (NEC), Birmingham International Station and Birmingham Airport provided by the new People Mover. The new station has the potential to be a catalyst for economic growth in the immediate area and the wider sub-region.

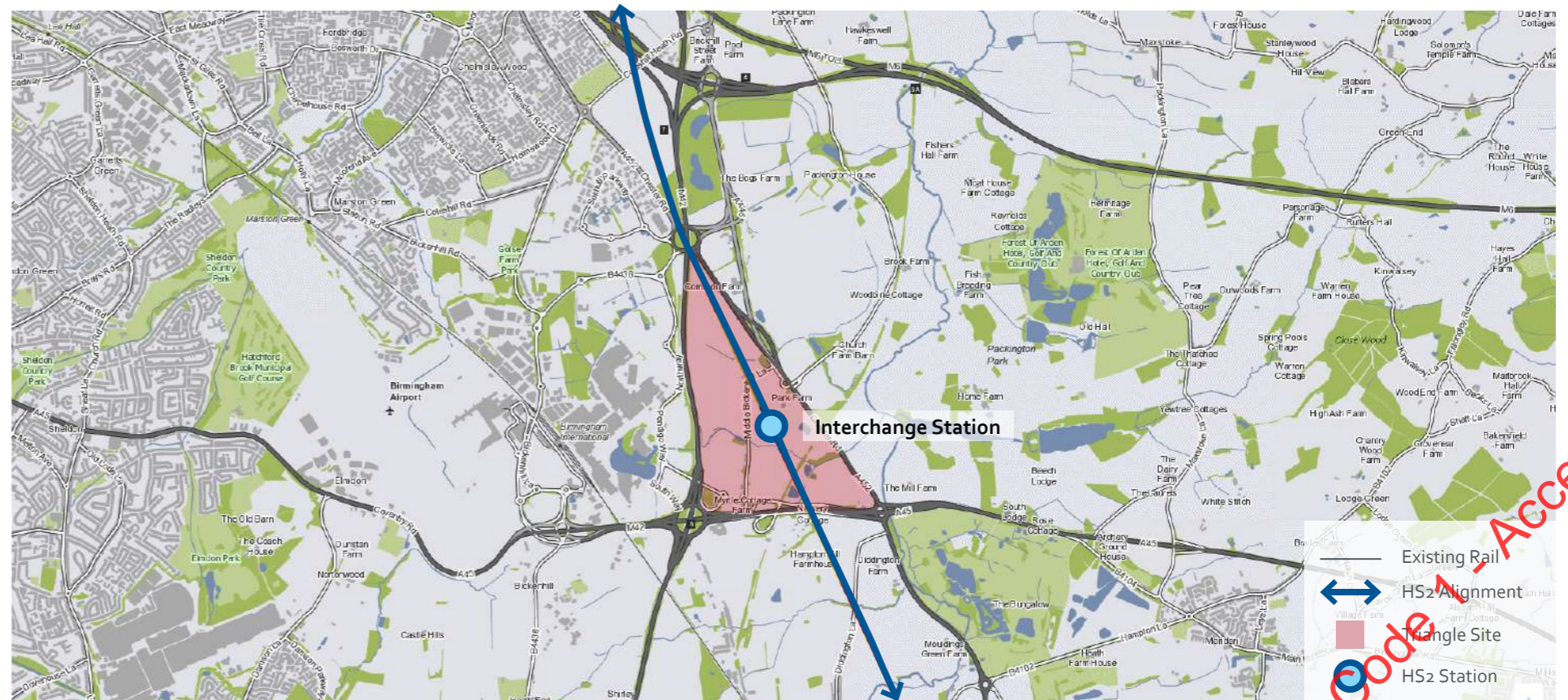
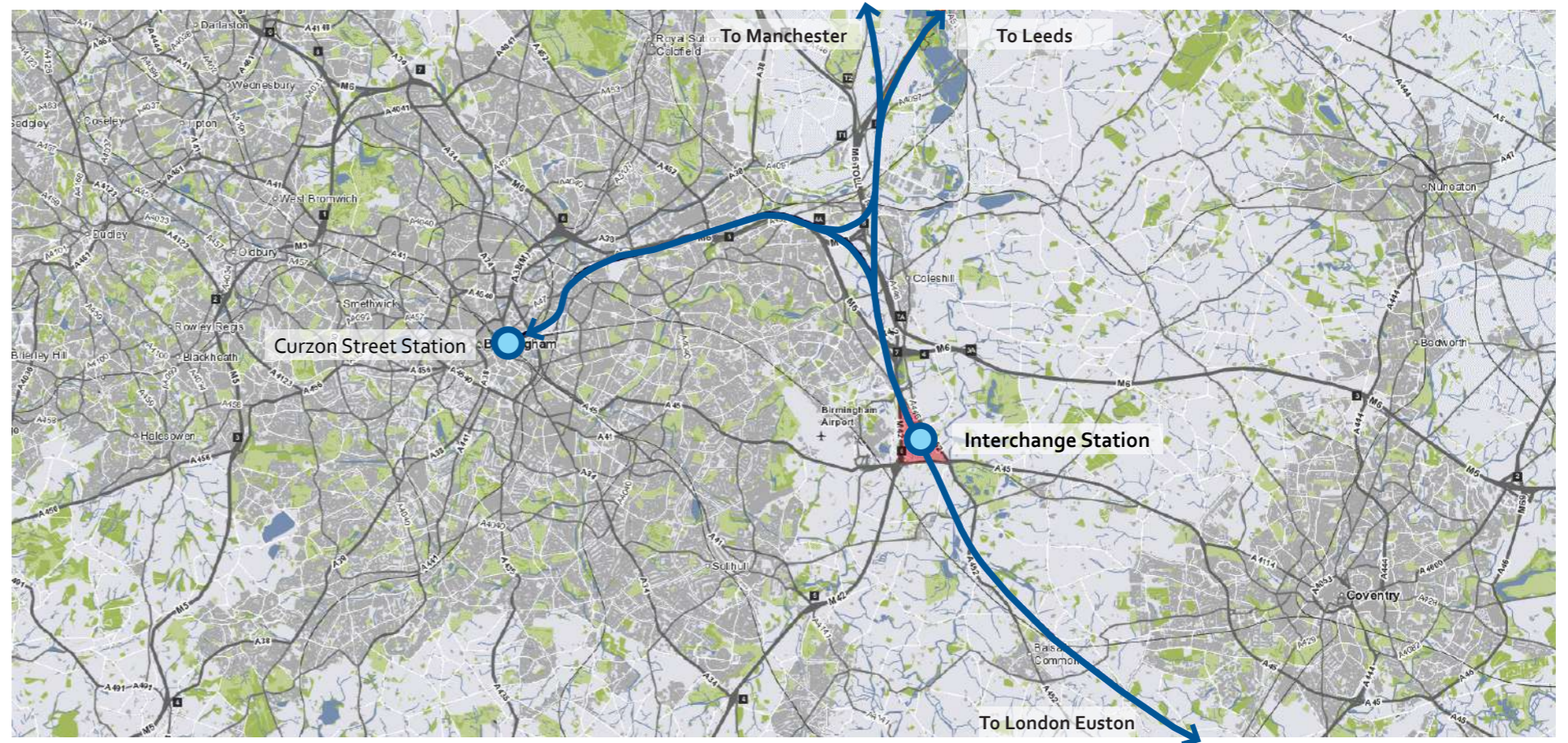


Figure 5: Location of the triangle site and its surrounding context

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# 2.2 Site Connectivity

Interchange station is strategically located and uniquely integrated into the local, regional and national and international transportation network. The station is adjacent to the motorway network, close to the M42, M6 and M40, providing links to the West Midlands and beyond.

The seamless integration of the proposed People Mover provides direct connection in a few minutes to the National Exhibition Centre and Birmingham Interchange Railway Station with convenient rail connections to the region's cities and towns and further afield. The People Mover also continues to Birmingham Airport where it terminates. The six minute People Mover journey time from the Interchange Station to the Airport provides accessibility to air travel to a range of domestic and international destinations.

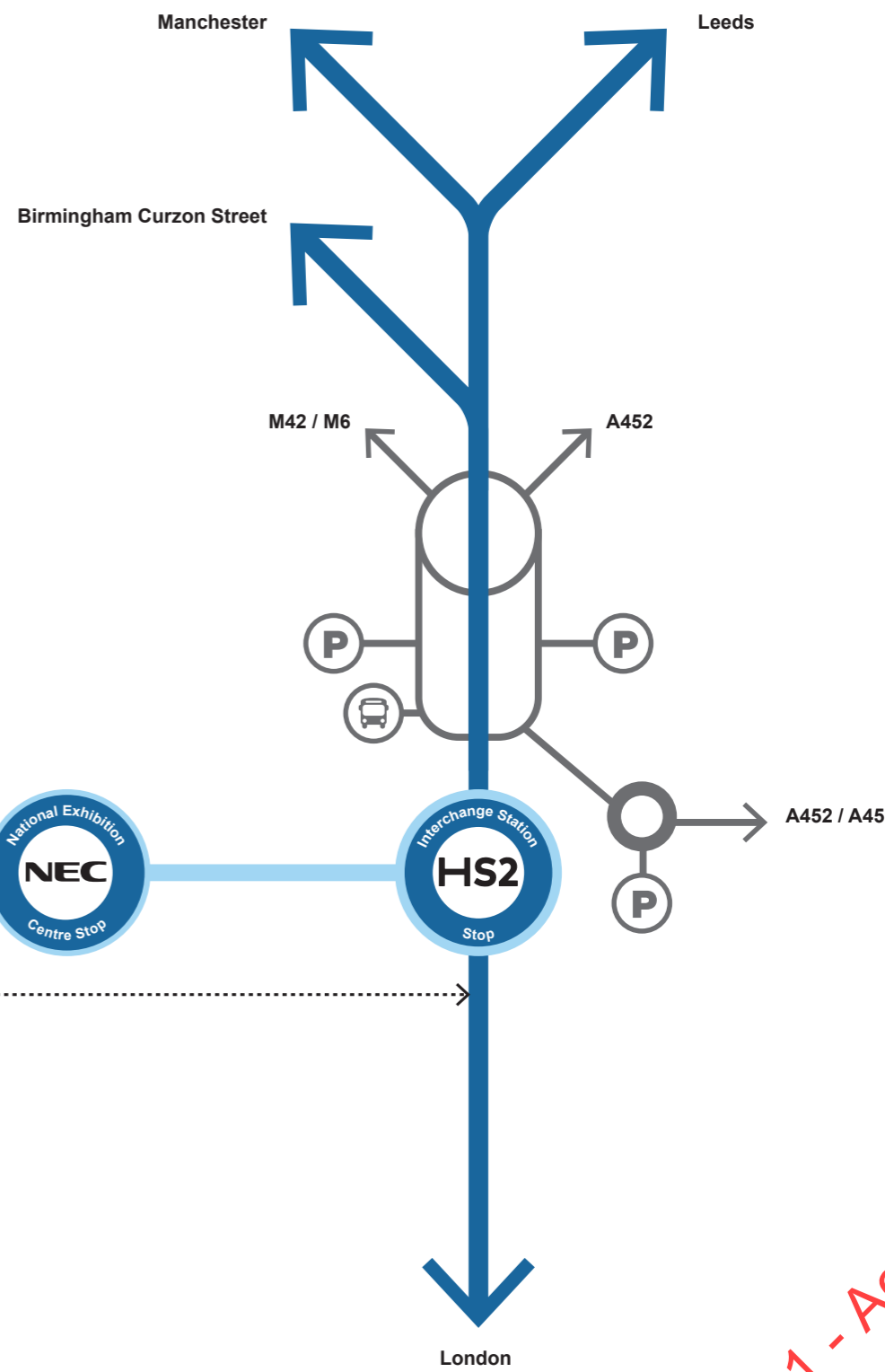
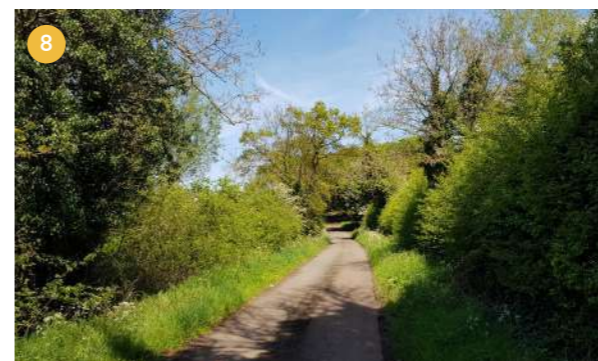


Figure 6: Connectivity Diagram

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## 2.3 Site Photographs

1. Park Farmhouse, a Grade II\* Listed Building
2. Existing trees to the south of the site
3. Quarry infrastructure at the south of the site
4. Looking West towards the station site from within the quarry
5. Looking East towards Park Farmhouse
6. View of the station site from the East
7. Existing trees around Hollywell Brook
8. Middle Bickenhill Lane
9. Looking North towards the station site across Hollywell Brook



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Figure 7: Existing aerial view of the triangle site with approximate photograph locations

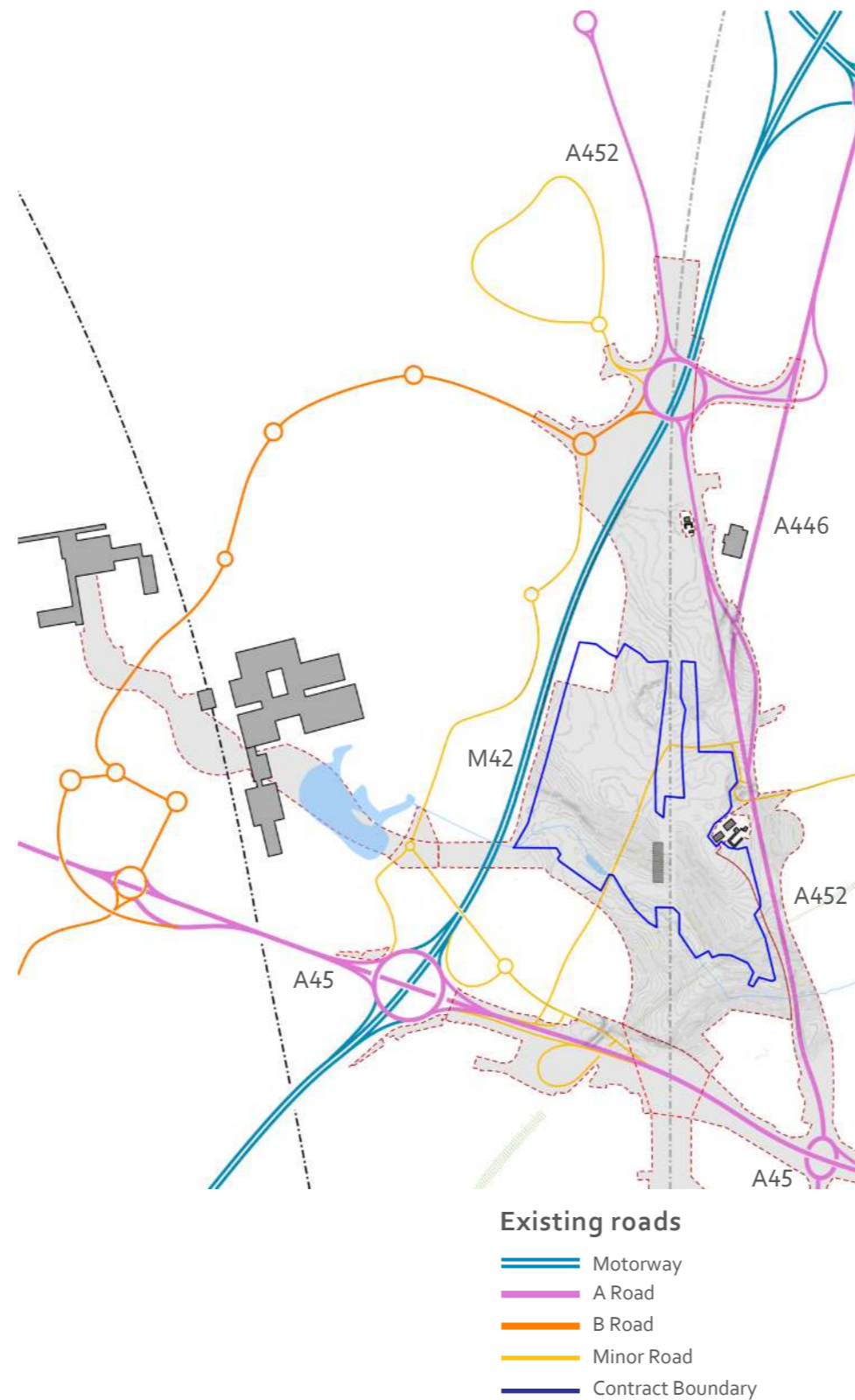
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## 2.4 Environmental Context

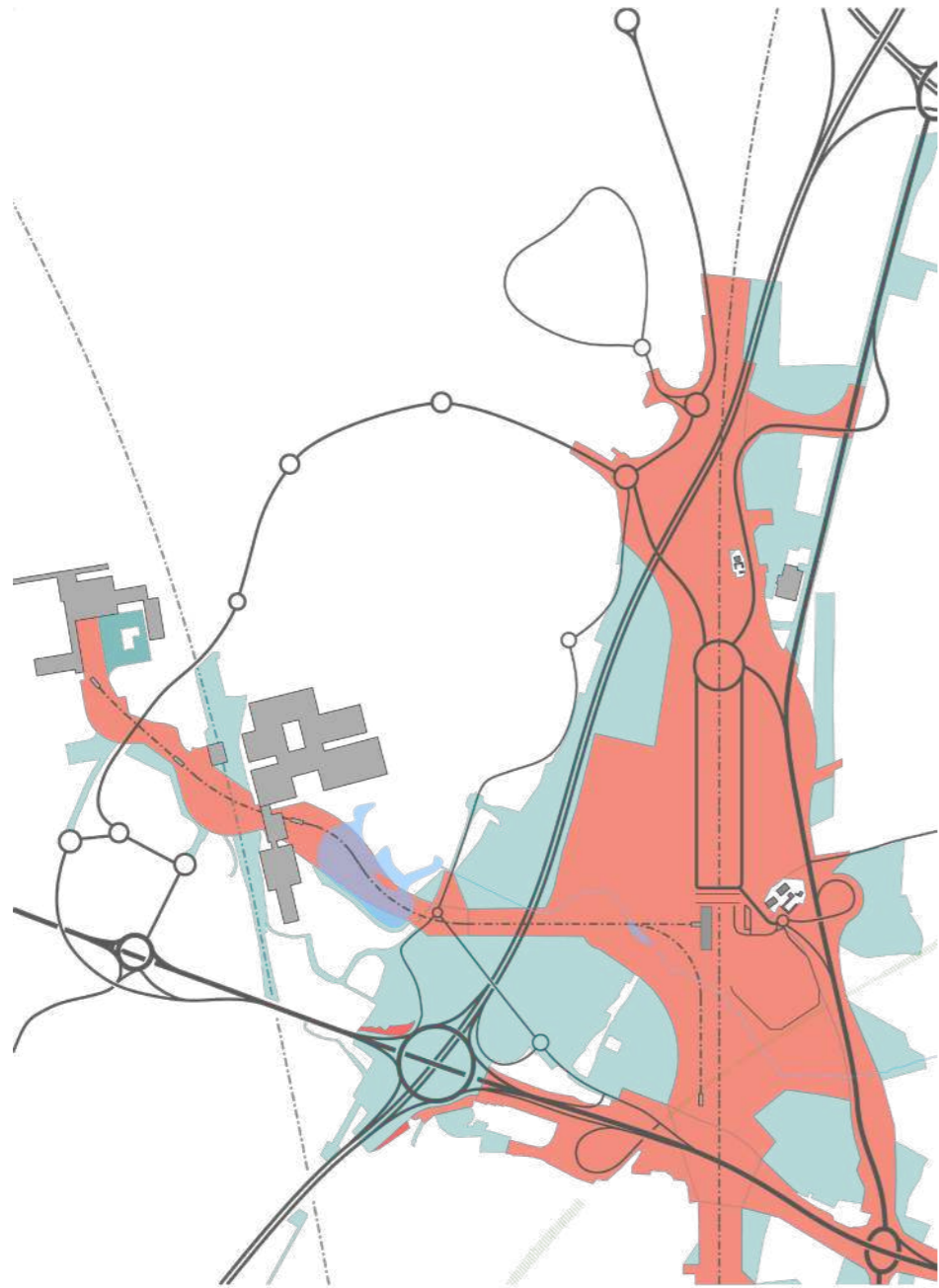
The site sits directly at the boundary between a well-developed and economically vibrant western zone comprising of Solihull Metropolitan Borough along with the National Exhibition Centre and Jaguar Land Rover and the rural open countryside of Packington Estate, the historic setting for Shakespeare's Forest of Arden to the East.

The wider site for Interchange station has a number of key characteristics which have informed the development of the station concept design:

1. In addition to the opportunity created by HS2 the site is uniquely located to the national motorway system through the M42, to a regional rail system through Birmingham International Station and internationally through Birmingham Airport.
2. The principle feature of the site is Hollywell Brook which runs diagonally through the existing lower part of the triangle dividing it into two halves. The northern section above the brook is a flat plateau which then slopes sharply down towards the flood plain of the brook. The site then rises to the south of the flood plain to create a valley.
3. There is a group of buildings of historic significance within the triangle and the Grade II\* Listed Park Farm, which is located adjacent to the A542.
4. Significant quarrying has taken place on the site to the south of Park Farm.



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HS2 boundaries (with HS2 London to Midlands Act 2017 scheme)

- LOD
- LLAU



Site constraints

- Mineral Extraction
- Flood Risk Zone
- Overhead High Voltage Power Lines
- Listed Building
- LOD

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## 2.5 Site History

Until recent times the site has remained as predominately agricultural land forming part of the village of Bickenhill. The village and Middle Bickenhill are mentioned in Domesday.

The historic OS map of 1887 shows the old Chester road to the east, now the A452, and the Birmingham and Coventry road to the south, now the A45. The site was open to the west with enclosed fields and areas of forest continuing westward and interrupted by the Coventry Birmingham rail line.

Middle Bickenhill Lane was in place running northwards from the Birmingham and Coventry road to join the Old Chester Road just below Denbigh Spinney.

The other principal features of the site, at this time, were the Holywell Brook, the Whitaker and Hampton Branch railway line and Park Farm. Further to the east of the site was the village of Little Packington and the Packington Hall Estate.

The Whitaker and Hampton Branch line cut through the site from south to the east formed part of the Stonebridge railway opening in 1839 with two tracks. This line was never wholly successful and was almost immediately downgraded to a single line in 1840, with infrequent passengers services. These continued till 1917 and the line was finally closed 1935 and the tracks were finally removed in the 1950s

Park Farm was located on the Old Chester Road. The principal building of interest is the main house which was built either at end of the 18th century or at the beginning of the 19th century. The two storey house was designed in the Strawberry Hill Gothic style.

Hollywell Brook is a tributary of the River Blythe, and runs through the site flowing west to east.

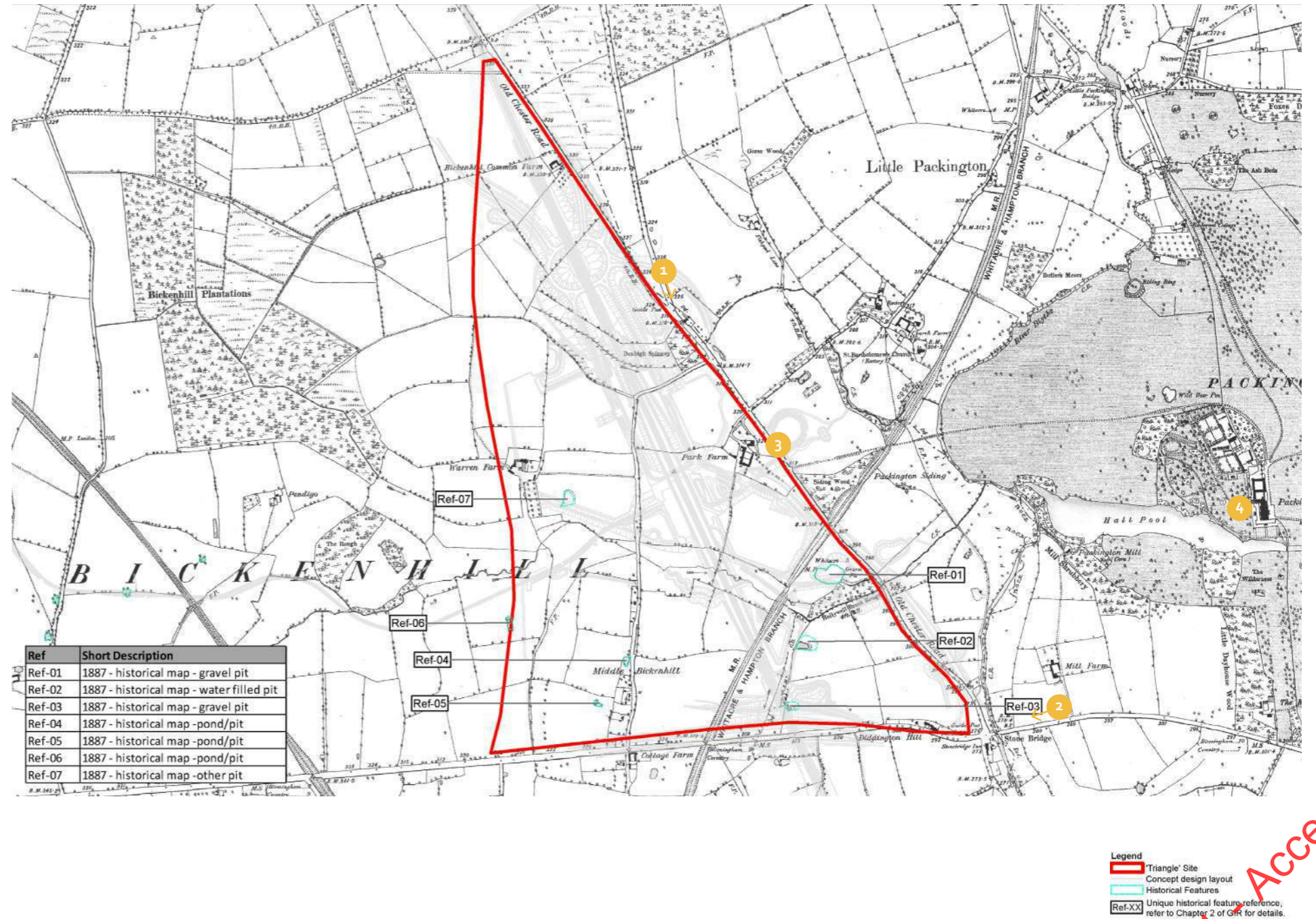


Figure 8: 1887 Site Plan with proposed scheme in grey

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Packington Hall is arguably the most important historic place of significance in the immediate context outside of the triangular site. The park and its landscape were developed from the 16th century onwards with various features added and refined over time. The gardens and landscape were in part laid out to sketch plans prepared by Capability Brown in 1750. The current house was predominately rebuilt by Matthew Brettingham during the late 17th Century. The house and grounds continued to be developed until the mid 19th Century.

The triangular site remained largely in the form shown in the historic map of 1887 until the mid 1970's when the western boundary was formed by the opening of the M42 in 1976, connecting the airport with the M6. At the same time a new station, Birmingham International was opened on the main Coventry Birmingham rail line. The NEC was also opened at the same time and connected directly to the new railway station.

Other than the extraction works the triangular site remains free of any development until today.



Figure 9: Denbigh Spinney, the Chester Road and surrounding countryside, Middle Bickenhill, from the north-west, 1935



Figure 11: Park Farm



Figure 10: Stonebridge and the Coventry Road, Middle Bickenhill, 1935



Figure 12: Packington Hall

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## 2.6 People Mover

The People Mover is a proposal to link passengers from HS2 Interchange Station to Birmingham Airport via the National Exhibition Centre (NEC) and Birmingham International Rail Station. The People Mover is covered by a separate Schedule 17 application.

The people mover network consists of an elevated viaduct to carry the people mover vehicles, together with four passenger stops and a maintenance facility.

### 2.6.1 HS2 Interchange Stop

The stop at Interchange is located within the 'triangular' development site. It is situated immediately adjacent to the Interchange Station, allowing direct connectivity for passengers.

### 2.6.2 National Exhibition Centre Stop

The NEC stop is located to the south of the main entrance to the NEC Exhibitions Halls and to the west of Pendigo Lake.

### 2.6.3 Birmingham International Station Stop

Birmingham International Station Stop is situated to the west of the station in the existing station carpark.

### 2.6.4 Birmingham Airport Stop

Birmingham Airport Stop is located at the southern end of the airport's arrivals hall.

### 2.6.5 Maintenance Facility

The on-line Maintenance Facility is also located within the triangular development site. It sits along the viaduct adjacent to the M42 in order to minimise impacts on land-take, surrounding landscape and community. The location also provides easy access from Middle Bickenhill lane.

For more information on the People Mover, refer to the separate Schedule 17 Application and Design and Access Statement.



Figure 13: HS2 People Mover, view over Pendigo Lake

Code 1 - Accepted



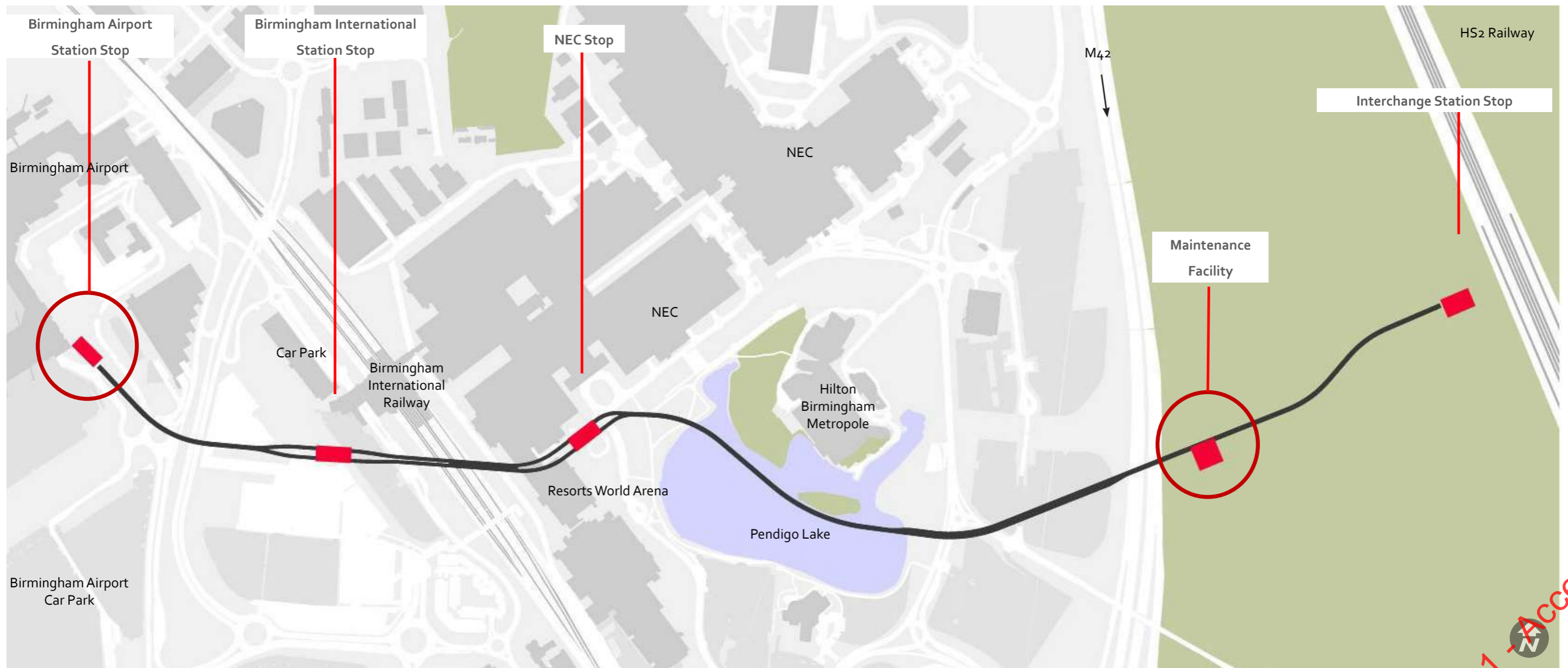


Figure 14: HS2 People Mover proposed stops location

Code 1 - Accepted



Interchange

Code 7 - Accepted

# 3. Design Vision

# 3.1 HS2 Design Vision

## 3.1.1 HS2 core design principles

The Design Vision sets out the role that design can play in making HS2 a catalyst for growth across Britain. The aim is to deliver value for money by applying the best in worldwide design and construction. The HS2 Design Vision is based on three core design principles of people, place and time. They have informed the design process for Interchange Station throughout the design stages.



### People

Design for everyone to benefit and enjoy

1. Designing for the needs of our diverse audiences
2. Engaging with communities over the life of the project
3. Inspiring excellence through creative talent



### Place

Design for a sense of place

1. Designing places and spaces that support quality of life
2. Celebrating the local within a coherent national narrative
3. Demonstrating commitment to the natural world



### Time

Design to stand the test of time

1. Designing to adapt for future generations
2. Placing a premium on the personal time of customers
3. Making the most of time to design

## 3.1.2 HS2 strategic goals

- Catalyst for growth – which means, amongst other things, ensuring opportunities are available and advertised to small and medium sized enterprises
- Capacity and connectivity – as part of a 21st century integrated transport system
- Value for money – delivering value to the UK tax payer and passenger
- Customer experience – HS2 will set new standards in customer experience
- Skills and employment – HS2 will create opportunities for skills and employment across the country
- World class standards – setting new benchmarks in occupational health and wellbeing, as well as asset management and infrastructure maintenance
- Environmentally sustainable solution – various measures to minimise environmental impacts and create an exemplar sustainable solution, engaging route-side communities and be a good neighbour

Code 1 - Accepted

### 3.1.3 HS2 sustainability goals

The strategic goals of HS2 include setting new standards for the construction and railway sectors, and to be an exemplar project in engaging with local communities, sustainability and respecting the environment. HS2 are helping to trial the BREEAM Infrastructure scheme and committed to use the latest sustainability standard on Phase One of the project, which connects London and the West Midlands. HS2 are committed to meeting BREEAM Infrastructure standards for Enabling Works, Main Works Civils, and Rail Systems with the aspiration to achieve a BREEAM 'Excellent' rating.



**Spreading the benefits:**  
Economic growth and community regeneration



**Opportunities for all:**  
Skills, employment and education



**Safe at heart: Health, safety and wellbeing**



**Respecting our surroundings:**  
Environmental protection and management



**Standing the test of time:** Design that is future-proof

*Code 1 - Accepted*

## 3.2 Interchange Design Principles

### 3.1.4 Design Principles

The overarching design principles for HS2 are central to the proposal for the Interchange station: The design will enhance the experience of passengers passing through, as well as those arriving at the station and the wider (and growing) local community, creating a civic heart for any future new neighbourhood. The station masterplan responds both to the historic Forrest of Arden landscape and to the vision for wider regeneration of the site environs.

The following principles established by HS2 and the Urban Growth Company (UGC) and Solihull Metropolitan Borough Council and have been used to underpin the development of the Station concept.

#### Customer experience

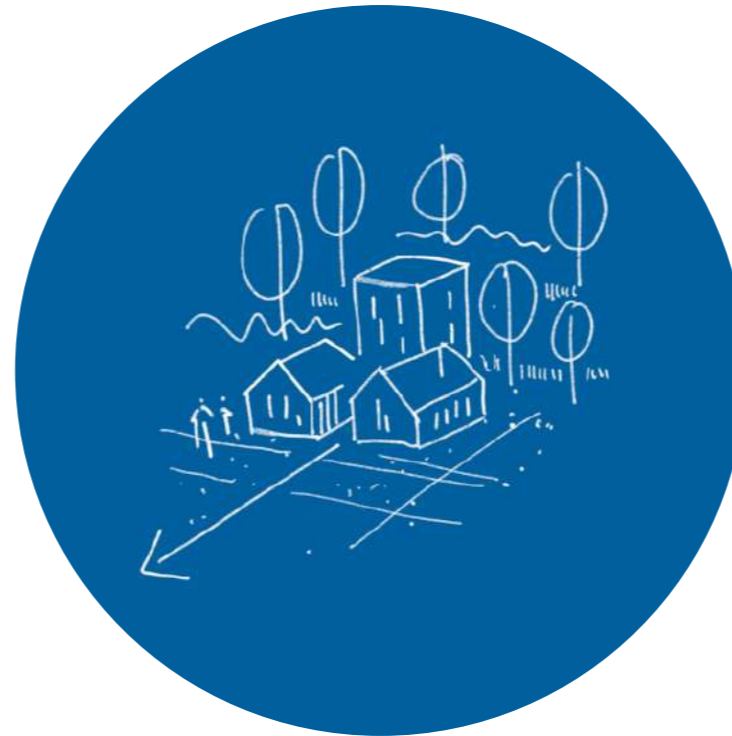
The Interchange station is designed to provide a world class experience for passengers. The HS2 customer journey starts on entering the Triangle site and each mode of arrival and departure has been considered and designed as a seamless journey. Each step of the journey is informed by and anticipates the next and is given its own distinct and memorable visual and sensory expression.

#### Topography and landscape

The vision for the site works with the landscape character and topography to enhance the setting of the station. The station uniquely capitalises on falls in level from north to south to maintain unobstructed east-west views across the tree lines and hedgerows which screen the parking. The station itself sits above the landscape, an icon for the first new railway since Victorian times, signalling the gateway to the West Midlands.

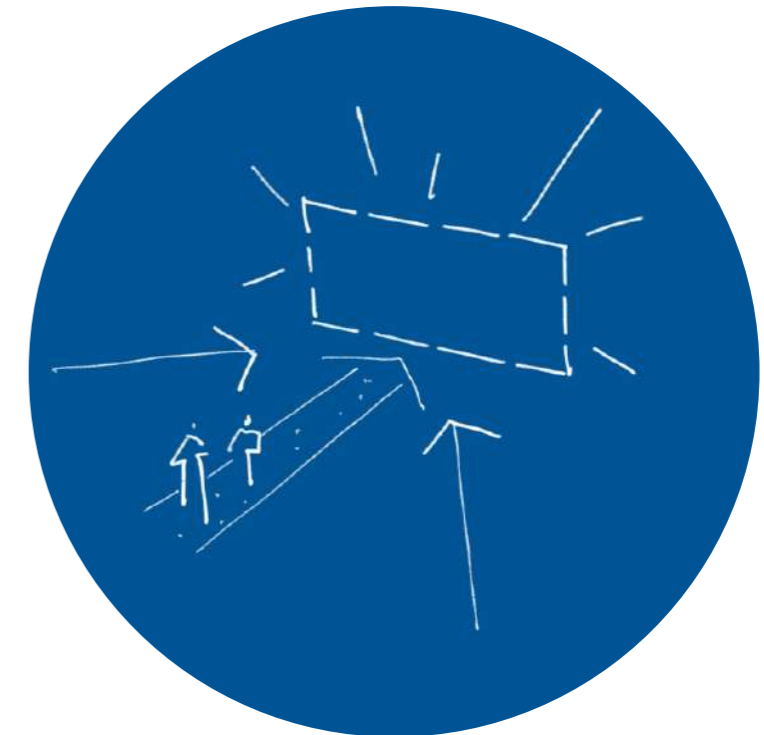
#### Orientation and legibility

The elevated station presents a beacon for HS2, clearly visible for all those approaching from afar by car, bus, People Mover, cycles or on foot. The framed views of the public realm and countryside provide differentiation and orientation for station users. The station itself is designed to be legible, orienting users effortlessly from ticketing, to gateline, to platform.



Green & Blues

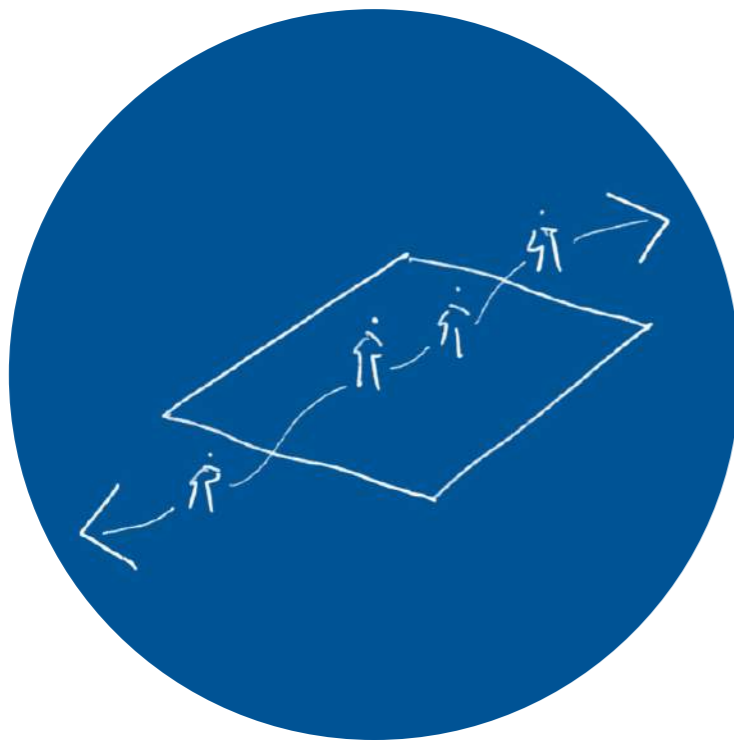
The requirements for green and blue infrastructure should be used to create a sustainable landscape and appropriate setting for the station.



Gateway Station

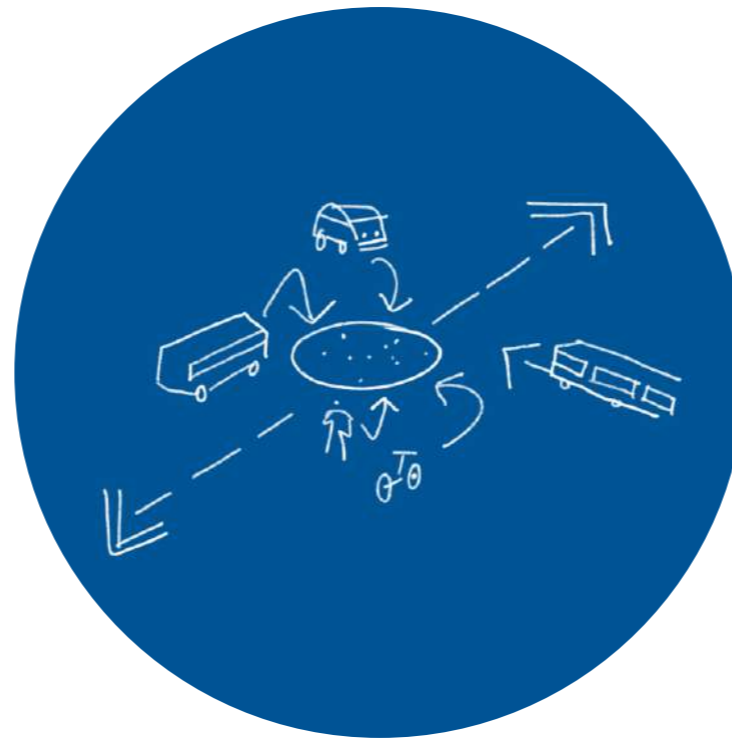
The station should act as a gateway to the Midlands and beyond by creating a memorable experience for all passengers.

Code 1 - Accepted



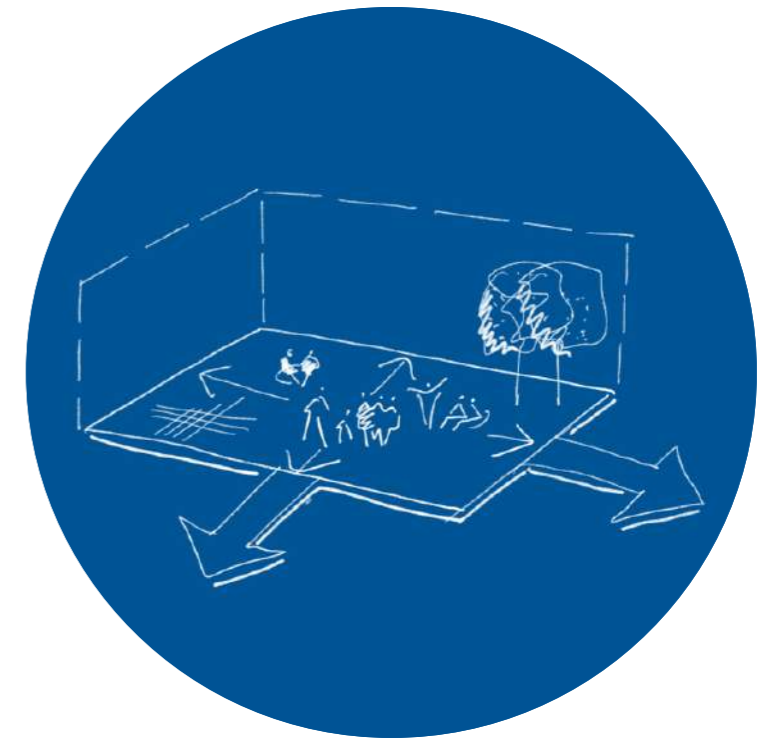
### Permeability

The design of the station should seek to seamlessly connect across the Interchange site both for HS2 passengers and future users.



### Civic Hub Placemaking

The station should be designed to act as a future Civic Hub allowing the creation of human scale public realm.



### Intermodal connectivity

The design of the station should facilitate future multimodal connectivity.

Code 1 - Accepted

## 3.3 Green and Blue



Figure 15: Forest of Arden landscape



Figure 16: A scene from 'As You Like It' - Rosalind Celia And Jacques In The Forest Of Arden by John Edmund Buckley

Interchange station is a contextual response to a unique landscape. It draws upon the historic and agricultural character of site to establish a strong sense of place and identity through its architectural form and the design of its landscape. Green and blue infrastructure is central to the station's concept and has been developed through scheme design to be embedded in the proposed scheme. This holistic approach runs across the design and is particularly evident in the landscape design.

The landscape element of the station will be vital to the passenger experience and to the visual and ecological integration of the project into its surrounding landscape. The Arden Parklands, of which Interchange station forms part, exhibits a very specific set of characteristics. The mosaic of small field enclosures which make up the Arden landscape offer helpful clues in developing a scale, grain and texture for Interchange station.

Interchange station will also seek to reconnect the site with its wider setting. The relatively recent trunking of the A45 and A452 and the arrival of the M42 have created an island, disconnected from both the suburban context to the West and rural setting to the South and East.







Code 1 - Accepted

## 3.4 Gateway Station

The architecture of the station reflects its role as a gateway to the West Midlands. On arriving at the concourse, all passengers are presented with a framed panorama of trees announcing Solihull, the NEC and the Airport in the distance. This, together with the naturalistic quality of the station roof express the sense of arriving at a special place.

The extended canopy, over the Western plaza, by framing views of the surrounding of the station also celebrates arrival. Similarly, the generous pedestrian trace bridge with its high-quality finishes provides view across the trace, reinforcing a sense of arrival by reminding passengers of the journey just made.



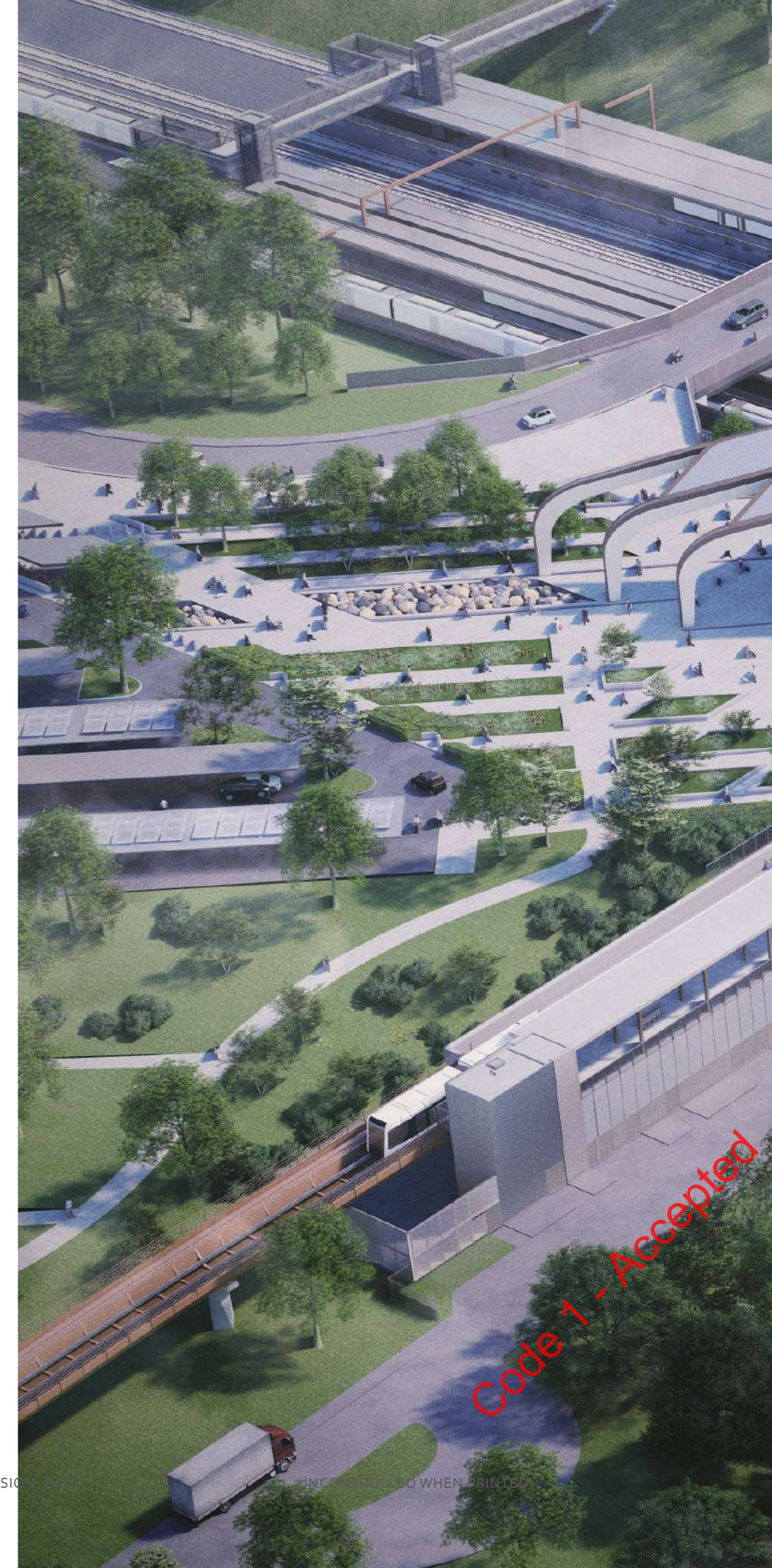


Code 1 - Accepted

## 3.5 Station in the Landscape

The station sits in sympathy with the existing landscape topography and is placed on the site to minimise regrading of the ground levels. The west public plaza and the front of the station are situated on the natural edge of the Hollywell valley at the point where the land begins to fall sharply to the brook. This allows the podium to be fitted under the concourse while remaining outside the brook's flood zone. The concourse at +98.5 AOD enjoys panoramic views above the fall of the valley.

At the platform level, the design has removed the need for retaining walls to support the eastern drop off so that apart from the station and bridge abutments the views from the platforms are either fully planted embankments or open to the surrounding countryside.





Code 1 - Accepted

## 3.6 Catalyst for Growth

The design of the Interchange station recognises the importance of transport links to seed future development and economic growth. The station has been carefully located to preserve the unique landscape features of the site, which will form the backdrop to any future development. The road system and multi-modal connections have been arranged to anticipate future development without compromising convenience and speed of use of the station.

The design of the urban realm at the two entrances of the station has been designed to act as Civic Hubs incorporating intelligent features to provide a secure and welcoming environment for pedestrians. The design, siting and orientation of the station and its urban realm has been carefully developed to create a civic heart to any future development around it, notably that being led by the UGC as part of plans for the UK Central strategic economic growth area.



Figure 17: Future growth of the triangle

Code 1 - Accepted

## 3.7 The 'Leaf' - a Context Driven Response

The Design Vision for the station and the broader site is rooted in its naturalistic context and an ecological ambition to work with nature.

The station is located to maximise views towards the valley formed by Hollywell Brook. Its form reflects its setting in a found countryside with the edges of concourse enclosure curved down towards the open landscape.

The roof is conceived as a series of interlocking diamond-shaped leaves, which like their natural inspiration are designed to work with the environment.

The leaves are upturned towards the north to allow light into the station concourse and collect rainwater and direct its flow towards storage for later reuse. Also, like their natural antecedents, when joined together, they form a bower which is then carried logically on a timber structure.

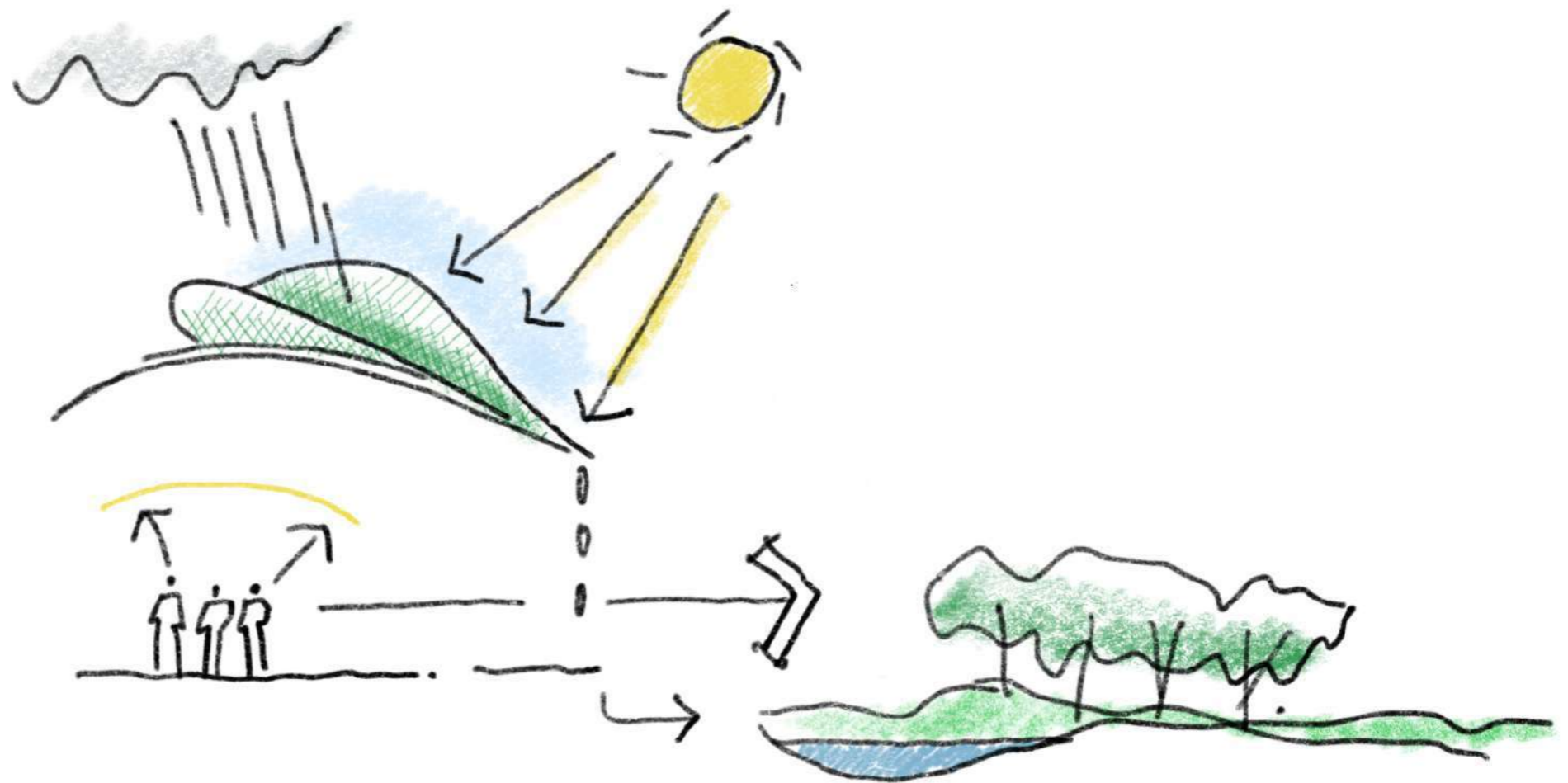


Figure 18: The leaf concept

Code 1 - Accepted

## 3.8 Art and Culture Opportunities

Incorporating Art in to the Interchange Station, the People Mover and its wider site has been an integral part of the vision for the scheme.

An Art Strategy has been developed which outlines the context, vision and proposed methodology for prioritising and creating art for the scheme through a collaborative Art + Culture Programme which aims to amplify the area's existing cultural ecology, work as a tool to make a new place and enhance the everyday life of local and visiting publics through encounters with contemporary art and cultural activity. This strategy will inform the next stage of detailed design and delivery.



Figure 19: Alice Channer, *Rockfall* (2015), Aspen Art Museum



Figure 20: Assemble, *Yardhouse* (2014), Stratford, London



Figure 21: General Public, Heathland Festival (2018), Birmingham



Figure 22: Otobong Nkanga, *Recipe for a Support Sytem* (2016-2017), Digital Drawing, Collage

Code 1 - Accepted



The strategy identifies 7 potential major commissions across the site:

- 1. People Mover
- 2. Station Interior
- 3. Feature Image Walls and Documentation of Processes
- 4. Landscape 1 – Entrance Plaza, Furniture and Blue Badge Parking Car Covers, Multimodal Canopies.
- 5. Landscape 2 – ‘Meeting/Pausing/Dwelling Places’ Resting Points, Paviours & Tarmac, Tree Planting, Wayshowing
- 6. Station Fabric: Colour of Station
- 7. HS2 Interchange Artist House: Live / Make Space: Artists Production and Residency, Community Making Space + Programme



Figure 23: 7 Major Commissions Across the Site

Code 1 - Accepted

## 3.9 Inspiration - Building in a Landscape

The design of the station reflects its setting in landscape. It has drawn inspiration from how the country houses of the 17th and 18th century sat in their picturesque landscapes. As described earlier Packington Hall to the east of the triangular site sits in a landscape that was developed to a design by Capability Brown.

These houses and their landscapes together form an interdependent whole where the mass of the construction is framed by the naturalistic elements that appear to be found in their raw state without human intervention. The landscape is often organised so that the building is both seen or approached off axis and where the entrance facades may face a formal landscape and the rear interplays with an informal one. Waterbodies are also used to create a picturesque setting that acts as a counterpoint to the building as seen at Packington Hall. And on occasion a tree might arc over a bridge giving definition to the sky and forest as seen at Kedleston Hall, Derbyshire by Robert Adam.

The design also takes further inspiration from how buildings might extend out to give capture a view of landscape in the distance. The portico at the Crematorium by Gunnar Asplund at the Woodland Cemetery, Stockholm, outlines the surrounding landscape, tying the building into its setting by creating a memorable joining between man-made artefact and nature. Similarly, at the Museum of Modern Literature, South Germany by David Chipperfield has an extended loggia which frames both the sky and the valley beyond.



Figure 24: Kedleston Hall, Derby, Robert Adam (1759)

Code 1 - Accepted



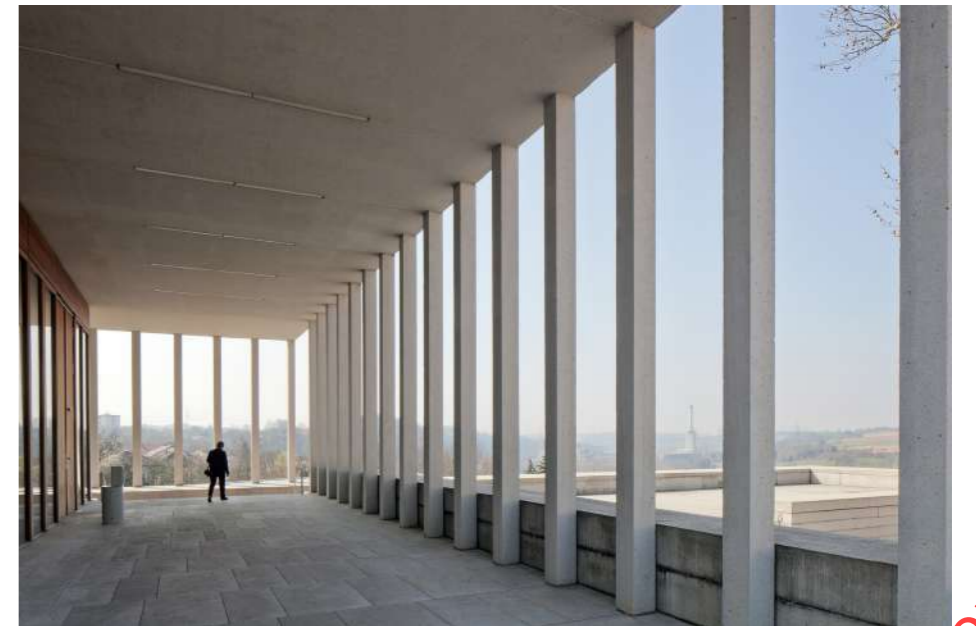
Figure 25: Kedleston Hall, Derby, Robert Adam (1759)



Figure 26: The Woodland Cemetery, Stockholm, Erik Gunnar Asplund and Sigurd Lewerentz (1940)



Figure 27: Museum of Modern Literature, David Chipperfield Architects, 2006



Code 1 - Accepted

## 3.10 Inspiration - Timber

The station's use of timber structure is inspired both by historic precedent and modern use.

Brunel's original terminus at Temple Meads has a timber cantilevered roof and was completed in 1841. The original roof of Kings Cross by Lewis Cubitt when opened in 1852 was supported by laminated timber arches. These were replaced by the current wrought iron structure from 1867.

In Europe, the roof of Stockholm Station opened in 1925 and in place today, is a glulam structure.

Modern example of the use of timber in transport buildings include Mactan-Cebu Airport in the Philippines. Here a series of timber arches create a warm and welcoming concourse for passengers. At the railway station at L'Orient Bretagne Sud a simple rectangular glulam structure carries the station canopy and encloses the station concourse providing a sense of arrival and openness.



Figure 28: Mactan - Cebu International Airport Terminal 2, Integrated Design Associates with Arup (2018)

Code 1 - Accepted



Figure 29: Mactan - Cebu International Airport, Integrated Design Associates with Arup 2018



Figure 30: Lorient Bretagne Sud, Arep Group, 2017



Code 1 - Accepted

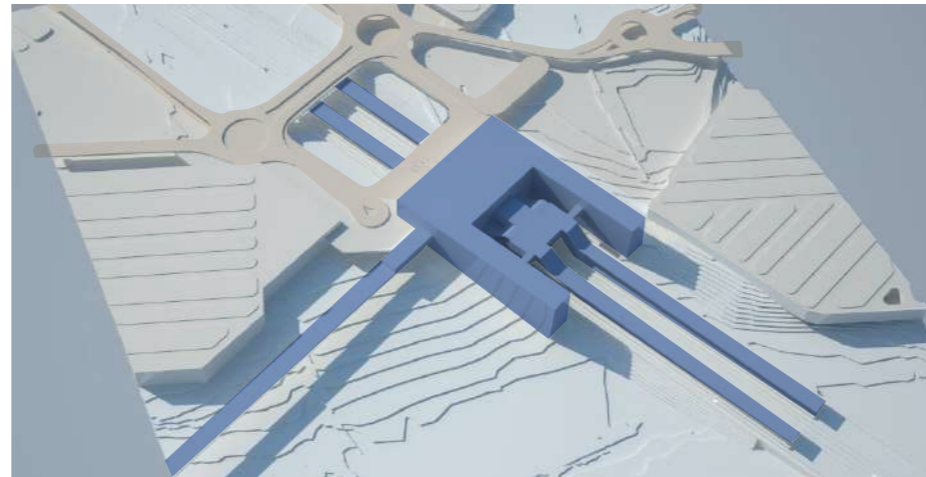
# 3.11 Station Design Development

Schedule 17 design work commenced in early Spring 2018 with the Concept design stage, the purpose of which was to arrive at a single preferred option. The starting point for this design stage was the Final Preliminary Design (FPD) scheme.

This scheme was a development of the Hybrid Bill Design with international provision omitted and with the main body of the station bridging over the trace. The primary vehicular access across the trace sat north of the station, with taxi ranks, Drop & Go parking, and short-stay parking to the north and bus stops to the west. Car parking was arranged in three areas with the smallest carpark at northeast, the south-east and the largest carpark to the west. The People Mover was located to the east and directly connected into the station concourse. The main entrance to the unpaid concourse was from a northern plaza, sitting over the trace. The two platforms were accessed by a single, 'T' shaped paid concourse located to the south of the concourse. The primary back of house accommodation was located below the concourse either side of the trace, with smaller station operations located on a mezzanine above the concourse retail.

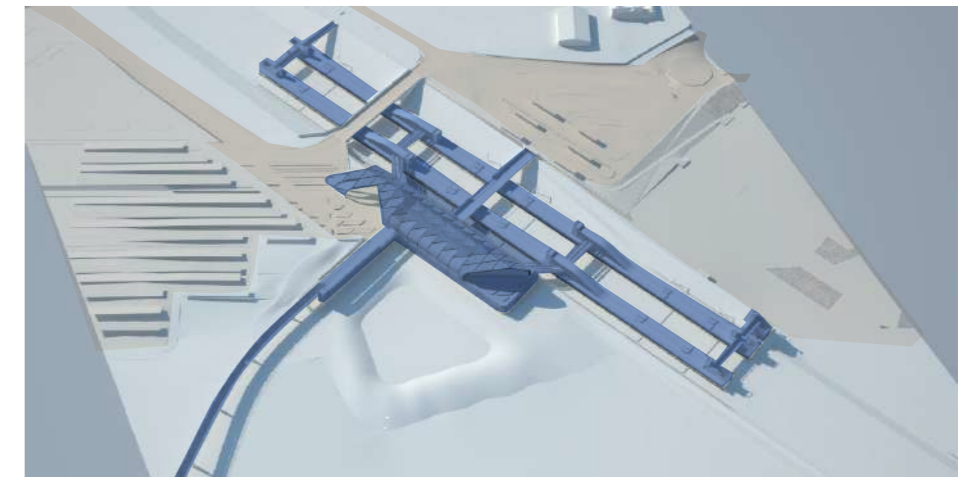
The early phase of design in the Spring of 2018 investigated options for the location of the station. Options examined included maintaining the station in its Hybrid Bill location over the railways tracks, to the east and the west side of the tracks. These options were then assessed and the western location was preferred as it provided greater alignment with the HS2 Vision. This formed the basis of subsequent design developments.

## Hybrid Bill: Outline Scheme



- Station sized to accommodate 9TPH in each direction
- Station concourse sits over trace
- Paid concourse sits over trace
- Centralised access to platforms
- Passenger entrance from over-trace public plaza
- Separate road bridge provide access across traces
- People Mover stop opens directly into station concourse

## Schedule 17: Proposed Scheme



- Station sized to accommodate 5TPH in each direction
- Platform moved north approximately 70m
- Single storey podium
- Paid concourse sits off trace
- Access to platform at quarter points
- Separate pedestrian bridge provides access to taxi drop off, Drop & Go and short term parking on the East of the trace
- Separate road bridge provides access over the trace
- Escape from ends of the platform via overbridges connecting to the east of the trace.

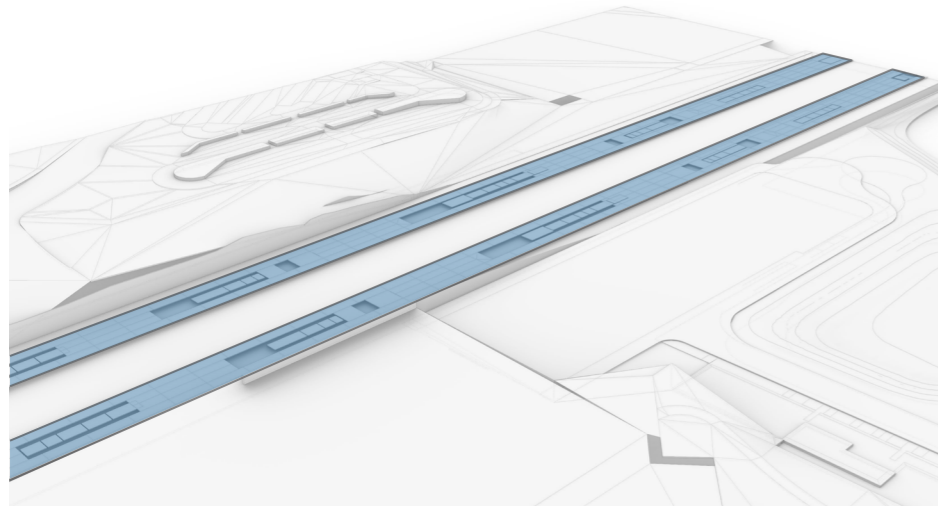
Code 1 - Accepted



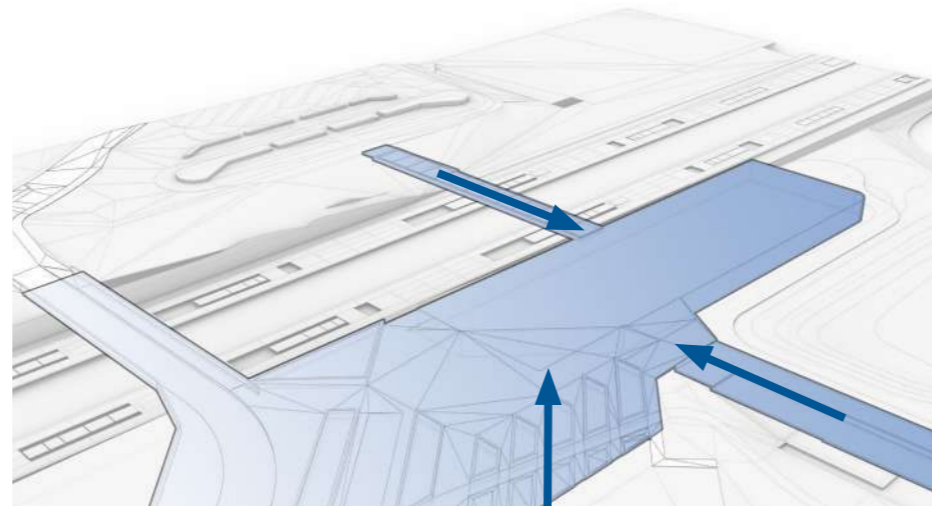
Figure 31: Proposed scheme for Schedule 17

Code 1 - Accepted

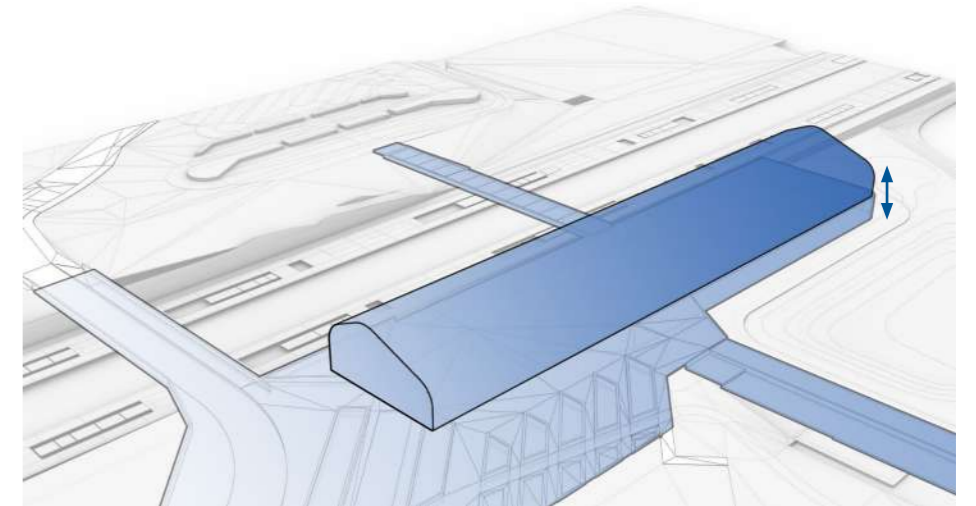
# 3.12 Design Evolution



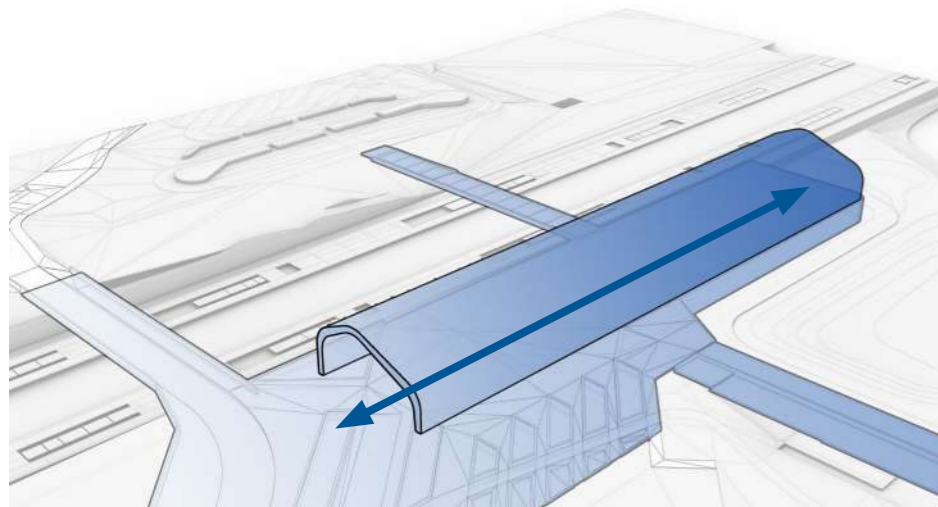
**1** Location of station responds to the site topography and the location of the platforms.



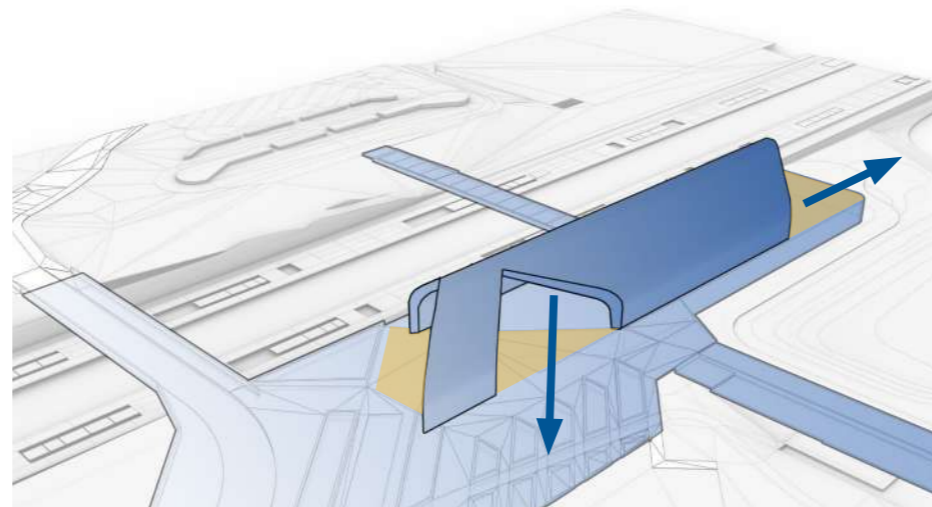
**2** Passengers directly connect to the station from car parking and multi-modal transport links.



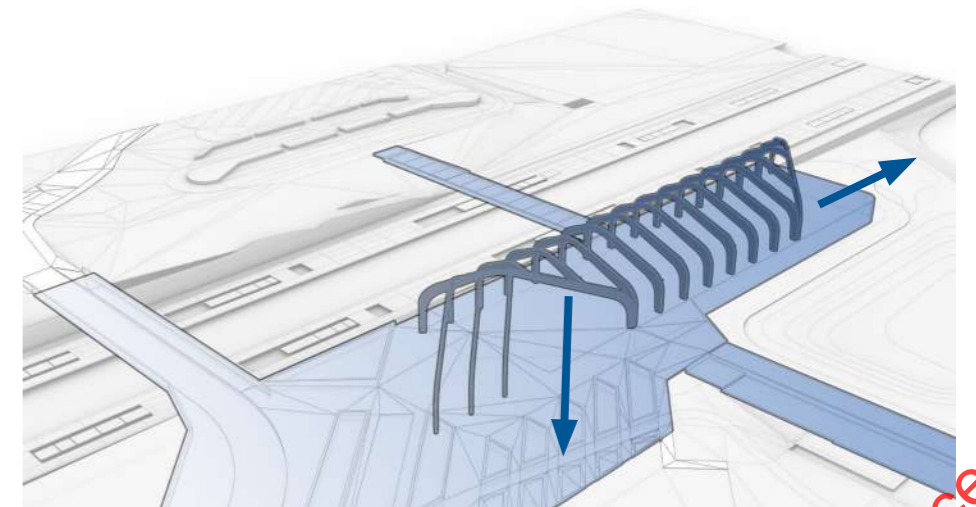
**3** The station concourse is enclosed by a single extruded volume, that responds to the landscape setting.



**4** The extruded internal volume of the concourse is expressed at each gable reinforcing a sense of direction.



**5** The northern gable is rotated to define a public plaza and the southern gable toward the landscape view.

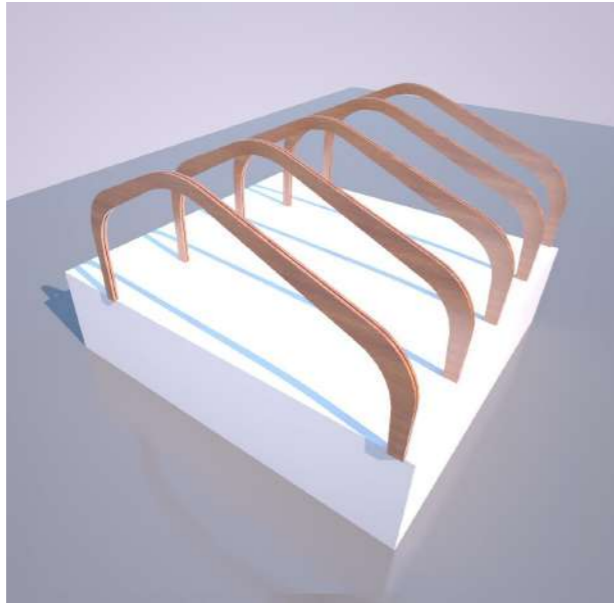


**6** The concourse is formed of a series of expressed modular portals.

Code 1 - Accepted

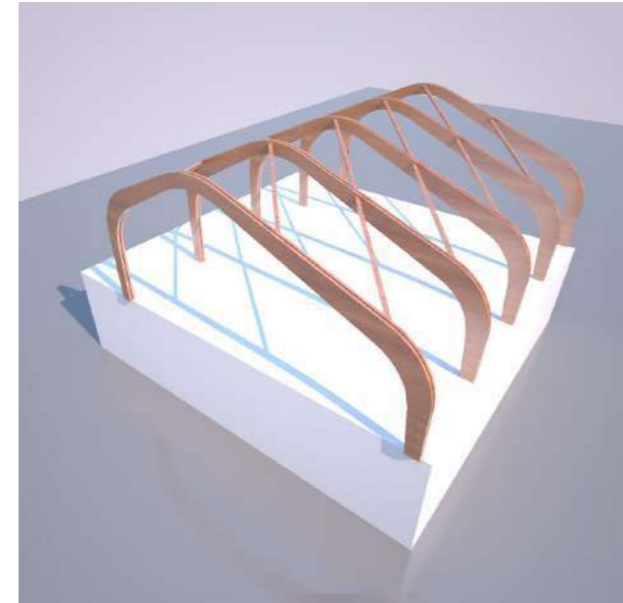


## 3.13 Station Form



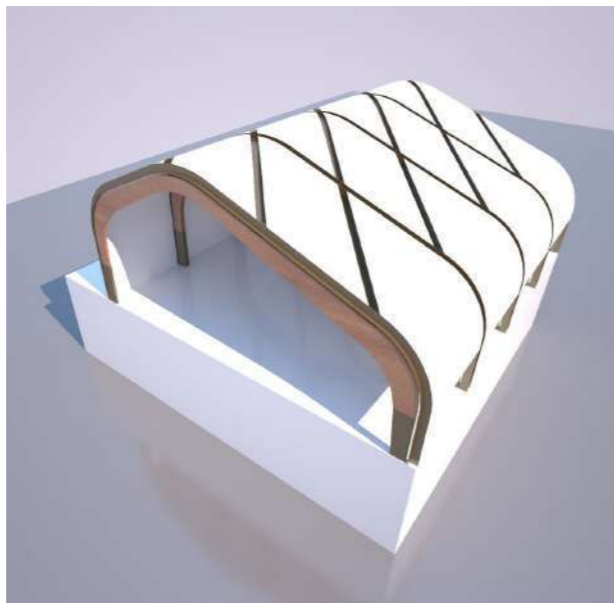
①

Roof form is generated from timber portals at 9m centres.



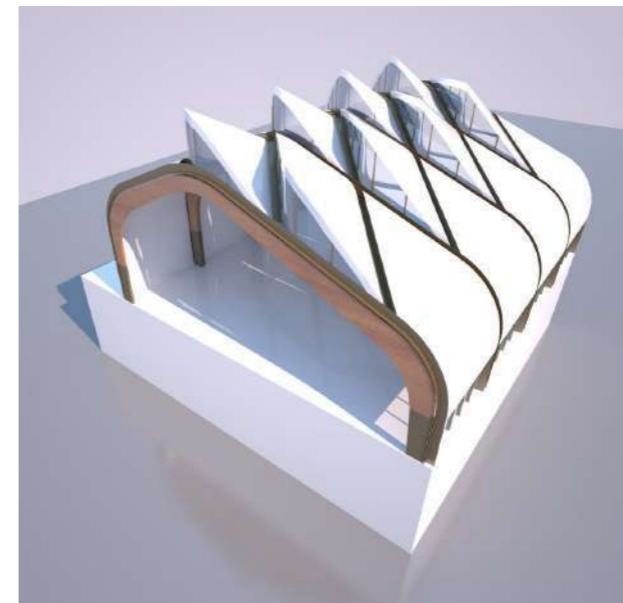
②

Diagonal timber members are introduced, orientated to the north to brace the structure.



③

A standing seam roof encloses the structure with gutters following the line of structure dividing the roof into a series of leaves.



④

The leaves are lifted up towards the north to form north lights.

Code 1 - Accepted



04

02

Code 1 - Accepted

# 4. Arrangement

# 4.1 Site Arrangement

The site is arranged around the topography of the landscape, with the station itself nestled at the edge of a valley around the Hollywell Brook. Interchange with buses, coaches, taxis and Drop & Go facilities is sited as close as possible to the station forecourt, with surface car parks located immediately beyond the other multi-modal provision. These all allow for step free access whilst maintaining opportunities for future development around each station entrance and plaza on either side of the trace.

## 4.1.1 Cyclists and Pedestrians

Cycle routes are provided to allow north-south and east-west transit through the triangle. Each cycle route consists of a minimum 3.0m shared-use pedestrian and cycle path. At the triangle boundary, the routes link with the off-site cycle facilities designed by EWC. The existing link across the site that is currently via Middle Bickenhill Lane is maintained as a route for cyclists and pedestrians.

## 4.1.2 Buses

A bus stop lay-by for up to three full-size buses or coaches is located on the West Link road between the station and the Car Park C access junction. The bus stop facilities will include shelters.

The lay-by is on the west side of the West Link road; the working assumption being that buses will enter the site from either the East Link road or from the A452 and all exit via the West Link Road. This arrangement simplifies pedestrian routes to the bus lay-by, avoids the need for additional pedestrian crossings and removes the potential hazard of pedestrians crossing away from the proper facilities.

## 4.1.3 Highways layout

The road layout around the site connects into the wider motorway network. The fundamental basis of the highways design is driven by the access and parking arrangements necessary to service the station. The triangle highway network has three access points; entry and exit on each of the two link roads from the Northern Roundabout and entry/exit from the A452 Chester Road

south only. The two single carriageway access roads, parallel to the trace with one on each side, run south for approximately 600m where they turn towards each other and link via a bridge over the trace. Adjacent to the bridge a signal-controlled junction joins the East access road to a roundabout that gives access to Car Park A and the short-stay car park, taxi and drop off areas. Beyond the roundabout two-lane carriageways form the outbound and inbound slip roads from A452 Chester Road into the triangle.

## 4.1.4 Taxis and Drop & Go

The taxi and Drop & Go facilities are located on the east side of the trace, opposite the station building to which it is connected by a footbridge which also serves the public short-stay car park. The taxi pick-up, set-down and waiting area comprises some 80 linear metres of kerb, sufficient for up to 13 vehicles at one time. The drop off area comprises some 154 linear metres of kerb, sufficient for up to 25 vehicles at one time.

Admission to the short-stay car park, taxi rank and drop off area is from the A452 site access roundabout. Barrier controls are not expected to be provided, and management is expected to be undertaken manually by parking attendants; which is more efficient than automated systems for maximising use of spaces in high-turnover areas.

## 4.1.5 Car Parks

The car parking requirement for the station has been derived from the PLANET national long distance travel model and forecast Phase 2 demand. This takes into account key factors including peak daily use of the station, regional car parking mode share, car occupancy, time of day arrival/departure profiles, parking efficiency and day-to-day variation, and allowance for long term growth and flexibility. There are 7400 visitor car parking spaces proposed. The following describes the distribution.

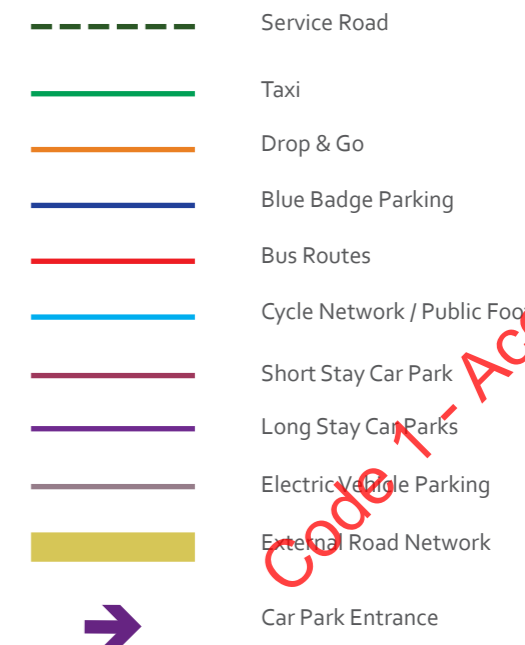
There are three main long-stay visitor car parks. Car Parks A and B are accessed from the East Access Road and have capacities of 1,530 and 943 spaces respectively. The largest car park, Car Park C is west of the trace and accessed from the West Access Road via a signal controlled 'T' junction. The car park access road links to a roundabout from which two arms to the north

allow access and egress to Car Park C North via separate double barriers for entry and exit. Two further exit-only barriers are located at the south-west edge of the car park, linked to the roundabout via the station service road. This car park has 4,060 standard 4.8m x 2.4m spaces. From the roundabout a further two arms to the south allow access and egress to Car Park C South, again via separate double barriers for entry and exit. This car park has 440 fully accessible spaces of 4.8m x 2.4m with a 1.2m protected strip to the rear and one side, plus 296 oversize spaces 6.0m x 3.6m to accommodate larger SUV types of vehicle or for future conversion to full accessible spaces.

A short-stay car park of 127 standard and 4 accessible spaces is located on the east side of the trace, opposite the station building to which it is connected by a footbridge which also serves the taxi ranks and drop-off facility.

## 4.1.6 Staff parking

In the north-west corner of Car Park A, 37 standard spaces are allocated for staff parking. Three accessible spaces for staff are allocated in Car Park C. These spaces are not fenced off or controlled and will be delineated by markings or signage.



Code 1 - Accepted



A446

A452

Car Park B  
943 spaces

Car Park A  
1530 spaces

Cycle  
Parking  
(42)

Short stay  
Drop & Go  
Taxi

Staff Car Park

Bus Stops

Station

Cycle Parking  
(134)

Blue Badge  
Parking

Car Park C  
4796 spaces

A45

M42

Code 1 - Accepted

## 4.2 Intermodal Arrangement

### 4.1.7 Intermodal strategy

The intermodal strategy is fundamental to the layout of the site and the design of the public realm. It has been designed to facilitate seamless transfer between all modes of transport in the local area.

The public realm design enhances and improves pedestrian connections between public spaces and public transport facilities. Transition spaces are designed so they are safe, legible and comfortable to move through and fit with the local context. The public realm connects with local walking, cycling and transport networks. Walking and cycling routes are convenient and direct, linking key components to create a cohesive environment.

The West Plaza is a lively space in front of the north entrance to the station, which faces out to the west. It provides the entrance for those arriving by buses, People Mover, cycle and from Car Park C. In the long term it could also be used by those arriving by Metro or Sprint.

The East Plaza is the hub for passengers arriving from the other side of the trace. Taxi drop off, Drop & Go, short stay car park and cycle storage are located in front of the central pedestrian bridge entrance.

From Car Park B, passengers will cross the road and are directed towards the central pedestrian bridge through the landscape. Passengers from Car Park A have a graded approach or steps up to the East Plaza. The layout of the intermodal connections has been designed to minimise conflicting routes of vehicular, cycle and pedestrian movements.

To the north of the main entrance a new proposed vehicular bridge connects East and West sides over the trace.

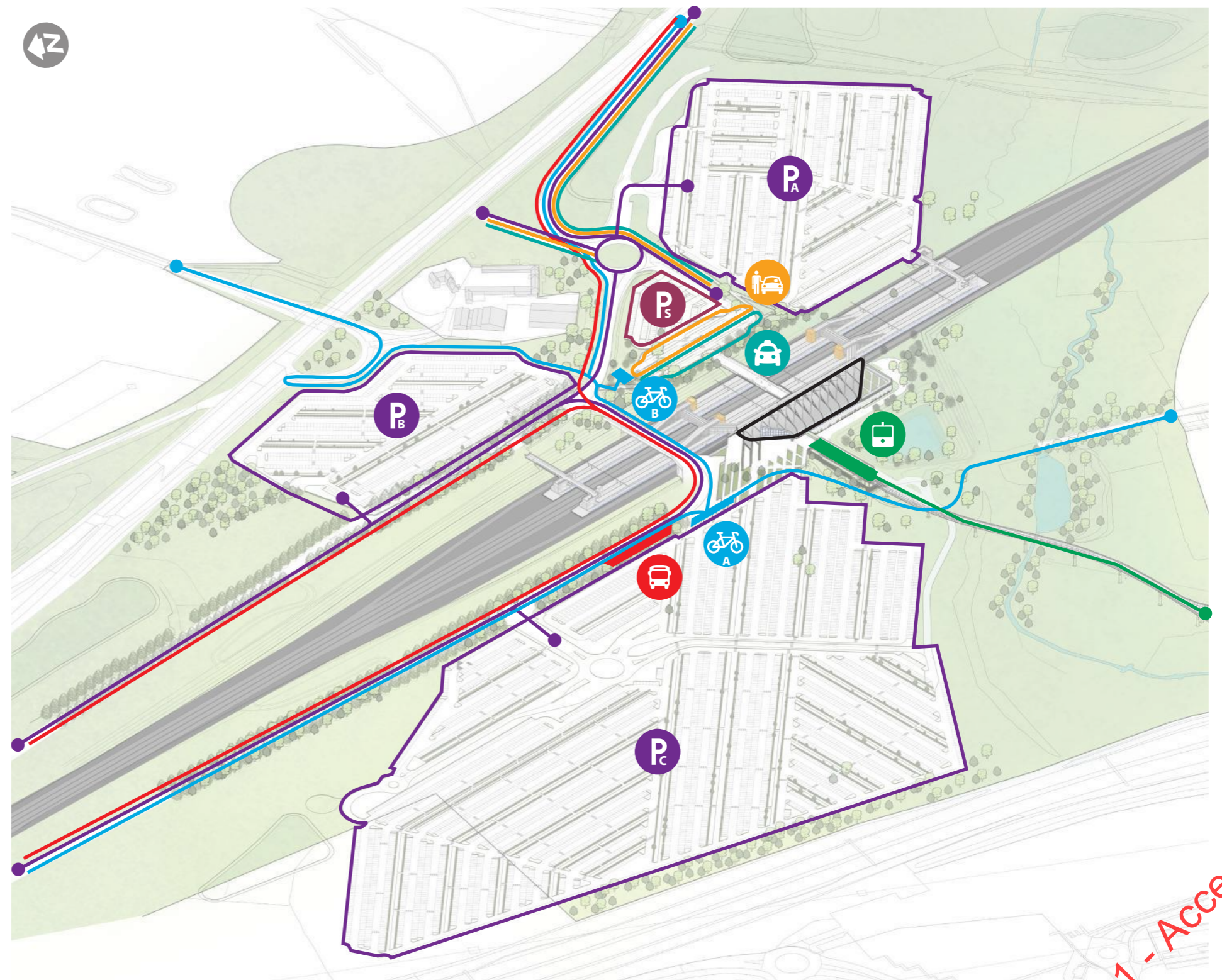












Figure 32: Connections to wider intermodal networks

Code 1 - Accepted

-  Taxi
-  Drop & Go
-  People Mover
-  Bus
-  Car Park A
-  Car Park B
-  Car Park C
-  Short Stay Car Park
-  Cycle Storage A
-  Cycle Storage B

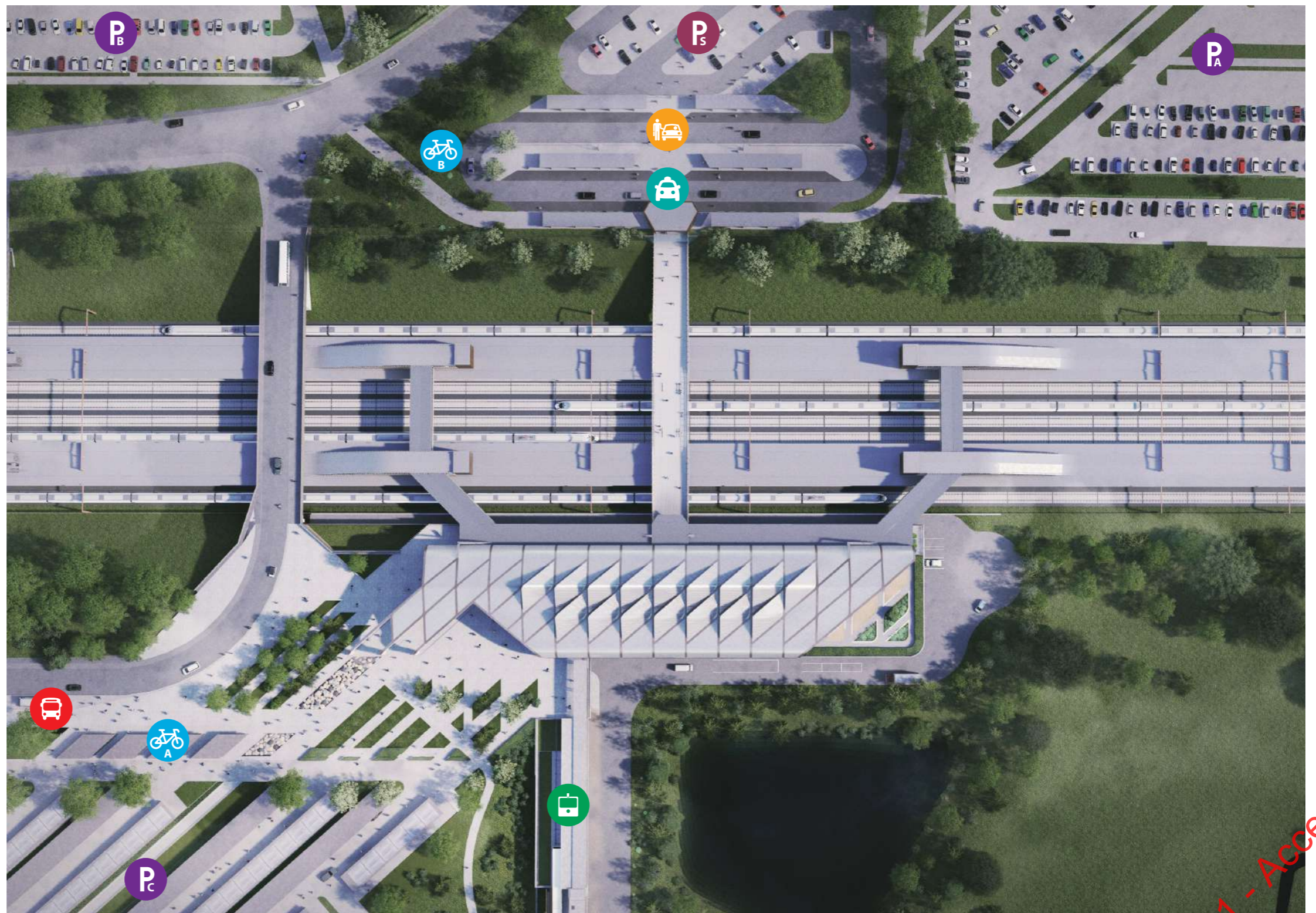


Figure 33: Intermodal connections at Interchange Station

Code 1 - Accepted

## 4.3 Public Plazas

The public plazas are designed to allow ease of movement, intuitive navigation and a sense of place for all customers. The East and West Plazas demarcate the entrance to the Station. A terrace at the south of the building gives further public amenity. Collectively the public spaces give customers a 360 degree experience of the station. The station architecture has been used to give each space an individual character:

- The external canopy is a landmark of the West Plaza, creating covered space in front of the station's entrance. The southern edge of the West plaza will also incorporate vantage points for visitors of the pond and brook to the south.
- The East plaza is connected to the station by the central pedestrian bridge. It is a gateway to the station's concourse, which is visible from both Car Parks A and B.
- The South Terrace is a quiet space. It is an outdoor space accessed from inside the building, from which one can overlook the surrounding landscape.

The multi-modal arrangement is split between the East and West plazas. Covered cycle racks are located along the edges of both the West and East Plazas. Areas of planting and seating will help to animate the plazas' surface encouraging people to dwell.

Access and maintenance requirements, such as for mobile elevating work platform (MEWP) access to glazed facades and fire vehicles access are taken into consideration in spatial arrangement of the public realm.

For further information of landscape design of the public realm refer to the landscape chapter within this report.



Figure 34: Public plazas around the station

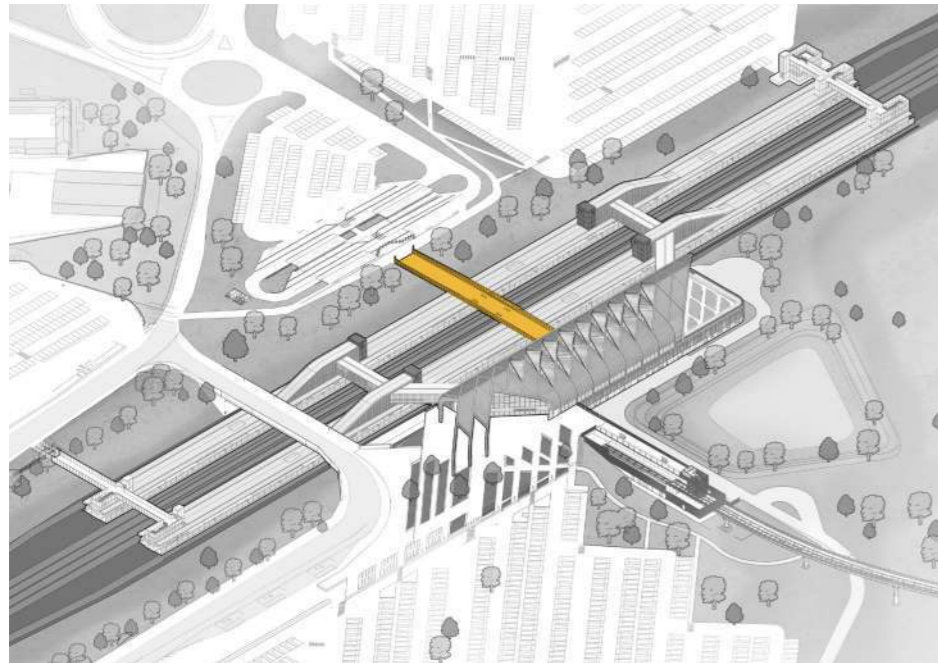
Code 1 - Accepted





Code 7 - Accepted

# 4.4 Central Pedestrian Bridge



## 4.4.1 Design concept

The entrance portal from the East Plaza to the bridge acts as a gateway to the station. The central pedestrian bridge connects the station building with the taxi pick up and drop off, Short stay car park and 'Drop & Go'. Passengers arriving from Car Parks A and B would also approach the station from the east and via the central pedestrian bridge.

The bridge is 9m wide with a high balustrade constructed with solid powder-coated aluminium panels with sections of glazed parapets giving views towards the tracks below. Services are incorporated in the panel with an openable cap at the top and bottom section of the bridge cladding. The balustrade is inclined for self cleaning purposes with the central glazed panels hinging inwards for cleaning purposes.

Street furniture is provided along the bridge in front of the glazed panels. The seating will achieve a visual contrast with the paving against which they are seen.

Passenger information screens are located at each end of the bridge. A help point is integrated in the mullion in the centre of the bridge.

The bridge can be closed outside of operational hours with sliding, lockable gates. These are integrated into the portal entrance at the edge of the East Plaza. The gates slide along the fence protecting the track at the top of embankment.

The bridge's primary structure and side mullions are made of weathering steel. This allows for corrosion protection and low maintenance requirements, which means less disruption to over rail environment. Weathering steel initially appears as a fresh, orange-brown colour. After a few years of exposure to the elements, the colour changes to a dark brown 'chocolate' colour.

The bridge is paved with concrete pavers with a slip resistant finish to match the East Plaza external finishes. Drainage is incorporated into the camber and cross fall of the bridge to ensure it is fully accessible and slip free.



Figure 36: Entrance portal from East Plaza

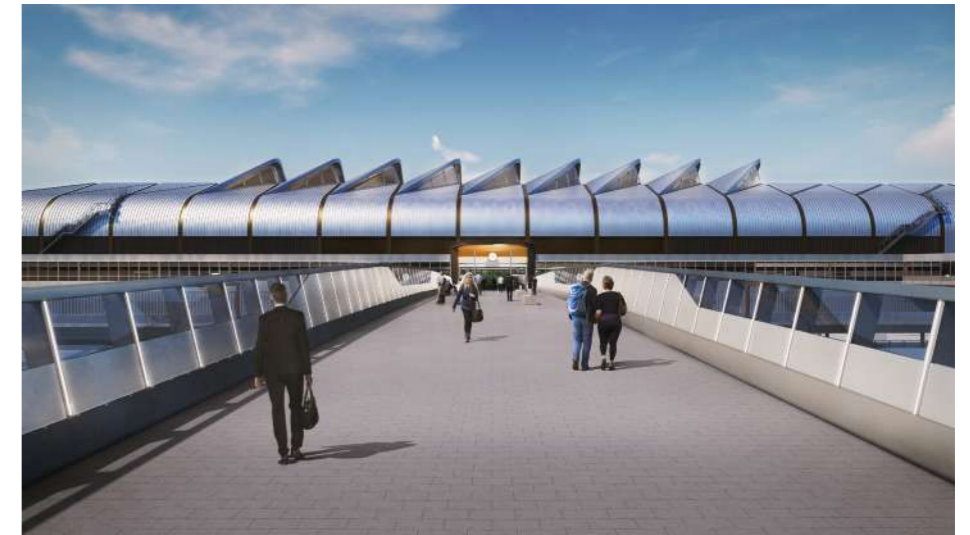


Figure 35: Station approach from central pedestrian bridge looking east



Figure 37: Central pedestrian bridge

Code 1 - Accepted

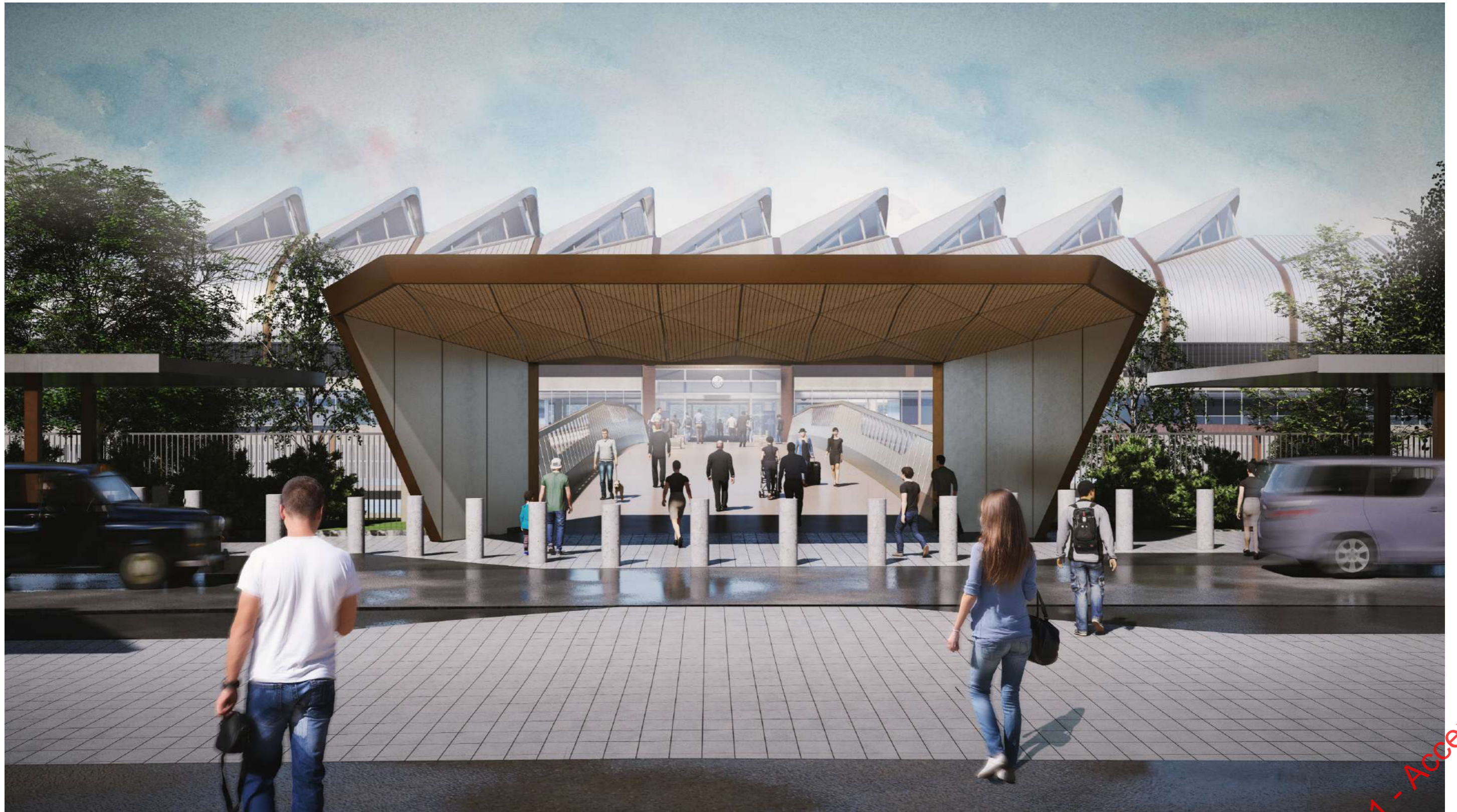


Figure 38: East Plaza entrance via the central pedestrian bridge

Code 1 - Accepted

# 4.5 Entrances

## 4.4.2 Public entrances

There are two main entrances to the station from east and west side of trace.

Passengers arriving from either Car Park A, Car Park B, the Short Stay Car Park, Taxi Rank or Drop & Go arrive from the east side of trace. A central pedestrian bridge provides a link directly into the station. It is assumed that 40% of passengers will use this entrance.

Passengers arriving from Car Park C, the bus stops or People Mover arrive from the west and enter the station through the West Plaza. It is assumed that 60% of passengers will use this entrance.

Car Park C includes covered spaces for Blue Badge parking as well as oversized spaces. These have been arranged as close as possible to the West Plaza entrance. Covered Blue Badge parking is also provided in the Short Stay Car Park.

Cycling storage has been provided on both sides of trace, with covered stands located next to both the taxi rank and the West Plaza. This allows for cyclists to enter from either side of trace and connect to the surrounding cycle networks.

## 4.4.3 Back of house entrances

Whilst it is expected that staff working at the station will be able to access the entrance via the main entrances, there is a separate back of house entrance provided via the service road.

The service entrance is used for all deliveries and waste collection.

Station staff also have two points of access. One is directly off the main public concourse, down the staff lifts and staircase. The second is via the trade entrance on the west, directly off the service road.

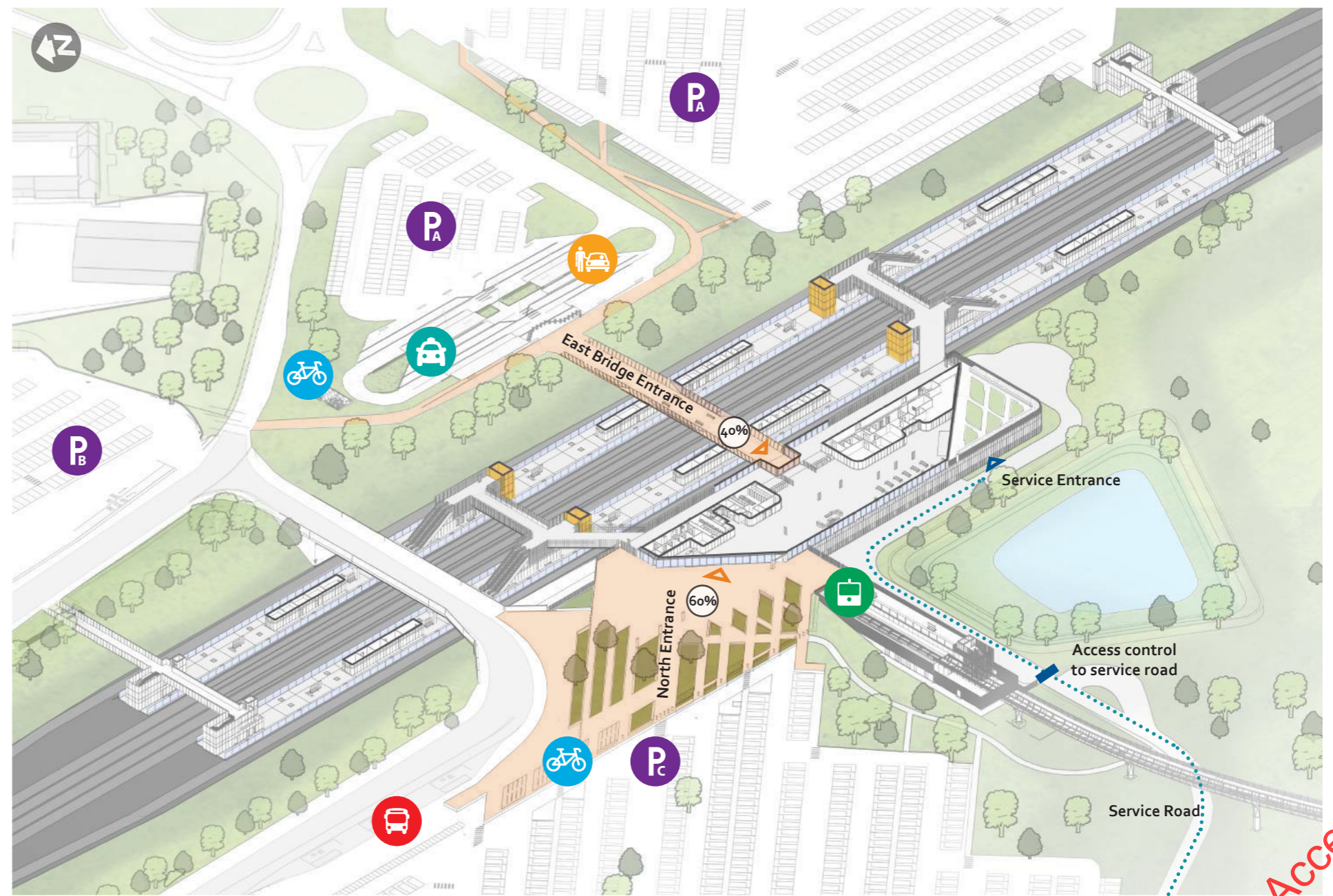


Figure 39: Station connectivity

Code 1 - Accepted



Figure 40: West Plaza Entrance



Figure 41: East Plaza Entrance

# 4.6 Station Building

## 4.6.1 Contextual response

The station has been designed as a contextual response to the drivers of people, time and place. It is an intuitive architecture, drawing customers to its centre from which clear lines of movement and clear lines of sight help show the way to all destinations and facilities. The station uses architectural features, such as the entrance canopy, and has placed glazing purposefully to define spaces and frame views. Conceptually, customer experience has been considered under two headings that talk of place and journey:

- Where you are?
- Where you are going?

Where you are:

- Place making through architectural features and framed views.
- A station in the landscape, positioning seating and waiting to take full advantage of views.
- Celebrating the Hollywell Brook landscape, bringing customers into that space with the South Terrace. The South Terrace planting and seating will create a destination in and of itself.
- Platform islands surrounded by green banks. Helping customers to immediately locate themselves when arriving by train.
- Looking towards future growth. The gateway entrance and entrance plaza on the west will grow in its civic prominence as the site is developed in the future. It has been designed to face its future context.

Where you are going:

- Lines of sight and direct connection between all directions of movement and all modes of onward journey.
- The central pedestrian bridge gives views of the high-speed lines, to celebrate movement and activity.
- Panoramic views from the seating area frame the People Mover viaduct and the landscape.
- Destination walls and features help show the way for onward travel and give opportunity to add individual character to the passenger journey.

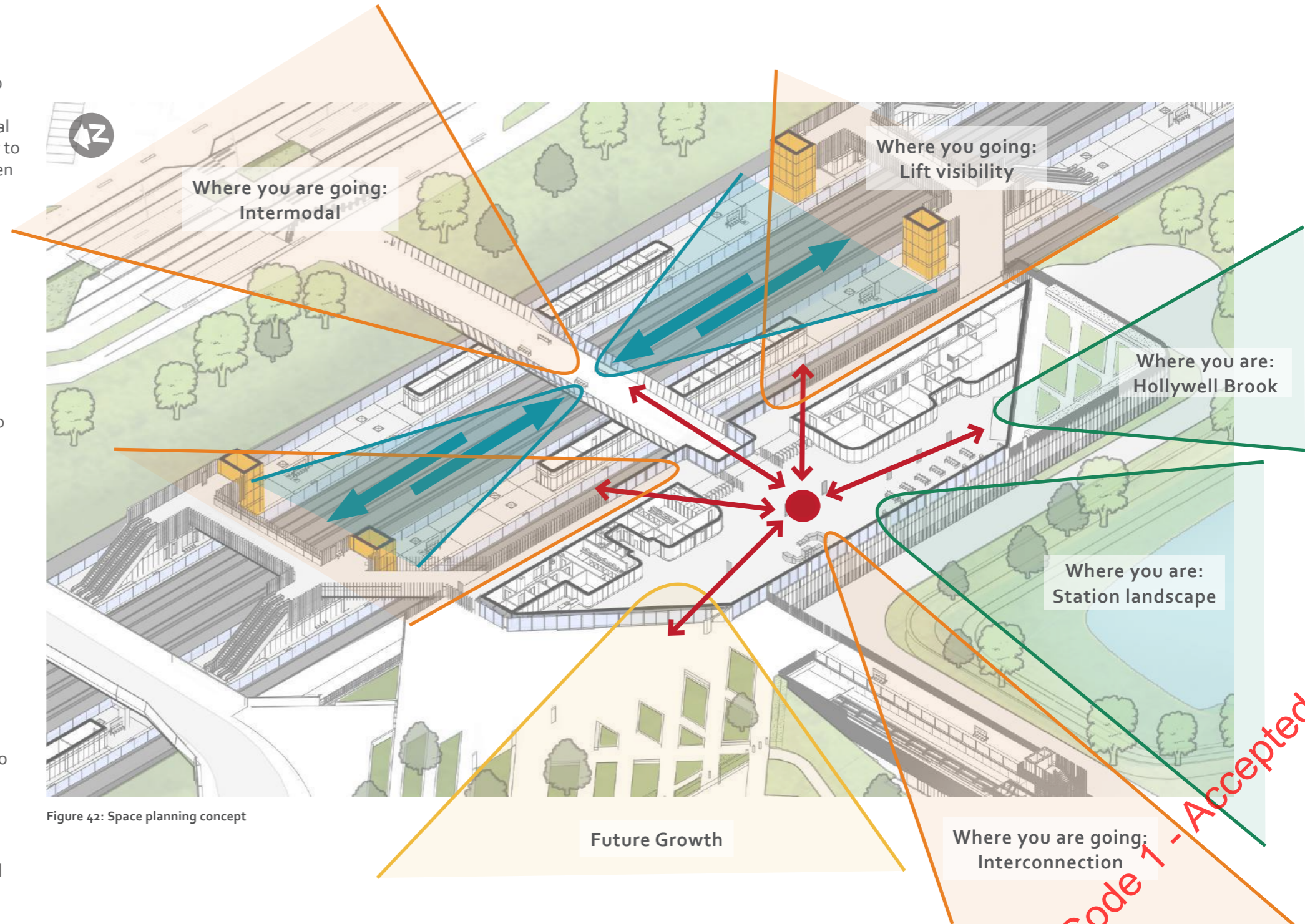


Figure 42: Space planning concept

Code 1 - Accepted

### 4.6.2 Station arrangement

The station is arranged with the public concourse and passenger facilities at grade with the entrances and surrounding intermodal connections and landscape. The platforms sit below and are connected to the station via two paid concourse bridges. The majority of the back of house (BoH) areas are hidden within the podium beneath the concourse.

- Public Circulation Area
- Passenger Facilities
- Commercial
- Station Operations
- Staff Accommodation
- Logistics
- Cleaning and Waste Management
- Services
- Fire Escapes
- External Public Areas

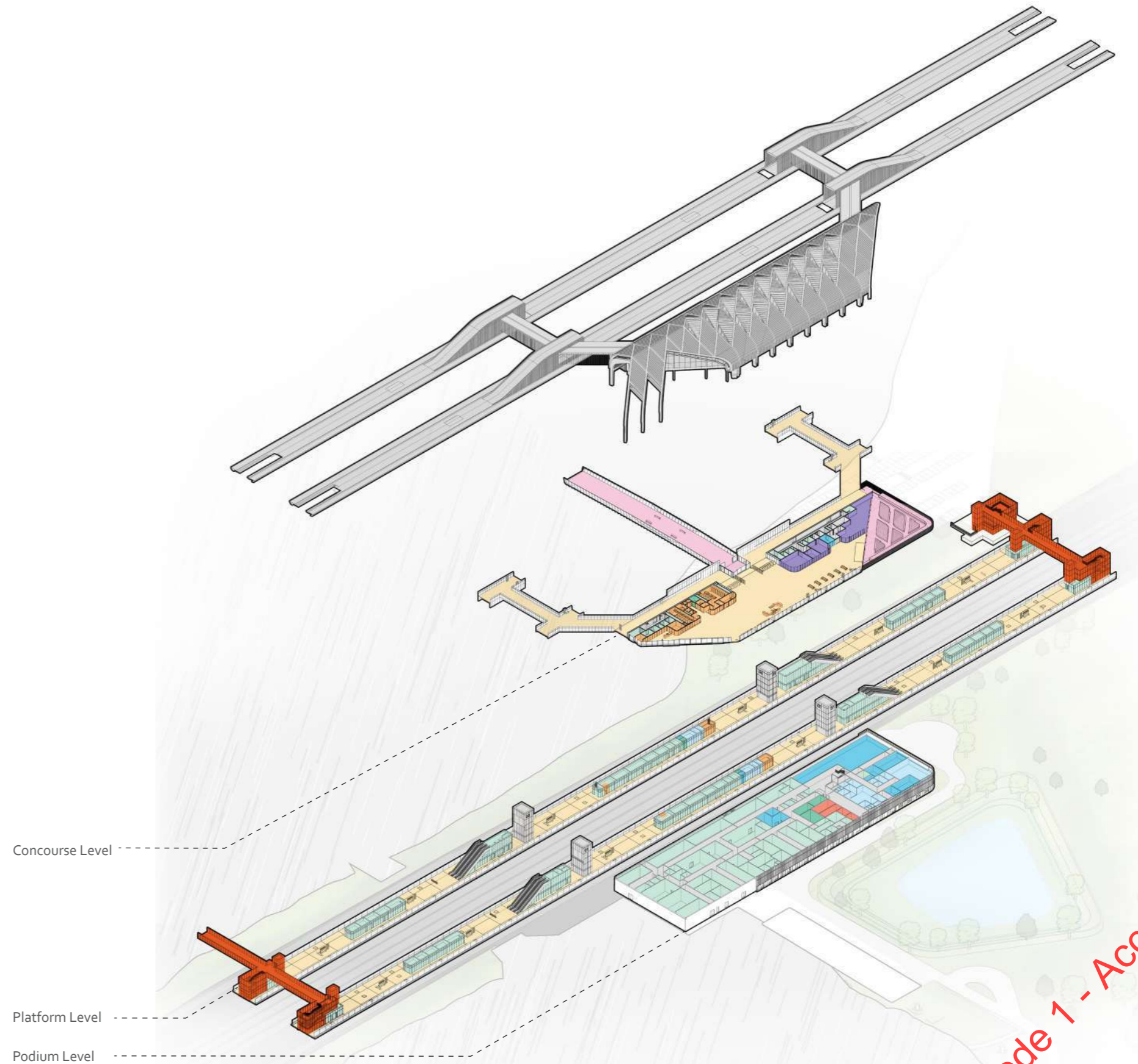


Figure 43: Station zoning diagram

Code 1 - Accepted

# 4.7 Unpaid Concourse



The station concourse has been arranged to support the design vision for a contextual, intuitive, and delightful station. In summary:

- Information and customer experience hub are in the centre of the station, directly visible from both public entrances
- The passenger facilities block and the retail block are positioned along the east side of the concourse, keeping views to the west uninterrupted
- The 'Passenger facilities block' is at the northern end of the concourse. This contains the public toilets and other passenger facilities
- The 'Retail block' is at the southern end of the concourse, adjacent to the seating and waiting area and the south terrace

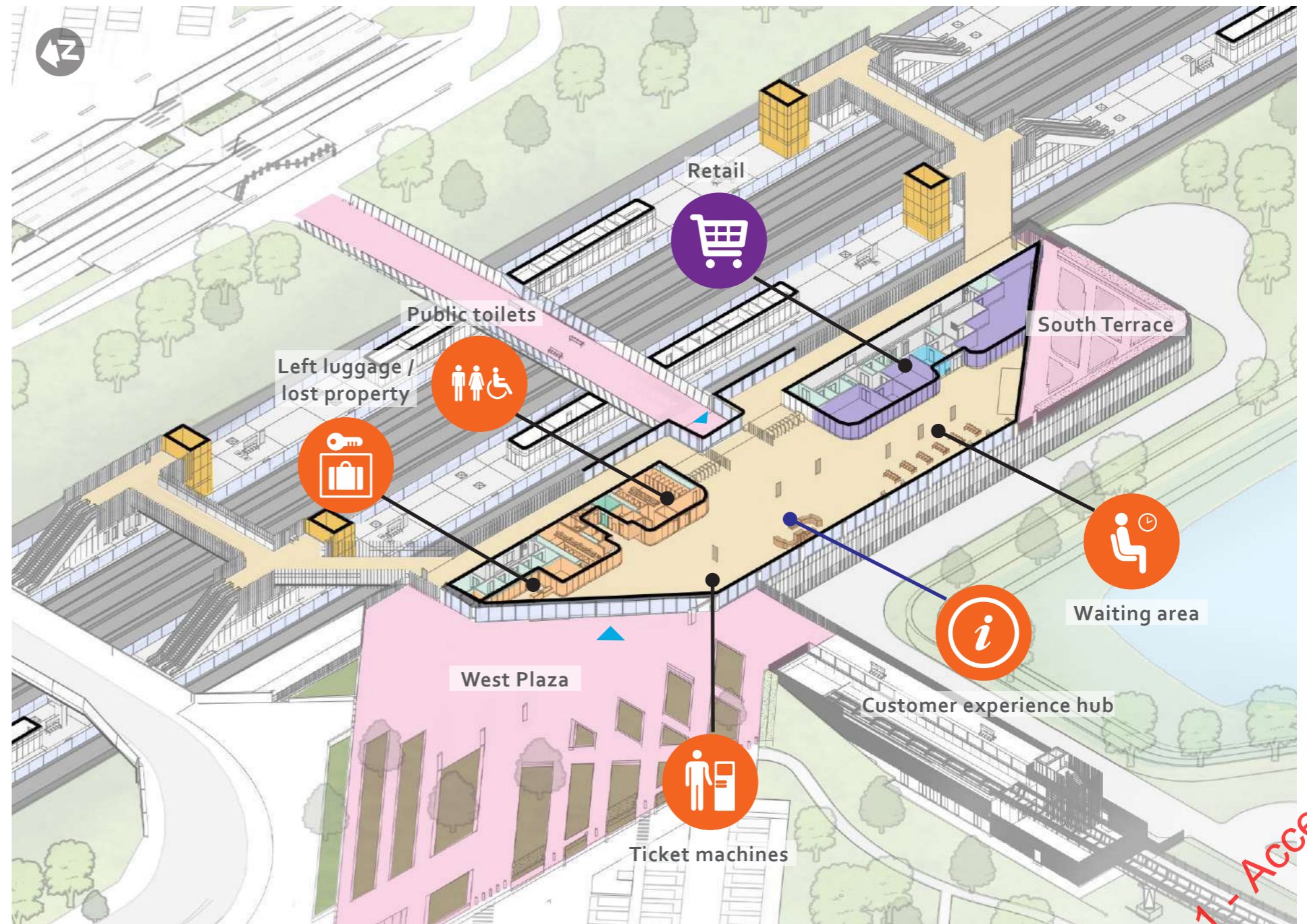


Figure 44: Facilities within Unpaid Concourse

Code 1 - Accepted



#### 4.7.1 Concourse arrangement

The unpaid concourse sits to the west of the trace, and acts as the central hub of the station. Accessed via the main entrances on the North glazed gable and east pedestrian overbridge it contains the facilities and retail block of the station, as well public seating areas, ticketing and customer help points.

Key to this space is the architectural expression of the buildings timber structure, the wayshowing datum which direct the user through the station and colour accents to designate zones.

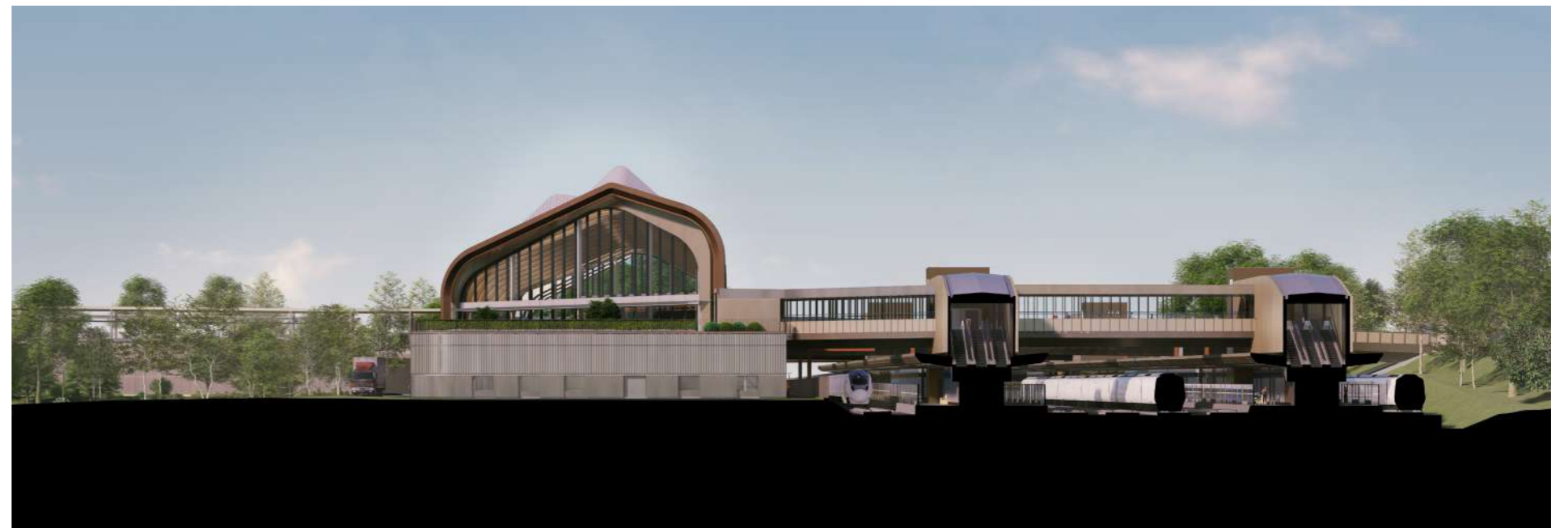
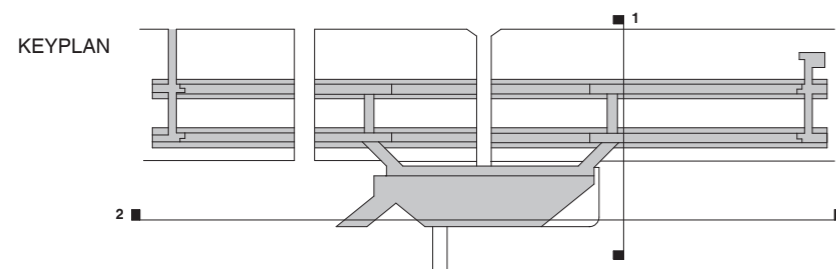


Figure 45: Concourse, Section 1



Figure 46: Concourse, Section 2

Code 1 - Accepted

# 4.8 Paid Concourse



The Paid concourse connects the station to the four high speed platforms, via a series of bridges.

The general arrangement of the paid concourse is driven by the Station's off trace location, the series of intermodal connections which connect the central over bridge and unpaid concourse, as well as the buildings grid, vertical transportation locations, escape cores and the station's various functional and operational requirements.

The concourse level is arranged horizontally to provide clear areas for circulation between the entrances and the gatelines. Vertically 6 escalators and 4 passenger lifts connect each platform to the paid concourse. Their placement is 25% and 75% along the platform to allow convenient access for passengers.

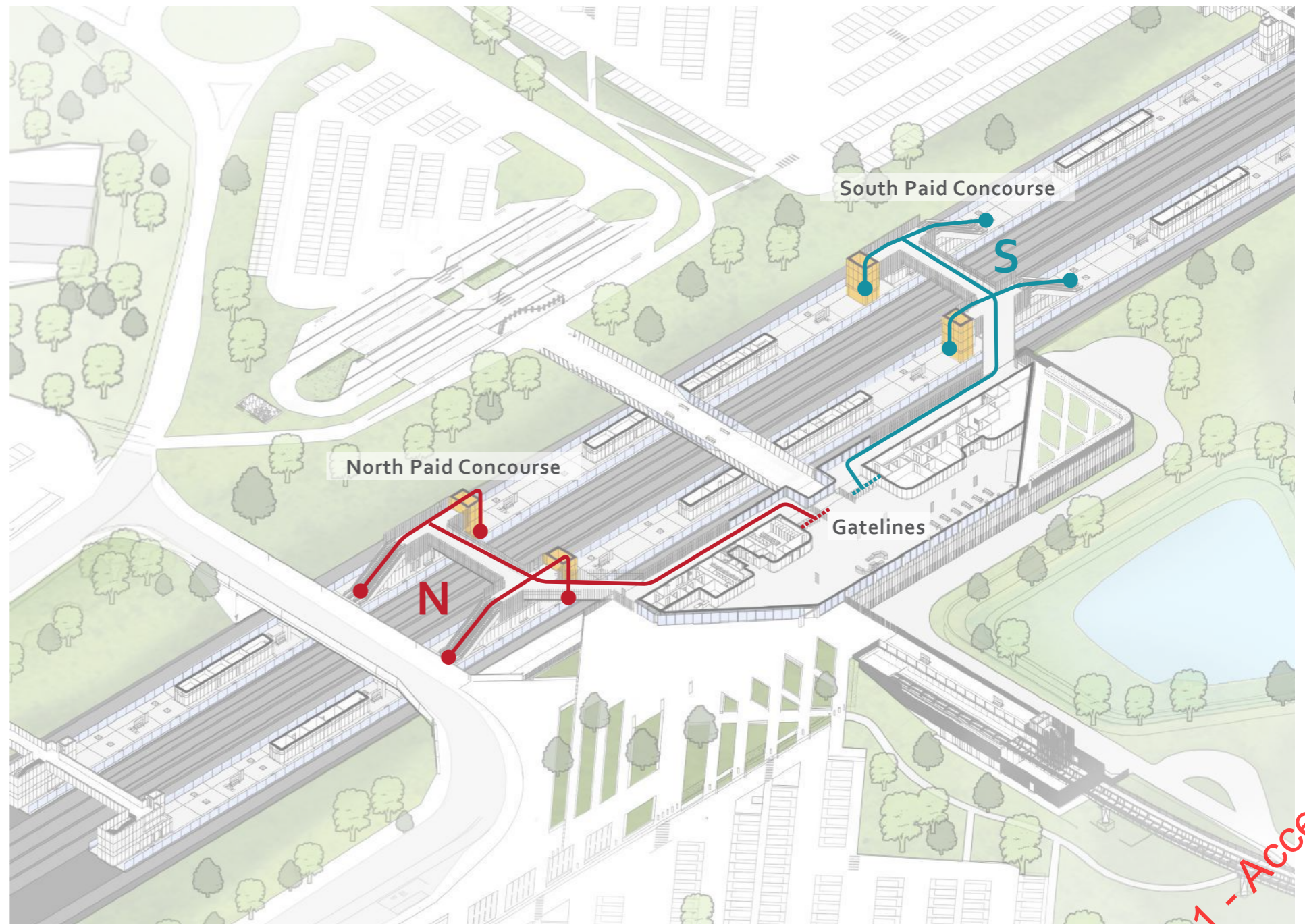


Figure 47: Paid Concourse connections

Code 1 - Accepted

# 4.9 Vertical Circulation

Sitting above the platforms and intersecting the bridges, two expressed nodes, containing the lifts and escalators connect the walkways to the platforms. At these nodes customers are shown to their platform and can decide upon access via the lifts or escalators. All choices are clearly designated and integrated into in a wayshowing band running at high level.

Two through lifts descend from each paid concourse bridge to each platform island. Heavy duty escalators provide the principle means of access to the platforms. These are arranged in banks of three for resilience.

A stair and evacuation lift at each end of the platform islands provides the principle means of escape from the platforms, a further core at the south end is required to bring customers off the escape bridge down to the ground.

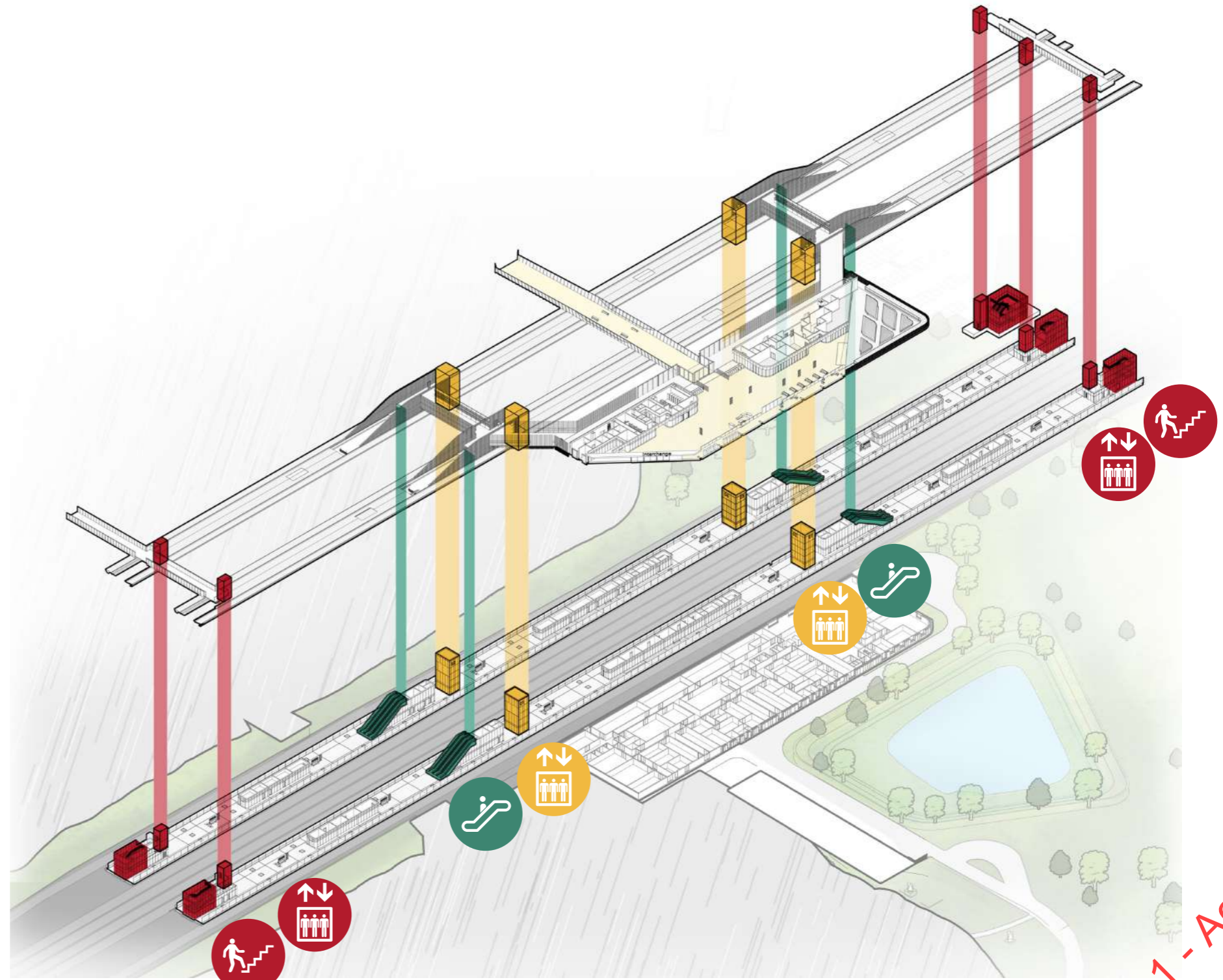
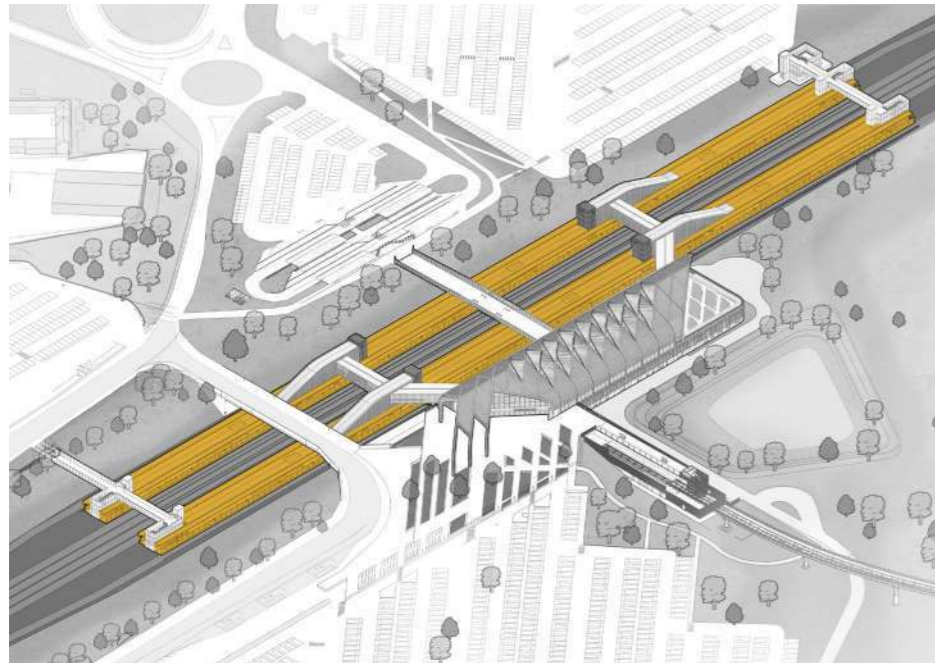


Figure 48: Vertical circulation

Code 1 - Accepted

## 4.10 Platforms



The design ambition for the platforms is to create a durable and modern space, which clearly allows the customer to board and alight the trains quickly, and navigate the space efficiently. The architectural hierarchy of the scheme builds on the wayfinding narrative through the station, with low level platform canopies directing the flow of customers to and from the platforms.

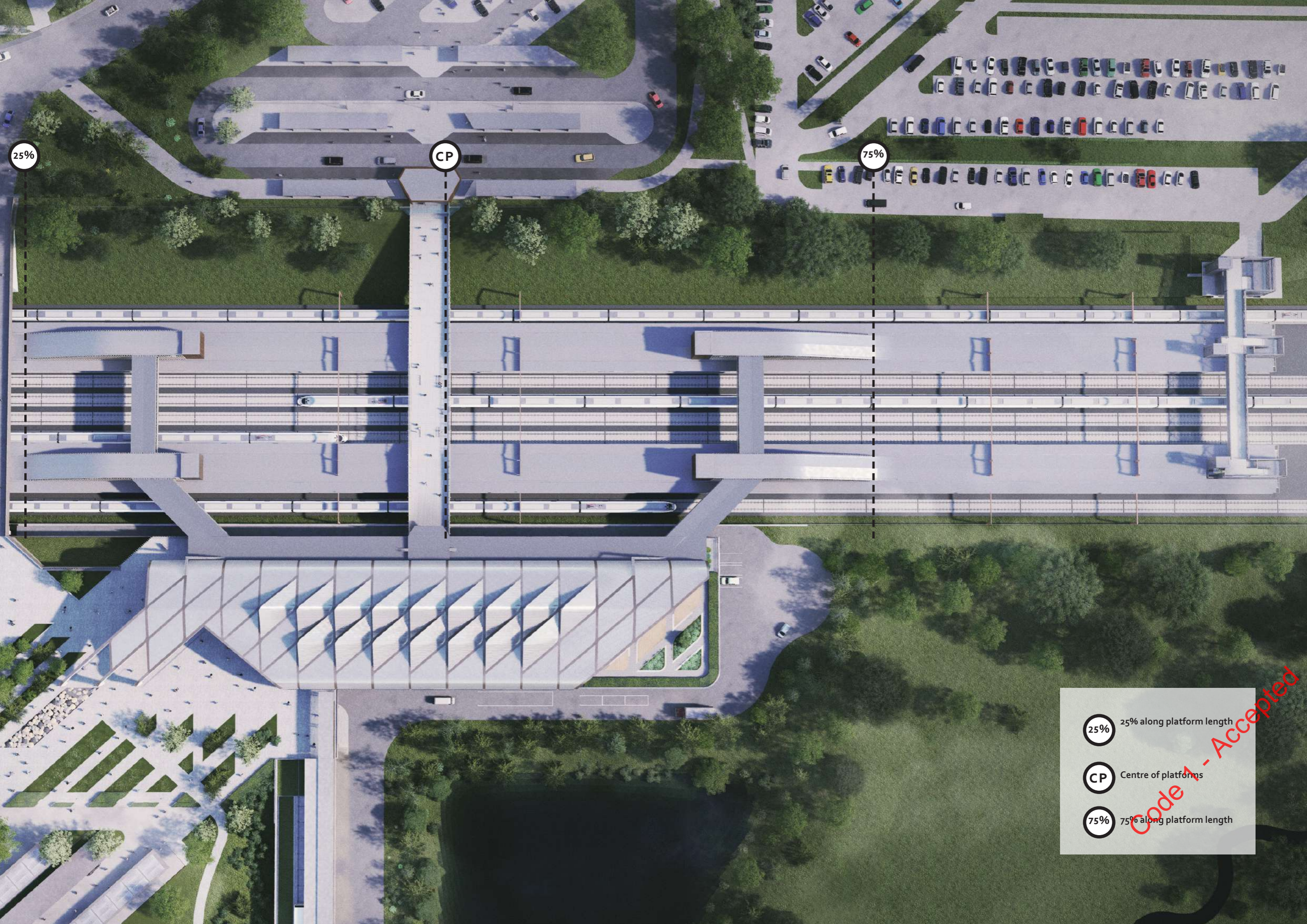
Clear, uninterrupted platform zones are provided along the length of the platforms, with a central zone for circulation and structure. The central zone takes into account runoff distances for all vertical circulation, to reduce conflicting passenger movement without segregating passenger flows. The platforms are fully covered.

### 4.10.1 Interchange platforms

There are four platforms at Interchange station, paired to form two platform Islands. The platforms are specified as follows:

- Platforms are 415m long
- Island platforms are 12m wide
- Platform widths have been determined by vertical circulation requirements, and are wide enough for a bank of three escalators with 6m overall width, leaving 3m clear width on either side.
- Platforms have been laid out in order to encourage separation of uses between waiting and queuing, circulation, and the platform edge safety zone
- Travel distance along the platform has been minimised by distributing access from the centre
- Weather protection has been provided along the entire length of the platform, oriented longitudinally along the platform and designed to maximize sight lines for station patrons, station operators, and train engineers





25%

CP

75%

25%

25% along platform length

CP

Centre of platforms

75%

75% along platform length

Code 1 - Accepted

#### 4.10.2 Platform Accommodation

Along the platforms a series of accommodation blocks are required to support the safe and efficient operation of the platforms for both the public and the staff. Facilities are arranged in multiple clusters, enclosing the rooms and risers for the electrical, mechanical, signalling, telecommunications and storage facilities.

The staff facilities and accessible changing accommodation clusters are configured with a minimal footprint. They are positioned to align with the canopy columns, maximizing the open platform space. These create clear circulation routes between both island platform faces and allow for seating to be provided at regular intervals

#### 4.10.3 Platform access

For platform access there are vertical circulation cores at two locations per platform, which are at approximately 25% and 75% of the way along the high speed platforms. As such, entry or exit points on the platforms are equally spaced over the full length of the train so as not to disadvantage any passenger type from any section of the train.

#### 4.10.4 Sight lines

Through the platform key sight lines defined the architectural design of the scheme. Clear views of vertical transportation and escape cores are achieved with building finishes, utilising wayfinding parameters and lighting to highlight dwell and movements zones.

#### 4.10.5 Accessible routes

PRM access is a key aspect of the station design, with lift access to the platforms, and escape requirements met by evacuation lifts located on the north and south of each platform.

#### 4.10.6 Resting Areas

The mitigations for the travel distance include:

- Having seating at regular intervals, preferably every 25m, but maximum 50m, along the platform with a passenger help point close by. This requirement has been met station-wide.
- Having supportive signage directing passengers along the platform indicating where the nearest vertical transport.
- Lifts and escalators will be clearly visible to assist navigation on platforms.
- Lifts and escalator's location and orientation are optimised to avoid congestion on platforms.
- 

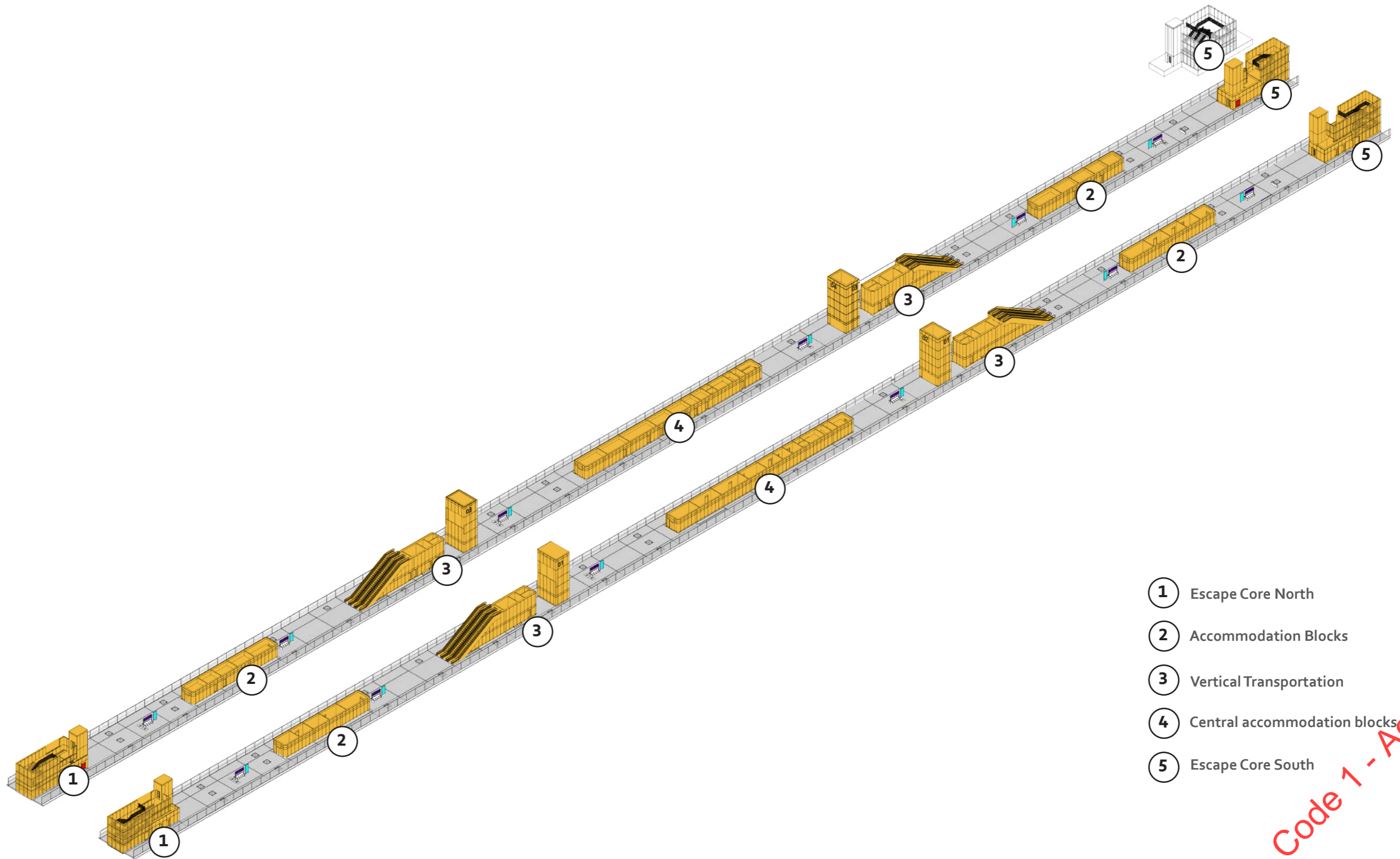
#### 4.10.7 Emergency escape

Escape cores are provided at the end of each platform for evacuation onto the east side of trace, and to provide access for fire service personnel onto the platforms. The north escape core includes stairs and evacuation lifts which lead out across the north escape bridge onto the road to the east, by Car Park B. The south escape core includes stairs and lifts which lead out across the south escape bridge to another escape core which exits into Car Park A which is at a lower level.



Figure 49: Rest area on platform

Code 1 - Accepted



- ① Escape Core North
- ② Accommodation Blocks
- ③ Vertical Transportation
- ④ Central accommodation blocks
- ⑤ Escape Core South

Code 1 - Accepted

## 4.11 Podium

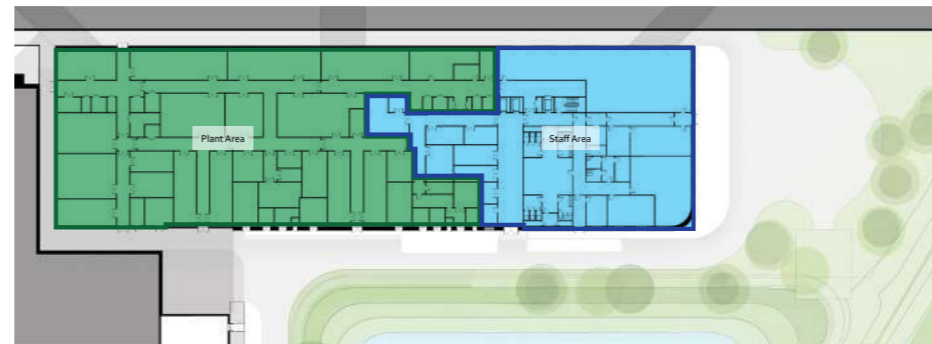


Figure 50: Plant / Staff areas

The Podium is directly below the Concourse and is the operational core of the station. It houses all staff facilities, offices, plant rooms and service areas for the station. The Podium is accessed directly from a lower-ground level, benefiting from the existing fall in the landscape towards the Hollywell Brook.

The back of house facilities are secure and, for the most part, hidden from public view. This enables the public realm at Concourse level to remain fully activated and free from delivery and waste removal vehicles and the station to operate efficiently.

The safety, security and wellbeing of the staff have been a key driver in the design. The lower level has been split between plant areas to the north and staff areas to the south. The staffed office areas are located along the perimeter of the building to take advantage of natural daylight and views of the surrounding landscape.

The staff areas are accessed from concourse level via a dedicated staff lift and staircase. There are also entrances directly off the back of house road for deliveries, waste collection, operations and maintenance.

Code 1 - Accepted



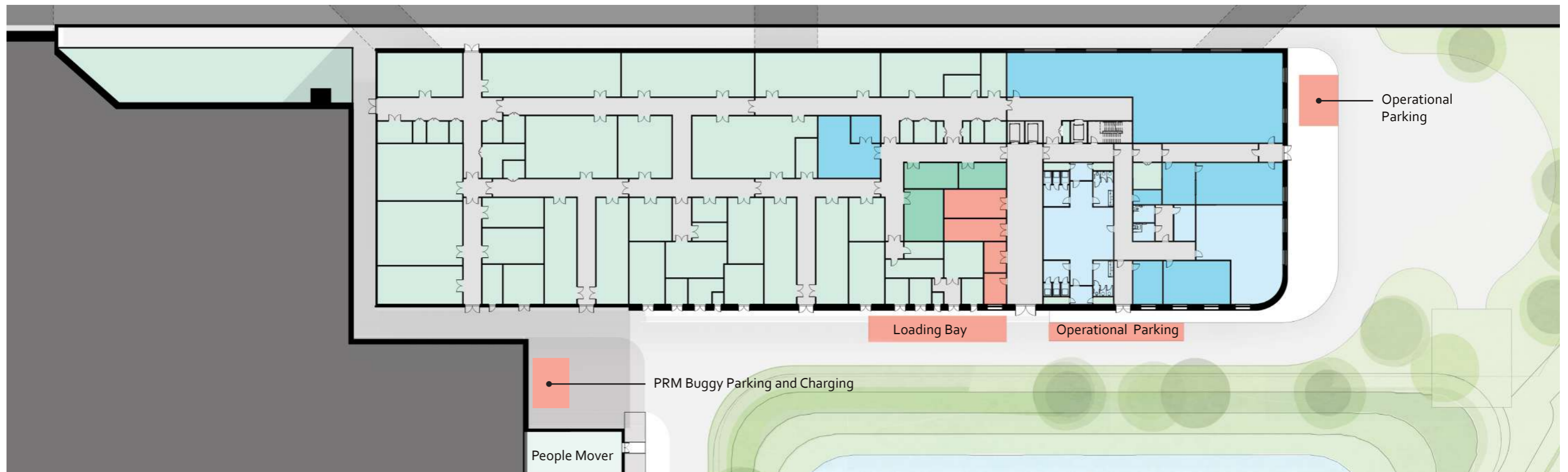


Figure 51: Podium, general arrangement

Key

- Station Operations Offices
- Staff Accommodation
- Logistics
- Cleaning and Waste
- Services
- Circulation
- Vertical Circulation

Code 1 - Accepted

## 4.12 Back of House Access

### 4.11.1 Staff access

Staff are expected to use the main station entrances. Access to the back of house (BoH) areas are security controlled at the main staff entrance on the Concourse which provides lift and stair access to the Podium below where the majority of the staff areas are located. New staff and contractors arriving at the station are expected to arrive at the Trade Reception to receive their safety induction and access card. Direct BoH routes from the main staff area to retail units and concourse facilities have been provided, enabling those areas to be serviced at any time.

### 4.11.2 Vehicle access

The service road is accessed via Car Park C. All deliveries will be made via road vehicle at the loading bay area in the service road. This permits 24 hour servicing of the station. All deliveries are made to the loading bay during booked delivery slots. There is a Dock Master who will oversee deliveries, based in the adjacent Dock Master's Office.

All service vehicles visiting the Interchange station will be subject to access control before being permitted to continue to the service area. Only pre-booked vehicles will be permitted to enter the service road and loading bay. Station security will oversee vehicle screening and where vehicles are rejected, they will be turned away. The design provides for a rejection loop to allow large vehicles to turn around.

### 4.11.3 Loading bay

The loading bay for HS2 station is at plant level. Access from street level is via the car parks to a purpose-built service road. All service vehicles will be directed to the loading by the dockmaster upon arrival in the service area.

Based on the vehicle demands, a requirement for one 16.5m loading bay has been calculated. The bay includes a designated off-loading space at the rear of the bay sized at 5m deep. The unloading area will allow for deliveries to be held temporarily until they have been checked and handed over to the receiving organisation.

Waste generally will be collected by refuse collection vehicles (RCV). The RCV will use the same bay as servicing vehicles.

### 4.11.4 Operational parking bays

Six 6m long spaces are provided on the service road for any occasional operations and maintenance vehicles.

### 4.11.5 Service area pedestrian route

Safe walking routes will be evident within all areas accessed by vehicles. A pedestrian gate is provided next to the vehicle gate at the access control point after the vehicle rejection loop.

Code 1 - Accepted

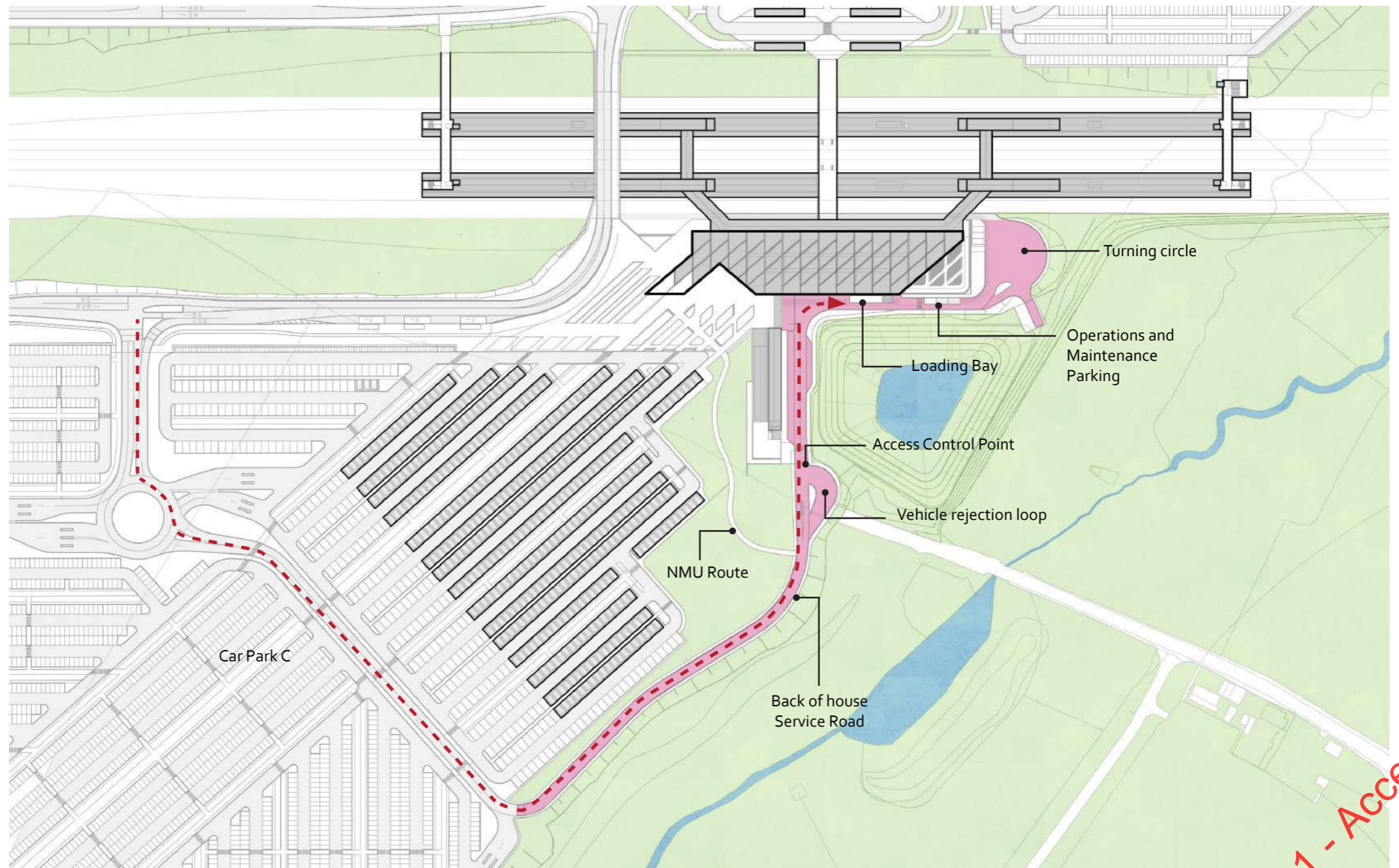


Figure 52: Back of house service road

Code 1 - Accepted

# 4.13 Fire Intervention

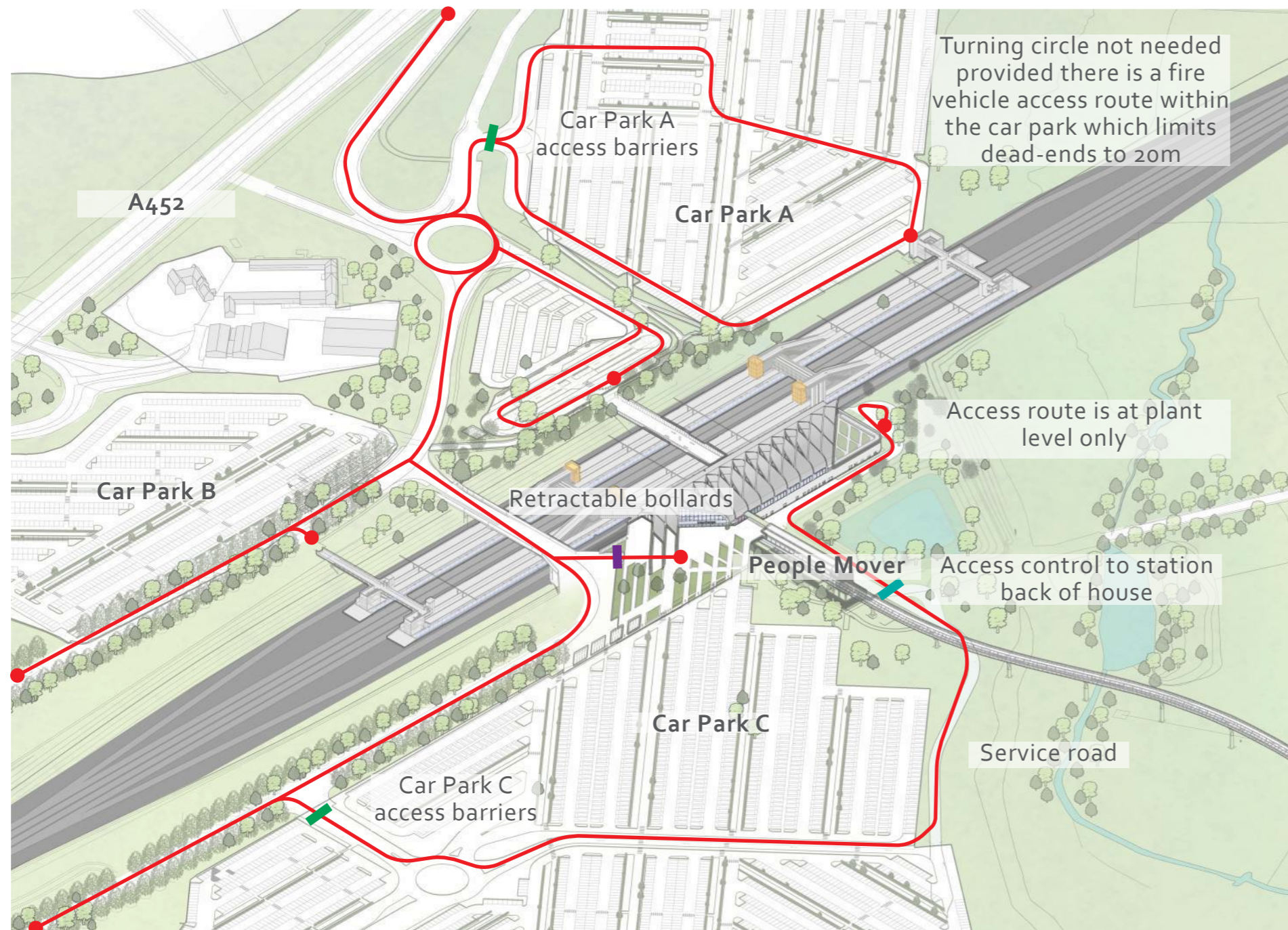


Figure 53: Fire service access

## 4.13.1 Fire service access

Fire vehicle access shall be provided in accordance with BS 9999 Table 19. As West Midlands Fire Service (WMFS) use fire appliances that weigh 15 tonnes, the roads for fire vehicle access shall be capable of supporting 15 tonnes.

BS 9999 recommends that 50% of Interchange station building perimeter is accessible. Currently, 56% of the perimeter is accessible by fire vehicle. This is achieved by access via the West Plaza (at concourse level) and via Car Park C and the service road (at plant level).

Fire vehicle access is also provided to the northern and southern overbridges, to provide WMFS with three points of access onto the platforms (the third access point being the West Plaza and then via the unpaid/paid concourse). Car Park A forms part of the fire vehicle access route to the southern escape bridge.

Access control barriers are proposed for the service road at plant level. Access control bollards are proposed at the West Plaza, to prevent unauthorised vehicle access to the West Plaza. Car Parks A and C may have access control barriers, if automatic number plate recognition is not used to track vehicles entering and leaving the car park.

## 4.13.2 Fire service facilities

A private hydrant system will be provided in accordance with BS 9990:2015 around the site. Hydrants will be located not more than 90m apart (measured along the ring main) and not more than 90m from a building entrance or platform main inlet.

A platform main is provided to each island platform, with outlets every 60m along the platform. Inlets to the platform mains are located by each of the escape overbridge entrances.

Code 1 - Accepted

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*Code 1 - Accepted*



Code 1 - Accepted

# 5. Appearance

# 5.1 Station Appearance

## 5.13.1 Main Station Building

The station roof is comprised of three main architectural elements providing shelter to the unpaid concourse as well as partial zones of the North and South Plazas.

### Unpaid Concourse Roof

The external station roof above the unpaid concourse generates a landscape built through the introduction of standing seam modules, skylight leaves and gutters generating a rainwater harvesting network system.

### Canopy Roof

At both north and south ends of the station the standing seam roof leaves extend above the plazas through a couple of cantilevers. The main station entrance on the West Plaza features a series of outdoor portals highlighting the entrance space.

### Roof Soffit

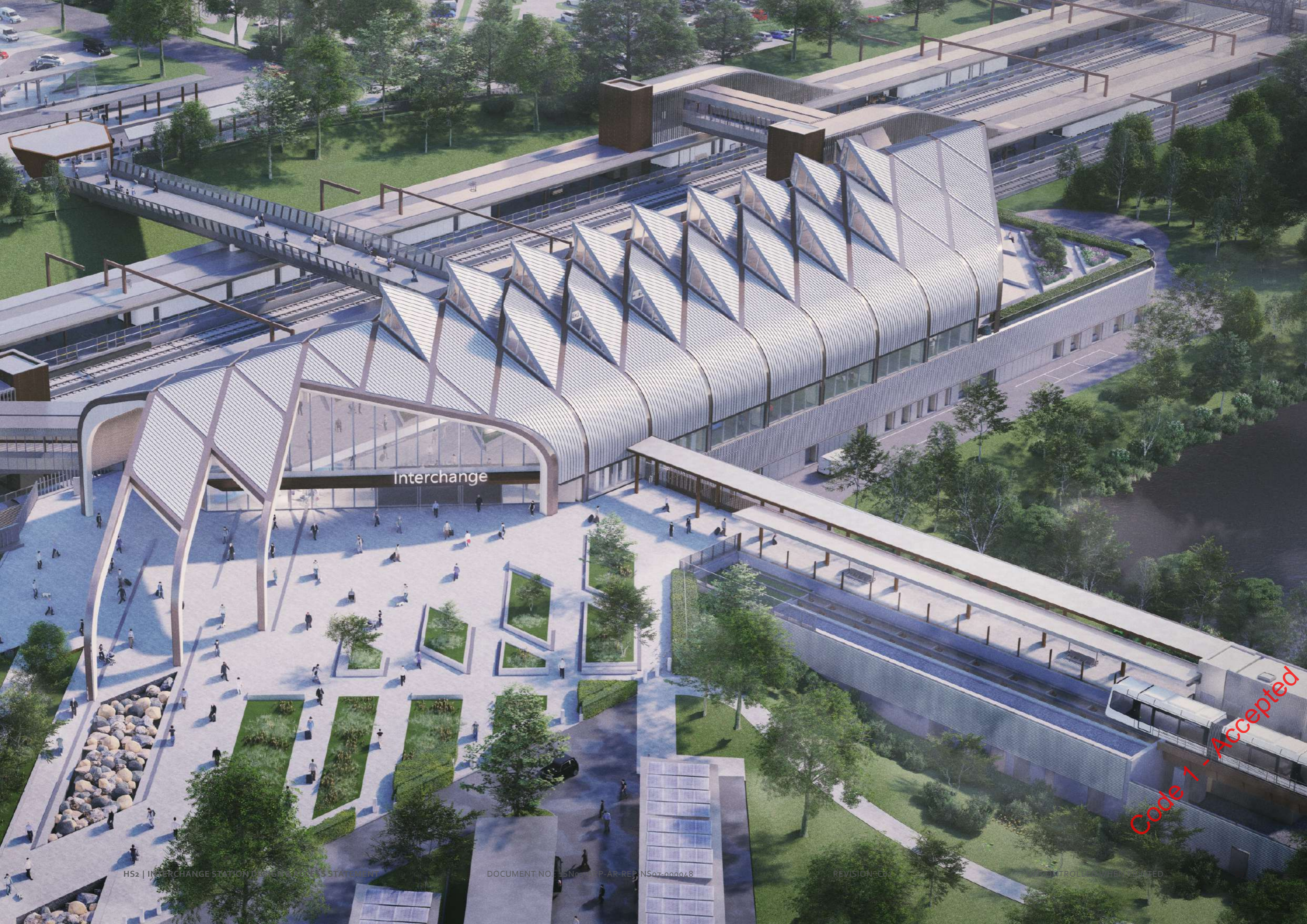
A series of directional timber slats provide a sense of continuity along the station concourse level signifying the visual walkthrough.

### Podium

Bands of patterned and perforated precast concrete rainscreen cladding are arranged around door and window openings, with perforations and louvres in areas requiring openings for ventilation.





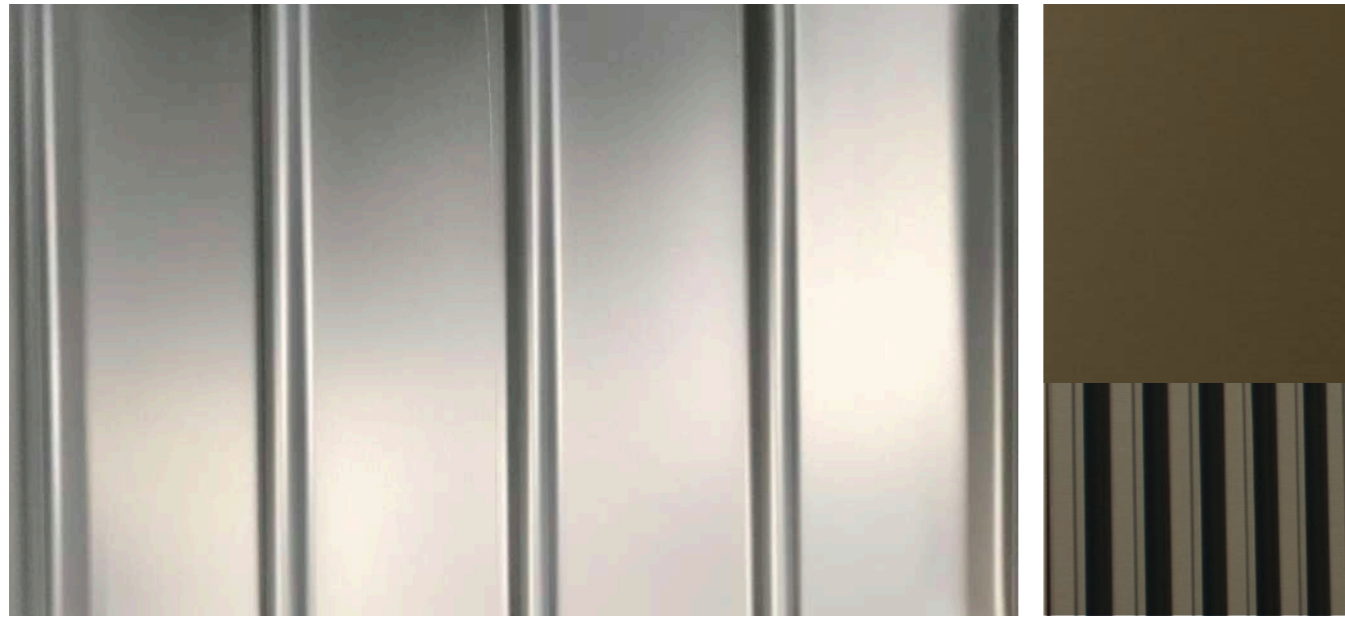


Interchange

Code 1 - Accepted

# 5.2 Material Palette

## Station building roof



Aluminium, standing seam roof

Metal gutter, panels and louvres, light bronze finish

## Landscape



Weathered steel planters

In situ concrete planters

Hardwood timber slats



Concrete paving

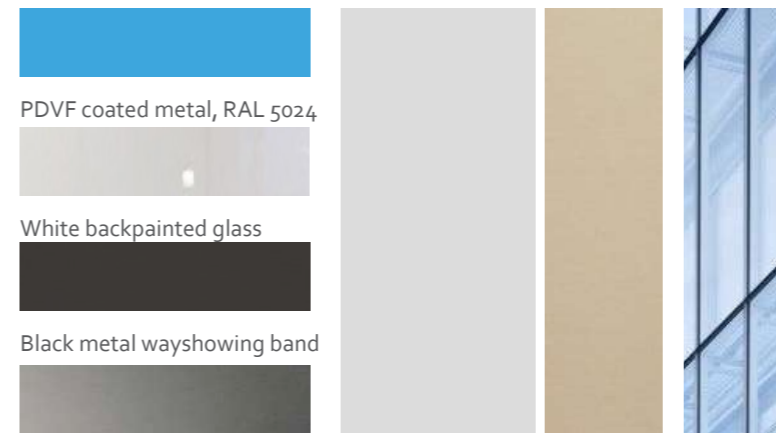
Granite paving

Anti pedestrian paving

## Station building interior



Timber slat soffit with warm grey backing



PDVF coated metal, RAL 5024

White backpainted glass

Black metal wayshowing band

Stainless steel skirting

PVDF coated metal, Light champagne RAL 9003

Glass



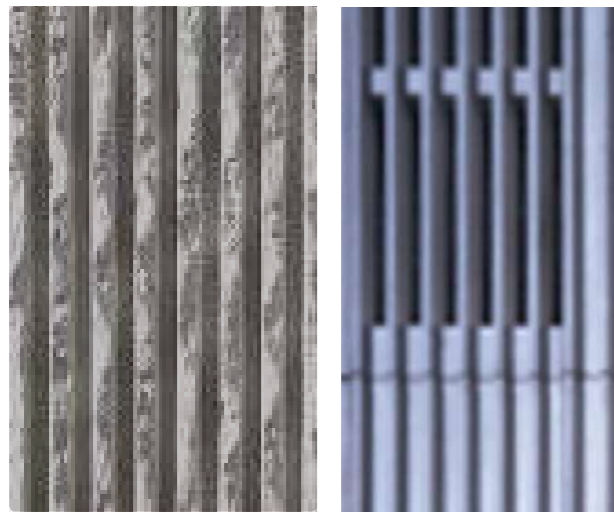
Light terrazzo floor tiles



Exposed glulam portal frame structure

Code 1 - Accepted

Podium



Patterned and perforated precast concrete panels

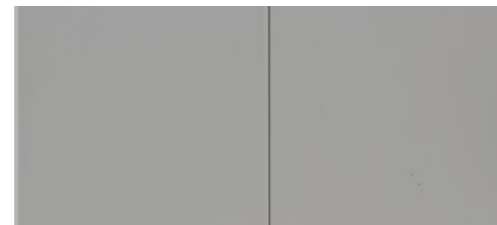


Precast concrete rainscreen panels

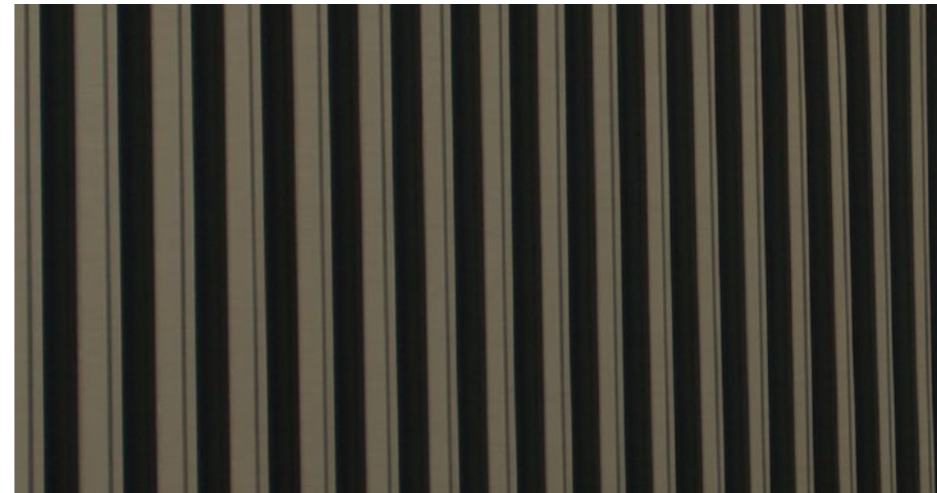
Paid concourse and platforms



Weathering steel



Grey PVDF coated metal panels, RAL 7038



Anodised metal louvres, light bronze satin finish



Grey metal louvres



Black metal wayshowing band



Stainless steel skirting

Finishes:



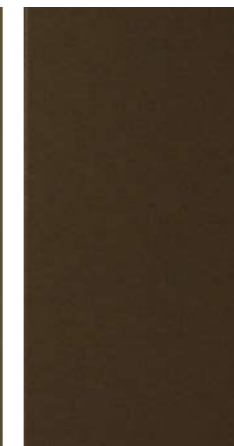
Light champagne



Champagne



Light bronze



Dark bronze

See drawings for materials



Concrete paving

Escape cores



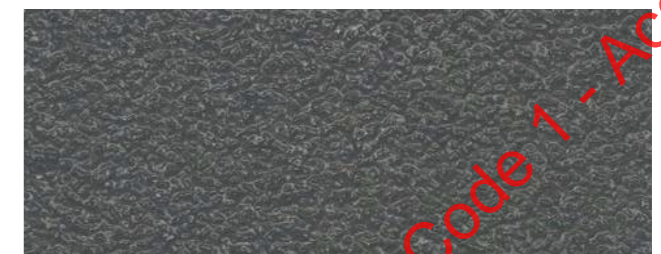
Metal grating



Fibre cement board



Grey PVDF coated metal panels, RAL 7038



Anti-slip GRP flooring, dark grey

Code 1 - Accepted

# 5.3 Unpaid Concourse Roof

## 5.3.1 Roof Build-Up

The main station roof is formed from glulam timber portals at 9m centres which span transversely across the unpaid concourse. Diagonal glulam members trim openings for the 'leaf skylights'.

A secondary set of purlins set on top of the timber structure and support the roof coveing and leaf skylights.

The inside of roof is then lined with open timber slats with an acoustic backing membrane.

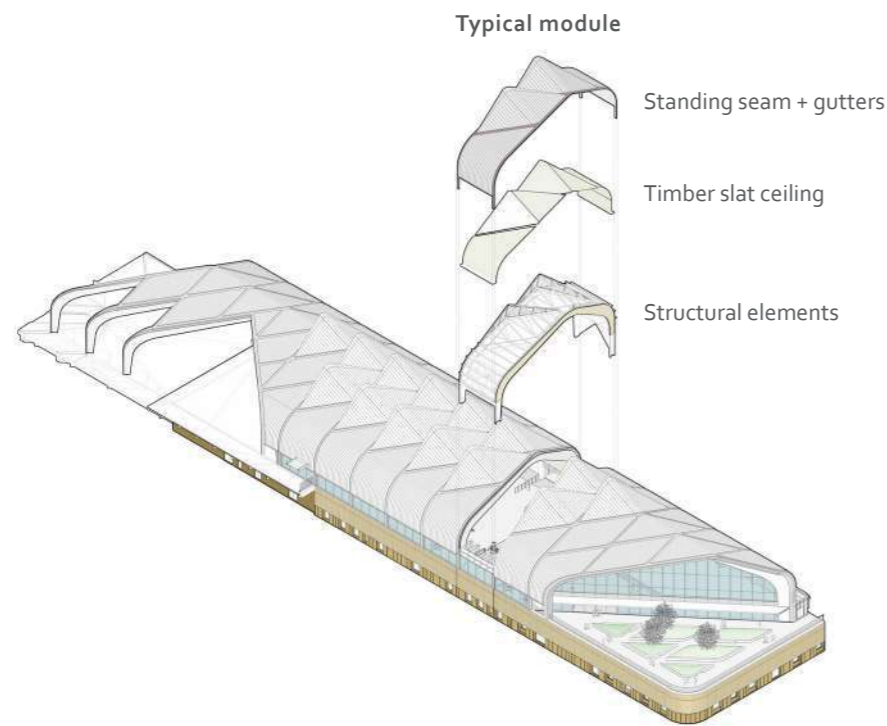


Figure 55: Roof general arrangement

### Skylights

Vertical curtain walling with double glazing

### Unpaid concourse + station canopy ceiling

50 x 20mm treated solid timber slats for outdoor use with a 50mm gap between elements and an acoustic backing.

### Horizontal gutter

finished in anodised aluminium fascia

Anodized aluminium cover sheet to downpipes

### Glazed wall West

Thermally-broken blast-resistant curtain walling with silicon bonded double glazing

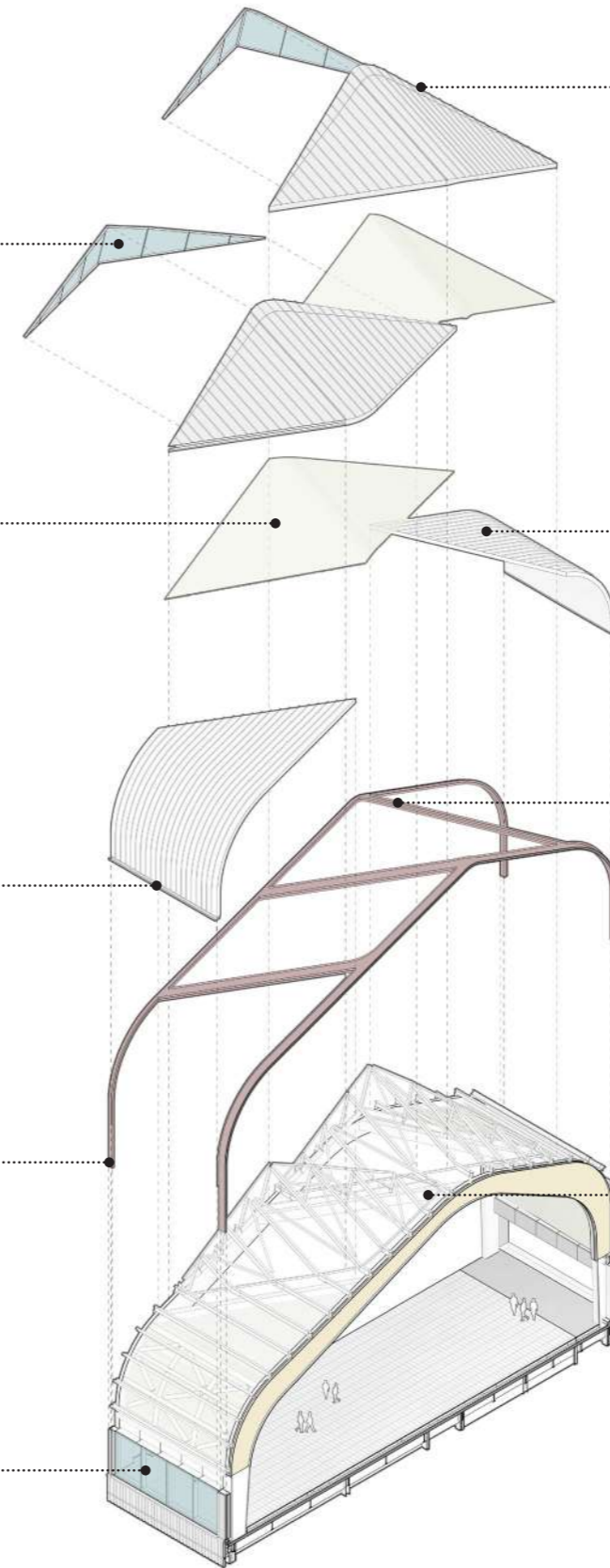
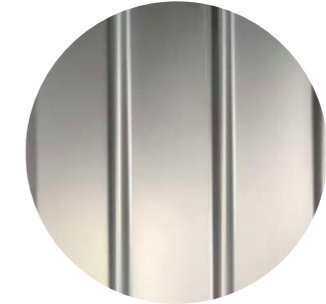


Figure 54: Typical module view

### Insulated standing seam roof

Prefabricated petals clad by with aluminium standing seam roofing in a satin finish



### Insulated standing seam roof

Prefabricated roof panels clad by using a standing seam linear tray system (400mm wide each) coated with an aluminium zinc alloy weathering layer. Stone wool insulation above metal decking.

### Prefabricated aluminium gutter, light bronze finish



### Leaf frame structure

Code 1 - Accepted

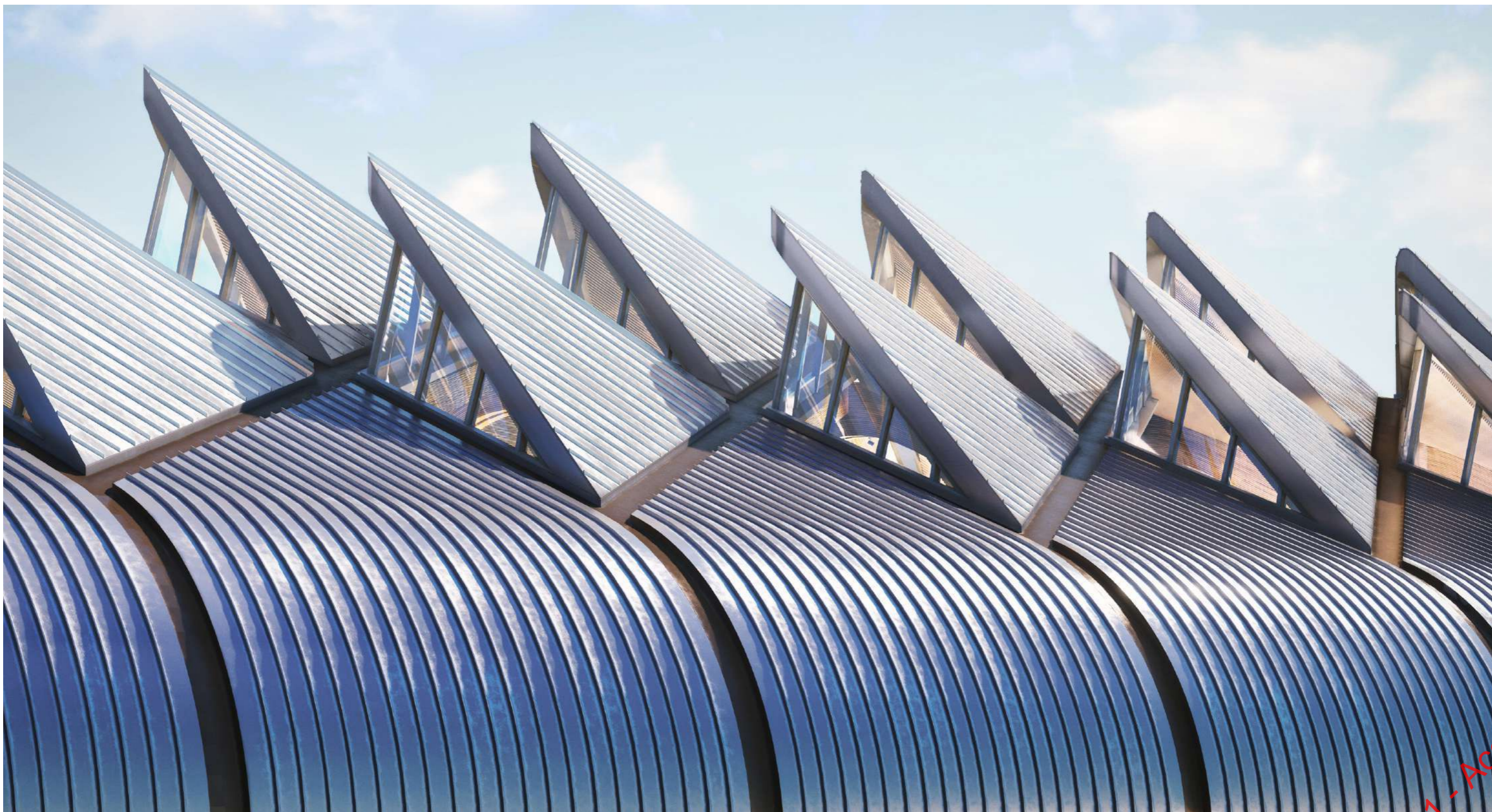


Figure 56: Artist's impression of unpaid concourse roof skylights

Code 7 - Accepted

### 5.3.2 Gable Curtain Wall

The gable ends of the paid concourse are fully glazed. The glazing comprises of double glazed units silcon bonded into an aluminum frame which is carried on steel mullions. The mullions span between floor and the roof structure.

3m high doors are incorporated into the system which are designed to remain fixed open during peak hours.

A 2m wide canopy is place above the doors and runs the full length of the gable walls. An opaque signage band is then placed above the canopy.



Figure 59: South end of the station building

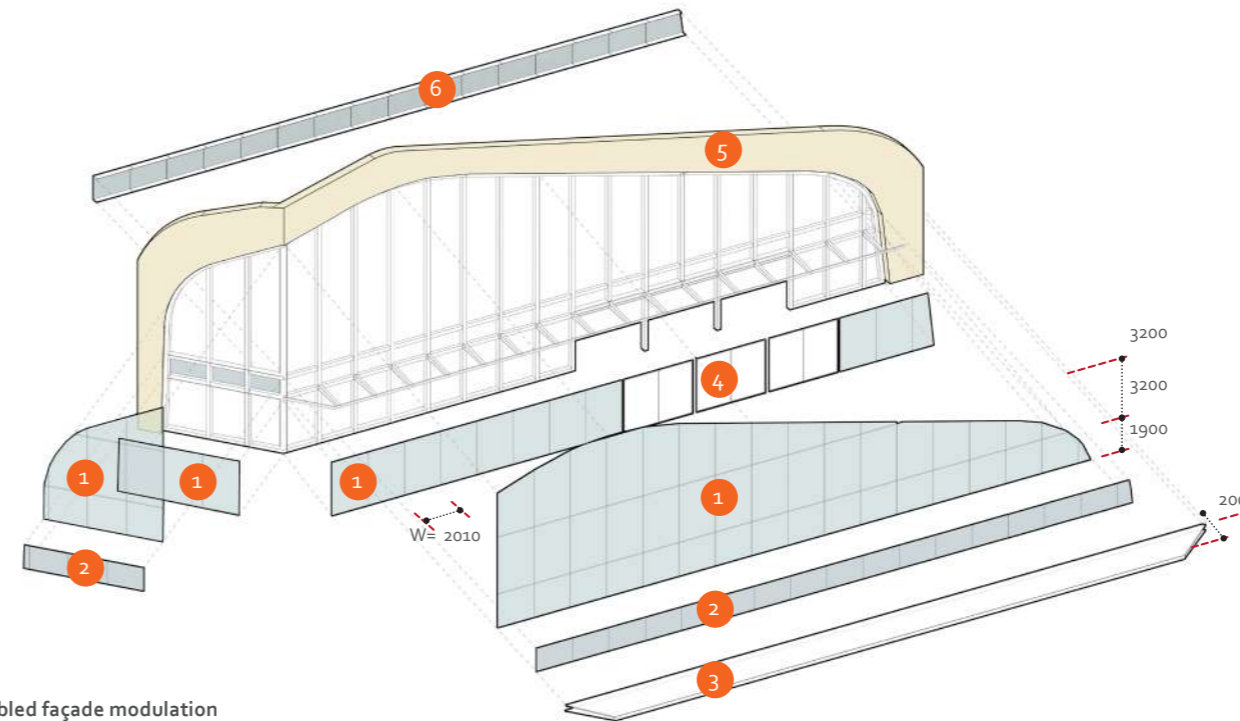


Figure 57: North gabled façade modulation

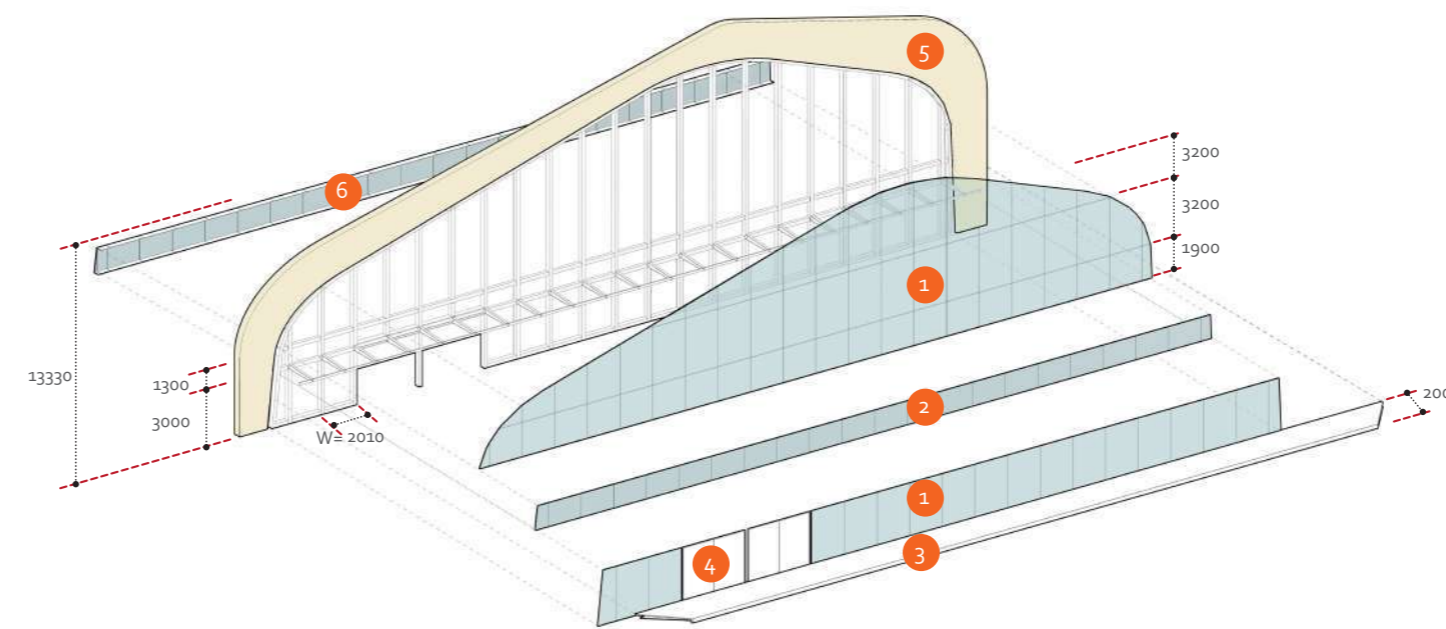


Figure 58: South gabled façade modulation (units in mm)

- 1 **Insulating Glazing Units**  
Blast-resistant glass units bonded with structural silicone to an aluminium carrier frame fixed back to the steel structure.
- 2 **Shadow Box**  
Back painted coated blast resistant double glazed units
- 3 **Canopy**  
Anodised aluminium hook-on panels fixed onto a substructure system.
- 4 **Swing Doors**  
Blast-resistant glazed swing doors with lock system to be accommodated at canopy area to keep sashes permanently open during summer. Manually opened at winter to access South plaza.
- 5 **Portal frame cladding**  
Painted steel rainscreen panels 4-side bonded to an aluminium carrier frame. Colour finish to match non-clad steel portal frames.
- 6 **Aluminium back panel or signage to rear shadow box**

Code 1 - Accepted

### 5.3.3 North Entrance Canopy

The north entrance canopy extends the main roof architectural language above the West Plaza to signify the entrance and provide a sense of place.

The painted steel portal frames that form the “arm” shelter part of the West Plaza and support a series of gutters interfacing with the concourse level that are part of the rainwater harvesting strategy. When the gutter becomes vertical it is clad with cover sheet panels.

### 5.3.4 South Canopy

The south canopy provides solar shading to the south facade. It is a 2.8m wide cantilevered extension of the standing seam roof with similar characteristics to the north canopy but less invasive in order to unveil the garden space.

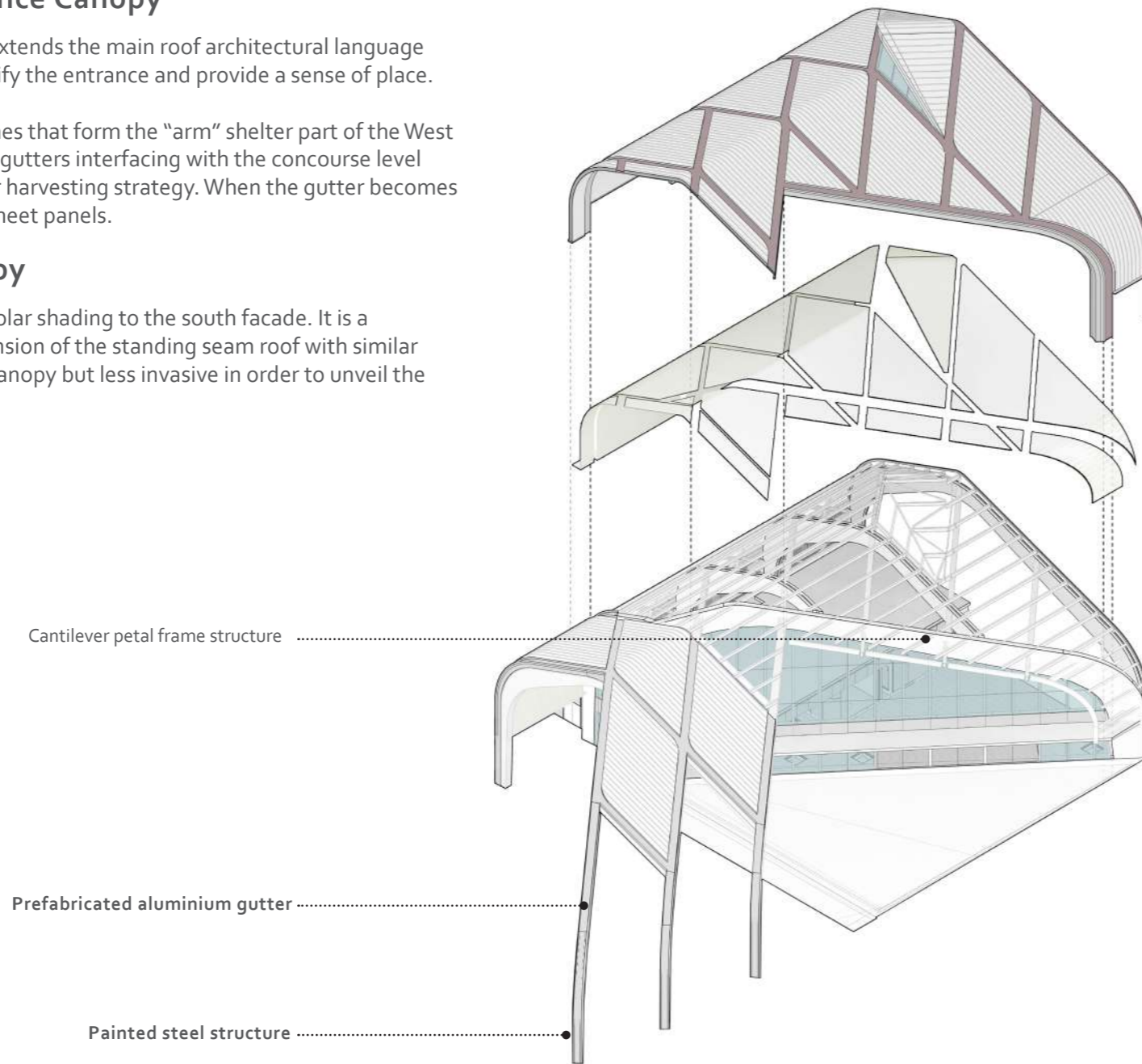


Figure 60: North canopy exploded view

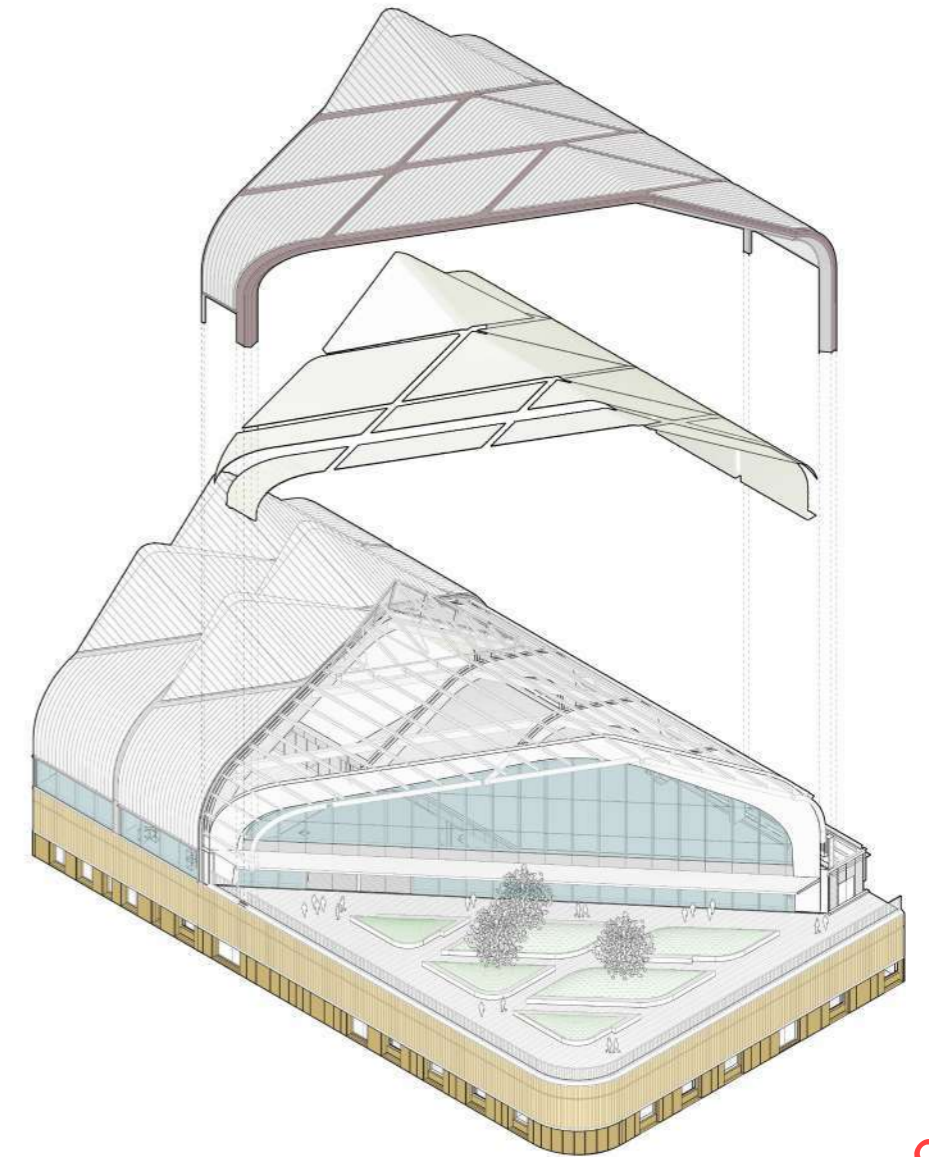


Figure 61: South roof canopy exploded view

Code 1 - Accepted

## 5.4 Concourse



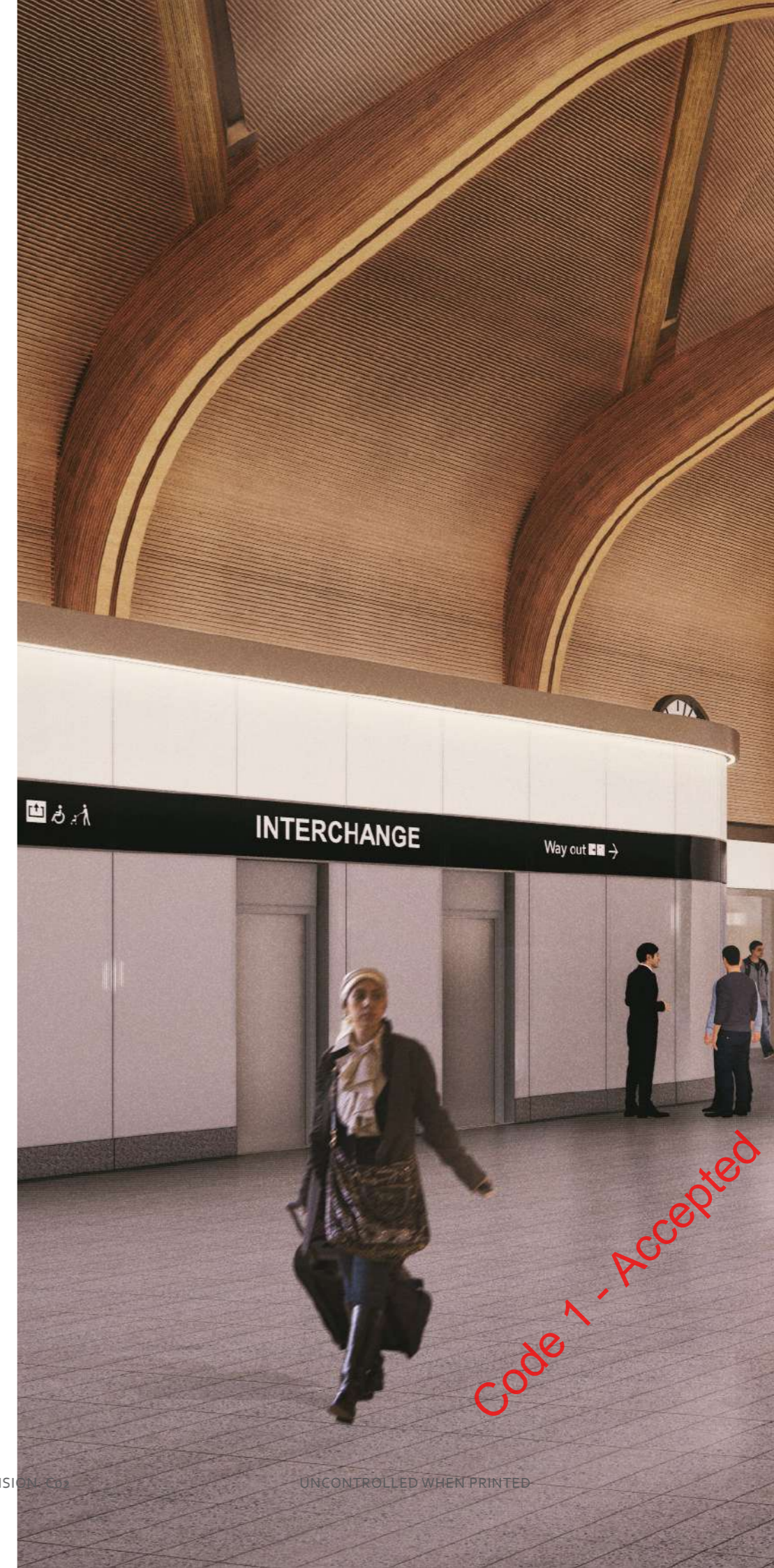
The concourse is designed to be both functional and delightful. It is configured to create intuitive and inclusive customer journeys between the intermodal connections and the platforms.

The routes to the platforms are arranged to provide one clear decision point for passengers and to maximise on operational efficiency. From the centre of the concourse, customers will have clear sight lines to all destination and adjacent information to provide help or assistance if they require it.

Passenger facilities are clearly located throughout the concourse with the slower waiting area and accumulation zone located to the south-west corner of the concourse to take advantage of views of the landscape. The retail units are also located at the south end of the concourse, away from the main gateline circulation area and immediately adjacent to both the seating area and the south terrace.

Panoramic views across the Hollywell brook to the west and the gardened terrace to the south give customers moments of delight unique to the station's setting. To the north and east passengers will be connected with all the modes of transport, which will help show the way to onward journeys and give the station animation and vibrancy.

Above all this, the timber structure will give the space warmth and character.



Code 1 - Accepted





Gatelines →

Check-in

Code 7 Accepted

# 5.5 Concourse Soffit

## 5.5.1 Concourse Soffit

The Concourse soffit is made of compressed timber slats, suitable for indoor use. The timber slats follow the geometry of the roof. The colour of the timber is designed to complement the colour of the main glulam structure.



Figure 63: Soffit orientations across unpaid concourse



Figure 62: Station concourse, section perspective

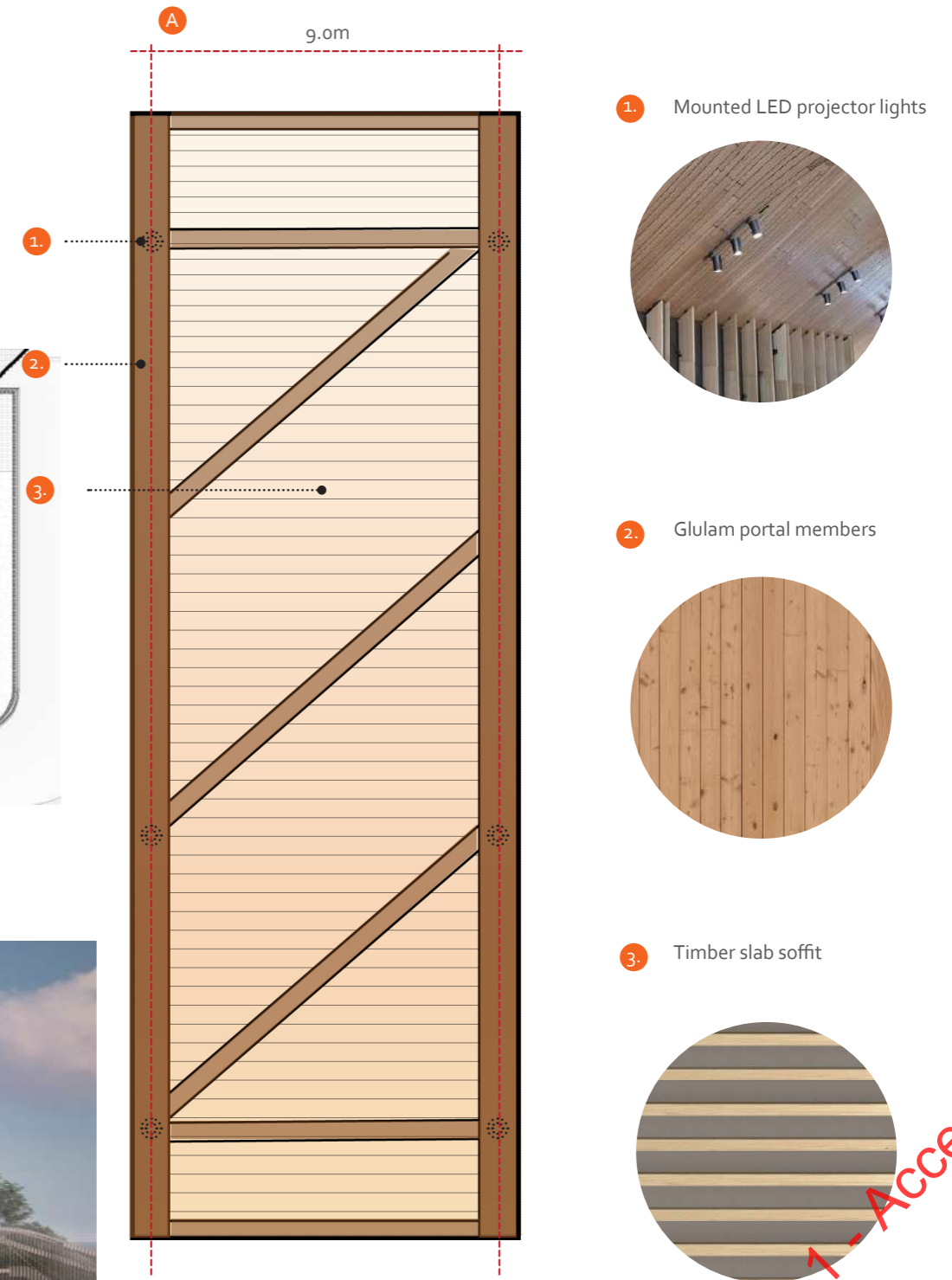


Figure 64: Visualization of Soffit

Code 1 - Accepted



Code 7 - Accepted



## 5.6 Paid Concourse



The paid concourse connects the unpaid concourse to the platforms via two bridges, and associated vertical transportation and escalators. It has been designed to be intuitive and accessible. The paid concourse is semi-enclosed, with a partially glazed balustrade providing safety whilst affording clear sightlines to all directions of onward travel.

The two routes direct the passengers to the north and south end of the station dependent on the entry gateline, providing a clear and direct journey for the customer to their destined platform.

On each bridge a set of escalators and lifts transport the passenger to the platforms. The lifts are highlighted in their architectural expression, with supergraphics as part of the external cladding. Architecturally, the paid concourse has a warm soffit to compliment the architectural language of the concourse.

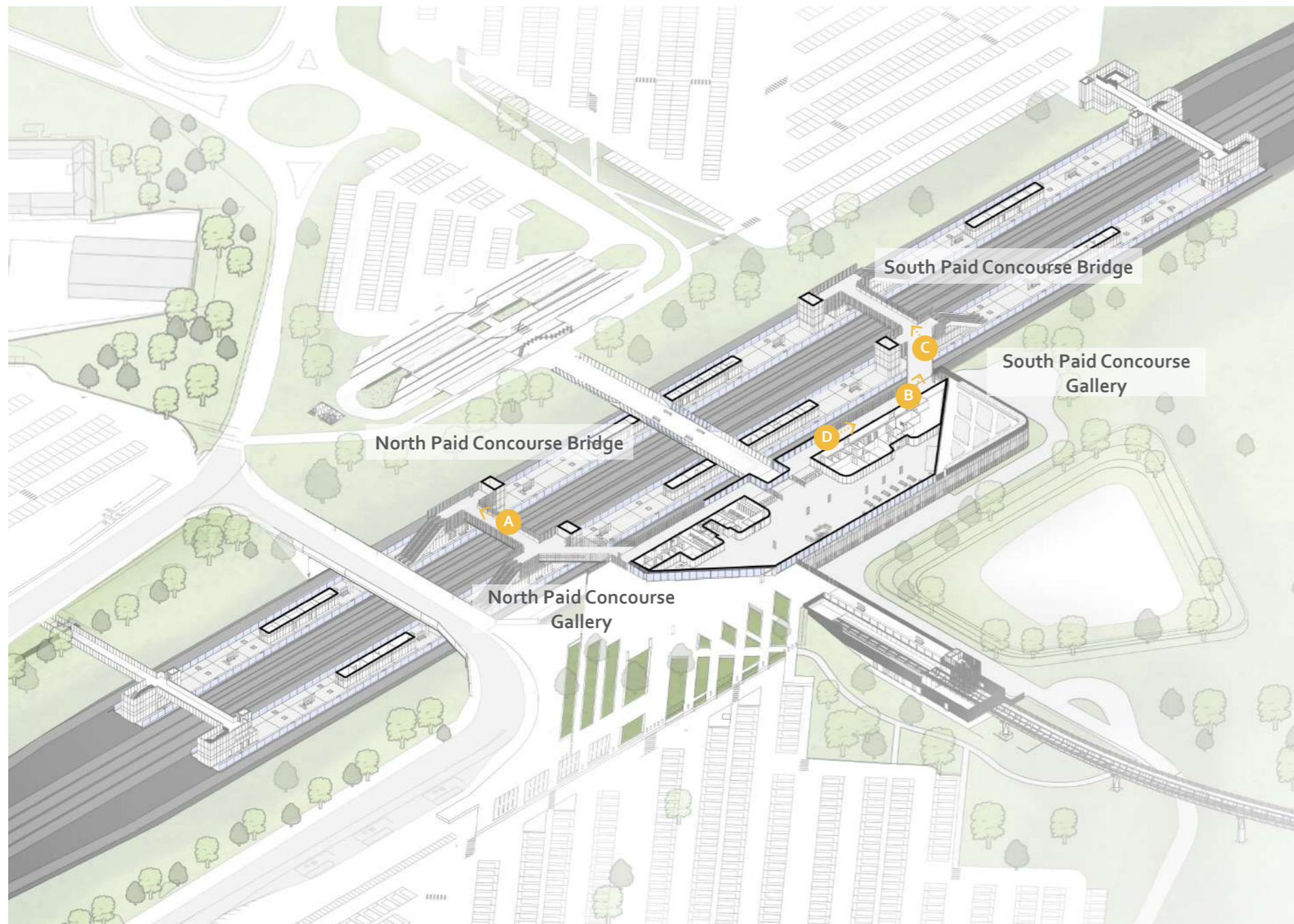
Distributed Customer Information Screens (CIS), help points, lighting, and reassurance signage along the internal facades and soffits direct and assure the passenger. With clear views from the bridges to the vertical access, platforms and wider environments give the customer a delightful and efficient experience navigating from the concourse to the platforms.





Code 1 - Accepted

# 5.7 Gallery and Paid Concourse Bridges



- 1 PVDF coated aluminium panels, mid grey satin finish, RAL 7038
- 2 Anodised aluminium mullions, light bronze finish
- 3 PVDF coated aluminium panels, champagne satin finish, typical 600mm widths
- 4 Anodised aluminium louvers, light bronze finish
- 5 Glazed panel
- 6 Blue PVDF coated aluminium panels, blue finish
- 7 Fire cabinet
- 8 Seating
- 9 Help point
- 10 Black metal wayshowing band
- 11 Concrete paving
- 12 Stainless steel skirting

Code 1 - Accepted



5

7

6

8

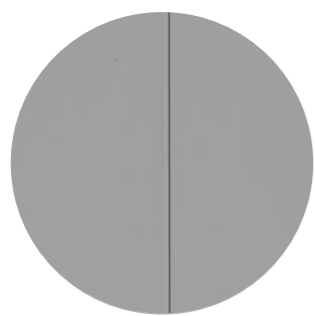
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10

11

12

1



1



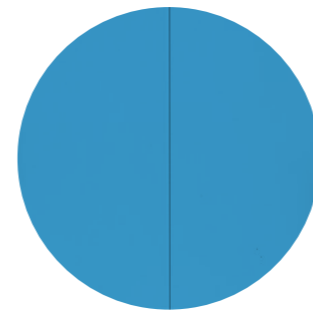
2



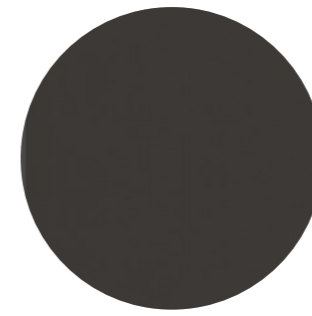
3



4



6



10



11



12

Code 1 - Accepted

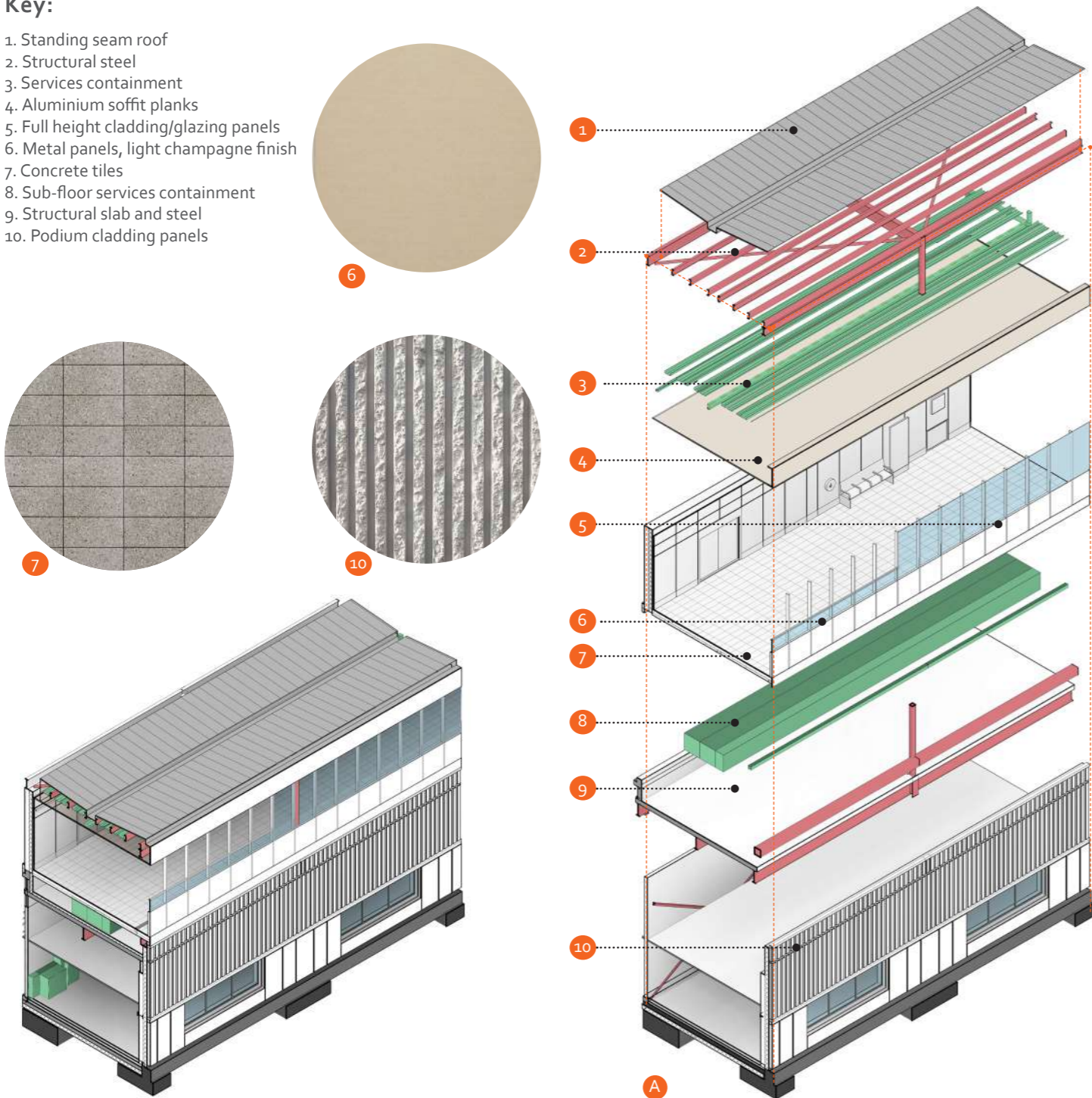




### 5.7.1 Gallery Axonometric and Exploded Diagram

**Key:**

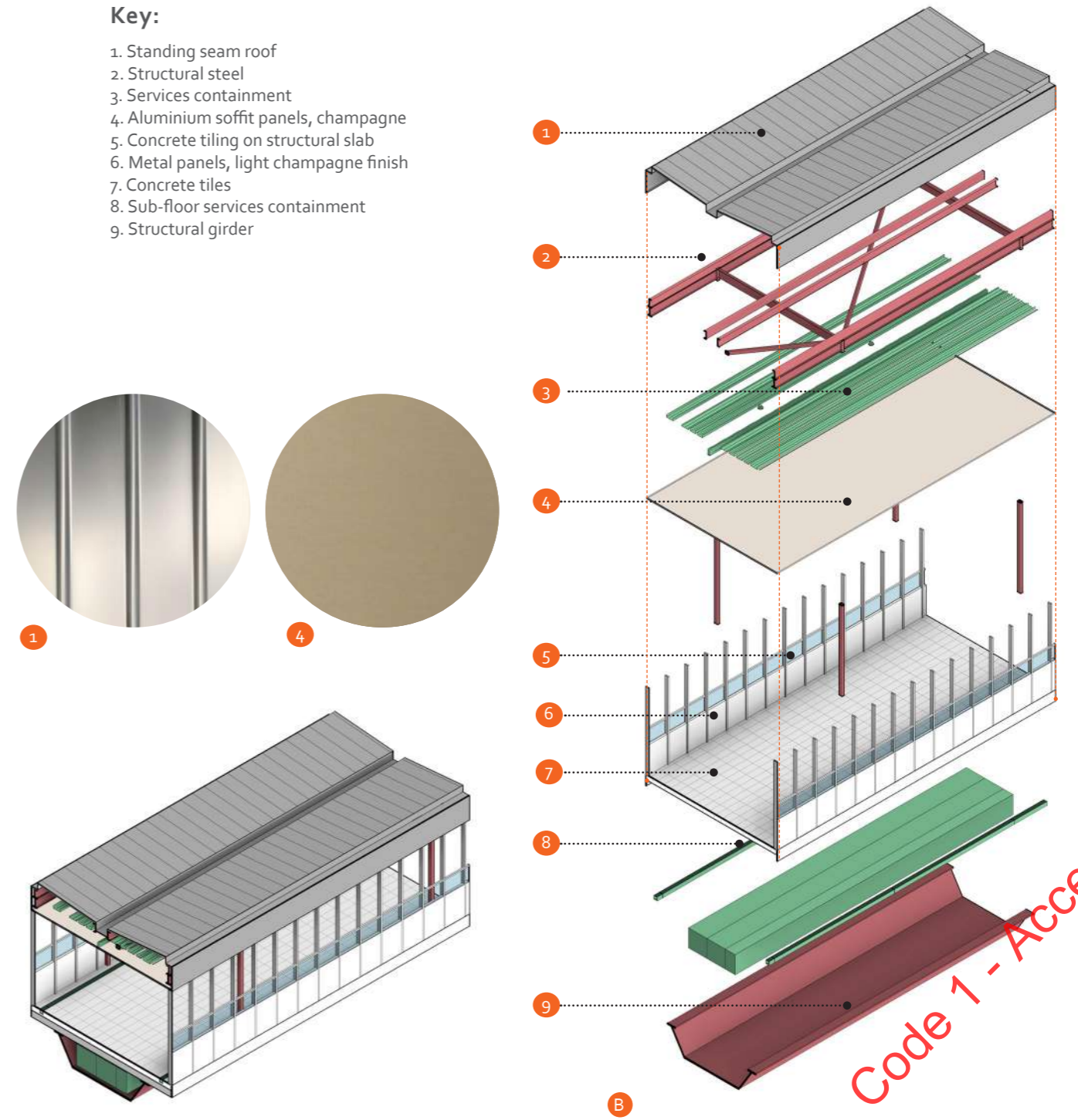
- 1. Standing seam roof
- 2. Structural steel
- 3. Services containment
- 4. Aluminium soffit planks
- 5. Full height cladding/glazing panels
- 6. Metal panels, light champagne finish
- 7. Concrete tiles
- 8. Sub-floor services containment
- 9. Structural slab and steel
- 10. Podium cladding panels



### 5.7.2 Paid Concourse Bridge Axonometric and Exploded Diagram

**Key:**

- 1. Standing seam roof
- 2. Structural steel
- 3. Services containment
- 4. Aluminium soffit panels, champagne
- 5. Concrete tiling on structural slab
- 6. Metal panels, light champagne finish
- 7. Concrete tiles
- 8. Sub-floor services containment
- 9. Structural girder



Code 1 - Accepted

### 5.7.3 Lift and Escalator Blocks

The setout of the escalators and lifts is determined by the required run-offs and clearances. The lift electrical room and escalator equipment room are situated either beneath the escalators, and recessed to aid sight lines. All lifts are through-lifts to facilitate wheelchair users.

The wayshowing strategy is integrated into the cladding and soffit, providing a consistent customer journey experience.

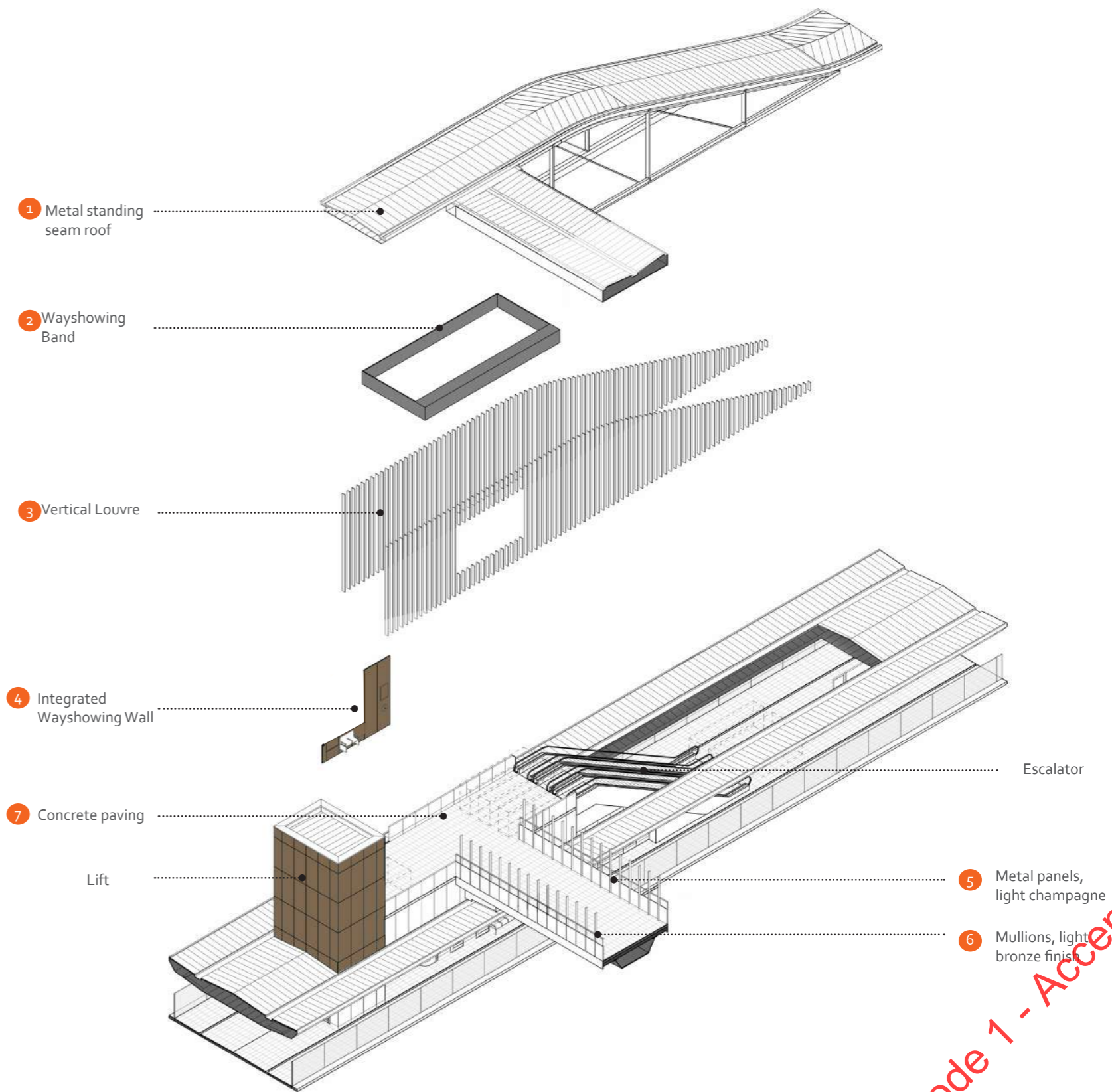
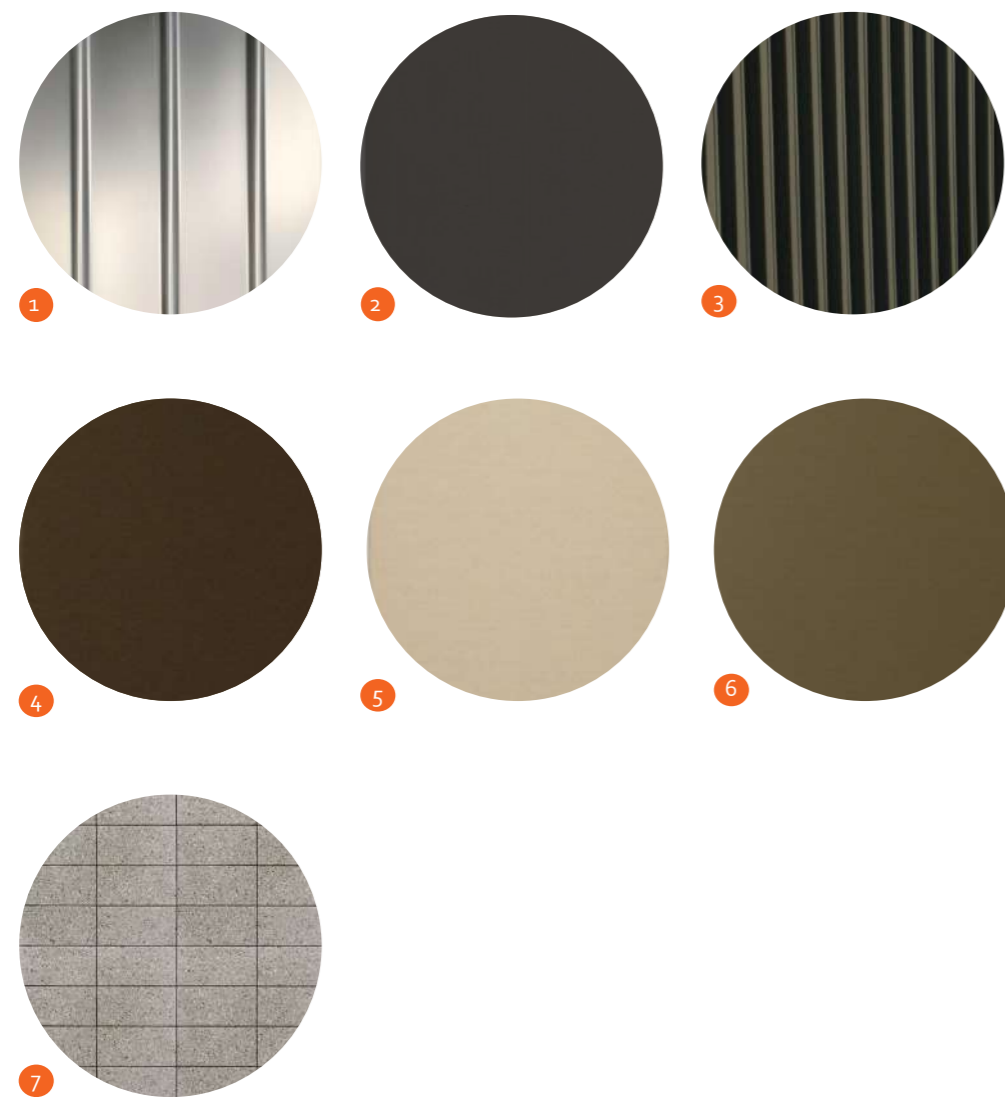


Figure 65: Escalator block exploded diagram

Code 1 - Accepted

### 5.7.4 Paid Concourse Materiality

The paid concourse acts as a bridge through its material palette from the unpaid concourse to the platform level. The choice of materials and material tone adheres to the key accessibility requirements of Light Reflectance Value (LVRV) tonal contrasts of 30 between each element. The darker, grey tones of the concrete pavers and balance of lighter materials for the vertical surfaces are complimented by the warm hues of the soffit, and wayshowing accent panels.

Balustrades across the bridges introduce a glass element for improved visibility across the station whilst retaining a combined height of 1.8m for safety.

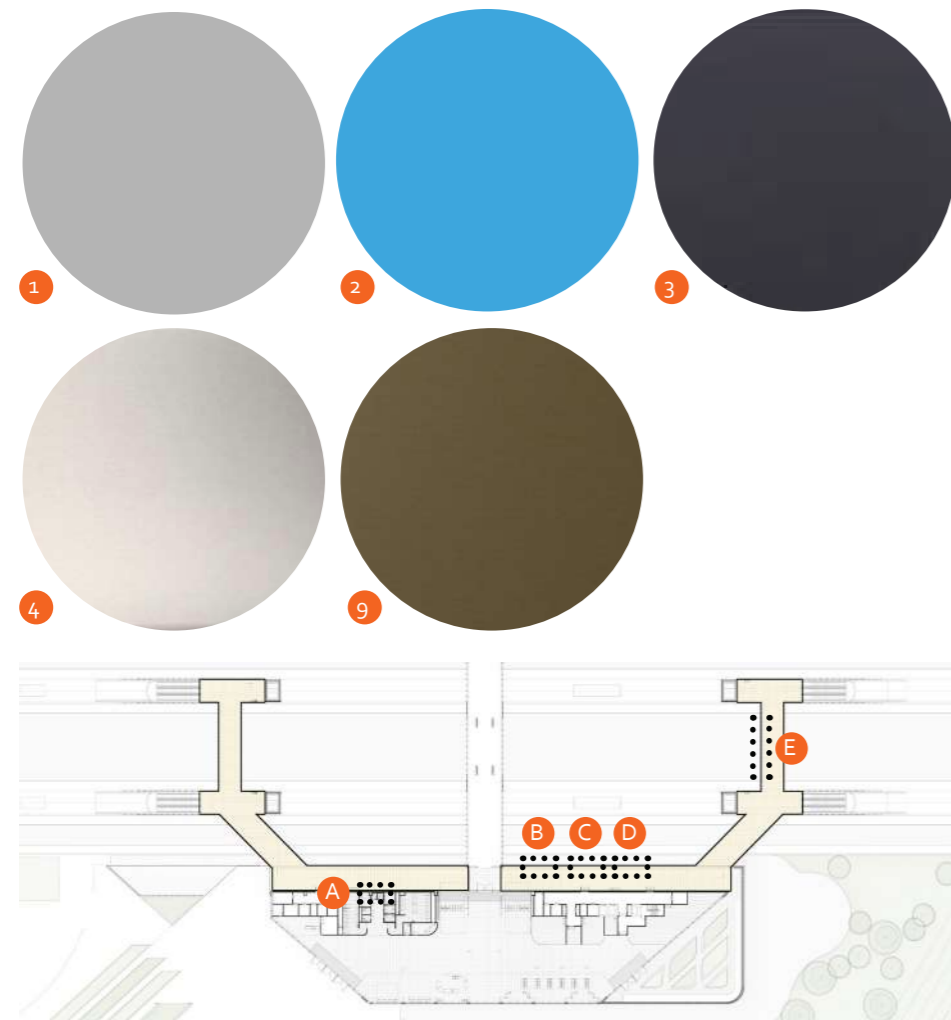
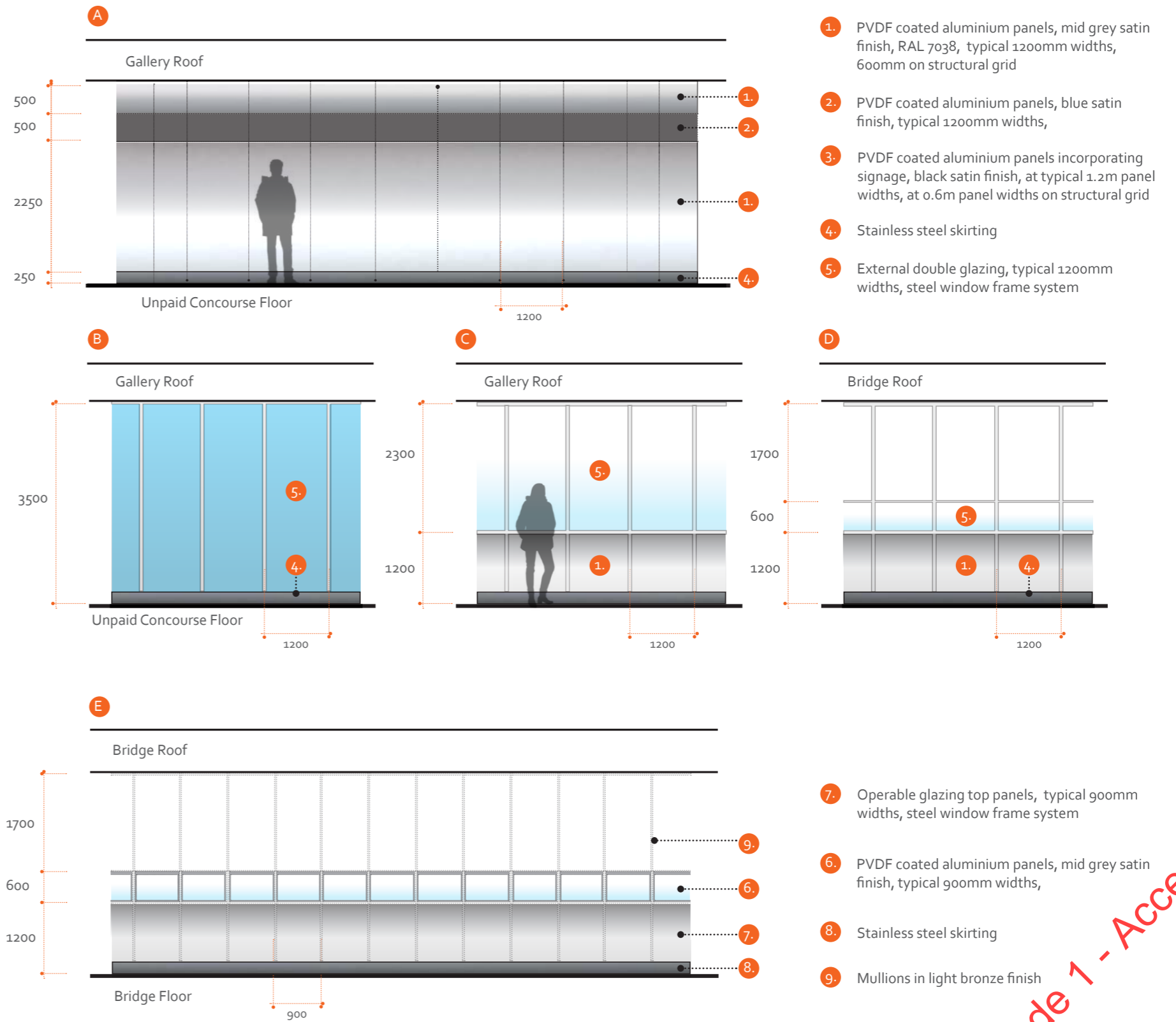


Figure 66: Paid Concourse material key



Code 1 - Accepted

### 5.7.5 Soffit

The platform soffit comprises of aluminium panels and baffles of a warm metallic tone, fixed by a steel frame system. This concept of warm natural shades at height are intended to contrast with the neutral shades of the walls and floors through the scheme, and acts as a material connection between the platforms, and the natural timber soffit of the unpaid concourse.

The soffits contain two variations of recessed lighting. Strip lights direct the user, and spot lights designate zones to pause, and transition from the paid concourse down to the platform. Divisions are expressed in the soffit panelisation, aligning to the curtain wall panels and louvre walls cladding the platform vertical access zones.

The soffit panels are 600mm wide, following the 1.2m planning grid of the wall and balustrade enclosures. The panels joints are perpendicular to the direction travel in the paid concourse.

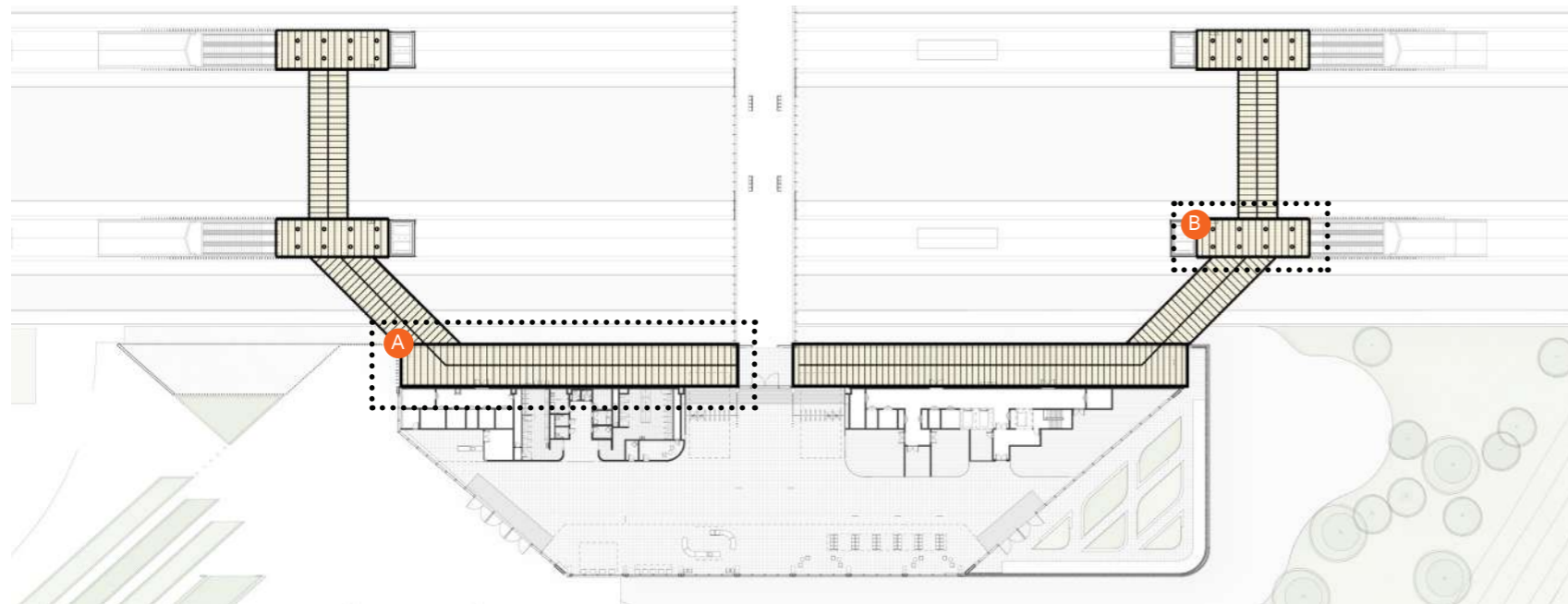
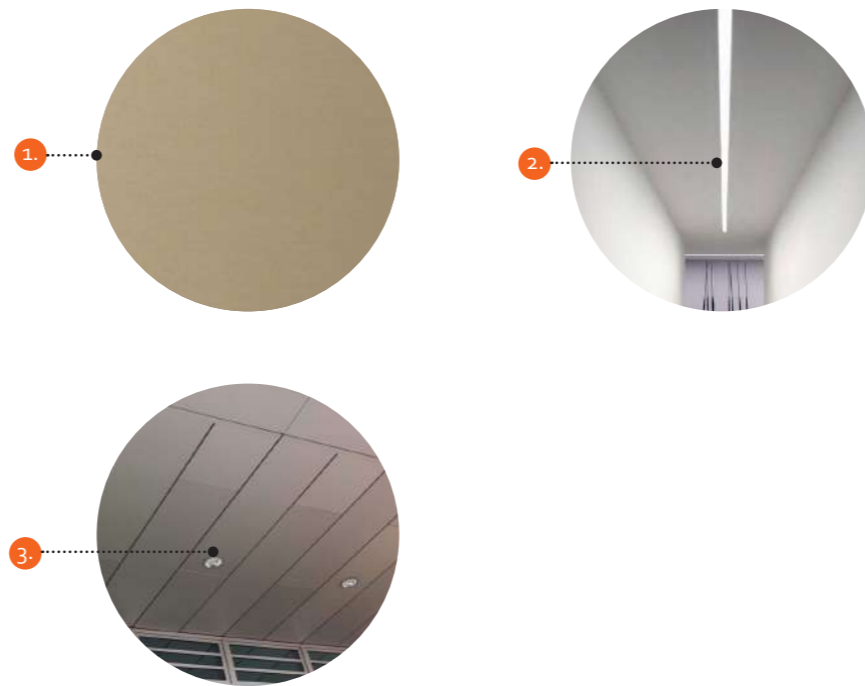
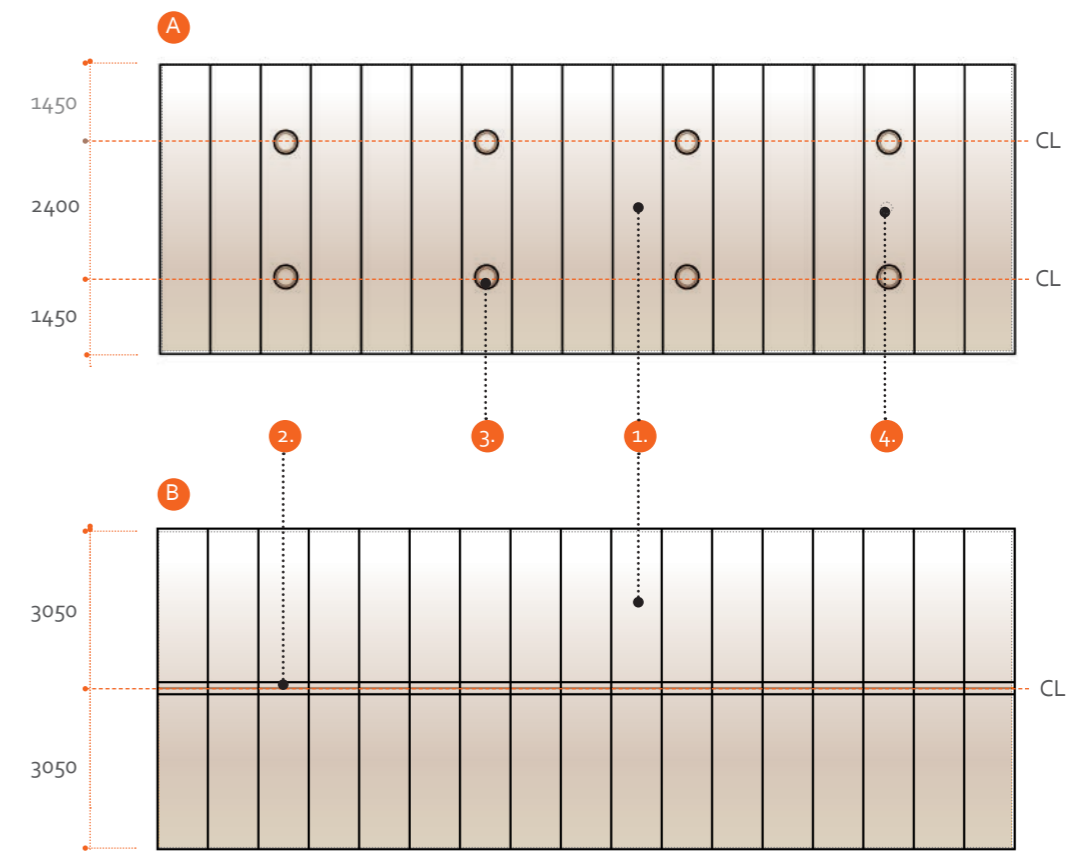


Figure 67: Soffit orientations across paid concourse



- 1. PVDF coated aluminium panels, champagne satin finish, typical 600mm widths
- 2. Linear LED light
- 3. Recessed LED spot lights
- 4. PAVA mounted speaker

Code 1 - Accepted

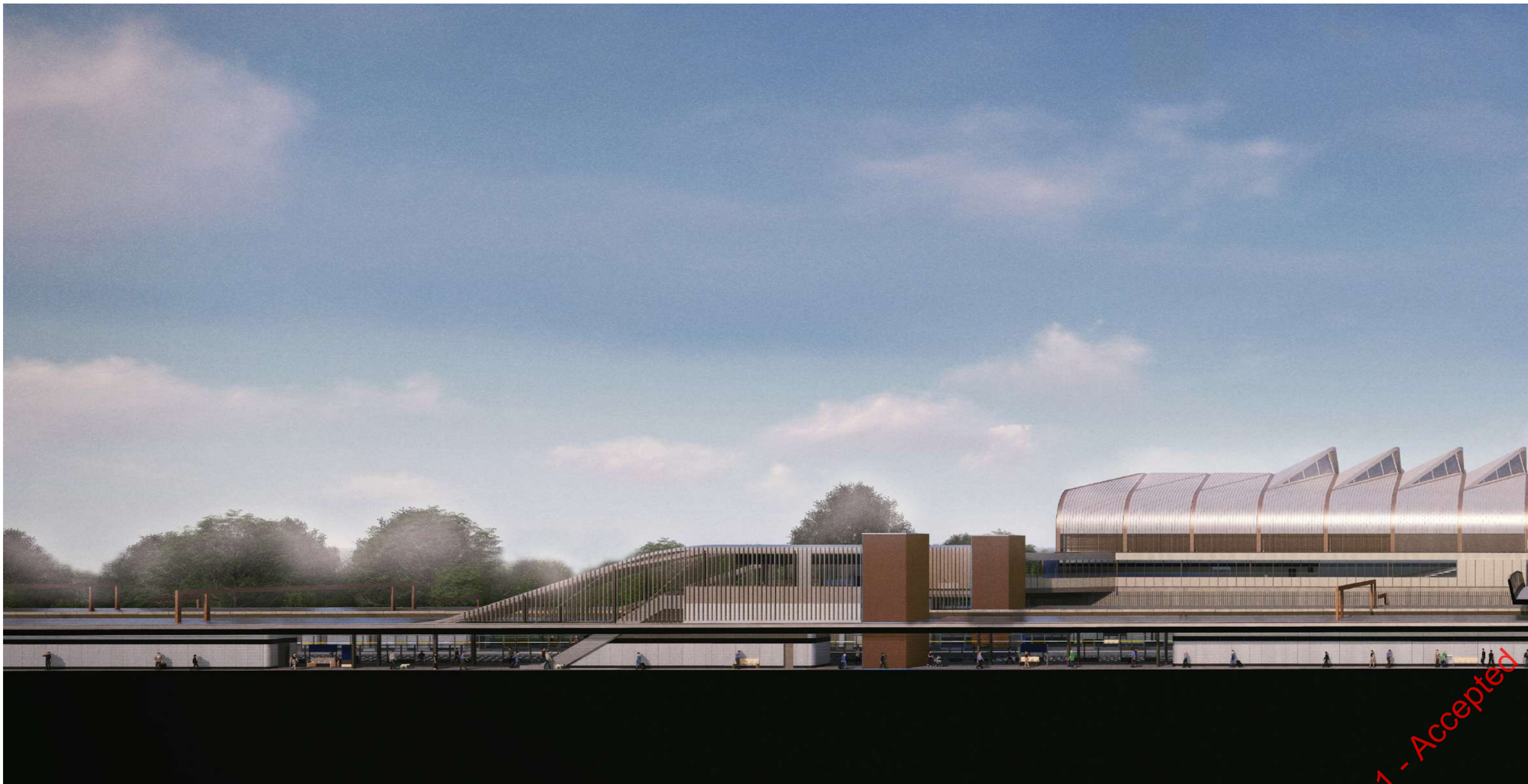
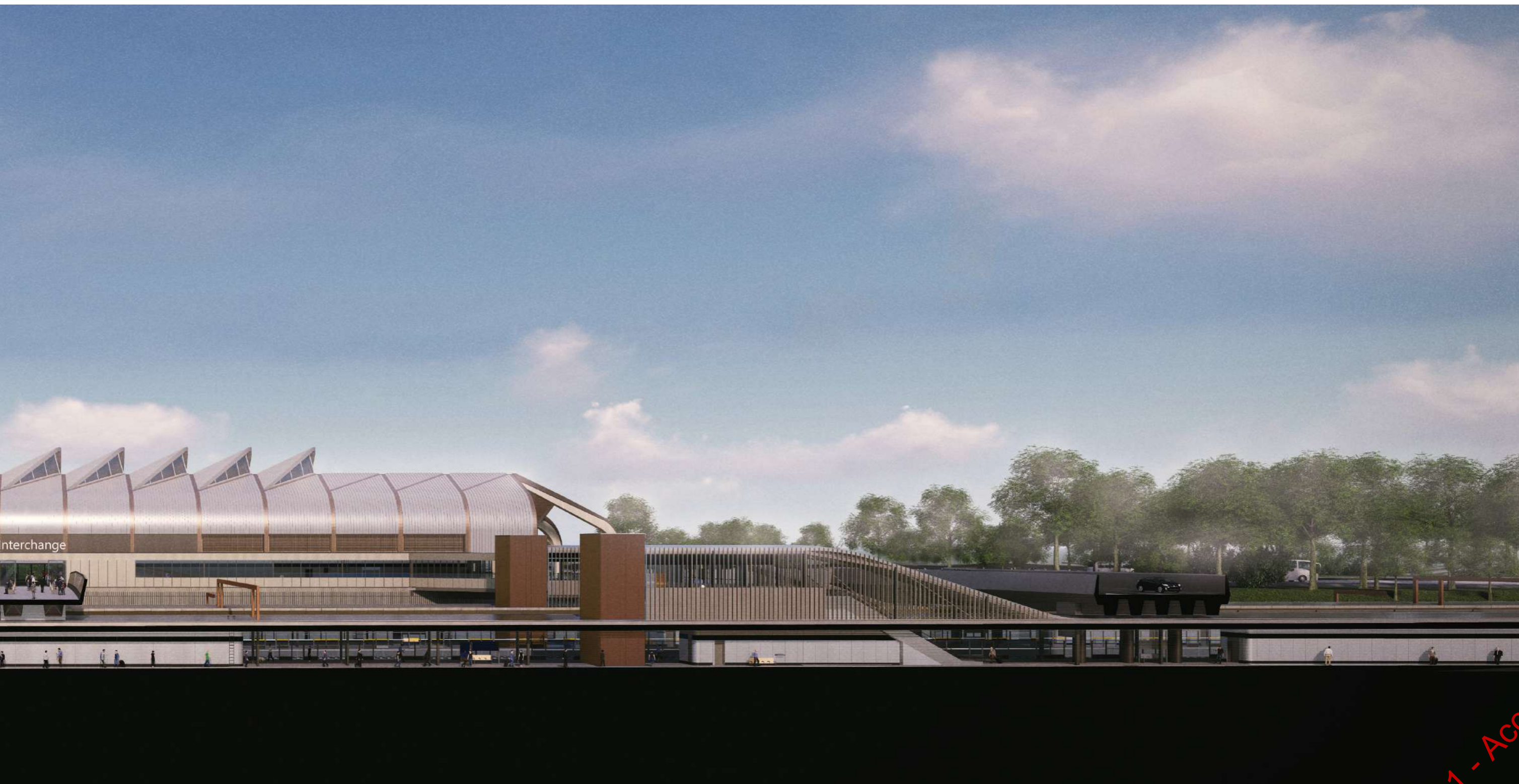


Figure 68: Long Section of Station

Code 1 - Accepted



Code 1 - Accepted

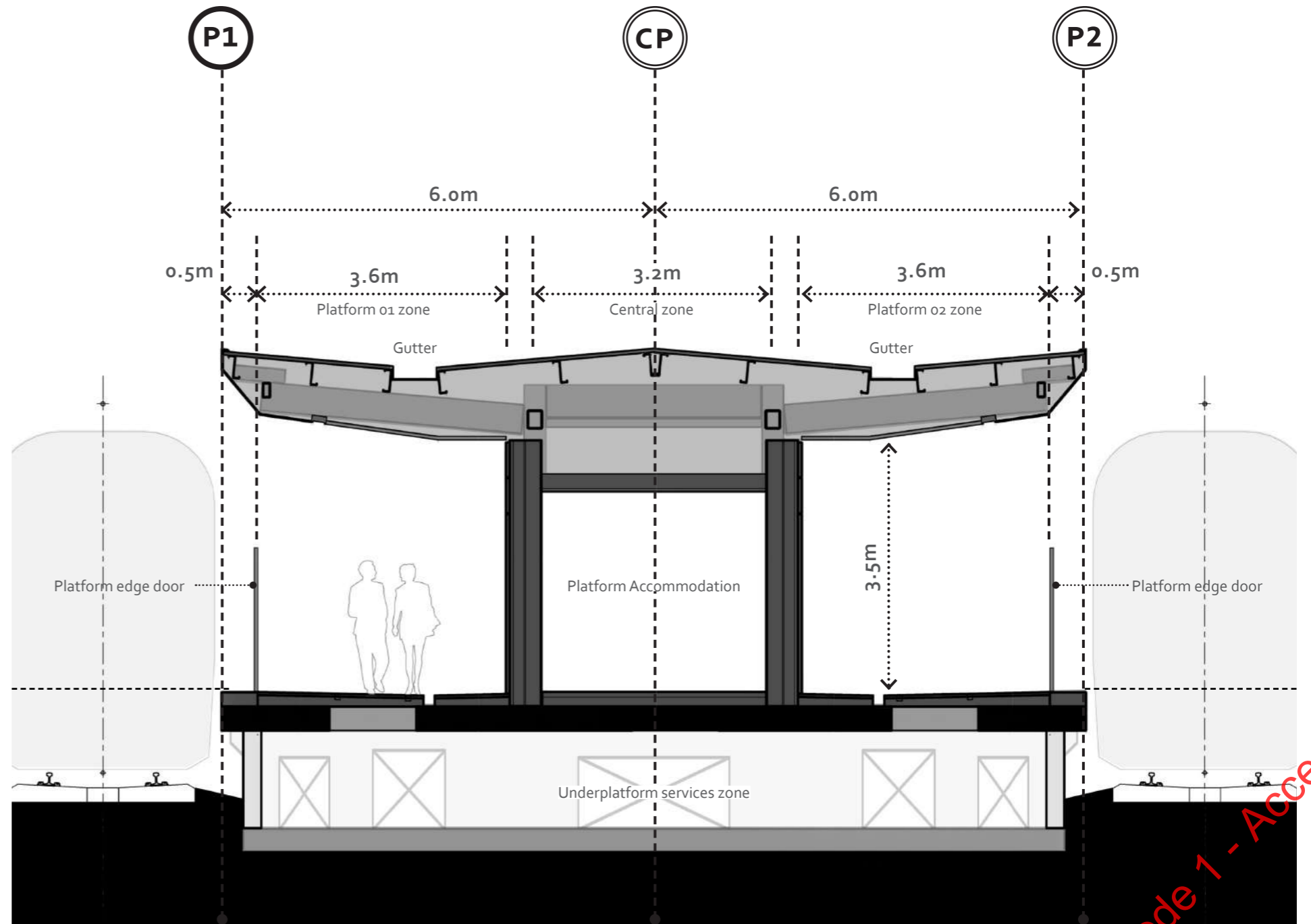
# 5.8 Platforms



## 5.8.1 Platform Canopy Setout

The setout of the canopy structure takes into account the various rail systems clearances. A safe and convenient servicing strategy has been integrated into the design of the canopy. The outer 1.25m edges of the platform form an exclusion zone from the OCS, the area between is where services are typically run with a demountable soffit below.

The platform canopy is designed to integrate with all the various junctions with different platform elements. The 12m width is divided into three parts, the two 3m wide edges and a 6m module in the middle, separated by two gutters which continue along the full length of the platform. The outer edges are constant along the length of the platform and contain all the services runs. The inner 6m interfaces with the various platform accommodation blocks such as lifts, escalators and plant rooms. Where they are exposed, structural columns have rounded corners to assist in visibility and to minimise points of congestion.



Code 1 - Accepted

### 5.8.3 Platform Accommodation Cladding

The materials selected for the paid concourse meet the key criteria of creating an efficient space which through their durability, modular composition, flexibility in integration and quality finish create a welcoming and user friendly series of spaces.

The materials provide a LRV tonal contrast of 30 between each element, have no variation in texture or colour and avoid glossy materials.

The material palette of the platforms is neutral, with darker tones to the concourse palette. This is in part derived from darker colours generally wearing better in external environments, maintaining the key tonal contrasts for accessibility requirements and allowing for clear integration of MEP. The 1.2m wide aluminium panels act as the main cladding panel. A wayfinding strip continues to set out passenger information at the 2.5m level, with the higher panel datum being specified as louvres to ventilate the services inside the blocks. The blocks incorporate full height aluminium louvre panels matching cladding module to meet ventilation requirements. All lifts are clad in aluminium PVDF coated rainscreen panels, matching the accommodation block cladding.

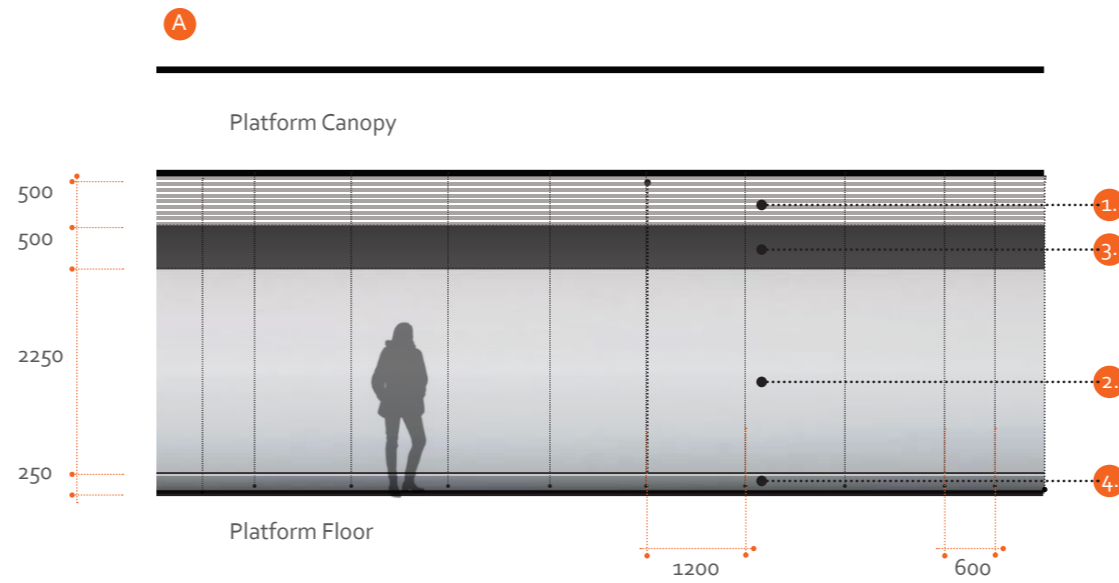
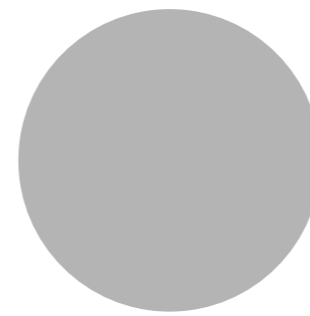


Figure 70: Typical block elevation



1. Acoustically rated PVDF coated extruded aluminium louvres mid grey satin finish



2. PVDF coated aluminium panels, mid grey satin finish, RAL 7038



3. PVDF coated aluminium panels incorporating signage, black satin finish



4. Stainless steel skirting

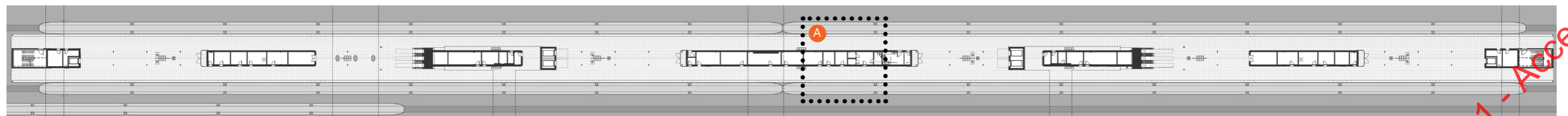


Figure 69: platform 03/04 plan

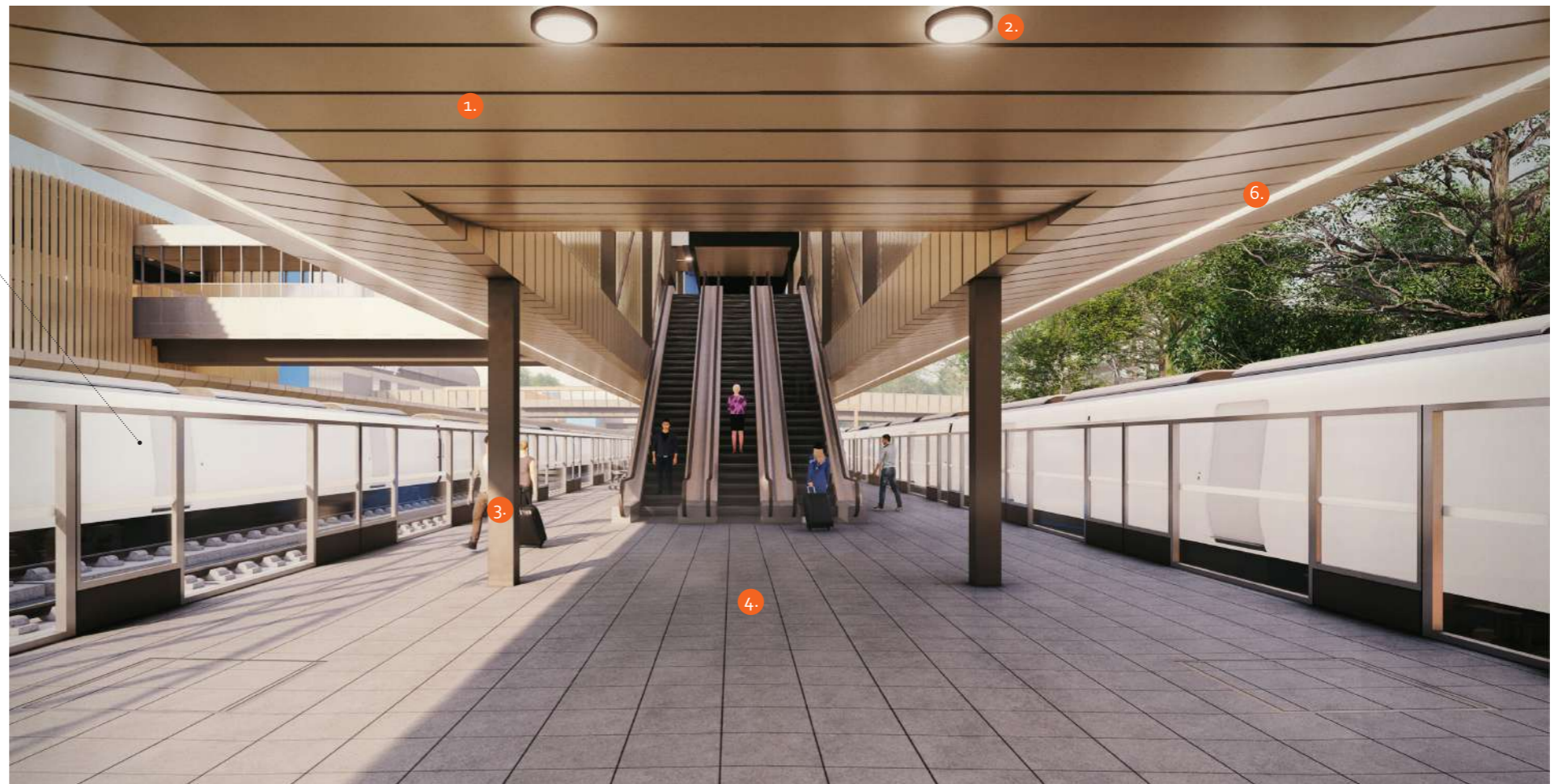
Code 1 - Accepted



## 5.8.2 Platform Canopy Soffit

The platform canopy soffit is provided to improve acoustics, security and aesthetics. It also reduces the possibility for pigeons to roost. It reduces the need for maintenance whilst also being accessible if services need to be inspected or replaced.

Platform edge doors



1.

PVDF coated aluminium panels, champagne satin finish, typical 600mm widths



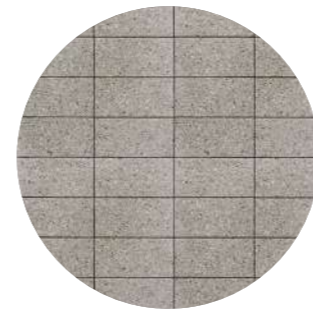
2.

Recessed LED spot lights



3.

Painted steel columns, dark bronze finish



4.

Concrete paving



6.

Strip lighting

Code 1 - Accepted

The platform soffit is PVDF coated aluminium panels and baffles of a warm metallic tone, fixed to a sub steel frame system. This concept of warm natural shades at height are intended to contrast with the neutral shades of the walls and floors through the scheme, and acts as a material connection between the platforms, and the natural timber soffit of the unpaid concourse.

The soffit panels are demountable and align to the 1.2m panelized grid of the accommodation blocks. Lighting, PAVA speakers and CCTV are organised in a consistent strip inset 1.35m from the outer edge of the platform.

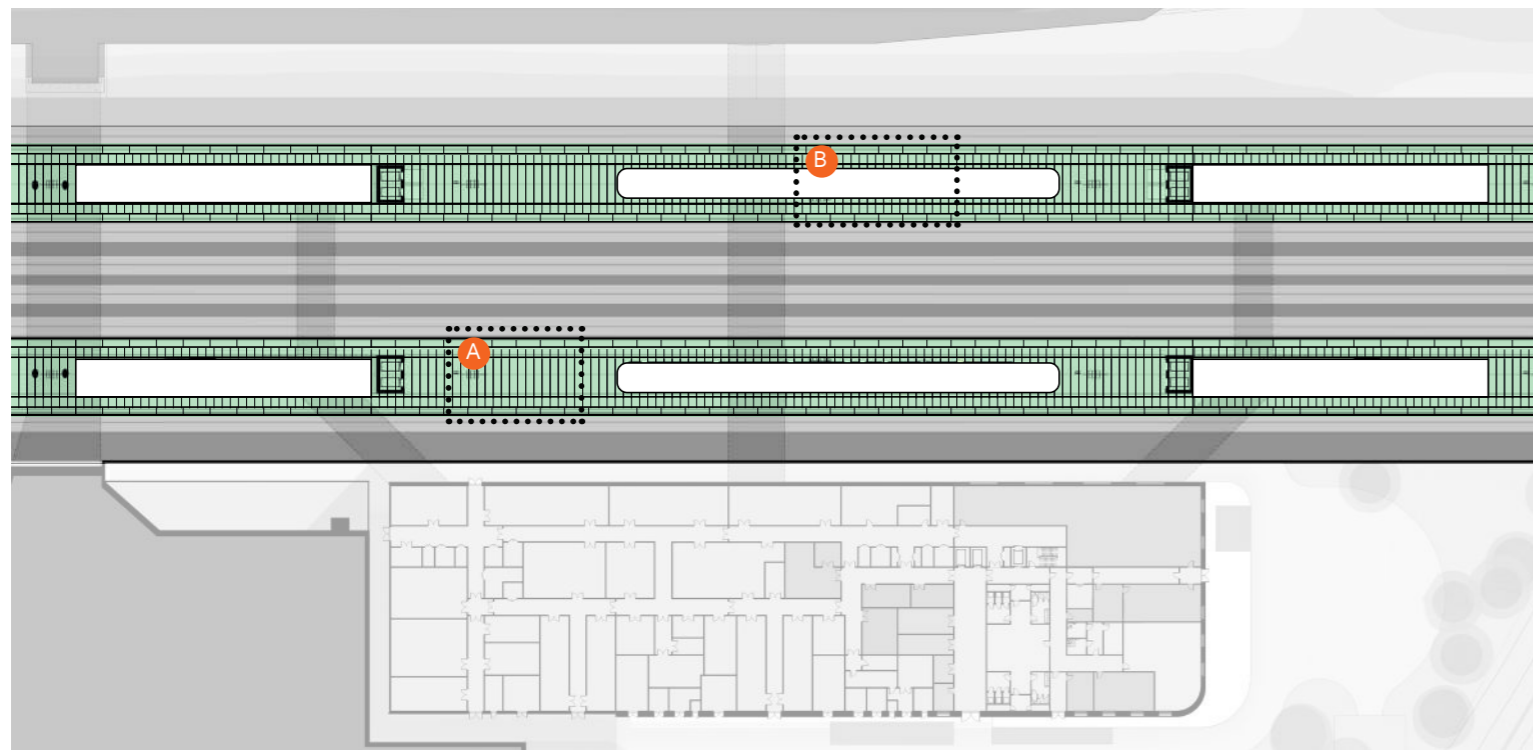


Figure 71: Platform RCP plan

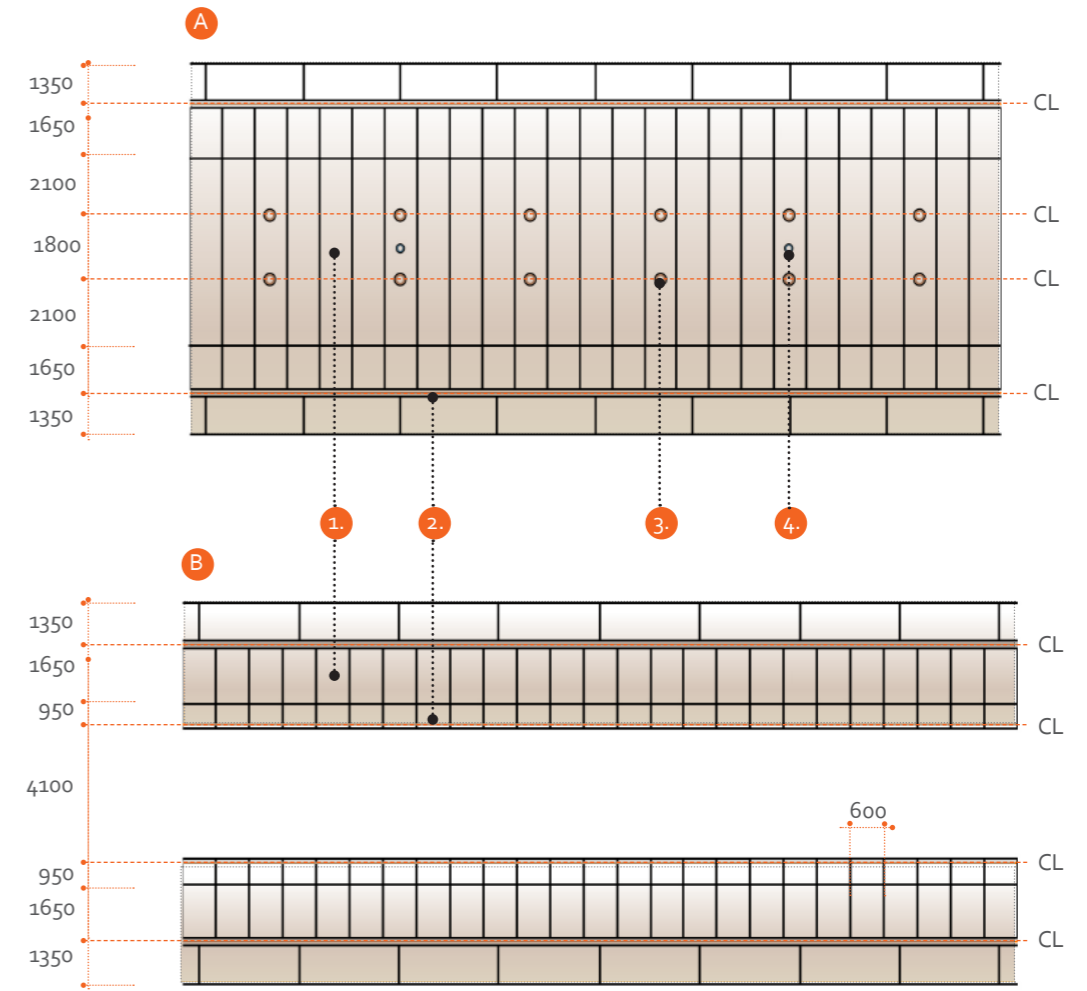


Figure 72: Typical Platform RCP's

- 1. PVDF coated aluminium panels, champagne satin finish, typical 600mm widths, RAL 1014
- 2. Linear LED Platform edge lighting
- 3. Recessed LED spot lights
- 4. PAVA mounted speaker

Code 1 - Accepted

# 5.9 North and South Escape Cores



## 5.9.1 North and South Escape Cores

The escape cores utilise several different materials. The lift core is clad in an aluminium rainscreen cladding which provides a watertight barrier for the lift components. The stairs and bridges are open to air and the sides are clad in a hot-dipped galvanised steel grating. The pattern of the grating is such to prevent climbing or intrusion from the street level exits.

The bridge, stair landings and treads utilise a GRP anti-slip surface, this is a safe and durable material suited for this purpose.

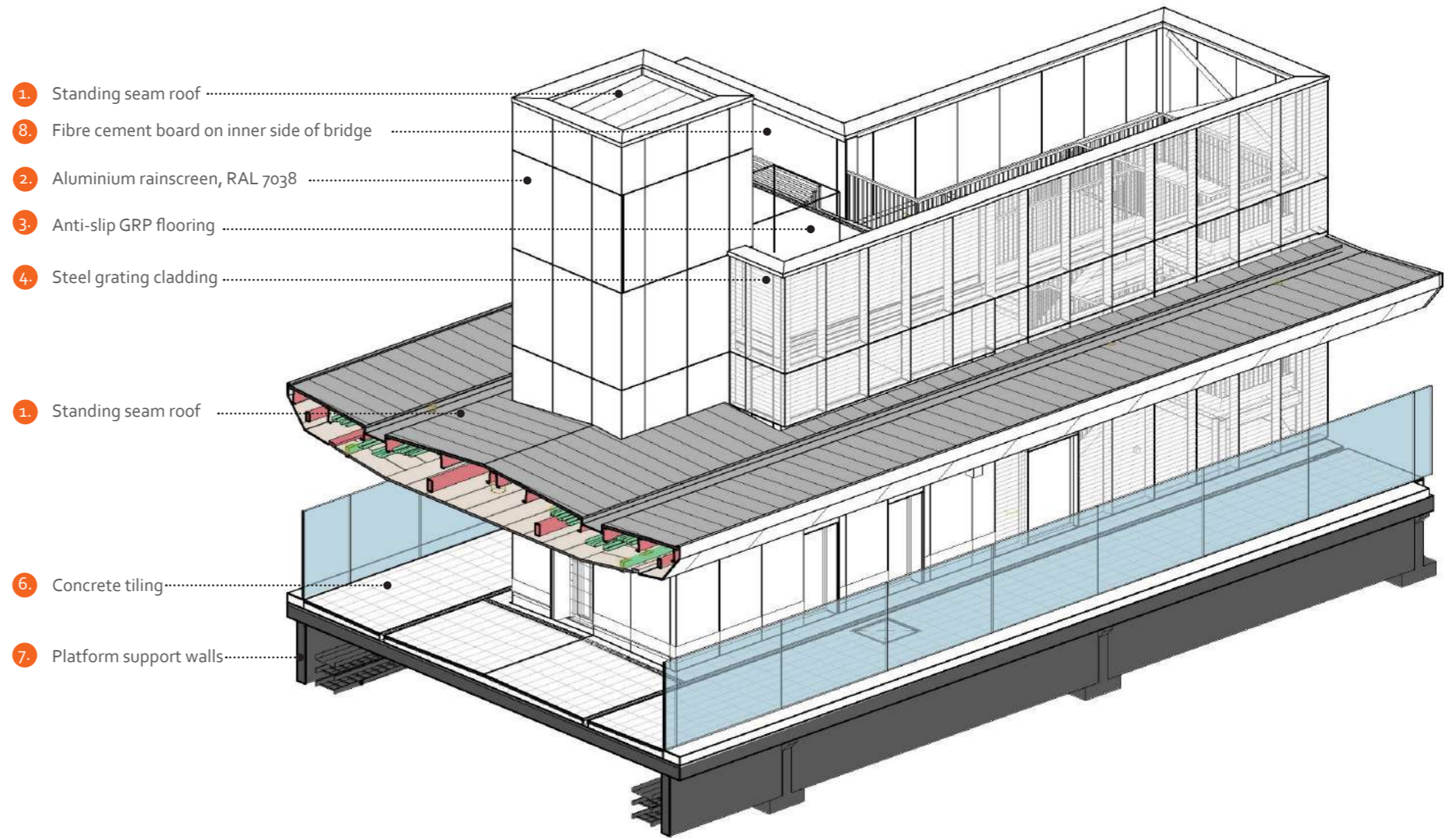
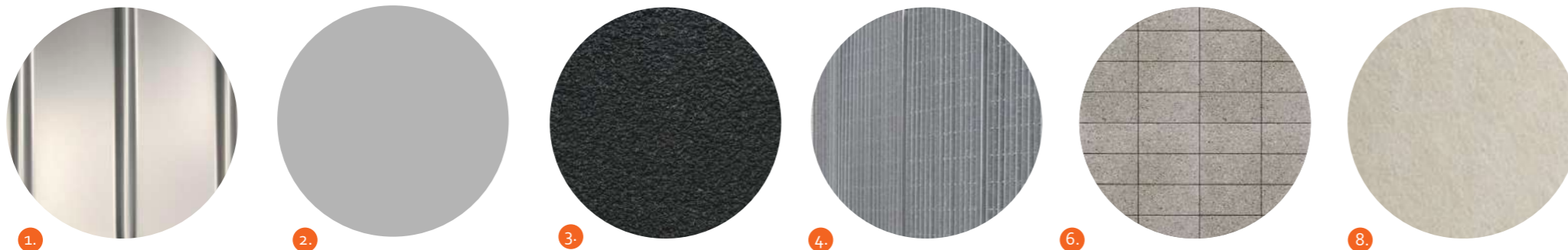
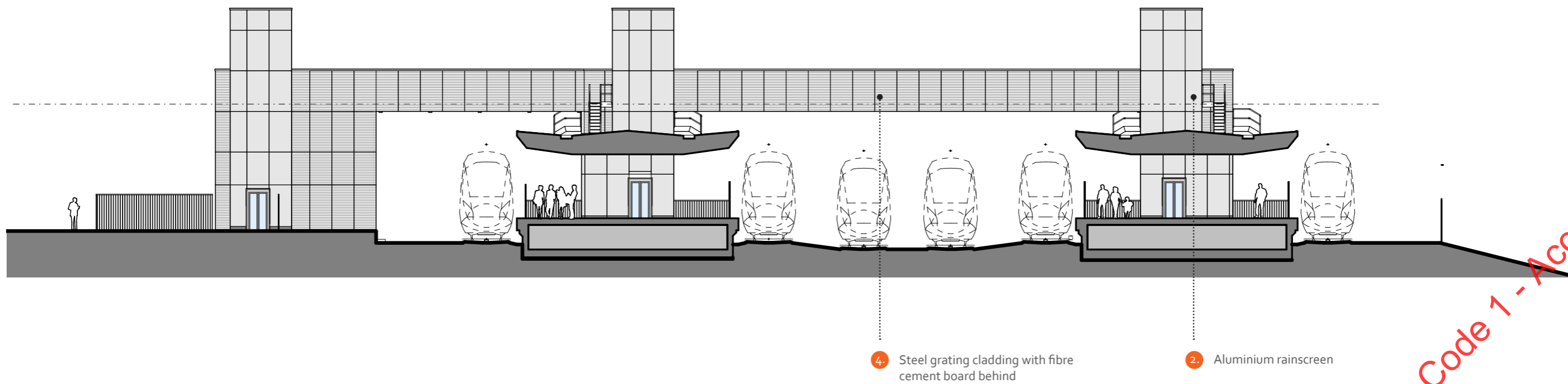
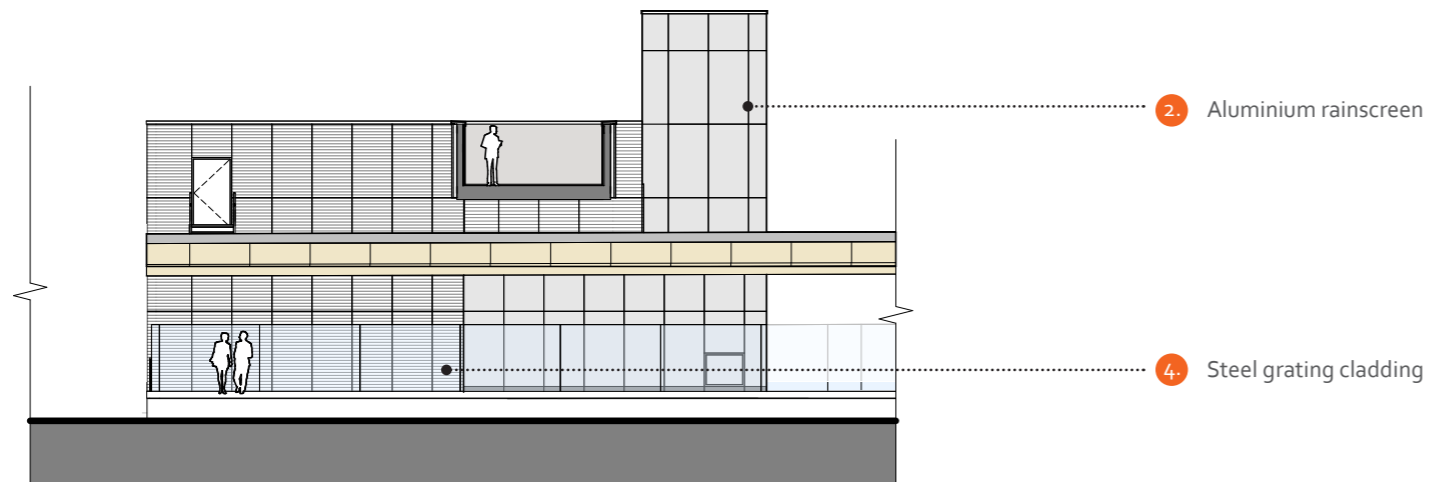


Figure 73: Cutaway Escape Core

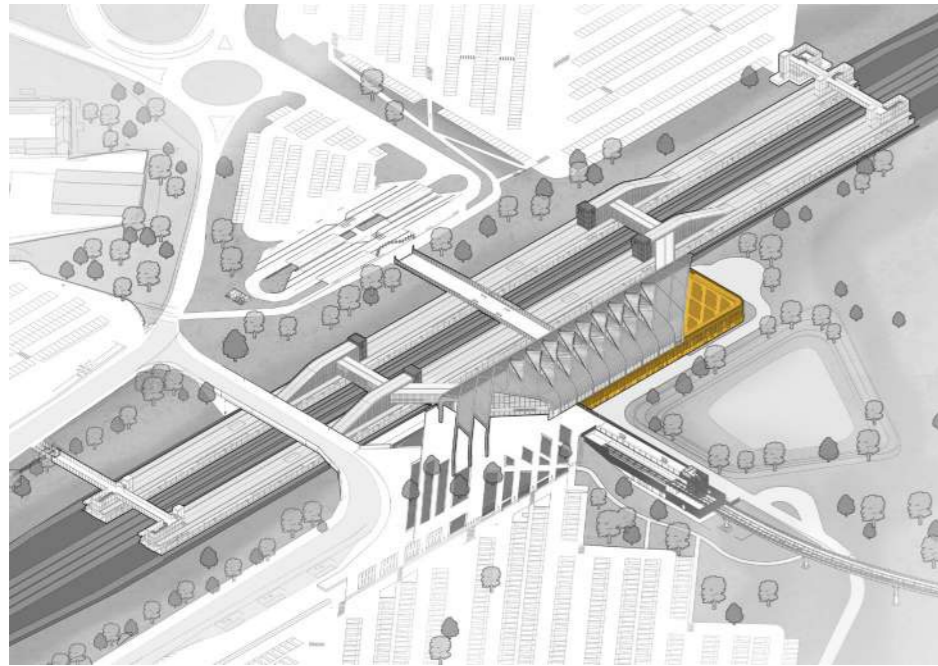


Code 1 - Accepted



Code 1 - Accepted

# 5.10 Podium



## 5.9.2 Podium Facade

The lower level of the station accommodates the back of house staff areas, offices and plant rooms. The podium requires a series of openings with different requirements that need to be integrated into the cladding design. The facade at podium level consists of bands of precast concrete rainscreen panels, with perforations where required for ventilation.

Podium openings are set back from the outer envelope line and consist of:

- Windows
- Loading bay doors
- Access/ egress doors
- MEP inlets/outlets

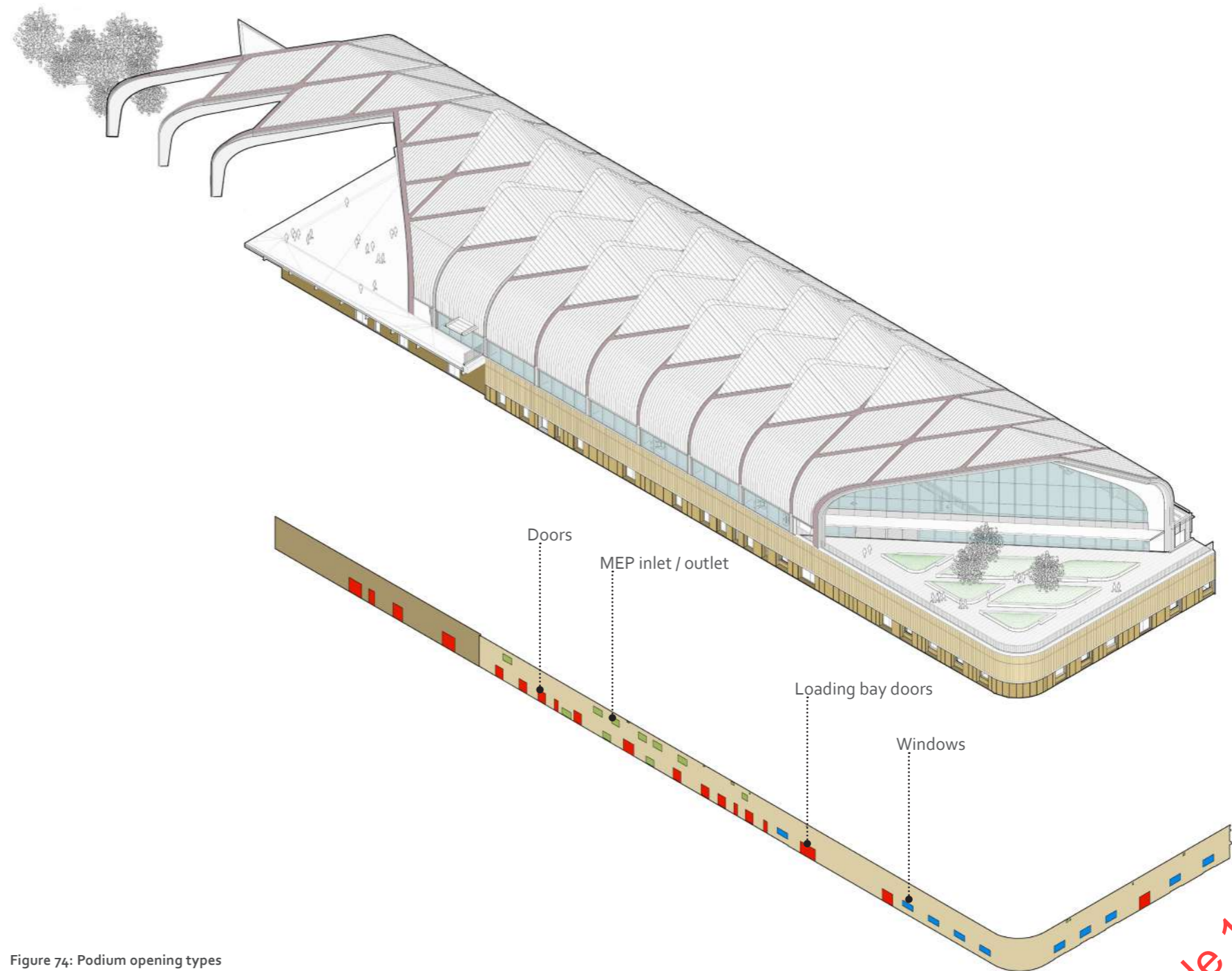


Figure 74: Podium opening types

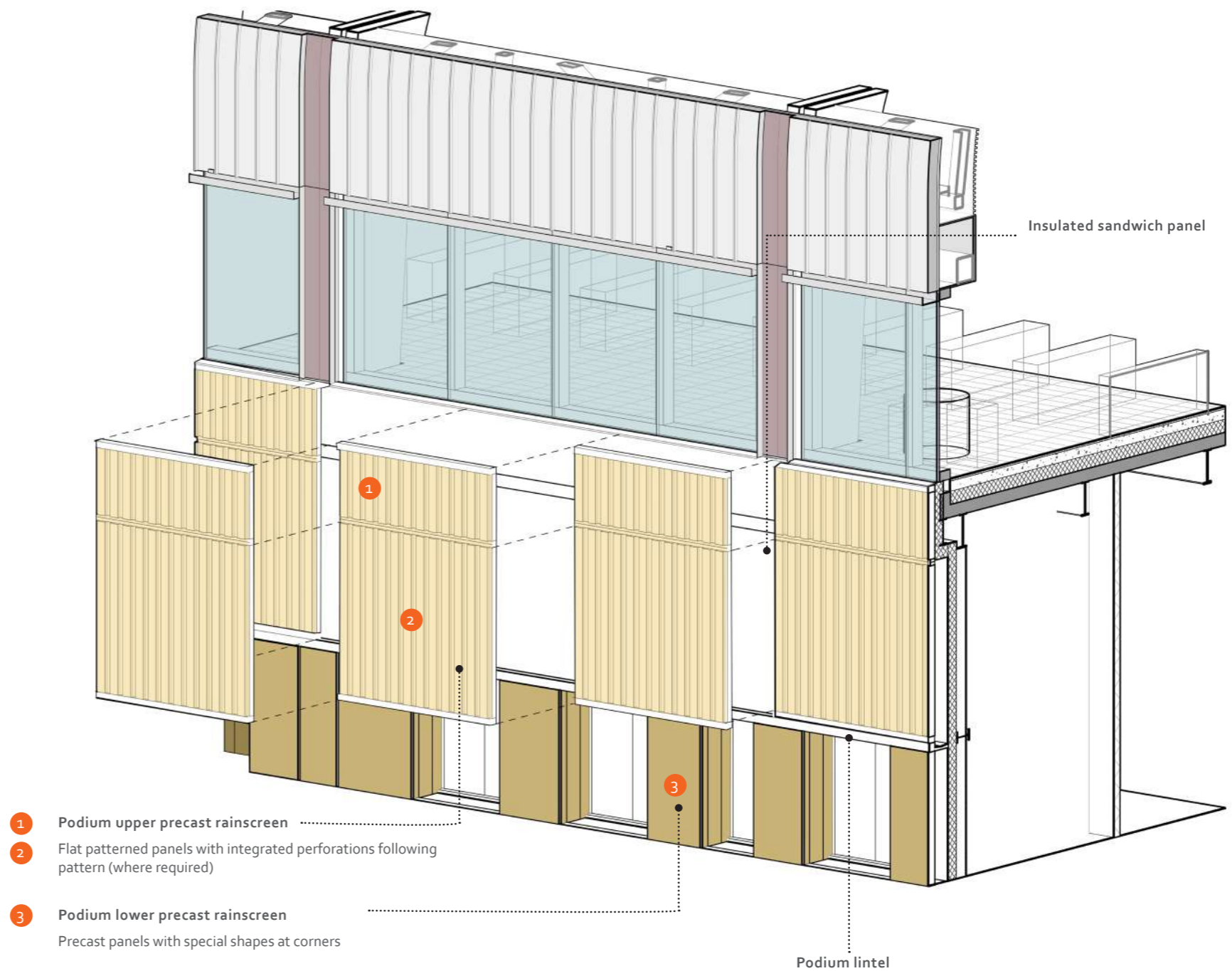
Code 1 - Accepted

### 5.10.1 Podium Cladding

The upper row of the podium features a series of regularly sized patterned precast panels. This rhythm of panels are supported on a lintel resting on a lower row of panels accommodating the different podium openings. A regular pattern coexists with a random lower ribbon with openings.



Figure 75: Artist's impression of south end of the building showing rainscreen cladding with integrated doors, windows and air intake/exhausts concealed behind



- 1 Podium upper precast rainscreen
- 2 Flat patterned panels with integrated perforations following pattern (where required)
- 3 Podium lower precast rainscreen  
Precast panels with special shapes at corners

Figure 76: Podium rainscreen panelisation

Code 1 - Accepted

# 5.11 Site Wide Canopies

Canopies are proposed for the blue badge parking bays, taxi drop off and pick up, Drop & Go, cycle storage and People Mover walkway. The canopies have been designed to read together as a family, with a similar language to those used on the People Mover itself.

Main routes:

- People Mover to station link: walkway is covered with the canopy, which is an extension of the central spine of the People Mover canopy. It connects straight into the station providing a covered walkway. Lighting fixtures are integrated within the roof buildup.
- Taxi drop off / Drop&Go cover: routes to East plaza are uncovered. The canopies are provided over the entrance to the Central pedestrian bridge and taxi drop off/pick up lanes. The width of pedestrian paths has been derived from pedestrian flow calculations for efficiency of movement. A simple cover similar to the central part of the People Mover canopy is provided. It is a portal frame structure supporting a standing seam roof. The soffit consists of aluminum panels similar to the canopies on the platform. Lighting fixtures are integrated in the soffit cladding.
- Cycle storage covers: these are of the same language as the other canopies on site. They have a portal frame structure with standing seam roof and integrated lighting fixtures.
- Blue Badge/PRM covers: Car parking spaces for blue badge holders are covered are located within close proximity to the station entrance within Car Park C. The support structure is every second bay. The roof is aluminum standing seam. 1.2m zone is provided between the designated spaces to enable a disabled driver or passenger to get in or out of a vehicle and access safely the boot, rear hoist or rear access ramp. Photovoltaic panels are provided on a proportion of south facing canopies.

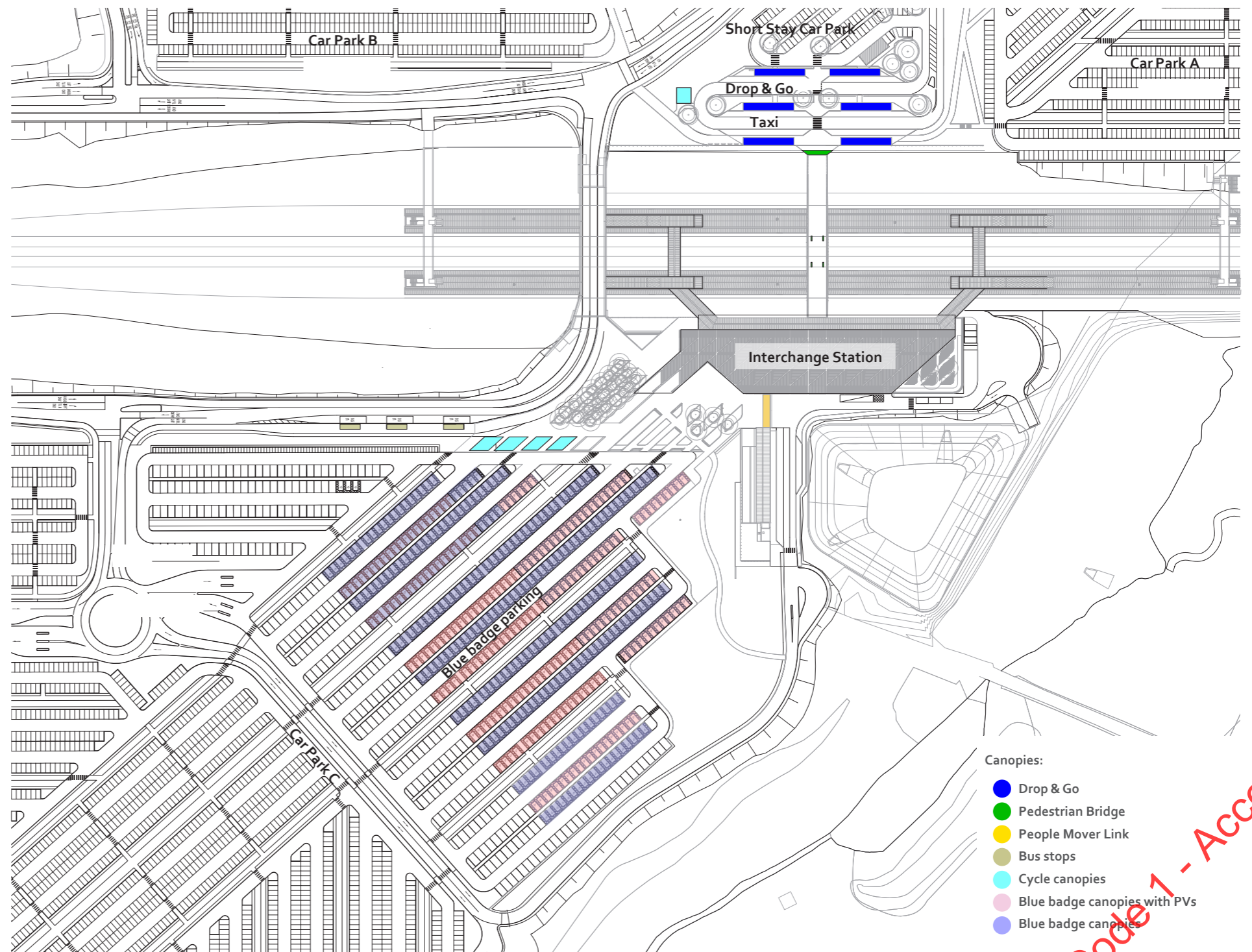


Figure 77: Site-wide canopies

Code 1 - Accepted

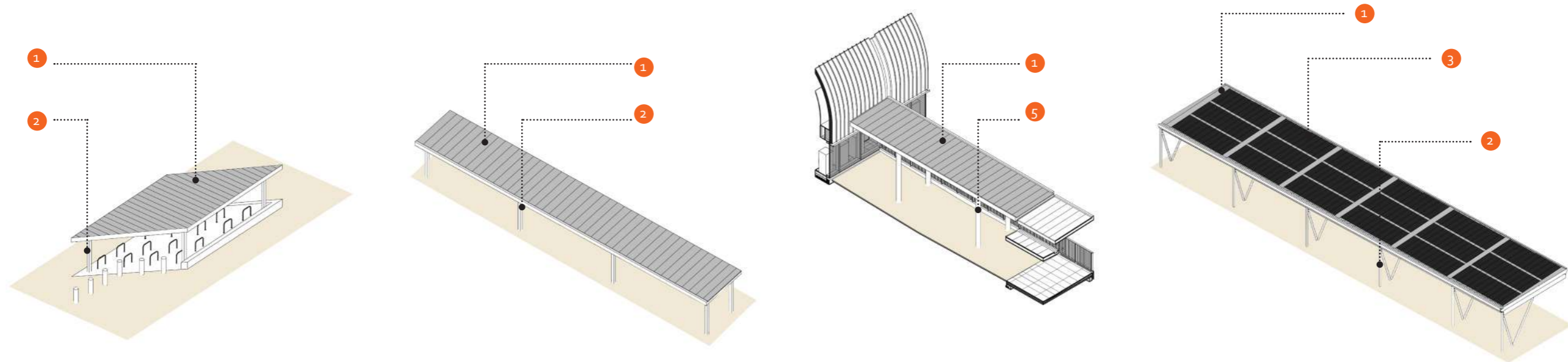
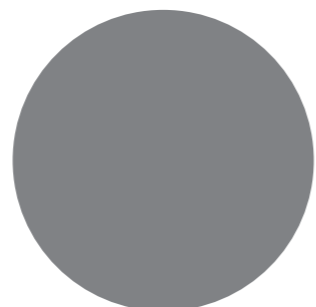


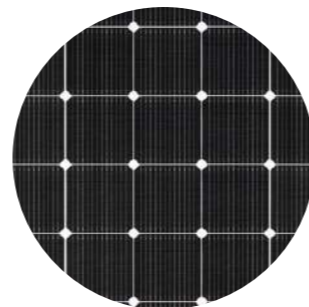
Figure 78: Family of canopies - cycle storage, taxi drop off, People Mover plaza and blue badge parking covers



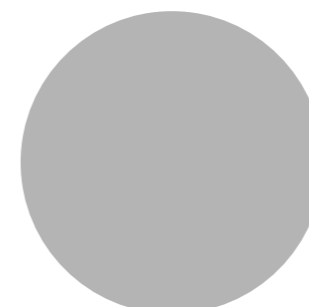
1 Standing seam roof



2 Painted steel, grey finish



3 PV panels on south facing blue badge canopies



4 PVDF coated aluminium soffit panels, RAL 7038



5 Painted steel columns, dark bronze finish

Code 1 - Accepted



### 5.11.1 Blue Badge Canopy

Parking spaces designated for use by people with blue badges are covered to provide protection from adverse weather conditions.

These are designed to be located in the closest proximity to the Station entrance. Canopies are provided over the spaces to provide protection from inclement weather, with PV panels on top of the south facing canopies.

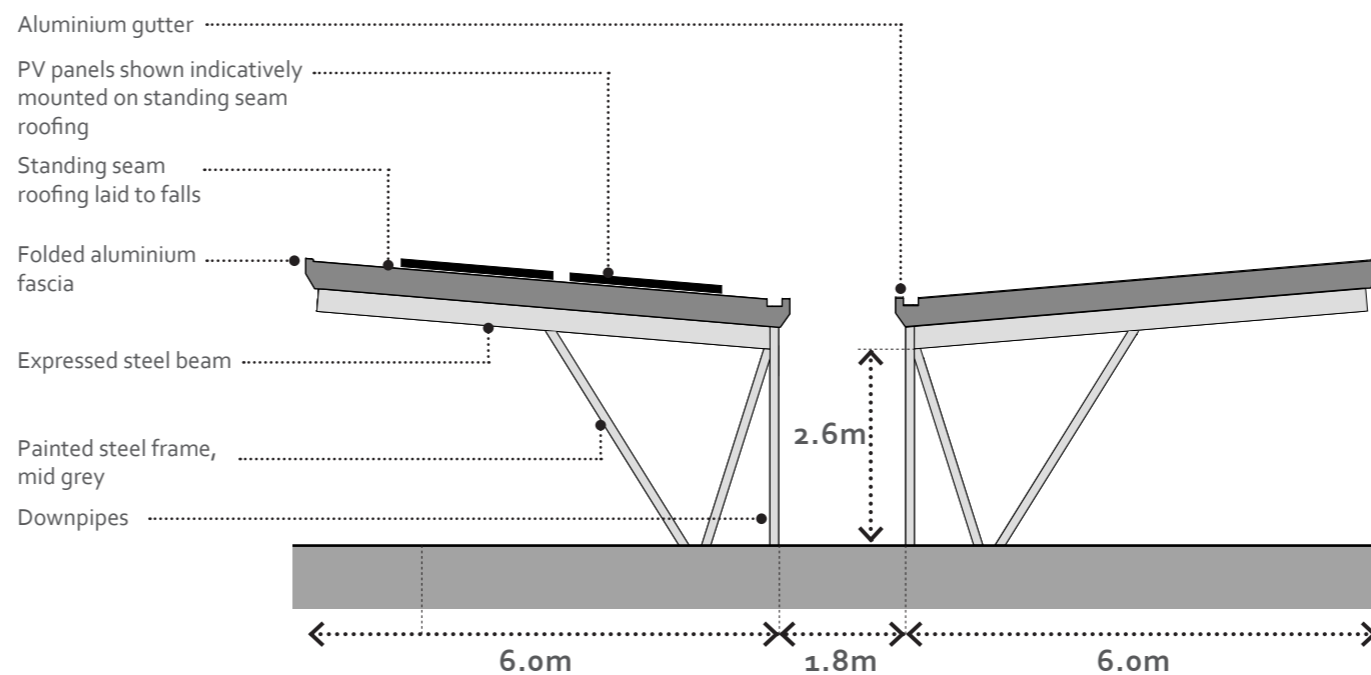
Additional blue badge parking with covers is provided in the short stay car park.

Lighting for these canopied areas will be provided by simple mounted downlights in a regular linear layout. These will provide a good ambient level of light under the canopies and will accentuate their linearity and support people moving through these spaces.

The Blue Badge parking bays have dimensions of 2.4m x 4.8m with a 1.2m access zone between bays and a 1.2m safety zone for boot access.



Figure 79: Artist's impression showing blue badge parking covers in Car Park C



Code 1 - Accepted

### 5.11.2 People Mover Plaza Canopy



Figure 80: Artist's impression of People Mover Plaza canopy

### 5.11.3 Taxi and Drop & Go Canopy

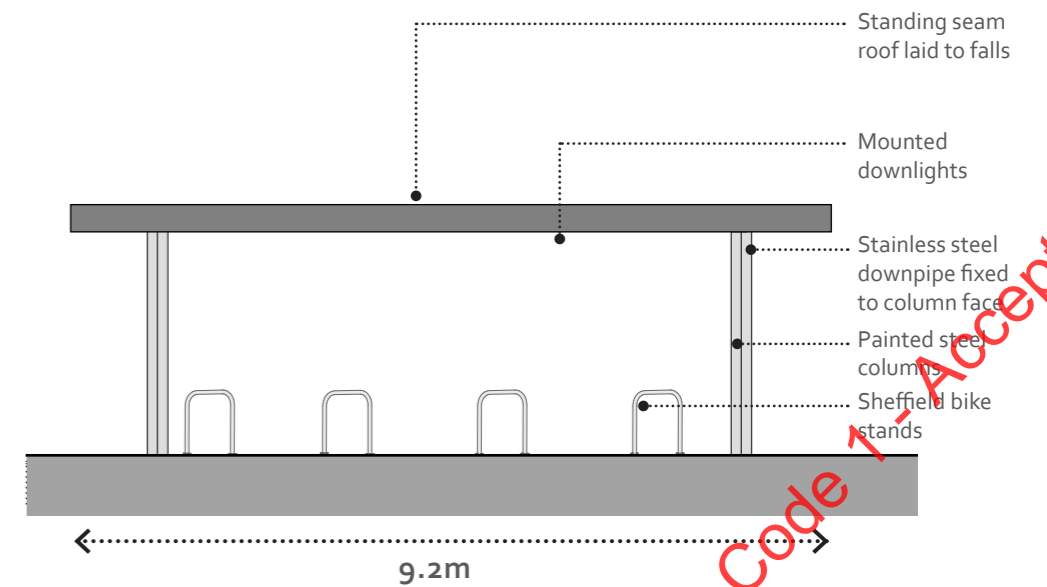
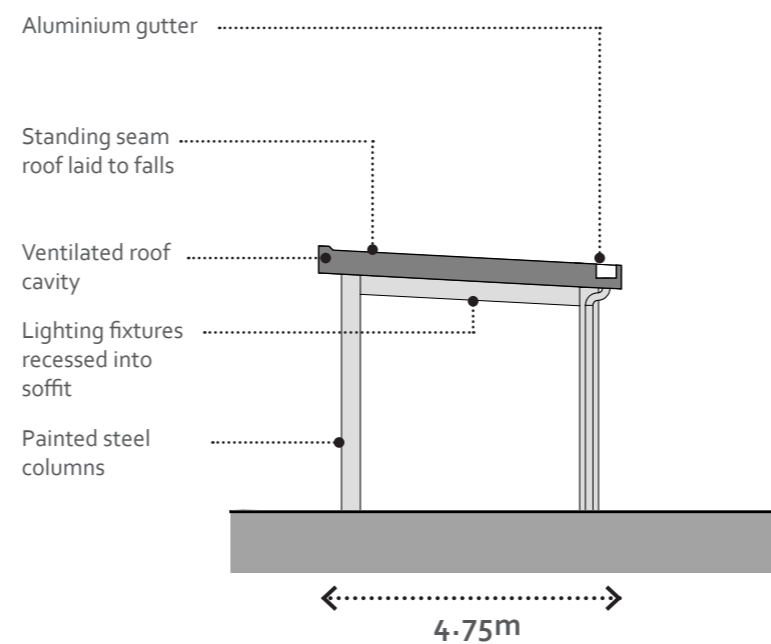
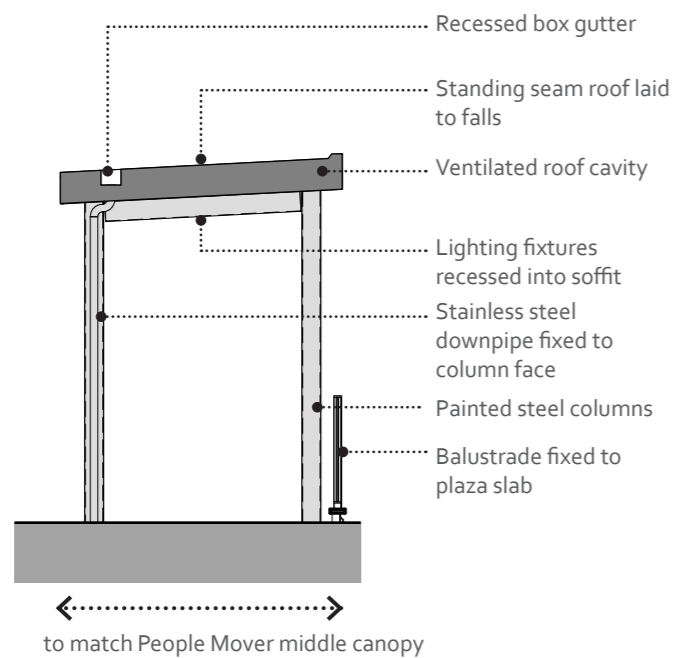


Figure 81: Artist's impression of Taxi and Drop & Go area

### 5.11.4 Cycle Storage Canopy



Figure 82: Artist's impression of cycle storage canopies in the West Plaza



Code 1 / Accepted



Code 7 - Accepted

# 6. Landscape

# 6.1 Introduction

The Landscape strategies now submitted to support the Schedule 17 and Reserved Matters applications have been developed against the framework defined by the approved Hybrid Bill application and the HS2 Design Vision.

The HS2 design ambition for the landscape:

- The design delivers positive improvements in the quality of the built, natural and historic environment, as well as people's quality of life;
- All visible elements of the built and landscaped environment in both rural and urban areas are sympathetic to their local context, environment and social setting;
- that design cohesion is achieved through a strong aesthetic ethos and a recognisable architectural language;
- the design considers the passenger experience.

The landscape design will create a positive lasting legacy, reconciling the scale and extent of its infrastructure and its components with the local landscape context along the line of route. It will deliver a strong identity, including the creation of bold new landscapes and transformational public spaces and places that will help generate and support economic growth.

Code 1 - Accepted



Code 1 - Accepted

# 6.2 Landscape Masterplan

The landscape strategy has been developed with a view to drawing on the qualities and characteristics of the local Arden landscape, the defining features of this rural typology being:

- a gently rolling topography
- a patchwork of small fields
- trimmed enclosing hedges with Midland Hawthorne the predominant species
- Hedgerow trees with oak by far the most common species
- Small streams ponds and ditches.

The design aspiration is to weave these natural elements into a landscape that contains major engineering features to create an appropriate contextual response to this site. The strategy explores the opportunities of establishing a network of blue/green links which extend throughout the public realm and the wider site, and creates public spaces that are designed to support the operational demands and the efficiencies of passenger use.

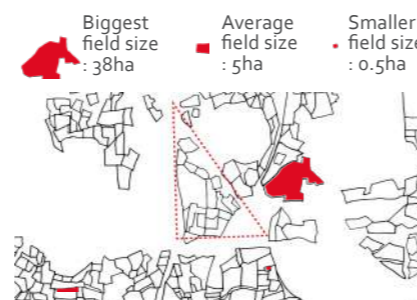
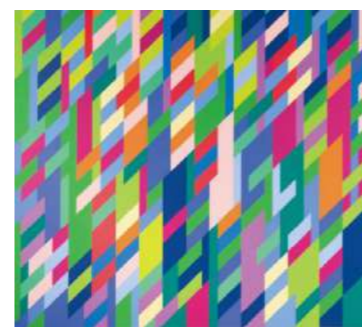
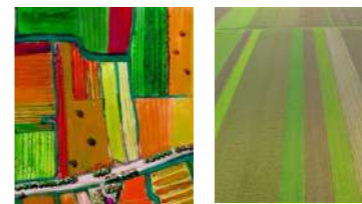


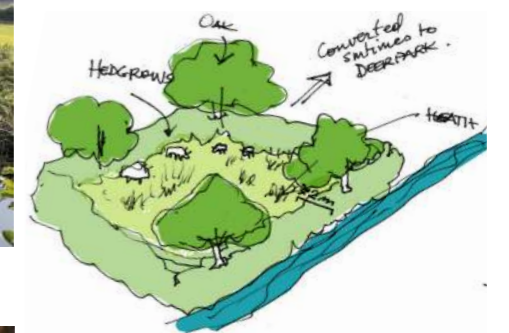
Figure 83: Landscape masterplan strategy



Images of ditches and wetland found in the Arden landscape



Sketch that depicts a space reminiscent to the Arden landscape



Trees



Streams



Hedges



Fields

Code 1 - Accepted



Figure 84: Landscape plan

Code 1 - Accepted



## 6.3 Topography

The significance of natural features on the site cannot be overstated. The Interchange site breaks down into two principal areas. The northern end of the site is a largely flat plateau. The southern end of interchange is dominated by an open flat bottomed valley of the Hollywell Brook. The topographic features define the way in which the Station relates to the track and the manner in which it will be perceived by passengers. The station concourse sits roughly 1.5 – 2 metres above the plateau level, so having parked your car there is only a modest ascent back to the station entrance. While the station has a far closer relationship with the exiting topography it still occupies the highest point within the triangle with levels falling softly to the north but more dramatically to the south.

There are a number of critical vertical datums which define the vertical relationships of the site. The track sits at a level of AOD 90.15 establishing a clear horizon line passing through the triangular site. At its southern end it is elevated on an embankment as it crosses the Hollywell Valley but to the north it is set in a cutting. The station concourse is set at AOD 98.5 some 7.3 metres above platform level.

There is a precedent for engineered features dominating the local landscape. The low hill to the north east of Interchange was, until recent years, the municipal refuse tip. Within the Interchange site the embankment of the abandoned Whiteacre -Hampton railway line passes through the south east corner. The triangle is also encircled by motorways and A roads, each of which sits on embankments or in cuttings.

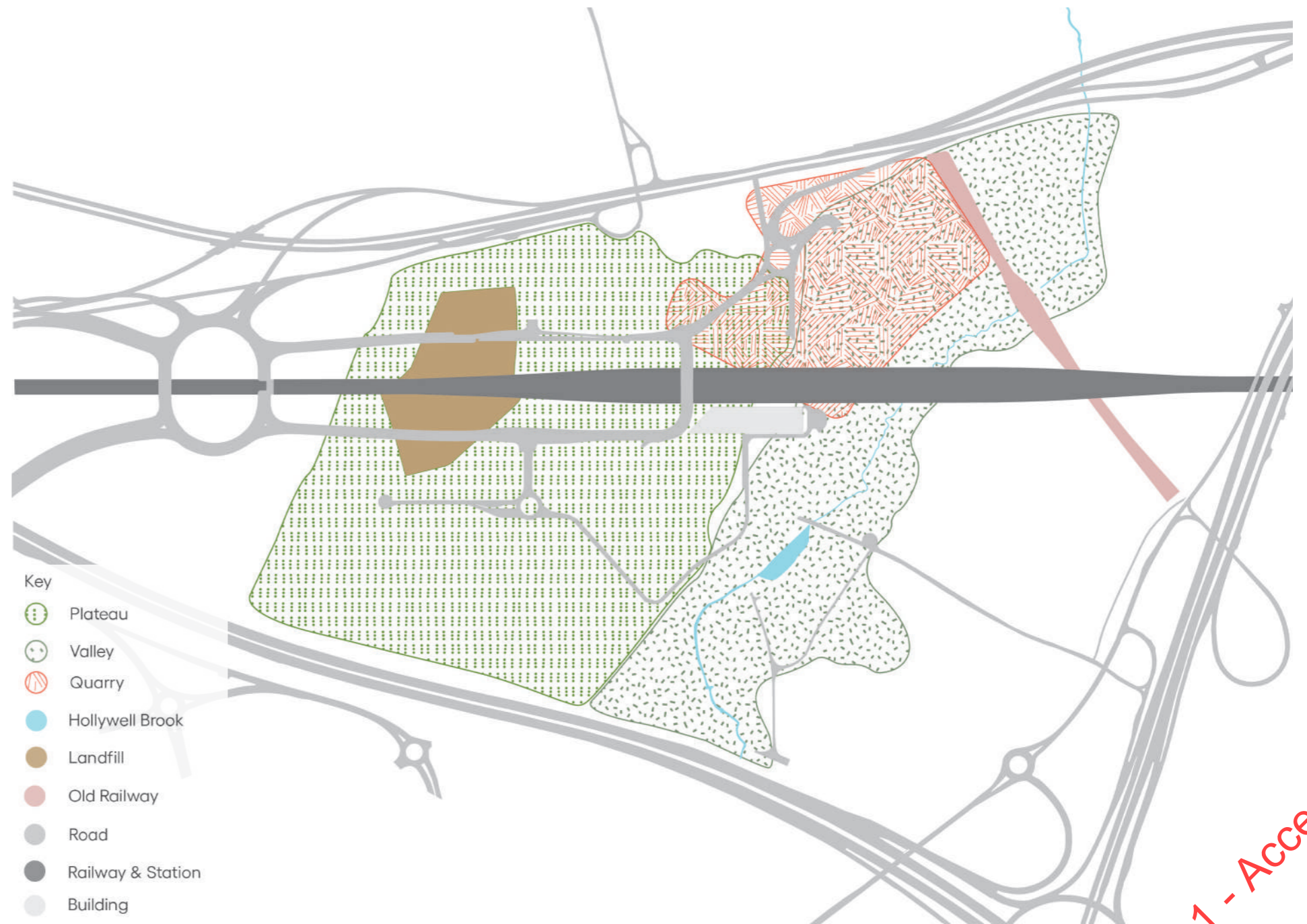


Figure 85: Key topographic features

Code 1 - Accepted

Man made earthworks are therefore one of the defining features of this landscape. The datum of the track at 90.15 AOD will be extended around the southern end of the Station to form a broad terrace from which the Station will emerge. The boulevards leading down from the northern roundabout will also be read as a pair of ramped features. Working with these changes of level will be key to the success of the design, in particular to the way in which the Station and its setting become a holistic composition. Lastly, and most significantly, on the east side of the station the levels are manipulated to form a 6-7 metre high cutting embankment which ascends to the short stay car park. This embankment will be a unique feature to Interchange, treated creatively it is one of the defining features of the station in the manner that the River Tyne marks the entrance to Newcastle and the sandstone cuttings define Liverpool Lime Street.

There are many local precedents for setting large buildings on strong topographic features. Kenilworth Castle and Charlcote Park both provide useful examples. Kenilworth rises from a promontory perched above a marshy flood plain. Charlcote is more of man made setting, the flood plain of the Avon being shaped and moulded by the hand of Capability Brown. In both cases the buildings are skilfully locked to the ground plane through the manipulation of levels.



Figure 86: Kenilworth Castle/Warwickshire



Figure 87: Charlcote Park/Warwickshire



Code 1 - Accepted

# 6.4 Car Parks

The Interchange Station site will accommodate 7400 cars, all parked at grade. This is subdivided into three bodies of parking:

1. Car Park A which occupies the quarry site and is set circa 5 metres below the concourse level and accommodates 1530 cars.
2. Car Park B which is set to the north of the Grade II\* Listed Park Farm and accommodates 943 cars
3. Car Park C which is located west of the trace accommodating 4796 vehicles.
4. In addition there are 131 bays, including 4 PRM bays, in the Short Stay Parking Area.

Each parking area is subdivided into a series of enclosures or fields, each of which has an area of 1-2 hectares and so accommodates between 400 and 800 cars. Each field is enclosed by a native hedge and each hedge is populated with a random pattern of trees. The tree planting within these reservations is deliberately diverse such that it is possible for motorists to navigate their way around the car park using trees of different species as visual reminders.

The car parking aisles are separated by landscaped aisles of varying width. The Primary artery has a width of 11.0 metres with a 4.0 metre wide walkway and a 3.0 metre wide swale. After every fourth row of cars there is then a main pedestrian spine with a 2.4m wide footway, a 330mm deep 3.0 metre wide swale and defining hedges. The swales are designed to accommodate a 1:5 year rainfall event, i.e they will be full of water once every five years and they are designed to drain down within 72hrs.

The hedges sit adjacent to the bays so that pedestrians walking to the station are completely separated from vehicle. Even in the PRM areas closest to the Station the walkway is still left toward the middle of the reservation. The PRM bay has a 1.2 metre extension to its end and side, and this is located at the back end of the bay, such that it provides an extra circulation corridor to the bay. At every 50 metres there is a gap in the hedge such that motorists can enter the pathway system and move toward the station. Each of these gaps acts as a rest point, all will have seats and all rest points within the PRM area will have call points while within the remainder of the car parks call points will be every 100 metres. This strategy ensures that drivers and pedestrians have a clear, car free, circulation network to follow between parking space and concourse.

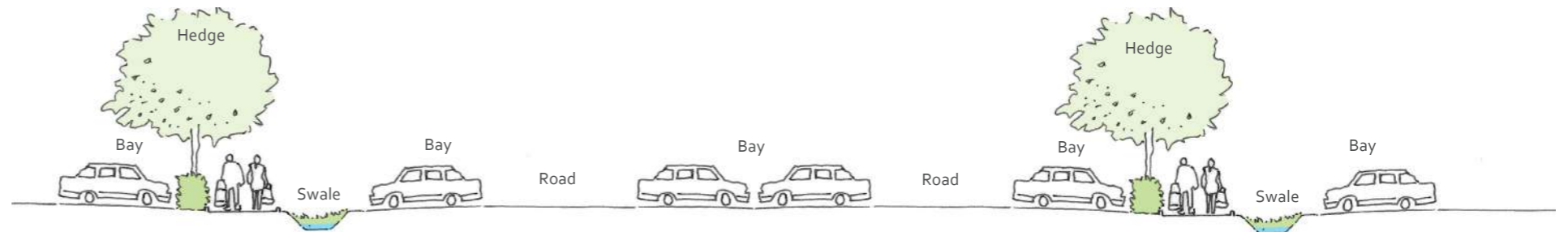


Figure 88: Randomised car parks vegetation and natural features provides a sense of orientation, "Oh! I remember I parked under that tree with the red flowers over there".



Figure 89: Car park landscape strategy



Code 1 - Accepted

All parking areas meet the requirements of an inclusivity agenda, there are no steps and no ramps for motorists to navigate. HS2s Inclusivity Standard requires that 6% of all 7400 spaces are for use by Persons of Reduced Mobility. These bays need to be as close as they can be to the main Station doors, and for that reason they are all located in the south eastern corner of Car Park C. In all cases where Persons of Reduced Mobility will park, the levels are flatter than 1:50 in compliance with the accessibility standard and BS 8300:2018 Part 1. In addition it is required that all PRM bays are covered. In addition to the PRM spaces there is also a requirement that a further 4% of bays are oversized, i.e they have dimensions of 6.0 metres x 3.0 metres rather than the standard 4.8 metres x 2.4 metres.

Car Parks are not secured by fences but they are enclosed by hedges or earthworks, specifically ditches and or berms, which act in the same way as moats or low berms.

To the east of the track is the taxi pick up, Drop & Go and short stay parking area. At any one time this area, which is on the main approach into interchange could contain over 200 vehicles, with cars entering and leaving several times every minute. This expanse of parked vehicles will occupy the foreground of the view for arriving passengers and as such is a major part of the arrival sequence. The levels have therefore be manipulated to try and diminish the impact of the parked cars while allowing high level views of the eastern elevation of the station.

The ground planes within the immediate environs of the station have been treated as very long slow inclines up to the Station. Although the modest changes in level means that the approach for anyone other than those parking in Car Park A will be almost indiscernible.



Figure 90: Carpark Verge Configuration

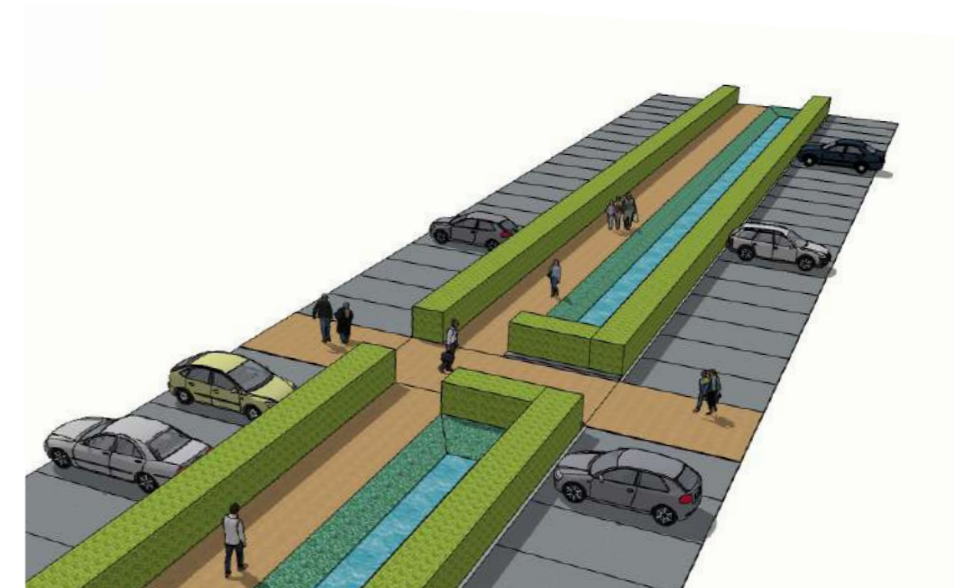


Figure 91: Standard Configuration



Figure 92: Rest Point with Seat



Figure 94: PRM Standard Configuration



Figure 93: Rest Point / Seat / Call Point (PRM area)

Code 1 - Accepted

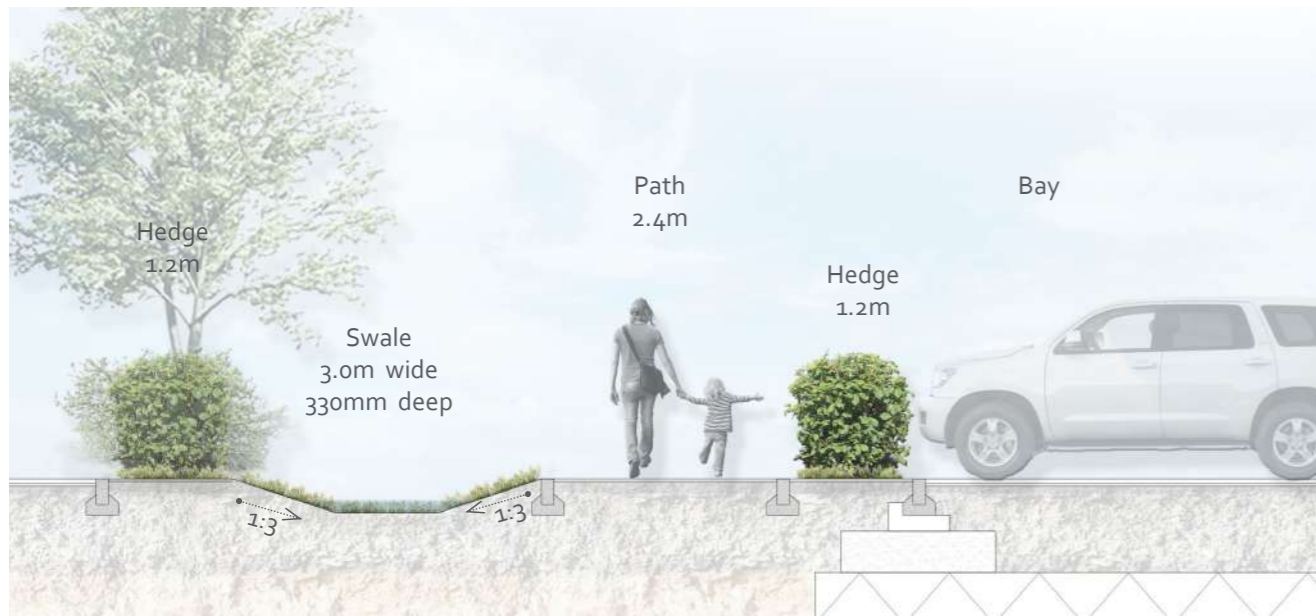


Figure 95: Swale Section

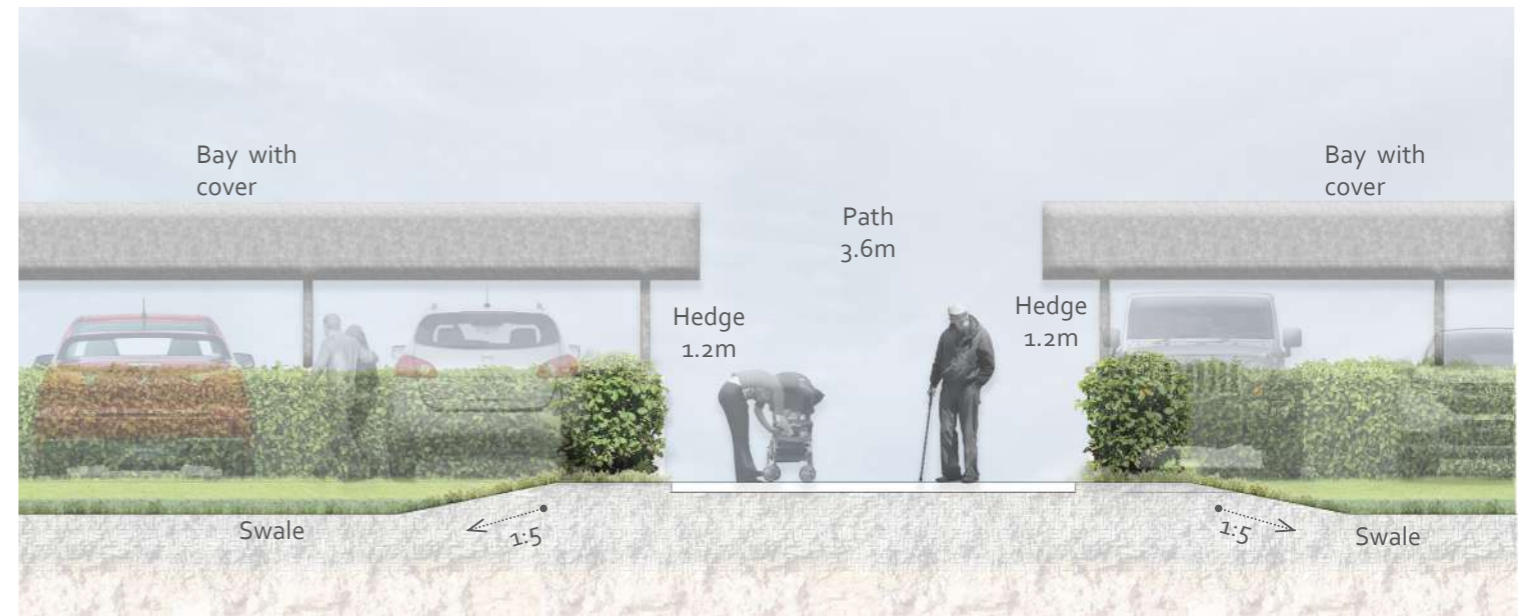


Figure 96: Swale Section with Rest Point: PRM areas

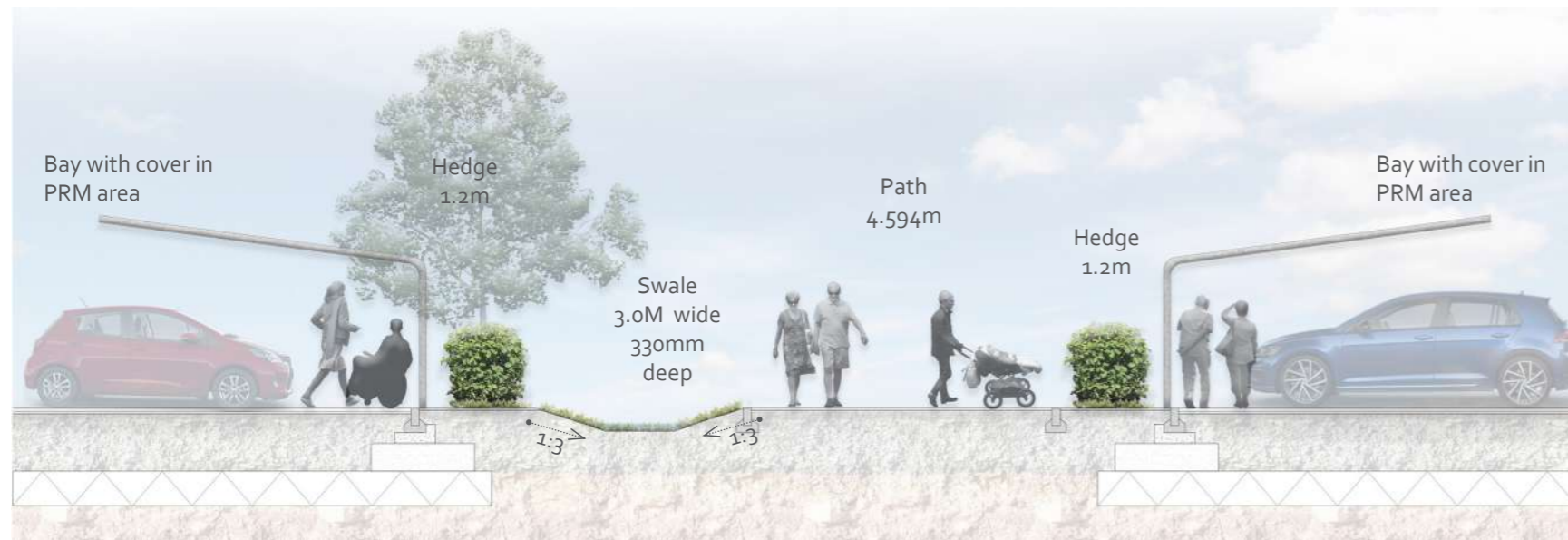


Figure 97: Swale Section in PRM area

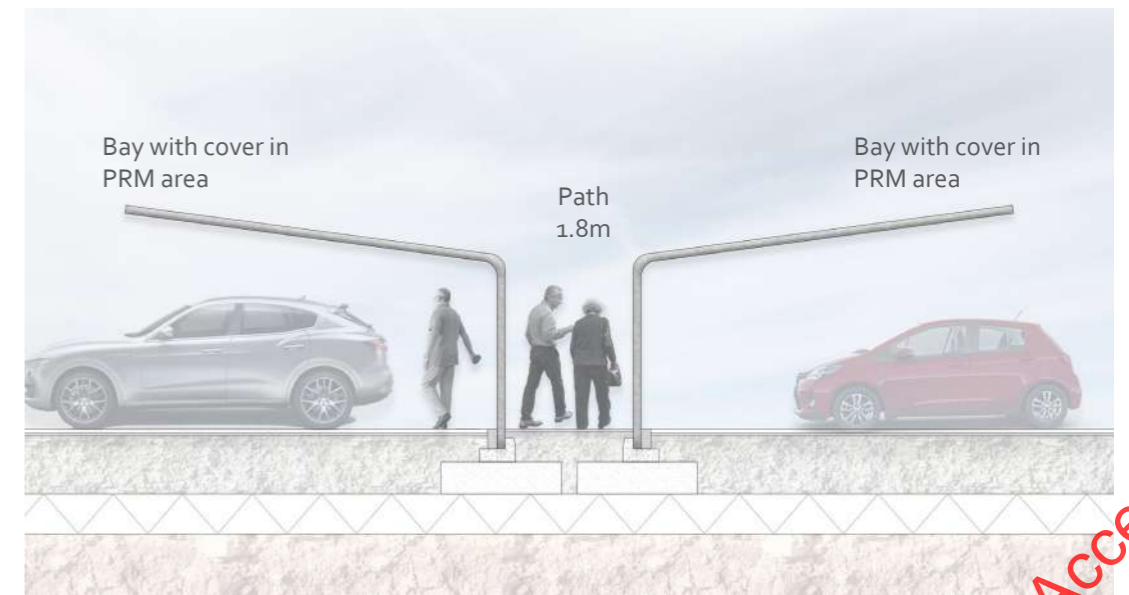


Figure 98: Walkway Section in PRM area

Code 1 - Accepted



Figure 99: Swale/Hedge Section in Standard Bay parking area

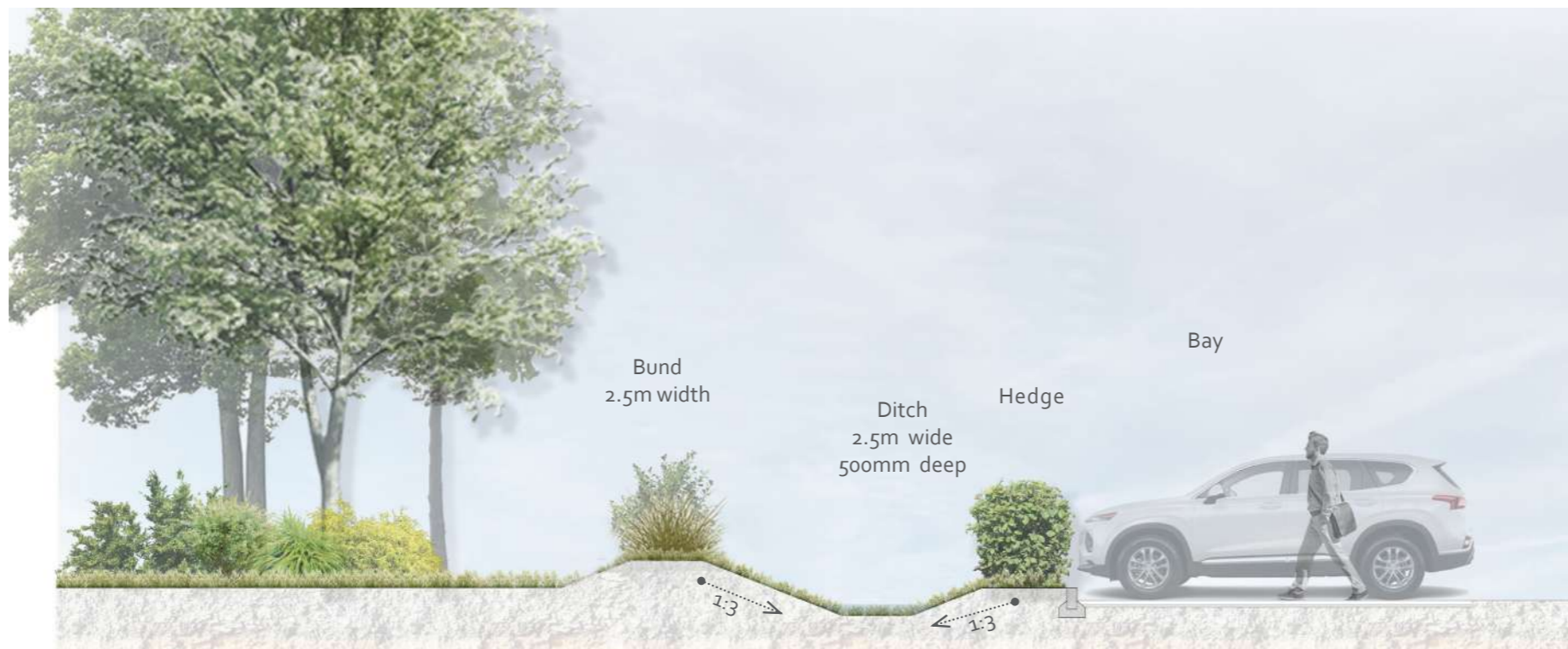


Figure 100: Perimeter Ditch /Bund around Parking Fields

Code 1 - Accepted

# 6.5 West Plaza

The West Plaza is the interface between the station and the largest parking area, Car Park C, however it also provides the arrival point for those arriving by bus, and in the long term could also be used for those coming by Metro or Sprint. The layout is heavily influenced by the geometry of the Station roof with its distorted parallelograms, and the setting out of the car parks. The latter is heavily reinforced by the canopies which are required above the PRM bays, a requirement of HS2s inclusivity standard. A primary pathway leads from the station roof armature out into the car park, where many people using Car Park C will find their route joining this pathway at some point.

The West Plaza also references the Blue Green Infrastructure of the site. Rainwater picked up by the roof and directed down to ground level will be captured and expressed through a series of basin features.

It is heavily informed by the principal directions of pedestrian movement, which in essence approach the Station at a 45 deg angle. Car Park C is fed by a number of aisles which contain the Blue Green Infrastructure in the form of shallow swales. However, these all connect in to one primary pathway and this lands on the projecting roof canopy, which provides a strong visual marker, drawing passengers in to the station.

The key features of the space are a series of linear bands which incorporate raised planters, rolling lawns, and dwarf walls with integral seats, all taking their cues from the articulation of the station roof. Set between two legs of the roof at the end of the primary circulation corridor is a shallow pool or rain garden. This sunken bed will accept rainwater discharged from the roof, feeding it into the connecting ditch. It is hoped that large sandstone boulders or megaliths, hopefully excavated during the HS2 excavations, will be located within this bed.

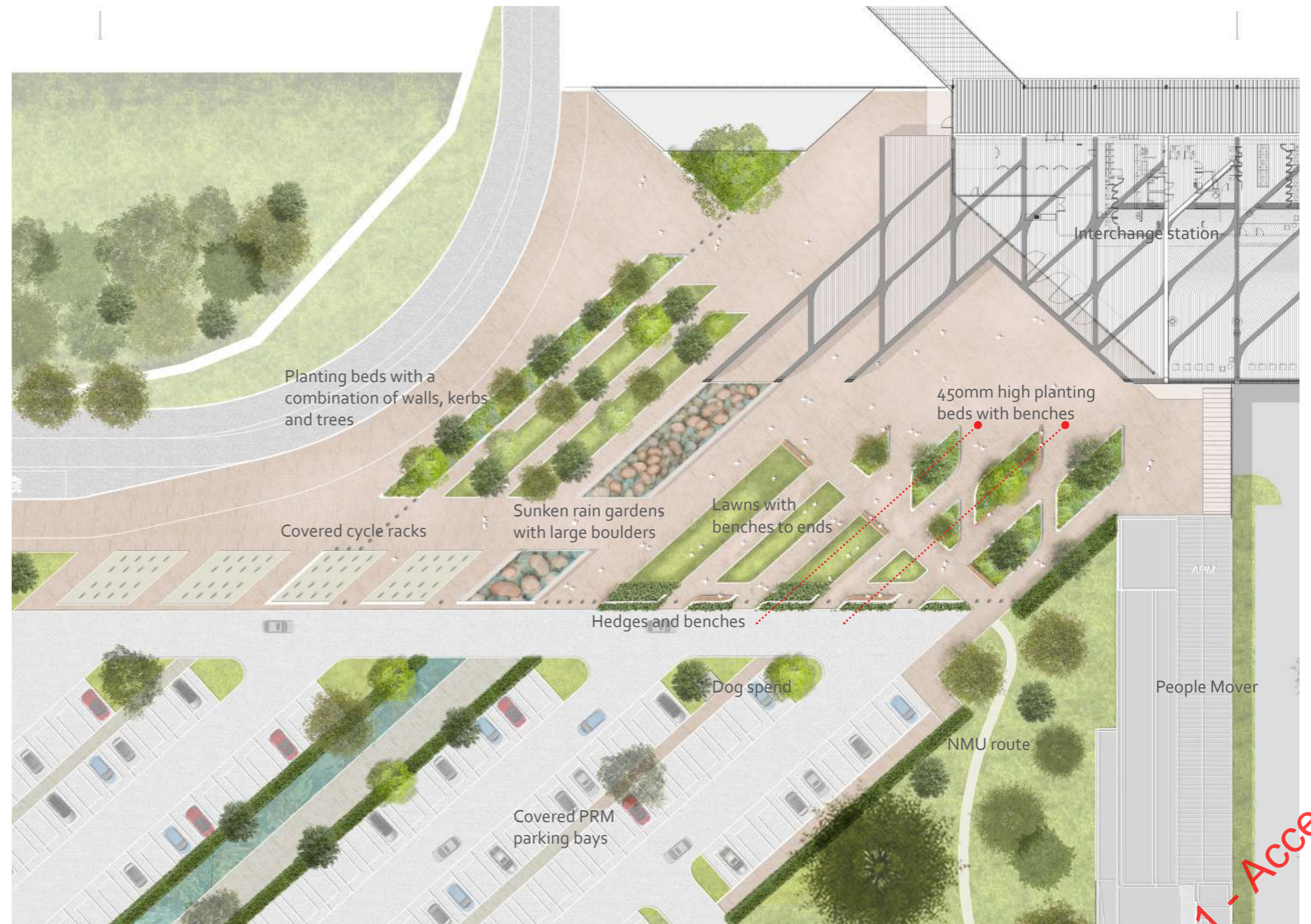


Figure 101: Landscape plan of West Plaza

Code 1 - Accepted

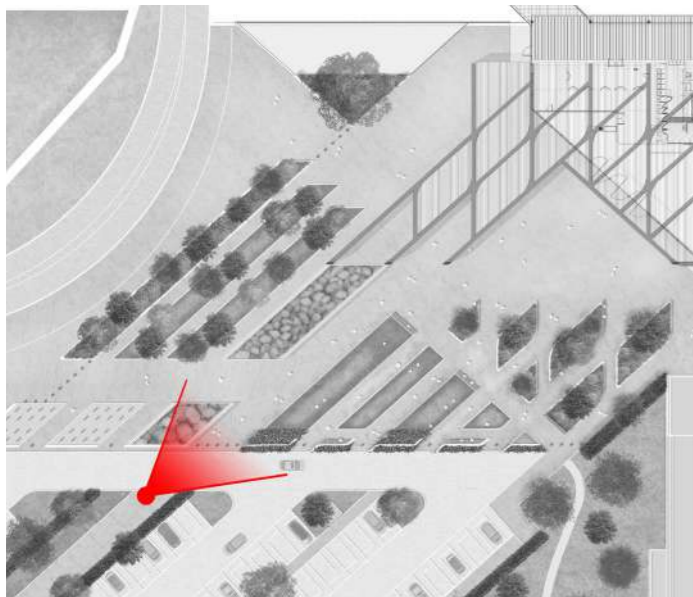
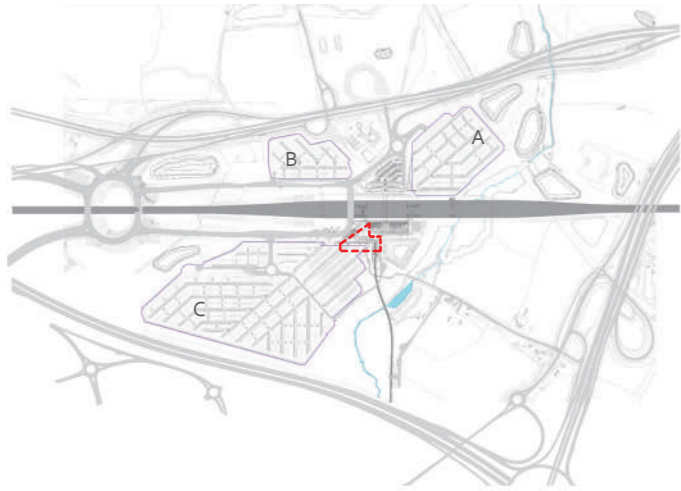


Figure 102: Artists impression of West Plaza landscape

Code 1 - Accepted



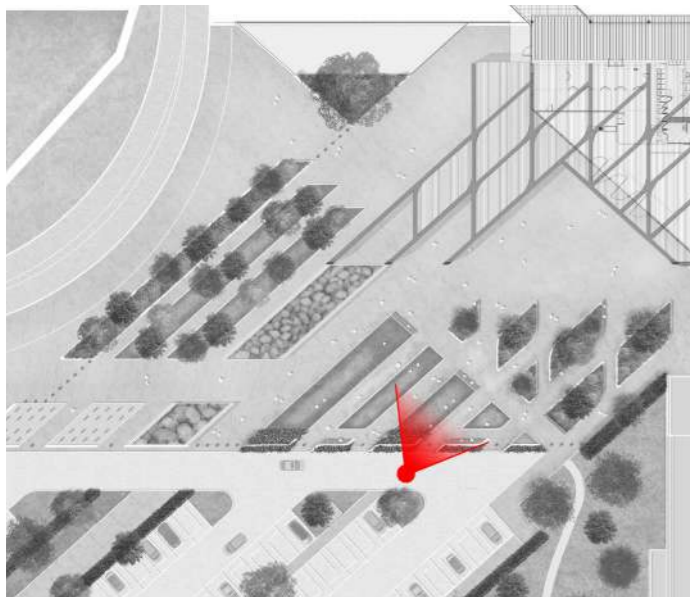
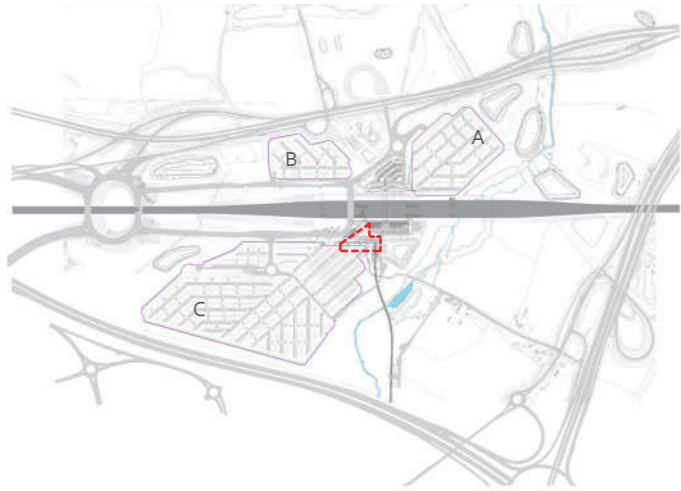


Figure 103: Looking across the West Plaza from Car Park C

Code 1 - Accepted



Figure 104: Section through Planters + Seats



Figure 105: Section through Planters + Seats

Code 1 - Accepted

## 6.6 East Plaza

The introduction of the new footbridge brings passengers directly into the heart of this space, in earlier designs those looking to access the short stay car park or the taxi drop off had to pass to the north end of this area, over the road bridge and then into the station. This move has significantly enhanced the user experience of the station. While for many people, this will remain their daily or regular point of interaction with the station, their route into the heart of the Station and to the ticket barriers will be far more direct.

The central location of the footbridge relative to the taxi drop and the short stay, and its equidistant from Car Parks A and B, means that it will, in effect, funnel passengers into the Station. The footbridge itself is of course an extension of the public realm, providing passengers with an exciting sensory experience as they cross the track, the only place at any of the Phase 1 HS2 Stations where this will be possible.

The Taxi drop off and Short Stay are set above a planted embankment which will be highly visible both from concourse and platform levels. Again this significant natural feature on one side of the station will give passengers a unique experience, reinforcing the connectivity between Interchange and its rural setting. The bank will be planted in accordance with HS2 standards related to trackside vegetation, the zone at the base of the slope and immediately adjacent to the track being only grass.

Moving higher up the bank and away from the track, native shrubs such as dogwood, dog rose and holly will take over while at the top of the slope and closest to the cars full size forest scale trees such as Beech and Pine will dominate.

The crest of the embankment and the edge of the Taxi drop off will be defined by a fence. In addition there are a line of seats/benches. The opening to the pedestrian bridge is protected by security bollards.

Within the car park there will be some planting of mature trees, primarily beech and oak. If any trees are to be relocated then these areas would offer good opportunities. These trees will be planted as semi mature specimens such that they achieve immediate visual effect.



Code 1 - Accepted

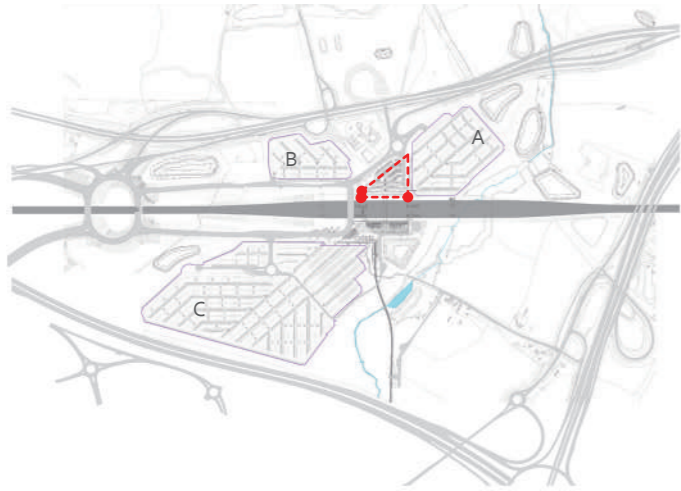


Figure 106: Looking toward footbridge and Station from path to Car Park B

Code 1 - Accepted

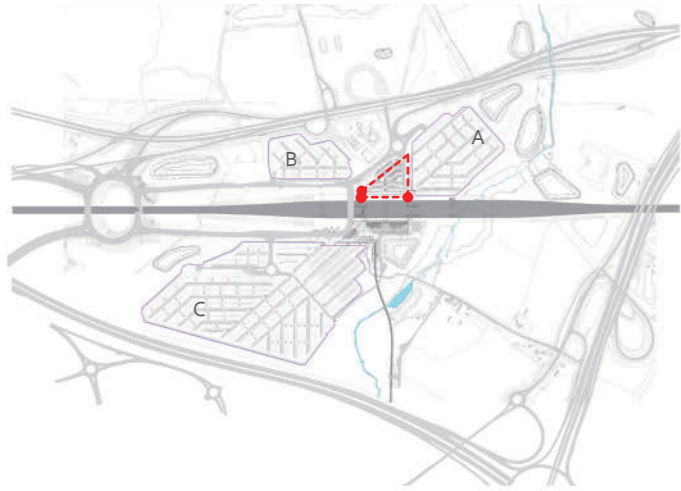


Figure 107: Artist's impression of East Plaza

Code 1 - Accepted

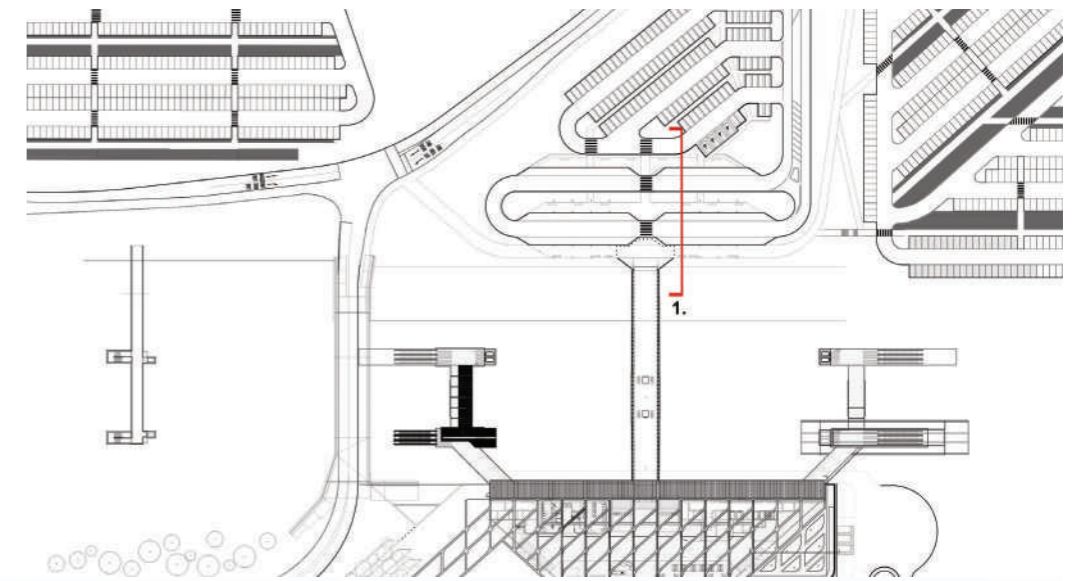


Figure 108: Section through East Plaza

Code 1 - Accepted

# 6.7 South Terrace

The South terrace is a new piece of public realm outside the gable wall of the station concourse. While slightly detached from the core of the Station, this space still offers a valuable experience, from this elevated vantage point it will be possible to enjoy views of the wider landscape, including long distance views of the trace as it heads south.

Unlike the east and west plazas the south terrace is not a space that is crossed by large numbers of people. Passengers will need to make a conscious decision to go out there, so it is likely to have much lower levels of occupancy and is a space to dwell in if you want to enjoy a quite outdoor refuge prior to catching your train.

The proposal involves taking the distorted parallelogram form of the concourse roof and translating this into a series of raised planters. The weathering steel walls of the planters thicken out at key locations to provide the support for a bench.

The perimeter of this space will be defined by a low boundary hedge, again planted in a low planter. The hedge helps to keep passengers away from the parapet but it still allows views out over the wider agrarian landscape, with the Hollywell Valley in the foreground.

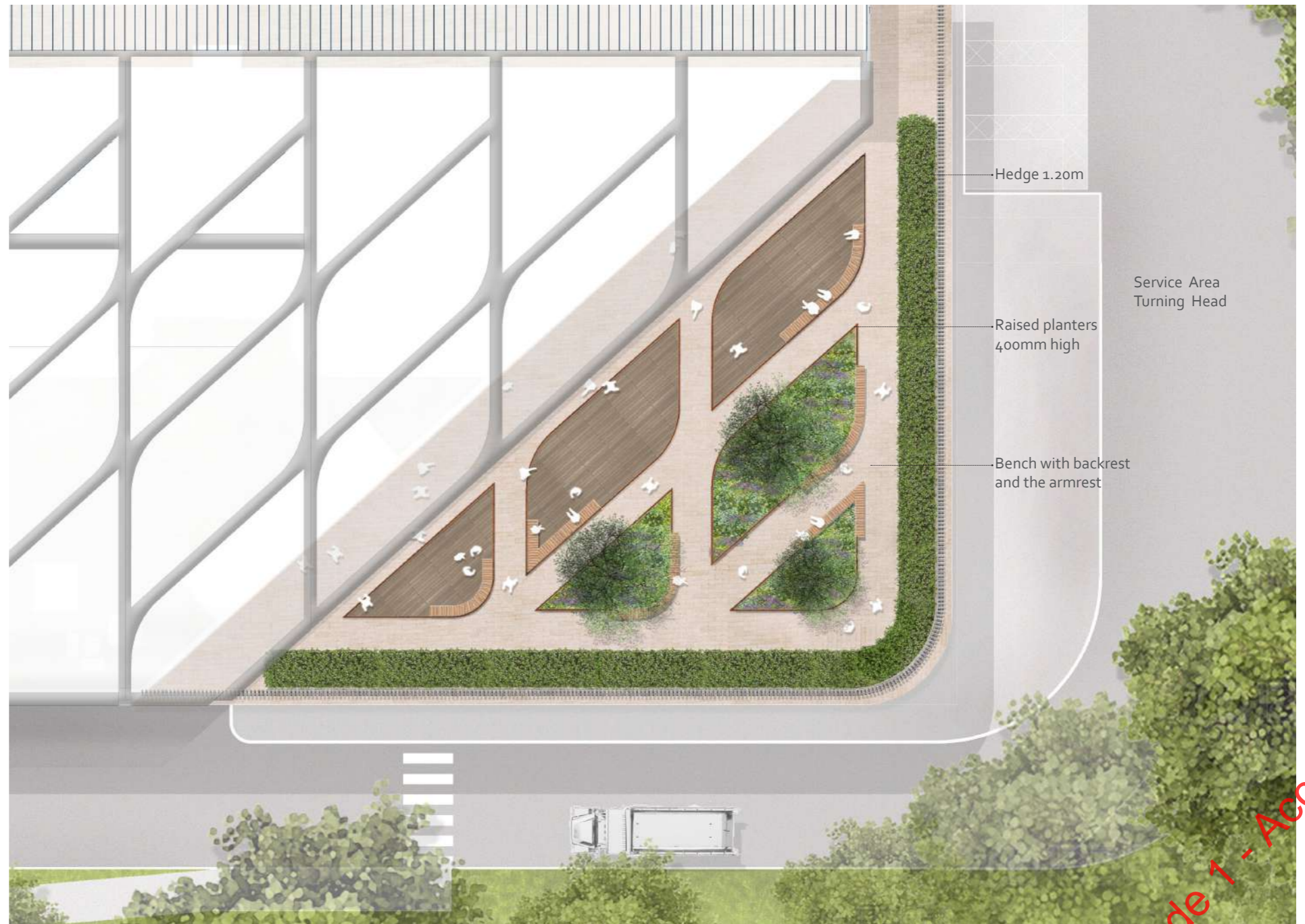
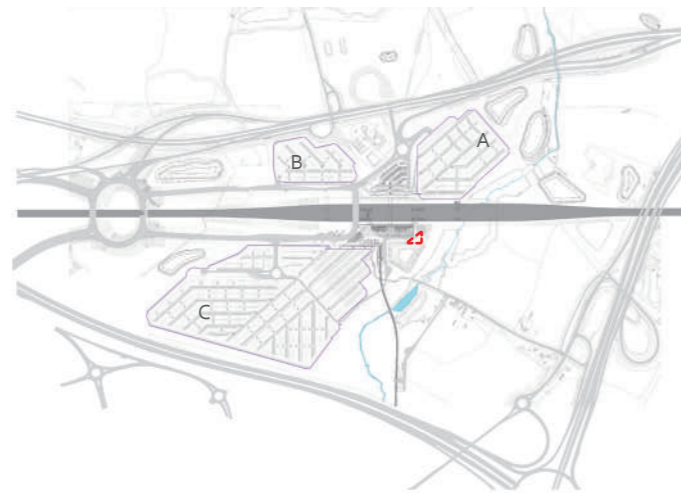
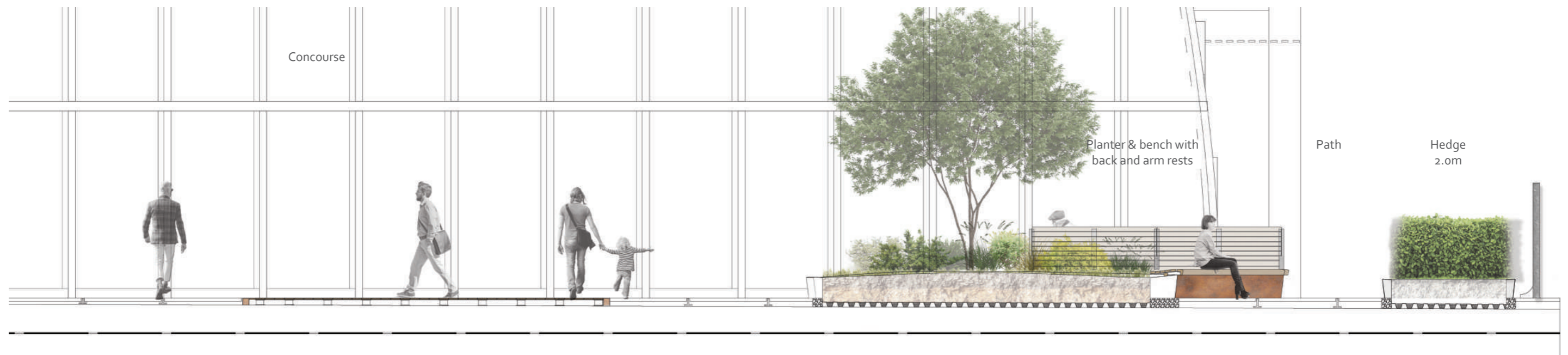


Figure 109: South Terrace Landscape Plan

Code 1 - Accepted



View out to the South Terrace from the Concourse



View back to the concourse from the South Terrace

Code 1 - Accepted



## 6.8 Podium Terrace

Set at 6 metres below the concourse level, the podium provides access to the operational areas of the station. The space is contained to the north by the People Mover and to the east by the Station. To the west it is contained by the northern end of the retained Middle Bickenhill Lane and to the south it is open, overlooking the Hollywell Valley.

The historic precedents of Kenilworth Castle and Chartwell Manor has been referenced with a terrace being established some 5 metres above the floor of Hollywell Valley. This will create a broad plinth on which the station will sit, rooting it into the ground, the valley and the wider landscape.

The terrace accommodates a generous pond, the only attenuation feature that is designed to hold water permanently. This is designed to provide a positive visual amenity immediately adjacent to the station concourse, views over the pond being a major part of the passenger experience at Interchange. During normal conditions the water level will be set at 89 AOD, but in its flood condition, it will rise to 91AOD. Relatively steep banks with profiles of 1:3 lead down to the water.

The sides of the basin are heavily planted with trees and shrubs and the grass on the slopes is left long. This is to reduce the attractiveness of the pond to large water fowl.



Figure 110: Landscape around lower level of station and people mover, back of house access road and retaining pond

Code 1 - Accepted



Figure 112: Artist's impression of landscape around retaining pond at lower level

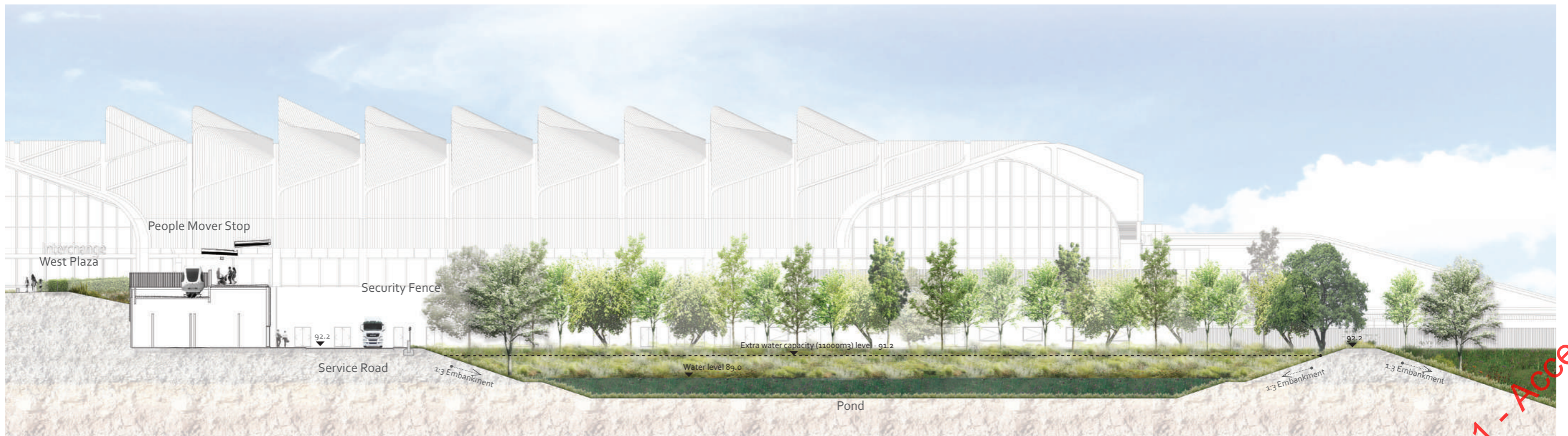
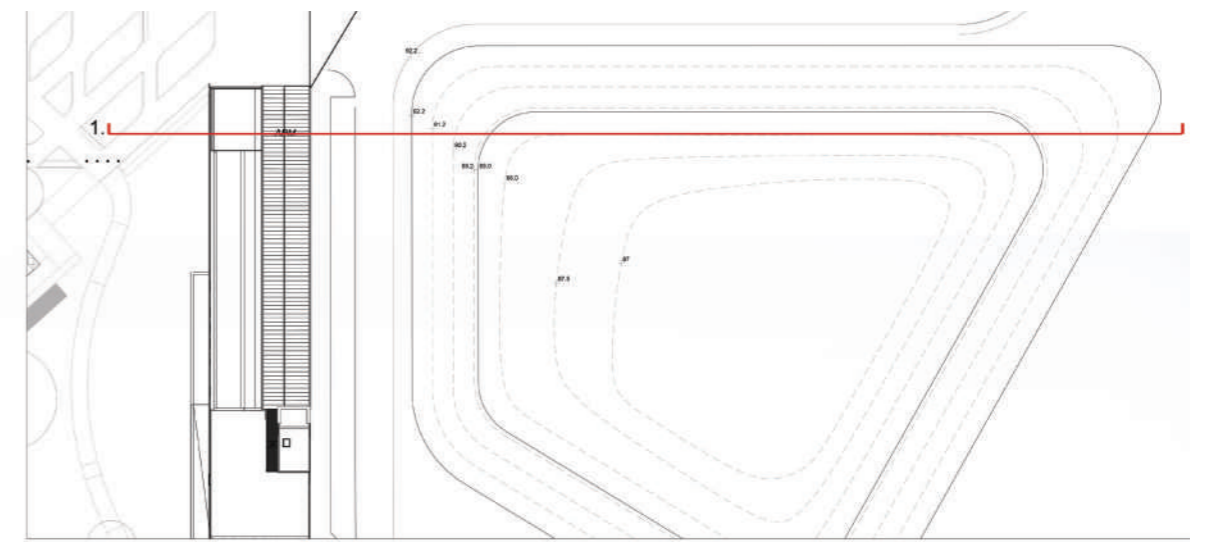


Figure 111: Section through retaining pond at lower level

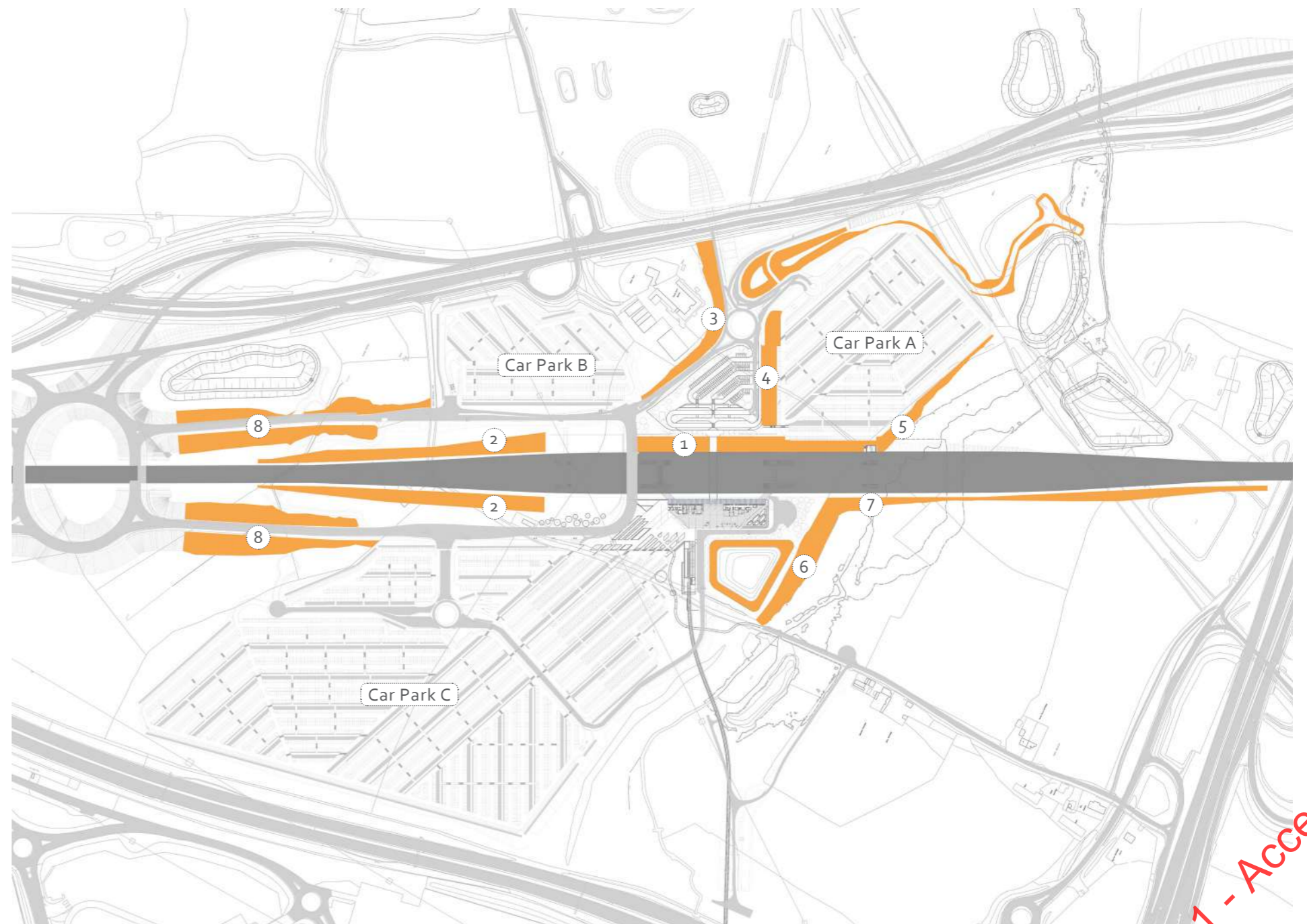
Code 1 - Accepted

## 6.9 Earthworks

Careful manipulation of the levels has ensured that no retaining structures are required within the wider landscape. However, there are still major level changes within the site which means that in certain locations steep cutting or embankment slopes are needed to create the site levels

The key location are:

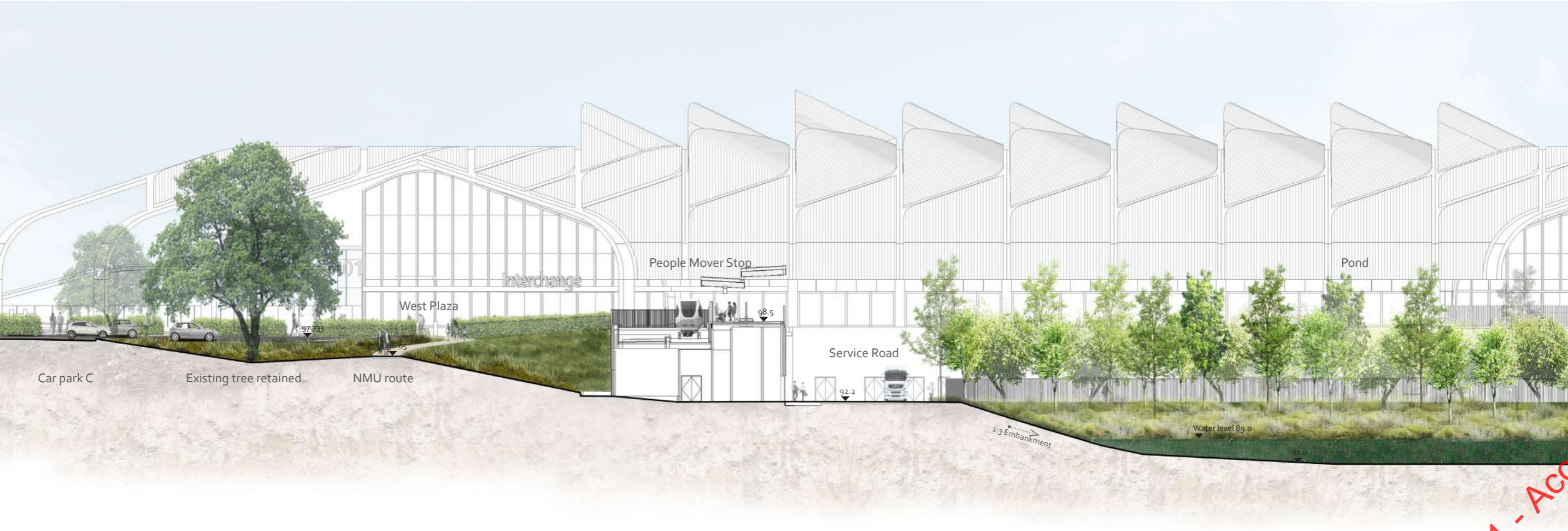
- 1) To the east of the station adjacent to Drop & Go
- 2) To the east and west of the trace running north from the road bridge.
- 3) To the south of Park Farm.
- 4) Between Car park A and the Drop & Go area.
- 5) Between Car Park A and Hollywell Valley.
- 6) To the south of the Station and the People Mover: Here a new embankment is set above the Hollywell Valley in order to create a wide plinth.
- 7) Embankments over the Hollywell Valley, by MWCC.
- 8) Embankments to main boulevards.



Code 1 - Accepted

# 6.10 People Mover

The Interchange Station Stop of the People Mover is directly adjacent to the main station entrance and is accessed through the West Plaza, it projects out towards the west. This protrusion defines the southern edge of the west car park and as such it tends to lock the station into the landform. The rear wall of the People Mover is therefore a retaining structure, although the extent of retention is minimised by installing a steep bank.



Section through People Mover

Code 1 - Accepted

# 6.11 External Lighting

## 6.10.1 West Plaza Station Entrance Canopy

The West entrance is the main opportunity for longer views into the station concourse from outside, allowing for the façade and external canopy to be experienced as clear extensions of the station architecture within. With this in mind, the canopy will be illuminated with a consistent accent graze to that used for the station roof on the interior, to reinforce its visual character as a single continuous element.

General lighting within the external canopy area will be provided by spotlights mounted on the structural elements of the canopy and will also follow the same principles as the lighting within the station main unpaid concourse.

## 6.10.2 West Plaza Lighting

General ambient lighting to the West plaza lighting is to be provided by spotlights mounted on a few discrete high masts and on the station building canopy, the intention being that these light sources are not dominant features of the plaza, and the landscaping and furniture of the plaza define its character by day and night, with the station building remaining the focus.

Additional layers of lighting, provided to augment this lighting, create visual interest and to create the welcoming character of the plaza, include:

- In-ground lines of light, to help create a sense of identity and to assist navigation towards the station entrance.
- Feature lighting for tree canopies and integrated into bench seating and furniture, adding ambience and highlighting these elements.



Figure 113: Artist impression of the Main Station Entrance at night



Figure 114: West Plaza Lighting reference images - in-ground lines of light and illumination of benches



Code 1 - Accepted

### 6.11.1 East Plaza Lighting

The East plaza is illuminated to provide a sense of openness as a component of the arrival sequence for customers, and to allow for the transition between the taxi drop-off area and the pedestrian bridge, leading to the east entrance of the station.

The lighting for pedestrian routes follows the same principles as outlined earlier, utilising lower-level urban lighting (5m columns and bollards) to promote intuitive wayshowing to the stations while activating public nighttime use of the external environment. Lighting for the covered cycle racks will be integrated into the canopy structure.

As with the West plaza, feature lighting will be provided for the benches, creating visual interest and highlighting the furniture, and key trees will be uplit to create the ambience of a quiet urban woodland.

### 6.11.2 Lighting to the Pedestrian Bridge

Lighting for the pedestrian bridge plays an important role in guiding people from the taxi drop-off area and East Plaza to the station entrance, and is a key part of the customer journey in and out of Interchange station.

The bridge will be illuminated by vertical linear luminaires integrated into the structural elements of the bridge on either side, providing a visually expressive source of light that leads people to and from the station and provides good levels of vertical and horizontal illumination.

Luminaires are fixed to the front side of the bridge mullions flush with the inner face of solid panels of the bridge. Access to the electrical trunking is via the openable cap integrated at the top and the bottom of bridge panels.



Figure 115: Human scale lighting and tree illumination

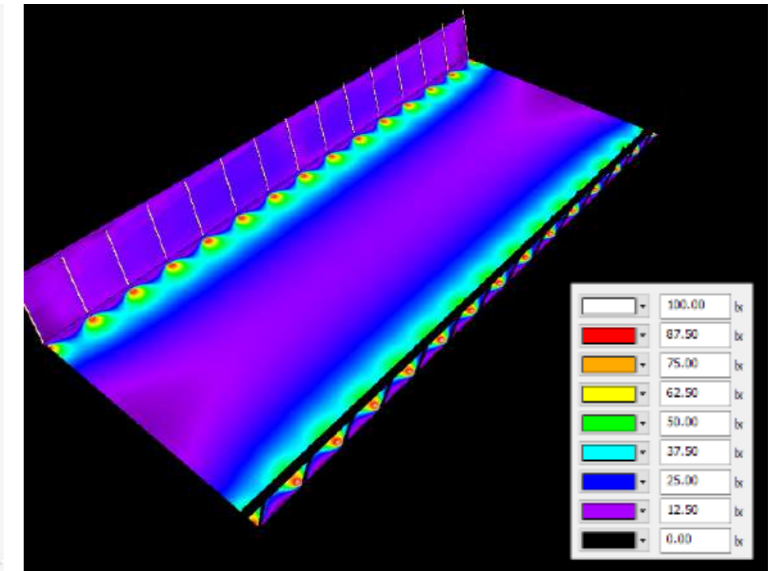


Figure 116: Pedestrian bridge lighting



Figure 117: Central pedestrian bridge lighting strategy

Code 1 - Accepted

# 6.12 Site-Wide Lighting

## External Lighting and Public Realm

The exterior lighting vision aims to forge a strong identity and sense of place, creating night-time character. The lighting will also ensure the safe navigation for pedestrians, cyclists and other modes of surface transport moving throughout the site.

It is envisioned that the primary wayshowing element will be the station building itself, lit from within at night, and acting as a 'beacon' - a clear view of the destination for arriving customers.

The main vehicular approaches, along the tree-lined boulevards will be illuminated by luminaires mounted on lighting columns. Additional luminaires will uplight the adjacent trees, creating a visual corridor led to and from the station.

Tall masts will provide a broad spread of area lighting to the car parks. This approach allows for the number of lighting columns to be minimised and will make lighting equipment less obtrusive because there are fewer columns and the light sources are further from the field of view. This helps to keep the focus on main routes and on the station as the destination.

For the main pedestrian routes through the site, lighting will be on a more human scale, with lower-level urban lighting to promote intuitive wayshowing to the stations at any time of day. These closer-spaced columns provide a visual cue by day delineating the primary direction of travel, distinct from the area lighting of the car parks and the different feel of the station plazas.

Focused directional lighting will be specified, especially at the perimeter of the site, to ensure that light pollution and obtrusive light to neighbouring areas is minimised. This shall also minimise light spillage to bat foraging habitats in areas adjacent to the site, such as along retained tree lines, woodland edge and the Holywell Brook grasslands. Warmer, 3,000K lighting is proposed for all external areas, as this warmer light is more likely to reduce displacement of bat commuting routes.

The public realm also provides several opportunities to incorporate light art to create playgrounds for nighttime engagement, which should be explored as the design develops beyond Scheme Design.

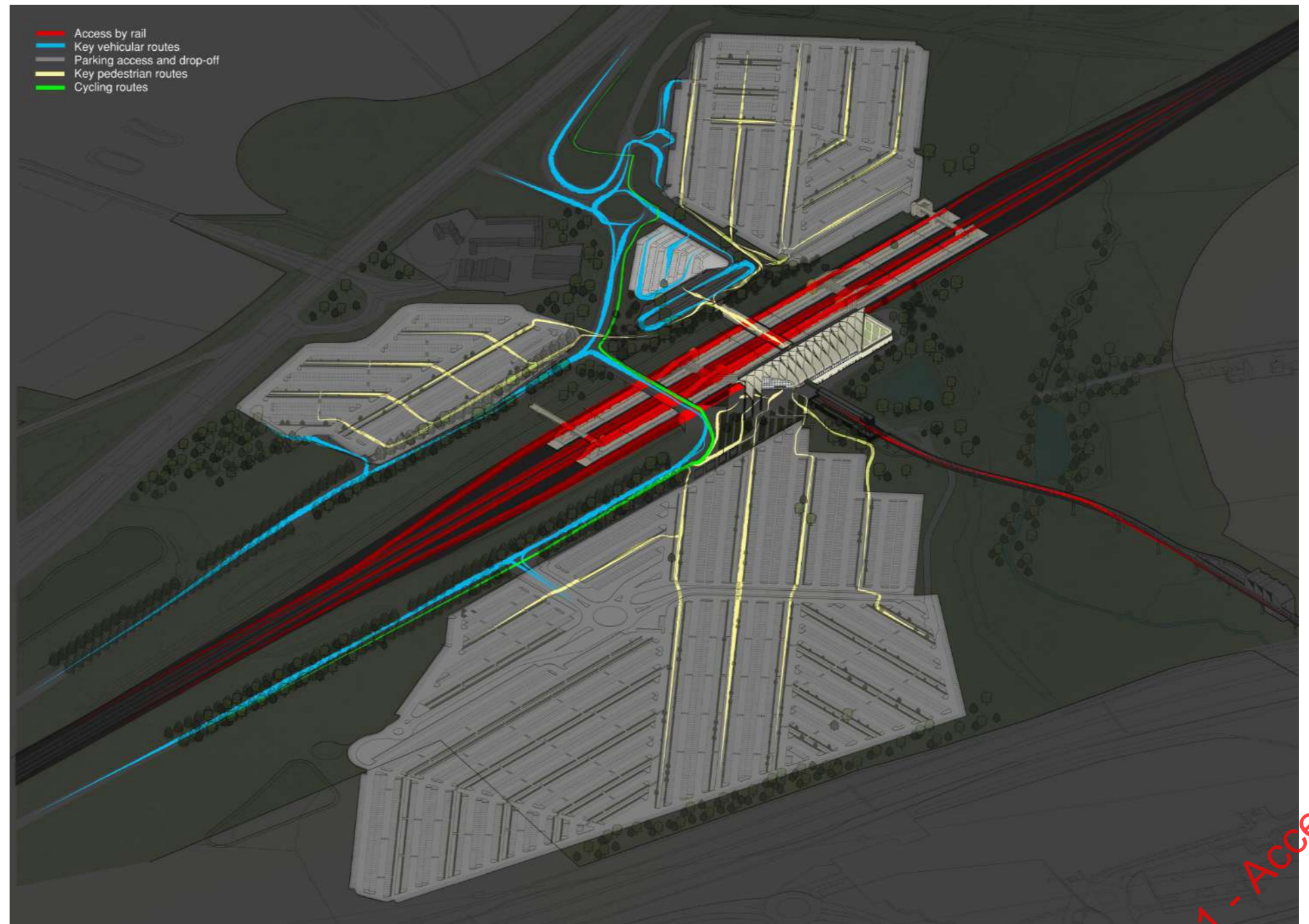


Figure 118: Key movement paths across the HS2 Interchange Station site

Code 1 - Accepted

## Car Parks, Vehicular and Pedestrian Routes

Main vehicular approaches, along the tree-lined boulevards, will be illuminated by luminaires mounted on 6m high lighting columns. Dedicated luminaires mounted on the same columns will uplight the adjacent trees, creating a visual corridor leading to and from the station.

Tall masts (10m) will provide a broad spread of area lighting to the car parks. This approach allows for the number of lighting columns to be minimised and will make lighting equipment less obtrusive because there are fewer columns and the light sources are further from the field of view. This helps to keep the focus on main routes and on the station as the destination.

For the main pedestrian routes though the site, lighting will be on a more human scale, utilising lower-level urban lighting (5m columns and bollards) to promote intuitive wayshowing to the stations while activating public night-time use of the external environment. These closer-spaced columns also provide a visual cue by day delineating the paths distinct from the area lighting of the car parks and the different feel of the station plazas.

The lighting along for all routes and car parks is primarily focused downwards so as to minimise glare and to avoid unnecessary light pollution.

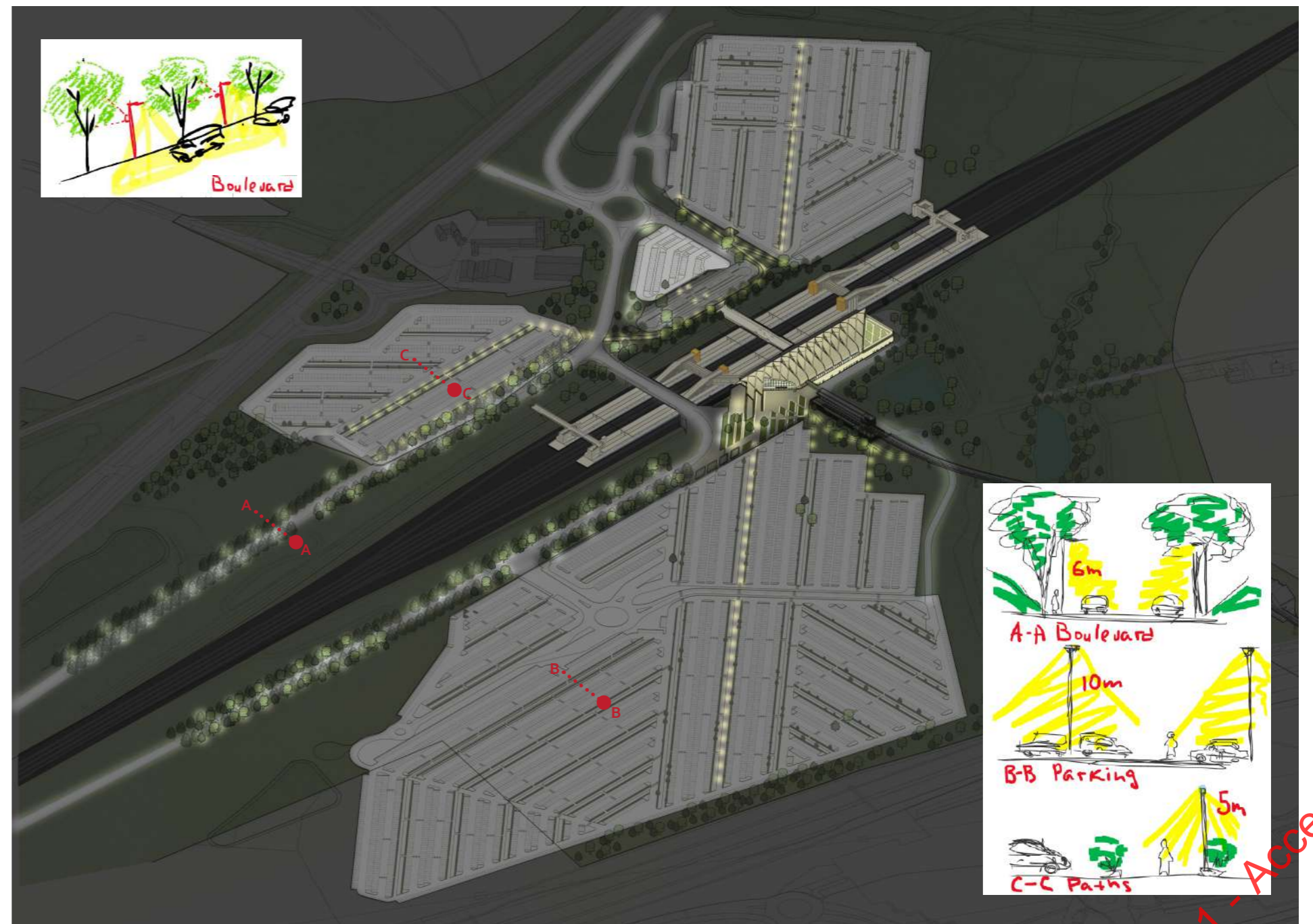


Figure 119: Sketch plan and sections indicating car park and primary route lighting strategy



## 6.13 Site-Wide Furniture

In general the site furniture will follow the protocols established within HS2s station common design elements. This will include litter bins, finger sign posts and digital display boards.

The features which will be non-standard will be the seats and benches, particularly those in the East and West Plazas and on the South Terrace. The furniture will be fabricated with a reinforced concrete core clad in hardwood.

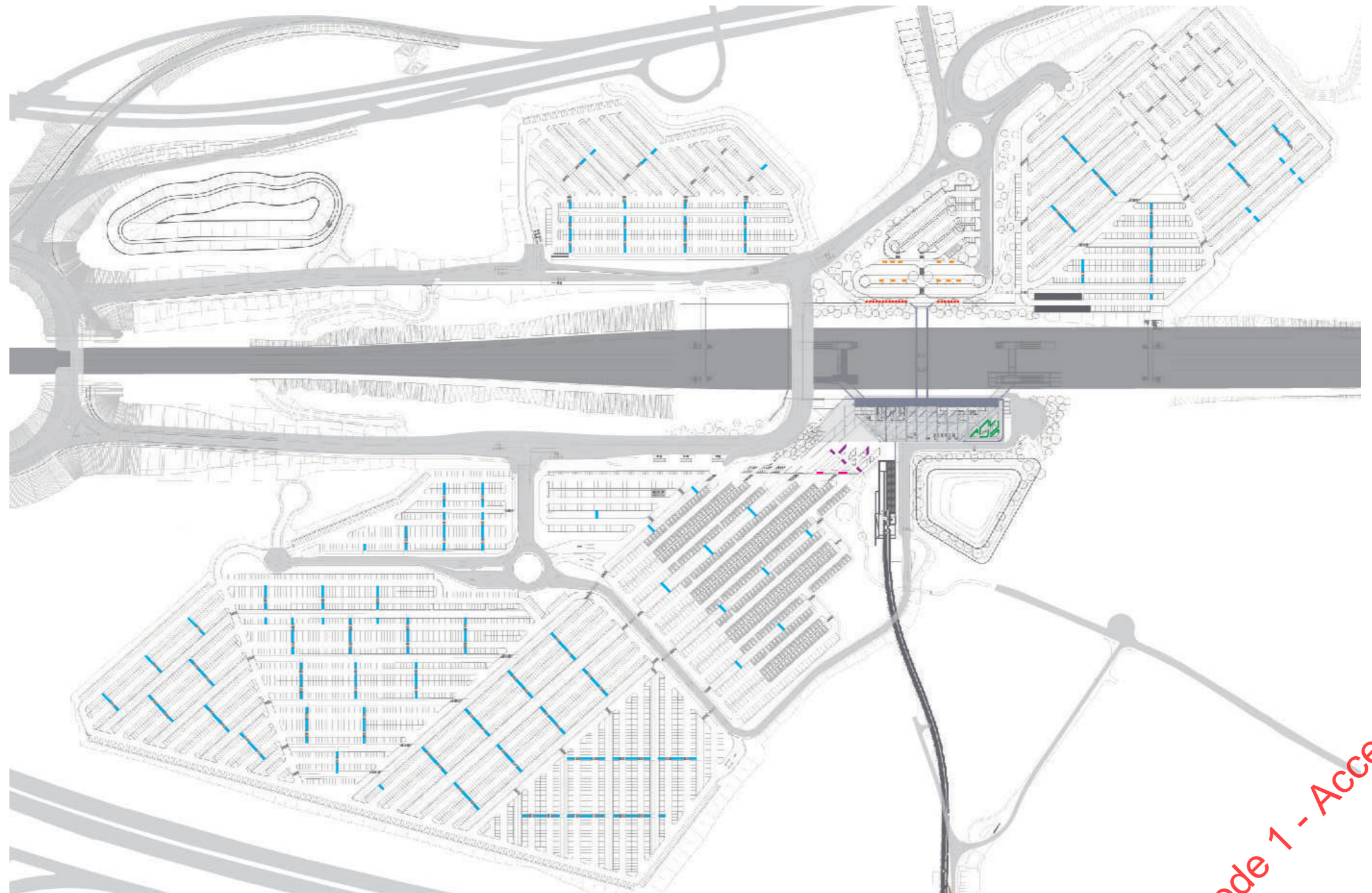
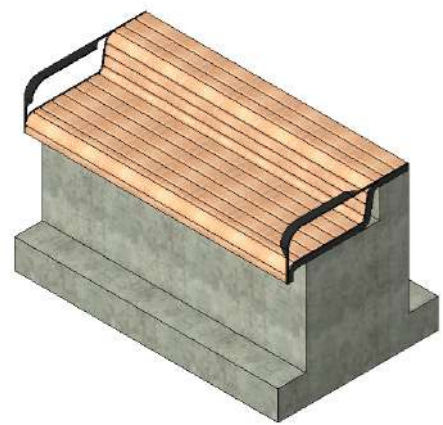


Figure 120: Site wide furniture strategy

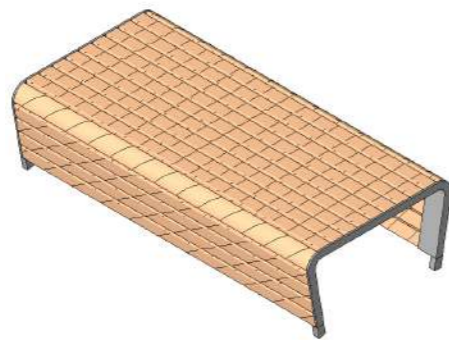
Code 1 - Accepted

**BENCH TYPE 1**



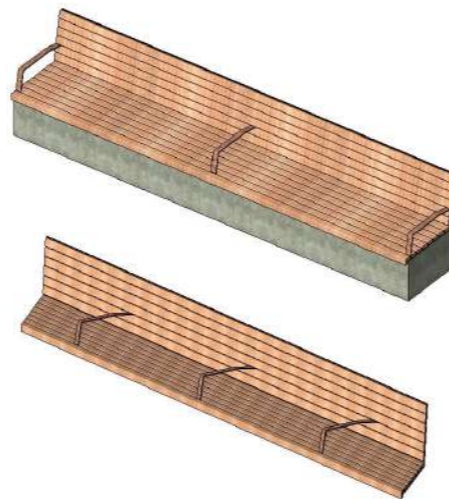
Timber bench with concrete plinth.  
Located on the East Plaza.

**BENCH TYPE 2**



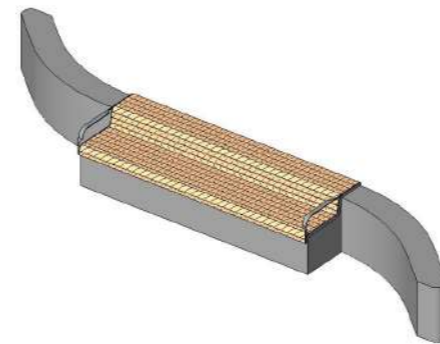
Timber freestanding bench.  
Located on the East Plaza.

**BENCH TYPE 3  
(with variations)**



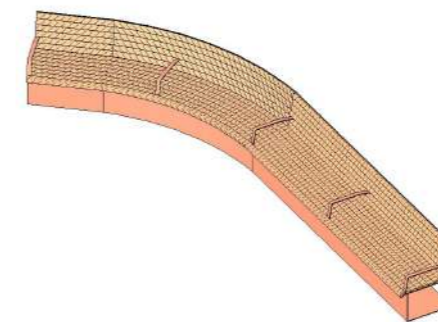
Timber bench on concrete planter (end  
geometry varies depending on location).  
Located on West Plaza.

**BENCH TYPE 4**



Timber bench with concrete plinth.  
Located on West Plaza.

**BENCH TYPE 5**



Timber bench on corten planter.  
Located on South Terrace.

**BENCH TYPE 6**



Proprietary timber bench to rest points.  
Located in car parks.

*Code 1 - Accepted*

# 6.14 Landscape Finishes and Materials

## NATURAL STONE



Granite  
Mimas Flamed

**Location :** West Plaza  
**Material :** Granite  
**Depth :** 63mm  
**Joints :** 6-8mm  
**Finish :** Flamed or fine picked  
**Pattern :** Final pattern to be developed at detailed design stage. Assumed to be set course widths.

**Unit Sizes :** Min 450- Max 900, Length to width ratio not to exceed 1:1.5 unless Annex A of BS EN 1341.2012 indicates that this can be exceeded.

**Min Slip Resistance:** PTV to BS 7976-2 of 40 on flat areas and 45 on slopes

**Shape:** Units to be cut as a parallelogram with east west sides running perpendicular to the Station Grid, while north, south sides run with the 45deg (nom) angle of the roof.

**Bedding:** Laid as a rigid construction on a porous engineered bed such as Steintec tuffbed. Laid over an RC slab to engineers details.

**Movement Joints :** Max 9 Metres with bays not exceeding a ratio of 1:2

## CONCRETE BLOCKS



Kellen  
Breccia Rosso

**Location :** East Plaza , All Car Park Footways  
**Material :** Exposed aggregate concrete blocks  
**Depth :** 80mm in vehicle areas and 65mm in pedestrian only areas  
**Joints :** 2mm sand filled  
**Finish :** Exposed coloured aggregate

**Unit Sizes :** Min 200x 100

**Min Slip Resistance:** PTV to BS 7976-2 of 40 on flat areas and 45 on slopes

**Bond :** Herringbone only in vehicle areas, Herringbone or half lapped stretcher in areas only subject to foot traffic.

**Bedding:** Laid as a flexible construction on a compacted sand bed. Laid over a Type 1 base to engineers details.

**Edgings :** Matching concrete kerb edge with min 100mm exposed width.

## RESIN FOOTPATHS



Natural Aggregate  
Barley Butter

**Location :** NMU Route and paths from East Plaza to Car Parks A and B  
**Material :** Natural Aggregate Crushed stone-gravels  
**Depth :** 18mm  
**Joints :** NA  
**Bedding:** Laid on Macadam footpath  
**Min Slip Resistance:** Resistance PTV to BS 7976-2 of 40 on flat areas and 45 on slopes

**Edgings :** Galvnised Steel

**Manufacturer:** Everedge

**Ref:** Titan

**Depth:** 150mm

**Thickness:** 4.0mm

**Bedding :** Set on concrete race with bottom 100mm of the edge set into the race

Code 1 - Accepted

**CONCRETE SLABS  
ON PEDESTALS**



Kellen  
Bianco Perla

**Location :** South Terrace  
**Material :** Kellen  
**Depth :** 80mm  
**Joints :** 5 mm, open  
**Finish :** Sferio  
**Pattern :** Grid  
**Unit Sizes:** 600 X 600mm  
**Min Slip Resistance:** Resistance PTV to BS 7976-2 of 40 on flat areas and 45 on slopes

**PLANTER EDGES  
AND EDGINGS**



Reinforced Concrete

**Location :** West Plaza  
**Material :** Reinforced Concrete Walls  
**Depth :** Min 300  
**Special Features :** 35mm fillets to all exposed edges  
**Finish :** Fair faced equivalent of BS EN 13670 : Plain Finish and/or as specified for exposed fair faced elements elsewhere.

**CORTEN  
PLANTERS**



Corten Steel

**Location :** South Plaza  
**Material :** Corten Steel  
**Special Features:** High backed timber seats mounted onto Corten bases  
 75mm wide Gravel filled drip trims around base of all planters

Code 1 - Accepted

## BOLLARDS



Steel  
Stainless

**Location :** East and West Plazas  
**Material :** Stainless Steel Outer Sleeve  
**Features :** Contrasting Visibility Strip

## SEATS



Iroko



Steel  
Galvenised

**Location :** East & West Plazas and South Terrace  
**Material :** Galvanised Steel Frame, Hardwood slats- iroko, cummaru or similar  
**Dimensions :** All seats have high backs which extend to shoulder height. Armrests at max 2400mm centres  
**Features :** LED lighting strip to be installed into underside of front batten of all seats.

## BENCHES



Iroko

**Location :** Car Park Rest Points  
**Material :** Hardwood slats- iroko, cummaru or similar  
**Length :** 1800mm  
**Backrest :** Fitted to at least 30% of all benches with the car parks

Code 1 - Accepted

# 6.15 Paving Diagram

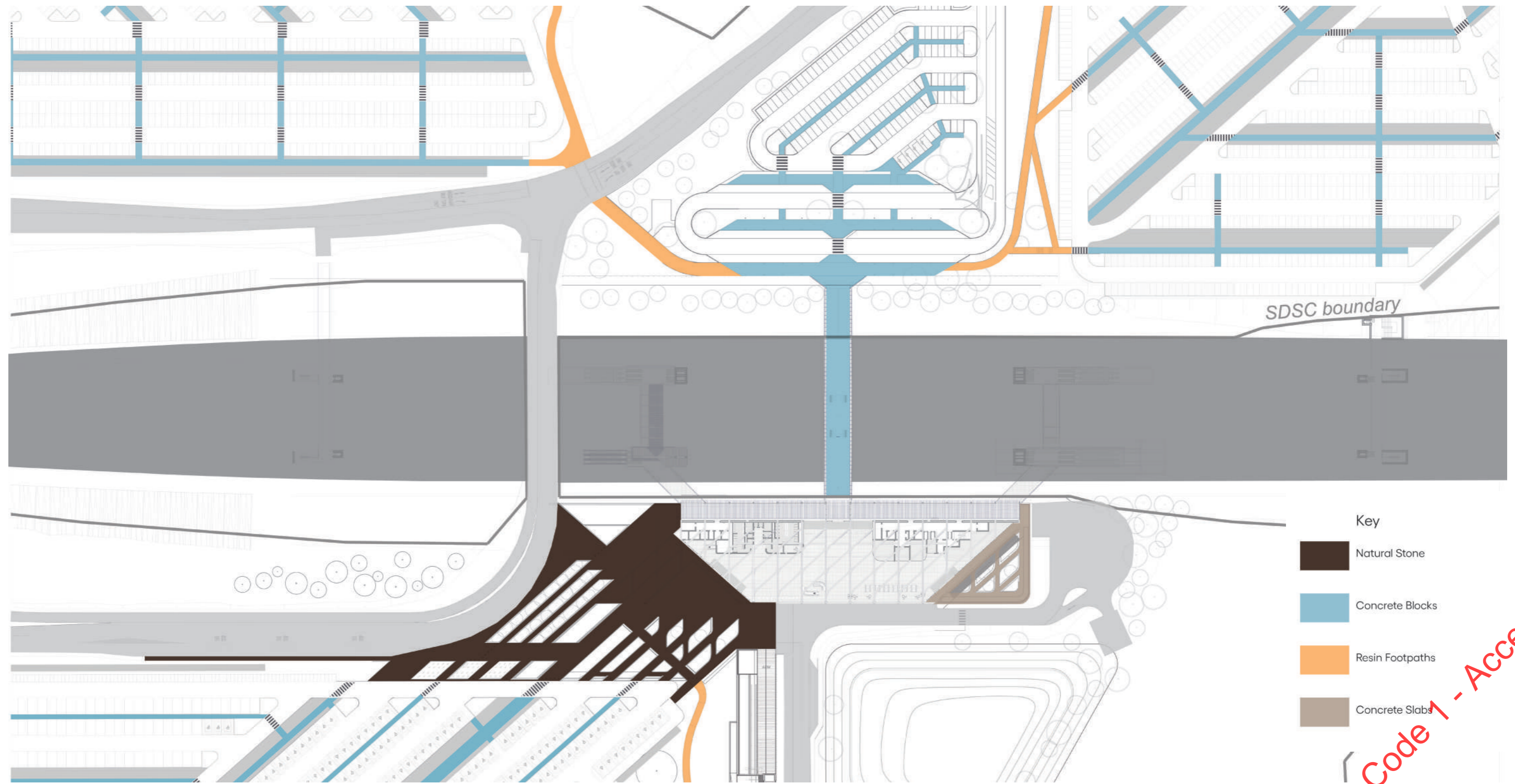


Figure 121: Site wide materials strategy

## 6.16 Planting Strategy

The strategy for planting at Interchange is defined by a number of key documents including HS2 design guides and Warwickshire Landscape Guidelines, Arden, prepared by Warwickshire County Council

These documents were used to inform a site wide approach to planting which is set out in this document.

The themes promoted by all of these guidance documents is to use a predominantly native palette of plants. HS2 standards limit the use of large trees, predominantly native trees, in close proximity to the track. However with such a large proportion of the site outside a zone of influence of the track there are still opportunities to establish a broad range of natives and some near natives and some notable stands of trees.

HS2 has legal commitments that it needs to deliver in relation to planting. The Environmental Minimum Requirements established as part of the Hybrid Bill give prescriptions for planting across the site, including the extent of the area to be planted and the species mix to be used.

The Environmental Assessment undertaken at Hybrid Bill stage establishes a quantum of planting that must be provided.

Landscape in the Triangle will be delivered on behalf of HS2 by three different contractors as part of different Schedule 17 submissions and work packages. It will therefore be important to ensure that, as far as reasonably possible, landscaping is consistent and cohesive across all parts of Interchange.

The fundamental principles of the planting approach are:

- Protect and save the maximum number of existing trees. In addition, protect existing field hedgerows and grass swards.
- Focus on locally relevant species, specifically Oak and Midland Hawthorn
- Maximise resilience by diversifying the species mix and by securing some stock from nurseries south of the site.
- Ensure that stock is sourced from nurseries that are disease free. Limit tree procurement to home grown stock.

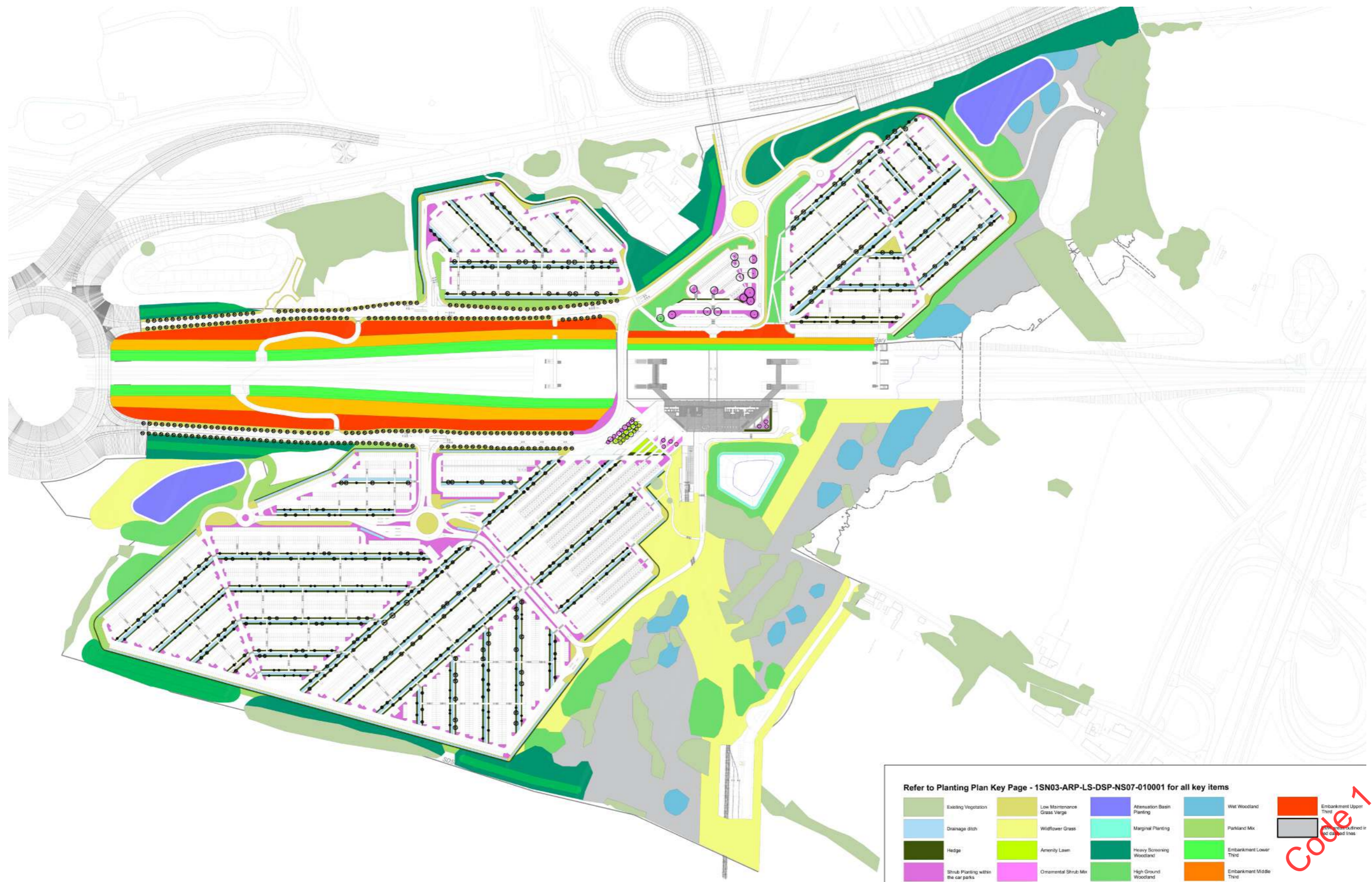
- Establish a multi-layered planting mix composed of woodland trees, smaller trees, shrubs, herbs and bulbs.
- Enrich the planting typologies to suit the diversity of habitats
- Plant species mixes which promotes local fauna.

Lastly there is a recognition that Green Infrastructure can achieve significant benefits in terms of improving air quality. The Interchange site is already a hot spot in terms of pollution with elevated levels of particulates and Nox generated by the traffic on the M42, A45 & A452 plus the planes landing and taking off from Birmingham Airport. It is now generally recognised that trees and shrubs can help to mitigate some of the effects of these pollutants.

The principle planting groups are:

- Boulevard plantings - 4 rows of *Carpinus betulus* flanking the east and west boulevards
- The Eastern Embankment
- The Hollywell Valley and Flood Plain
- Site Perimeters
- Car parks

Code 1 - Accepted



Code 1 - Accepted



# 6.17 Planting

One of the main drivers at Interchange is the need to deliver the quantum of planting established at Hybrid Bill Stage as defined on the drawings, and in the schedules of the Environmental Minimum Requirements. The requirements under the EMRS are :-

- Planting to be in accordance with HS2 Procurement Strategy
- Species to be drawn from the Warwickshire Landscape Guidelines Arden Landscapes 1993-Woodland on Sandy Soils Species List.

The Plant Procurement Strategy states that Woodland Planting shall be installed on a 1.5 m grid. Where the planting is provided for screening the spacing should be increased to 1.0M. There is a rider that woodland habitats can contain rides or glades, so there is an opportunity to reduce these densities where it is relevant to do so to help maintain the identity of adjacent retained woodland.

The approach taken in all areas of woodland planting required to deliver against the EMRs is therefore aligned with the 1.5m grid. However, where additional planting is to be provided which is not covered by the EMRs, then a different and more varied regime has been adopted. This is in part to allow larger trees to be planted close to the station, but also to establish a character that is more reminiscent of a parkland characteristic.

Where possible the locally relevant species predominate, so principally Oak and Midland Hawthorn.

Excluding the EMRs which are dealt with above the planting typologies within the drawings are broken down as follows :-

## 6.17.1 General woodland

A range of woodland typologies have been established to deal with a variety of site conditions.

### HEAVY SCREENING WOODLAND

We are proposing a mix of native trees in three sizes including 16-18 cm girth, 12-14cm girth and 90-120cm transplants, with a total number of trees per hectare of 370, so a tree at an average of 5.2M centres. The trees will be clumped so there will be some zones within a woodland block which are devoid of planting.

In addition, and within the same block, there will be native understorey at 500 plants per m2, so these plants will be on an average 4.47m spacing, but again they will be clumped with zones of grass between. The entire area is undersown with a grass /wildflower mix.

### HIGH GROUND WOODLAND

Similarly the planting is based on multiple sizes with an average spacings of 4.2metres, but again this will be clumps of trees separated by open areas of grass.

### WET WOODLAND

Again we have multiple sizes of tree with an average spacing of 4.3meters. The trees are underplanted with a wet woodland shrub mix of Cornus, Rhamnus, Corylus, Prunus and Salix and undersown with a wildflower and grass mix.

### HEAVY SCREENING WOODLAND



Small-leaved lime (Tilia cordata)



Oak (Quercus Robur)



Scots pine (Pinus sylvestris)

### HIGH GROUND WOODLAND



Field maple (Acer campestre)



Downy birch (Betula pubescens)



Oak (Quercus Robur)



Scots pine (Pinus sylvestris)



Common beech (Fagus sylvatica)



Small-leaved lime (Tilia cordata)

### WET WOODLAND



Crack willow (Salix fragilis)



White willow (Salix alba)



Black poplar (Populus nigra)

Code 1 - Accepted

### 6.17.2 East embankment

The embankment areas to the east of the Station and the north of the roadbridge are planted as three zones working away from the track with the size of planting increasing as the distance from the track increases.

The middle zone will be planted with a shrub mix of Cornus, Prunus, Crataegus, Corylus, Ilex and Sambucus installed as transplants on a 1.5 metre grid. Only 50 % of this area will be planted, the rest will be open heathland. For the upper zone of the bank again the heathland grass will be used, together with the shrub mix.



Cornus Alba Prunus Spinosa Crataegus Monogyna Corylus Cornuta



Corylus avellana Ilex aquifolium Rosa rugosa Sambucus Nigra



Fagus Sylvatica Tilia Cordata Oak (Quercus Robur) Prunus Spinosa



Pinus Nigra Cornus Alba Rosa rugosa Crataegus Monogyna

### 6.17.3 Parkland mix

Here we just have a small number of semi mature trees in open grassland, predominantly oak. There are only 30 trees in total and they will be planted as 20-25cm girth trees



Sweet chestnut (Castanea sativa) Common beech (Fagus sylvatica) Scots pine (Pinus sylvestris)



Small-leaved lime (Tilia cordata) Oak (Quercus Robur)

### 6.17.4 Boulevard

The main incoming East and West access roads are lined with double rows of Hornbeam. The trees are arranged to work with the spacing of the light columns, which are located at 30 metre centres in staggered rows. There are therefore 4 trees per 30 metres, so a tree every 7.5 metres. The trees are planted at a range of sizes, those nearest the Station are 50cm girth, those by the roundabout only 20-25cm girth. This is in part for reasons of cost but also because the smaller trees will rapidly catch up with those planted as larger stock.



Carpinus betulus (Hornbeam)

Carpinus betulus (Hornbeam)

Code 1 - Accepted

### 6.17.5 East and West Plazas

Because these are the primary areas of public realm they contain larger, more substantial trees at the outset. The planting will be predominantly *Quercus robur*, but it will be supplemented by small leaved lime - *Tilia cordata*, and Beech- *Fagus sylvatica*. Due to the prevalence of processionary oak moth, and the current ban on the use on the importation of oak from Europe, it may be necessary to reduce the reliance on this species, but this would be highly regrettable, as it is the indigenous tree of the West Midlands

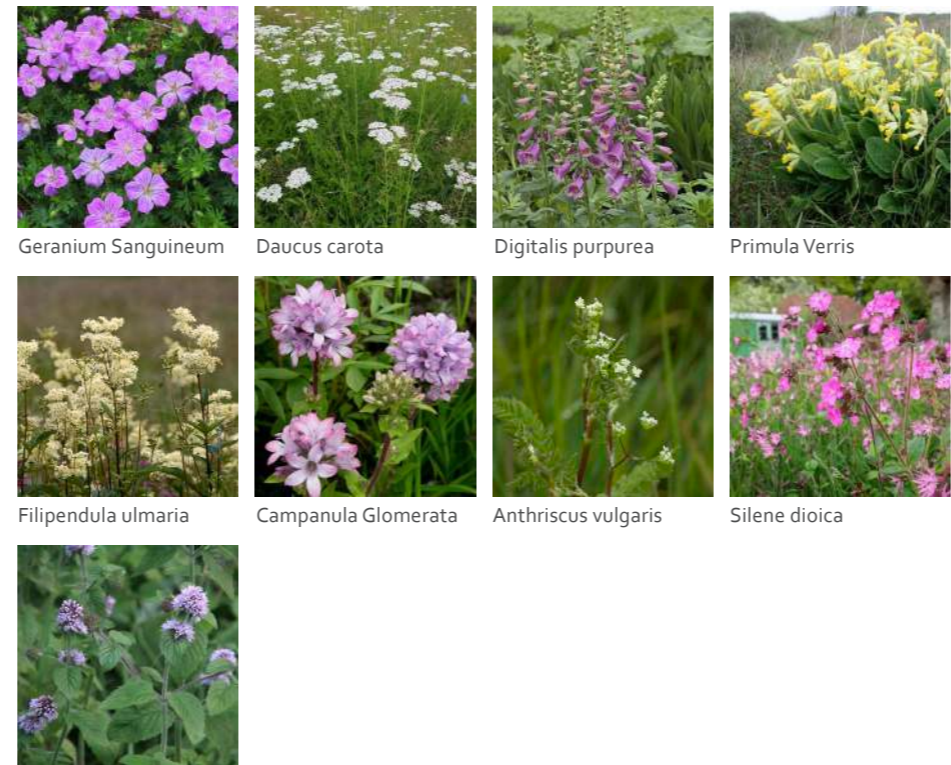


Small-leaved lime (*Tilia Cordata*)    Common beech (*Fagus Sylvatica*)    Downy birch (*Betula pubescens*)    Oak (*Quercus Robur*)

### 6.17.6 Hedges

These are predominantly within the reservations and around the edges of the car park. They are native hedge mixes planted in triple rows at 300mm centres. This is denser than recommended but this is because they will be subjected to heavy levels of footfall, and so the hedges do need to be robust. The perimeter hedges which run around all car parks, and are intended as a device to stop unauthorised access to the parking fields, can be planted with smaller stock and as only two rows of plants.

All hedges have an understory or native herbaceous planted as 1 litre material at 9 per lin metre. This includes *Geranium sanguineum*, *Campanula glomerata*, *Primula verris*, *Digitalis purpurea*, *Filipendula ulmaria*, *Daucus carota*, *Anthriscus vulgaris*, *Silene dioica*. They also contain naturalised narcissus at 10 bulbs per lin metre.



*Geranium Sanguineum*    *Daucus carota*    *Digitalis purpurea*    *Primula Verris*  
*Filipendula ulmaria*    *Campanula Glomerata*    *Anthriscus vulgaris*    *Silene dioica*  
*Calamintha arvensis*

### 6.17.7 Amenity shrub planting - site wide

In general amenity shrub planting is not used at Interchange. However, there are some areas where it is employed as there is no suitable alternative. In essence it breaks down into 2 groups.

Medium to high shrubs in wider site areas that are too big for hedging. This tends to be in the islands at the ends of car park bays. Species tend to be native or near native and are selected for robustness and ability to deal with low levels of maintenance. They are planted as 2 litre stock at 7 per m2. Species include *Cornus alba*, *Rosa rugosa*, *Ribes sanguineum*, *Viburnum tinus*, *Viburnum opulus Sterile*, *Viburnum carlessii*. In addition herbaceous and grasses will be used to supplement the mix, both relying on low maintenance demanding species such as *Geranium maccrorrhizum*, *Iris foetidissima*, *Anthriscus sylvatica*, *Nepeta Walkers Low* with grasses being *Carex Testacea*, *Sesslaria nitida*, *Calamagrostis* and *Panicum Heavy Metal*.

Bulbs also feature heavily in this area, the predominant species being *Narcissus Rhinvelds Early Sensation* for flower in January and the *Carlton* for March-April flowering.



*Cornus alba*    *Rosa rugosa*    *Ribes sanguineum*    *Viburnum tinus*  
*Viburnum carlessii*    *Geranium maccrorrhizum*    *Iris foetidissima*    *Anthriscus sylvatica*  
*Carex testacea*    *Sesslaria nitida*    *Calamagrostis*    *Panicum heavy metal*

Code 7 - Accepted

### 6.17.8 Amenity shrub planting - raised beds

The raised beds in the West and South Plazas feature low maintenance demanding herbaceous and herbs including Geranium maccrorhizum, Iris foeridissima, Liriope Big Blue, Nepeta Walkers Low, Bergenia Overture, Kniphofia thomsonii, Salvia mainacht and Salvia nemorosa. Grasses would be Sessleria autumnalis, Carex Testacea, Panicum Shenandoah. On the south terrace Amenanthale lessonina and Molinia Windspiel will be the predominant feature grasses as they will capture the winds at this exposed south west end of the building creating a moving cloud of stems and seed heads. Amenanthale will be the perfect foil for the rolling form of the roof.

The edge of the south terrace is planted with a trimmed beech hedge, the coppery autumn and winter foliage being the perfect foil for the wood clad soffit of the roof.

#### RAISED BEDS PLANTING IN THE WEST AND SOUTH PLAZAS



Geranium maccrorhizum Iris foeridissima Liriope big blue Nepeta walkers low



Kniphofia thomsonii Salvia mainacht Salvia nemorosa Sessleria autumnalis

#### SOUTH TERRACE



Amenanthale lessonina Molinia windspiel Beech Hedge

### 6.17.9 Grasses

The site has a number of grass mixes, these all being based on the equivalents of the seed mixes in HS2 Standards.

The main mixes are as follows

Verge with wildflowers : Adjacent to the main highways and road networks. The verges are also planted with 25000 Narcissus pseudonarcissus bulbs per hectare.

Heathland : Composition adjusted to suit locally indigenous, species. Adjacent to the track, these grasses will be sown by MWCC contractor

Woodland herb layer: Grass, wildflower mix. Areas that do not need to be stripped to facilitate construction works will retain their existing grass sward. It is anticipated that where woodland blocks are planted they will be planted into the existing grass by spraying off the planting locations and then notch planting into the existing soil.

Wet Grassland areas, specifically making good in the Hollywell Valley. Seeded with Wet Grassland mix adapted to suit local conditions and native species composition.

Ditches : Wildflower seed mix plus 2litre marginal herbs at 9 per m2 such as Anthriscus, Daucus, Digitalis, Primula verris, Silene dioica etc

Amenity Lawn : To West Terrace, a robust, hard wearing, low maintenance mix that has good visual qualities.

In Grass areas, as an alternative to seeding it is permissible to establish grassland by:

*Seed can be sourced from suitable donor sites using 1) green hay 2) seed collected by brush harvesting a hay meadow, or 3) seed can be purchased This should be specified and based on the availability of local donor sites, the timing of the works and availability of seed (see Figure 3.2).*

For Basins, Swales and Ditches:

- For general principals of design for wildlife ponds with no specific target requirement other than as part of general biodiversity enhancement see Pond Conservation 201019 and Pond Conservation 201120
- For see sown sward establishment refer to 7.6.1 Locally appropriate native species should be used.
- Where there is no suitable donor site a standard river bank seed mixture with grasses available from commercial seed suppliers should be used, consistent with Technical Standard - Lawn, Meadow and Wetland Procurement Strategy.

Code 1 - Accepted

### 6.17.10 Attenuation basins



Angelica sylvestris



Mentha aquatica



Iris pseudacorus



Achillea ptarmica



Lythrum salicaria



Hordeum



Cynosurus cristatus



Briza media



Festuca rubra



Geum rivale

### 6.17.11 Station pond edge



Sagittaria saggitifolia



Mentha aquatica



Iris pseudacorus



Achillea ptarmica



Lythrum salicaria



Hordeum secalinum



Cynosurus cristatus



Briza media



Festuca rubra

Code 1 - Accepted

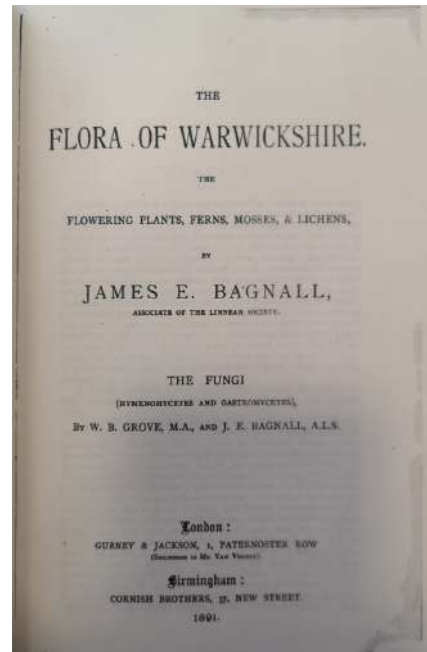
# 6.18 Locally Relevant Planting

There is an opportunity when selecting a planting palette to weave some locally relevant species into the mixes. There is a rich variety of species to draw from in the surrounding Warwickshire countryside as well as within the triangle site and ensuring this thread is continued within the proposals will add a unique aspect to the scheme and aid biodiversity.

A rich source of native plants that have been found growing locally to the Blythe Basin is 'The Flora of Warwickshire - The Flowering Plants, Ferns, Mosses & Lichens' by James E Bagnall, written in 1891. This source, although not current, is still very relevant as it lists species found in the Blythe Basin that are still very much appropriate today.

A total of 882 flowering plants, ferns and fern allies were noted as present in the Blythe Basin alone. This indicates a very rich and diverse flora that should be considered and enhanced through the planting design at Interchange.

Within our planting plans and specification we have included locally relevant species drawn from this source throughout the various mixes, these species are indicated with (LS) Locally relevant species.



SUMMARY OF GEOGRAPHICAL DISTRIBUTION OF SPECIES AND VARIETIES IN WARWICKSHIRE.

WITH THE WATERLOOIAN TYPES OF THE WARWICKSHIRE SPECIES AND CONTRASTIVE OCCURRENCE IN THE COUNTIES OF WARWICK, LEICESTER, NORTHAMPTON, AND OXFORD.

The initials W, L, N, and O indicate the counties above named, while the figures 1, 2, 3, &c., indicate the districts in which each plant is found.

No.	Name.	Type.	1	2	3	4	5	6	7	8	9	10
1	<i>Clematis vitalba</i>	...	...	...	...	...	...	...	...	...	...	...
2	<i>Thalictrum flavum</i>	...	...	...	...	...	...	...	...	...	...	...
3	<i>Asperula filifolia</i>	...	...	...	...	...	...	...	...	...	...	...
4	<i>Asperula nemorosus</i>	...	...	...	...	...	...	...	...	...	...	...
5	<i>Adiantum nemorosum</i>	...	...	...	...	...	...	...	...	...	...	...
6	<i>Myosotis silvatica</i>	...	...	...	...	...	...	...	...	...	...	...
7	<i>Ranunculus acris</i>	...	...	...	...	...	...	...	...	...	...	...
8	<i>Salix</i>	...	...	...	...	...	...	...	...	...	...	...
9	<i>penula-Solima</i>	...	...	...	...	...	...	...	...	...	...	...
10	<i>A. suberosa</i>	...	...	...	...	...	...	...	...	...	...	...
11	<i>trichophyllum</i>	...	...	...	...	...	...	...	...	...	...	...
12	<i>Dryas</i>	...	...	...	...	...	...	...	...	...	...	...

bridge, near Coleshill Hall, 274ft.; confluence with the Blythe, near Coleshill, about 230ft.

In this district I have found about 882 flowering plants, ferns, and fern allies, of which the following are the more important:—

*Aquilegia vulgaris*; *Lepidium Smithii*; *Barbarea intermedia*; *Sisymbrium Sophia*; *Sagina ciliata*; *S. nodosa*; *Hypericum Androsaemum*; *H. elodes*; *Radiola linoides*; *Geranium pyrenaicum*; *Erodium cicutarium*; *Genista tinctoria*; *Trifolium filiforme*; *Prunus Padus*; *Rubus hemistemon*; *R. Salteri*; *R. rosaceus*; *Rosa mollis*; *Pyrus torminalis*; *Chrysosplenium alternifolium*; *Cotyledon Umbilicus*; *Myriophyllum spicatum*; *Anthriscus vulgaris*; *Adoxa Moschatellina*; *Filago minima*; *Anthemis arvensis*; *Taraxacum palustre*; *Campanula patula*; *Menyanthes trifoliata*; *Myosotis repens*; *Limosella aquatica*; *Pinguicula vulgaris*; *Calamintha arvensis*; *Littorella lacustris*; *Salix fusca*; *S. argentea*; *Habenaria viridis*; *Gagea fascicularis*; *Narthecium ossifragum*; *Juncus diffusus*; *Lemna gibba*; *Eleocharis multicaulis*; *Scirpus caespitosus*; *Carex elongata*; *C. curta*; *Alopeurus fulvus*; *Festuca fallax*; *Scolopendrium*; *Botrychium Lunaria*; *Pilularia globulifera*; *Nitella opaca*; *N. flexilis*.

Title page and extracts from 'The Flora of Warwickshire - The Flowering Plants, Ferns, Mosses & Lichens' by James E Bagnall

## Meadow

- Aquilegia vulgaris*
- Sisymbrium Sophia*
- Hypericum Androsaemum*
- Geranium pyrenaicum*
- Erodium cicutarium*
- Chrysosplenium alternifolium*
- Cotyledon umbilicus*
- Anthriscus vulgaris*
- Filago minima*
- Anthemis arvensis*
- Campanula patula*
- Calamintha arvensis*
- Festuca fallax*

## Ditch/ Swale

- Barbarea intermedia*
- Hypericum elodes*
- Myriophyllum spicatum*
- Menyanthes trifoliata*
- Narthecium ossifragum*
- Carex elongata*
- Carex curta*
- Pilularia globulifera*

## Attenuation Basin

- Radiola linoides*
- Taraxacum palustre*
- Menyanthes trifoliata*

## Pond

- Menyanthes trifoliata*
- Limosella aquatica*
- Juncus diffusus*
- Lemna gibba*
- Eleocharis multicaulis*
- Scirpus caespitosus*
- Nitella opaca*
- Nitella flexilis*
- Sagina ciliata*
- Sagina nodosa*

## Hedge

- Genista tinctoria*
- Rosa mollis*

## Hedge Understorey

- Adoxa moschatellina*
- Hypericum Androsaemum*
- Geranium pyrenaicum*
- Anthriscus vulgaris*
- Myosotis repens*
- Pinguicula vulgaris*
- Calamintha arvensis*
- Gagea fascicularis*
- Asplenium scolopendrium 'Angustifolia'*
- Polypodium vulgare*

## Trees

- Prunus Padus*
- Pyrus torminalis*

## Wet Woodland Understorey

- Salix fusca*
- Salix argentea*

## Wet Woodland Herbs

- Carex elongata*
- Carex curta*
- Narthecium ossifragum*
- Alopecurus fulvus*

## Shady Woodlands

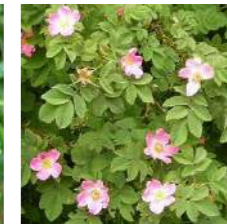
- Asplenium scolopendrium 'Angustifolia'*
- Botrychium lunaria*
- Polystichum lobatum*
- Polystichum angulare*
- Polypodium vulgare*
- Osmunda regalis*



Prunus Padus



Pyrus torminalis



Rosa mollis



Salix fusca



Aquilegia vulgaris



Barbarea intermedia



Radiola linoides



Nitella flexilis



Geranium pyrenaicum



Calamintha arvensis



Asplenium scolopendrium 'Angustifolia'



Osmunda regalis

Code 1 - Accepted



Code 1 - Accepted

# 7. Accessibility and Inclusivity



# 7.1 External Environment

## 7.1.1 PRM Strategy

A PRM Operational Plan is currently being developed by HS2 Ltd. While this PRM Operational Plan is being compiled the following assumptions have been agreed as a PRM strategy:

1. No outdoor PRM buggies will be used inside the station building or on the platforms
2. PRM passengers will travel independently or assisted in a wheelchair/electric wheelchair inside the station and on the platforms
3. Seating will be located at least every 50m inside the station to allow passengers to rest
4. PRM passengers will be able to call for assistance from help points provided at key locations, and at least every 50m in the blue badge parking area
5. PRM passengers will be able to call for assistance from a help point in the taxi / drop, in order to travel to the station entrance

Help-points, to request assistance, will be located at 50m intervals within the PRM bays of Car Park C, and at key locations for the other parking spaces. Within Car Park A and Car Park B, they will be located at regular key locations (approximately every 100m)

## 7.1.2 Car Parking and Setting Down Points

Three customer car parks are provided to the site, namely Car Park A, Car Park B, and Car Park C, containing a total of 7,400 parking bays. The car parks are located to the north and to the south of the site, and relate to the site's intermodal connections. The car parks and the intermodal connections are set out in order to avoid traffic congestion.

Car Park A, Car Park B and Car Park C have been developed as surface-level car parks. This has resulted in extended travel distances from the PRM parking bays to the station's entrance, exceeding the required maximum limit of 50m required by BS 8300-1: 2018. The extended travel distances to all car parks have been further mitigated by the provision of the PRM Strategy.

Car Park C contains 440 PRM bays (i.e.: 6% of the total number). All PRM parking bays are located so that passengers have clear sight of the

station and can locate it easily. However some PRMs are required to travel approximately 150m to reach the station's entrance, exceeding the 50m maximum required by BS 8300-2: 2018.

PRM parking bays for staff are located in Car Park C and will be differentiated from passenger PRM parking bays. They will be designed and provided in accordance with BS 8300-1: 2018.

The taxi drop-off is partially covered, is located to the east of the site and is provided with dropped kerbs to enable step-free access for PRMs. Pedestrian access from the taxi drop-off to the station entrance is via a 1:40 graded route, and subsequently via a footbridge.

The travel distance from the taxi drop-off to the building entrance is approximately 150m (exceeding the 50m maximum required in accordance with BS 8300-2: 2018). It is proposed that this is mitigated by the PRM Strategy.

There will be a bus stop located next to the West Plaza. The travel distance from the bus stop to the entrance is 180m (exceeding the 50m maximum required in accordance with BS 8300-2: 2018), however this is via a pedestrianised route, and it is proposed that this is mitigated by the PRM Strategy.

## 7.1.3 Cycle Parking

Cycle parking is located on a pedestrianised area on the East and West Plaza and will be designed in accordance with BS 8300.

Sheffield stands are provided in order to allow flexibility in storage of different types of bicycles. Within the cycle parking, access routes to the accessible stands will achieve at least 1.2m in clear width to accommodate adaptive cycle parking transfer.

## 7.1.4 Animal Spending Areas

An animal spending area is provided in the PRM area of Car Park C, accessed via appropriate and safe crossing points.

## 7.1.5 Street Furniture

Street furniture has been designed and placed so that it does not interfere with the main pedestrian flow.

It is proposed that seating will be located at 50m intervals, to mitigate the extended travel distances within the car parks, along the bus route, and along the route from the taxi drop-off to the station's entrance. Within the car park, seating will not be covered, however outdoor seating will be designed to prevent rainwater collecting in any part of the seat and to allow the seat to dry relatively quickly.

Seating should be provided with backrests and some seating will be provided with and without armrests to allow for flexibility in use.

Bollards are provided within the West Plaza for security purposes. They have been designed to have a visually contrasting band applied to make sure they will be seen against the background. Droppable bollards are provided in locations for access for emergency vehicles.

Code 1 - Accepted













Interchange Station

P<sub>B</sub>

P<sub>A</sub>

P<sub>S</sub>

P<sub>C</sub>

-  Car Park A
-  Car Park B
-  Car Park C
-  Short Stay Car Park
-  PRM Parking
-  Taxi drop off + pick up
-  Bus Stops
-  Cycle parking
-  People Mover
-  Drop & Go

Code 1 - Accepted

# 7.2 Station Building

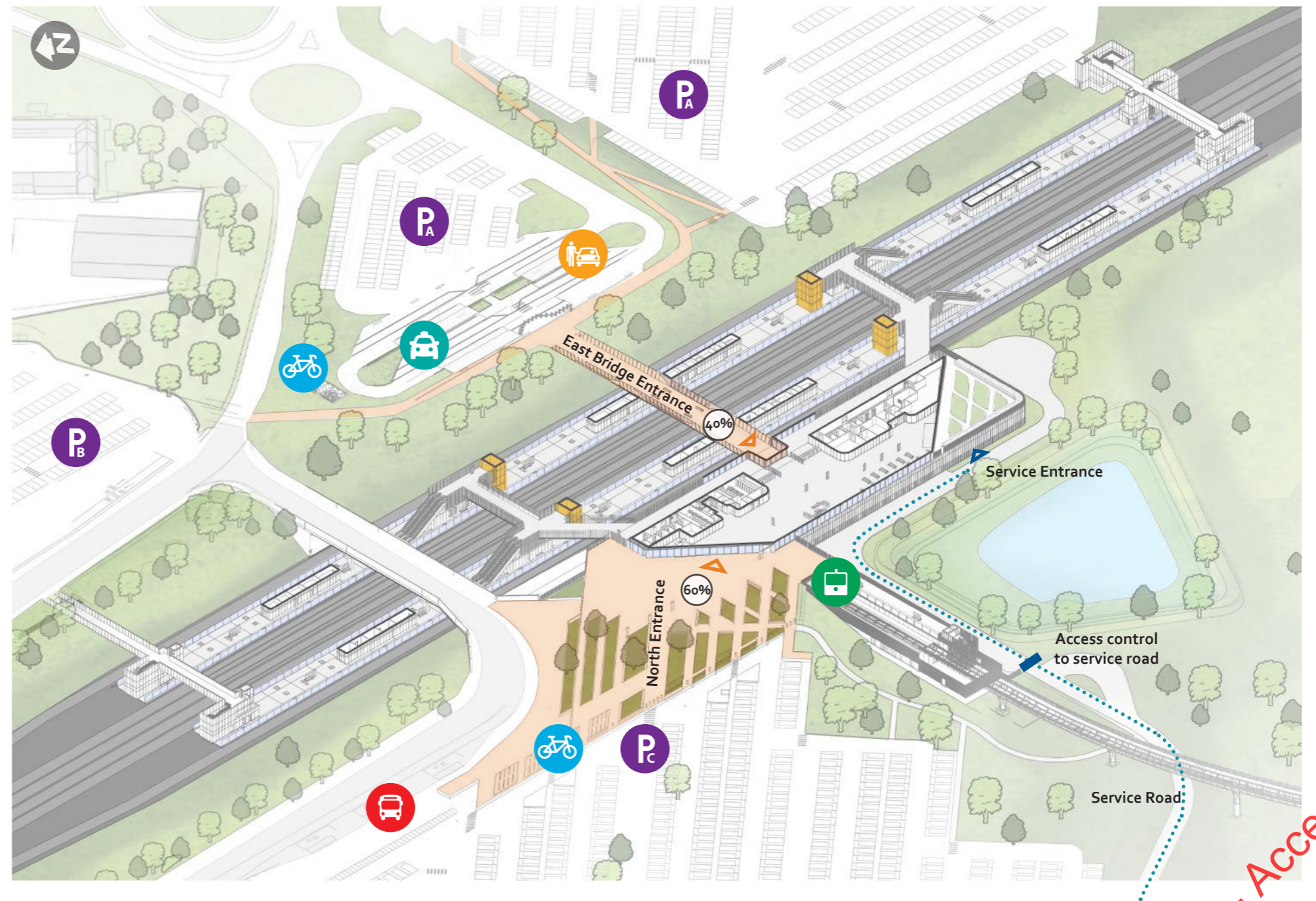
## 7.2.1 Entrances

There are two entrances to the building, both of which are step-free. One is located to the north-west of the station, accessed via the West Plaza, and the other is located to the east of the station, accessed via a footbridge connecting the taxi drop-off to the station.

All entrances contain doors which will be locked open during station opening hours, in order to provide a barrier-free route. The clear opening width of the doors, when held open, will be at least 2000mm.

The east entrance will be via a footbridge link from the taxi drop-off, and Car Parks A and B. The footbridge will be open during station opening hours. The footbridge, and all circulation routes across the site and the building, will have a consistent, suitable anti-slip flooring surface.

Wayfinding information will be consistently provided through signage located at the entrances, along key passenger routes and intersections, and along both the unpaid concourse and the paid concourse, to direct passengers to the lifts and the platforms.



Code 1 - Accepted

### 7.2.2 Horizontal Circulation

The routes from the concourse to the platforms are covered and are enclosed by a balustrade of 1.8m in height for safety and weather protection. The balustrade is designed to have glazed panels in the upper third to create better sight lines to onward destinations.

Corridors within the public areas of the station have a minimum clear width of 2.6m, to allow PRMs to pass each other comfortably, exceeding the minimum recommendations of 1.8m within BS 8300.

Along the circulation routes the presence of glass doors, and glass partitions, will be made apparent with permanent manifestation within two zones, from 850mm to 1000mm from the floor and from 1400mm to 1600mm from the floor, contrasting visually with the background seen through the glass in all light conditions.

Doors have clear useable width of 900mm and are operable by people with limited dexterity or mobility. Where thresholds are installed on a horizontal route (usually at doorways), they will contrast with the surrounding floor and will not be higher than 15mm.

Gatelines are provided along the access routes from the unpaid concourse to the paid concourse. Accessible gates, with a minimum clear width of 1m, are provided wherever gates for non-disabled customers are provided.

Platforms are straight, with a length of approximately 415m to accommodate the high speeds trains. They have width of 12m which includes a clear 3m width along each platform edge, in accordance with HS2 requirements.

The platform/train interface is level and the platform/train interface contains a minimum gap to allow direct, step-free access for wheelchairs and buggies.

Platforms have a maximum cross fall of 1:50 to allow for drainage and have a good level of slip resistance and a smooth and consistent surface texture.

Platforms are level in front of lifts and escalators. A minimum 3.5m head height above escalators, and to lift lobbies is provided. Entrances to platforms from lifts, and from escalators, are parallel to the platform edge to enhance legibility and navigability.

Due to the extended travel distances between concourse to lift, and platform to train, seating (incorporating wheelchair user spaces) will be provided at regular intervals at a maximum of 50m apart to allow people to rest along the accessible route.

Along the platforms, help points will be located in close proximity to the seating in order to allow customers to call for assistance.

Platforms will be equipped with Platform Edge Doors (PEDs), therefore only a visually contrasting guidance path will be provided to guide passengers to the platform edge. The design of the PEDs and the guidance path has not been finalised. Any glazing will have manifestations to be provided at the correct heights and to visually contrast with the background they will be seen against. Similarly, the guidance path will visually contrast against the platform surface.

### 7.2.3 Vertical Circulation

Four sets of passenger lifts allow passengers to transfer between concourse and platform level, accessible directly from the paid concourse.

Step-free access to the staff area at plant level, is achieved by means of lifts, as well. Along the platforms, passenger lifts can also be used as evacuation lifts. Lifts used exclusively for evacuation are located at each end of the platform. Escalators are located in close proximity to the set of passenger lifts. Stairs will be located at each end of the platform and will provide access between platform level and concourse level only for emergency.

Lifts are designed in accordance with the HS2 Inclusive Design Standards for width (at least 1600mm), depth (at least 2100mm to accommodate a stretcher) and height (at least 2300mm).

No ramps are required within the station as access areas have been designed to be level. Any gradients in surfaces for drainage will not be steeper than 1:50.

Escalators will comply with BS EN 115: Safety of escalators and moving walks, Construction and installation. Sufficient clear space is given to passengers at the top and bottom of escalators to get on and off the escalators safely.

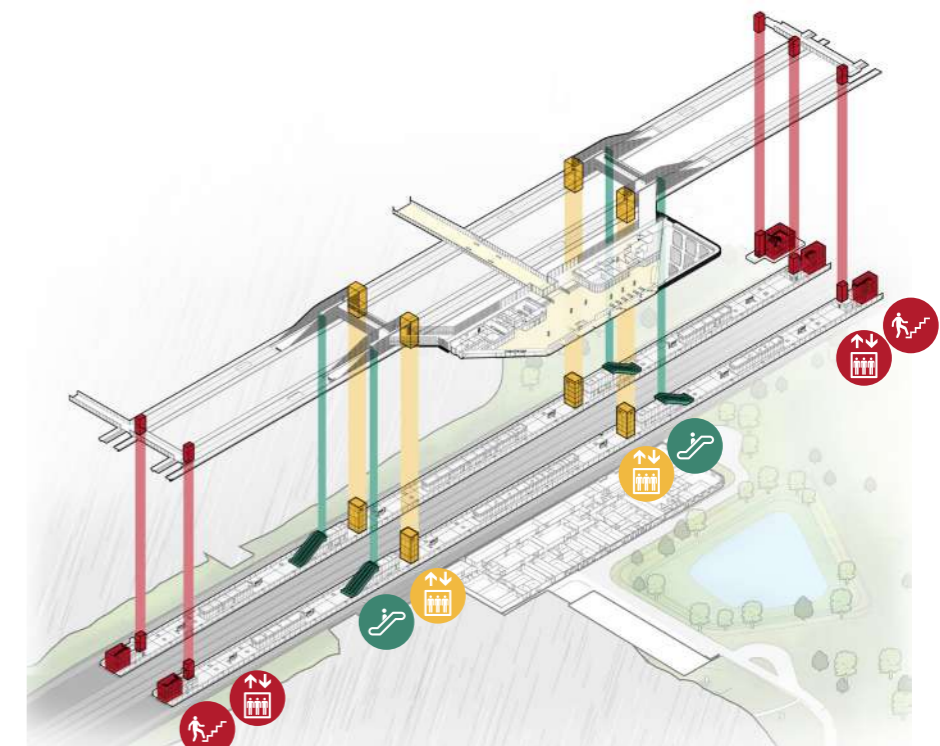


Figure 122: Vertical circulation

Code 1 - Accepted

### 7.2.4 Passenger Facilities

Passenger facilities are provided within the concourse and will be clustered in close proximity to each other to make the services more accessible and easier to locate. These will contain:

- A Customer Experience Hub (CX Hub), provided within the main concourse, with information screens placed along the wall between the CX Hub and the seating area, so that they can be seen when entering via each entrance. Information screens are also provided along the footbridge.
- A quiet / multi-faith room, located opposite the CX Hub for any passengers who require a quiet space to retreat to or a place to pray.
- Changing Places Facilities will be provided on each platform and in the unpaid concourse.

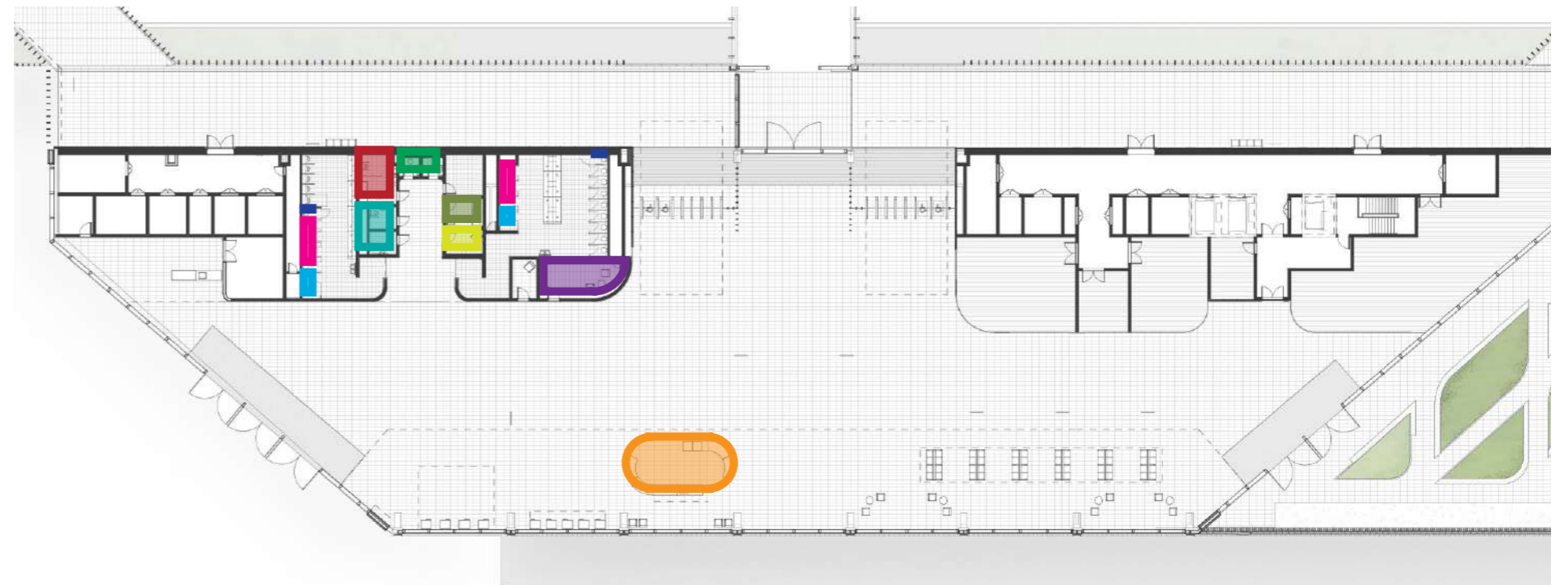
### 7.2.5 Staff Facilities

Staff facilities such as offices and welfare spaces will be provided at plant level. These will be in close proximity to the staff accessible toilet and shower.

All staff accessible sanitary provisions are accessible and step-free. Toilets and showers will be provided for all employees, including wheelchair accessible equivalents. All layouts and internal sanitaryware will be positioned in prescribed locations and designed in accordance with BS 8300 to allow for dignity and privacy in use.

Wheelchair accessible toilets will be provided on each platform for use by drivers and platform staff only. These will be accessed directly from the staff rooms provided.

The retail units are not proposed to have their own toilet facilities, toilets are provided on concourse for passengers, which will be usable by retail staff. An additional multi-faith room / quiet room is located in close proximity to the staff sanitary facilities and staff offices at plant level, for staff use.













 Baby feeding room	 Wheelchair accessible toilet
 Enlarged toilet cubicle	 Gender neutral toilet
 Family cubicle	 Baby change facility
 Ambulant disabled cubicle	 Multi faith / quiet room
 Changing places facility	 Customer experience hub

Figure 123: Passenger facilities within Unpaid Concourse

Code 1 - Accepted

## 7.2.6 Means of Escape

Safe and inclusive access and egress has driven the design and intended operation of the platforms. In an emergency, Persons of Reduced Mobility (PRMs) are able to evacuate unassisted from the station environment as part of a managed evacuation process, through the use of the main passenger lifts or evacuation lifts at either end of the platforms. Refuges are not used as part of the public evacuation strategy in HS2 Stations.

Level egress is provided from the concourse and lower ground. Occupants can evacuate via/from the platforms using evacuation lifts, depending on the fire location. PRMs can reach a place of safety as indicated below:

- Within 12 minutes from concourse level (in accordance with Network Rail guidance)
- Lower ground level is designed in accordance with BS 9999. Travel distances do not exceed 22m in a single direction and 55m overall (based on an A2 risk profile – it is assumed that PRMs will not be within the plant rooms which are A3).
- Within 8 minutes from platform level (in accordance with Network Rail guidance)

PRMs are able to carry out their evacuation journey unaided should they wish to do so, in some instances a managed approach to evacuation, such as the operation of lifts, may be required by trained staff.

The design of the evacuation lifts has been designed in accordance with BS 9999 Annex G and relevant provisions of BS EN 81-20 and BS EN 81-70. All evacuation lifts have been designed to accommodate a stretcher, with a depth of at least 2100mm in accordance with BS EN 81-70 and HS2 Inclusive Design Standard.

Escape stairs from the platform to the escape overbridges (north and south) will each have a clear width of at least 1800mm. The escape stair at the southern bridge which goes from bridge level to ground level (final exit) will have a total clear width of at least 3600mm and be provided with a central handrail. Escape stairs will be designed in accordance with BS 5395-1:2010. Escape stairs will be designed in accordance with Approved Document K, as a minimum, and will have at least three steps and a minimum width of 1600mm in accordance with the PRM TSI.

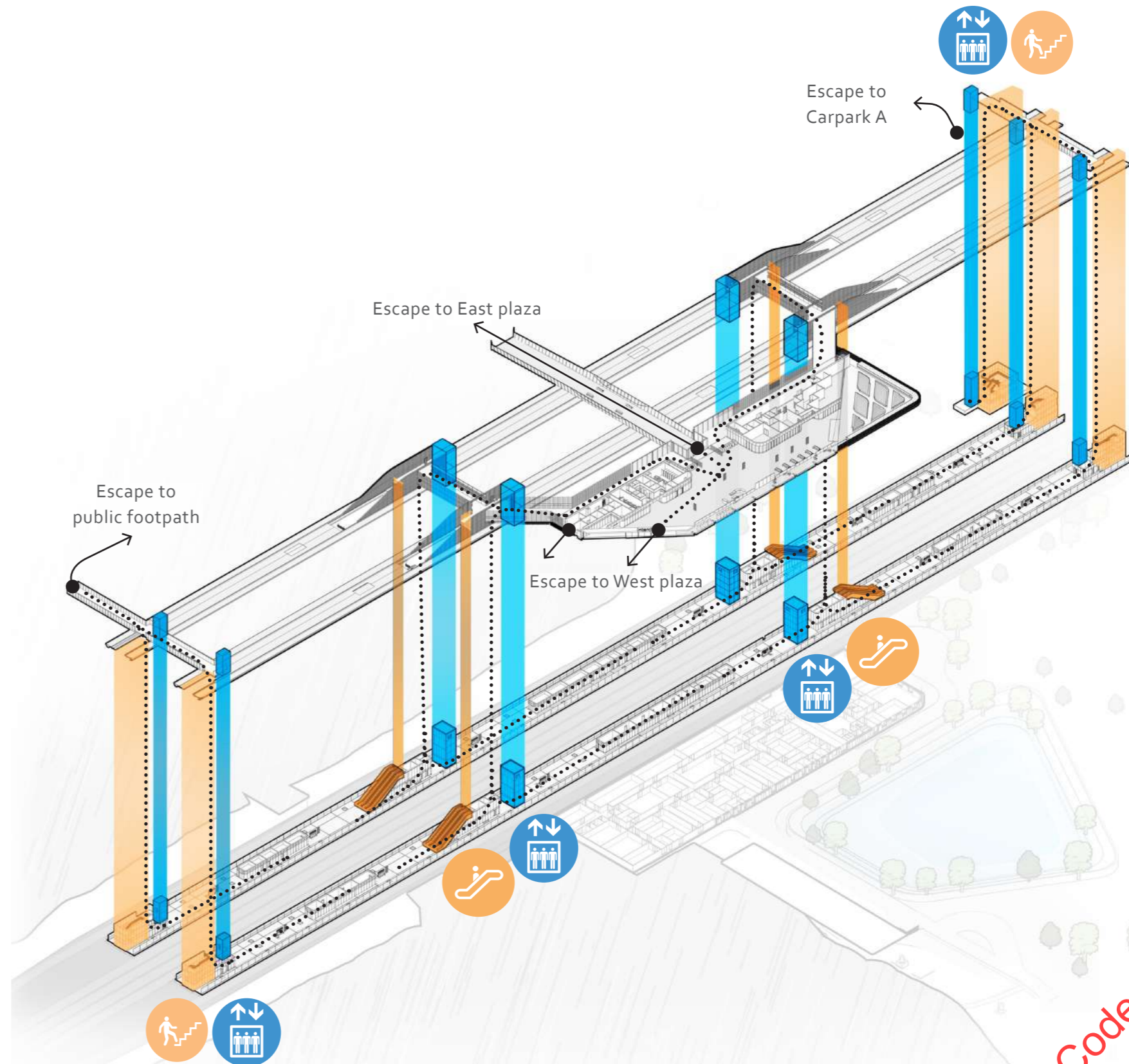


Figure 124: Evacuation routes

Code 1 - Accepted

## 7.3 Built Environment Accessibility Panel

Consultation with the Network Rail's (NR) Built Environment Accessibility Panel (BEAP) took place on 5th September 2019 to discuss the Inclusive Design elements of the station.

The scheme was well received, and the following items have informed the design :

- Safety around planting.
- Colour contrast materials, especially for bollards.
- Cycle parking and conflict with pedestrians

In addition there are other points such as the assistance for PRMs that will be addressed as the Operational Strategy for the Station is developed.

Code 1 - Accepted

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*Code 1 - Accepted*





# 8. Access and Maintenance

# 8.1 Access and Maintenance

## 8.1.1 Access and Maintenance Introduction

Access and maintenance to the buildings and assets is an important consideration. Access is required to maintain the visual aesthetics as well as to undertake necessary planned and reactive maintenance to ensure continued operation and to prolong the life of assets. Safety of operatives undertaking the works is a key consideration for any access and maintenance strategy.

An access and maintenance strategy review has been developed to document and summarise the recommended strategies for external and internal facade access.

The strategies have been developed up until Scheme Design, and further development will be required in following stages.

## 8.1.2 Access and Maintenance Strategy Overview

The image below summarises the basic access and maintenance strategy options currently proposed.

- North and south glazed elevations accessed by MEWP from concourse level
- West elevation, including shoulder of roof, accessed by MEWP from ground level and concourse level
- East elevation, by hand from concourse level and from canopy roof, no access to roof shoulder or above (hidden in image)
- East elevation, roof shoulder by rope access or extendable pole

- Access to the roof by external stair. Once on the roof walkways are provided over gutters, steps provided on 20° slopes. Cableline restraint system for fall protection
- Roof skylights, access from walkways and cableline restraint system
- Internals, MEWP for access to roof soffits and internal face of skylights (hidden in image)
- Platform canopies and bridged roofs, access by hand with nonslip walkways and cableline restraint system
- Platform canopies soffits access by small MEWP and / or access tower (hidden in image)

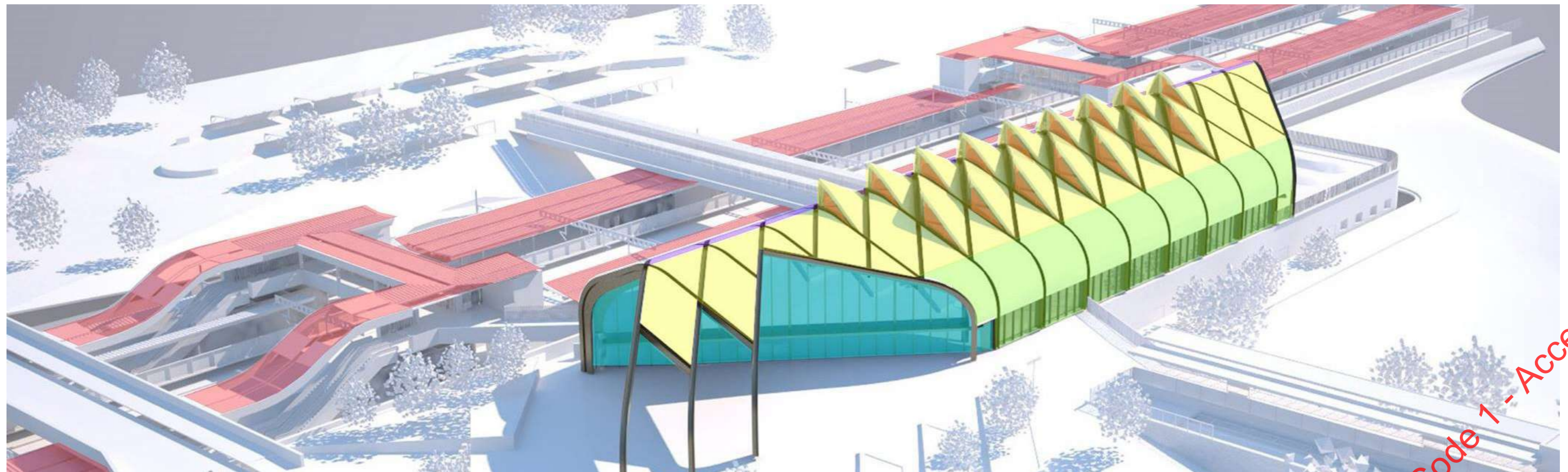


Figure 126: Colour coded access and maintenance strategy summary

Code 1 - Accepted

# 8.2 Roof

## 8.2.1 Roof Access

Access to the roof will be required to enable cleaning and maintenance. The skylights and gutters will require relatively regular access, anticipated to be on a 6 monthly basis. Therefore, due to the need for regular access, a permanent means of roof access is recommended.

Access to the roof will first be via one of two permanent stairs in the accommodation blocks to the concourse accommodation block roofs. These stairs will be in back of house locations. The accommodation block roofs will have handrails for fall protection. Once on the accommodation block roofs, a door / hatch in the vertical facade on the east elevation will lead to the paid concourse canopy outside. The canopy will have a cableline restraint system for fall protection. Two external stairs enable access to the roof. The stairs will be bespoke, and require handrails and a fall arrest system.

## 8.2.2 Roof Access - Fall Protection

Access around the roof will be predominantly by following the path of the gutters. There are two options considered for fall protection;

1. A cableline restraint system and stepped walkway option (first image);
2. An option which relies more on rope access but does not need as many posts or steps (second image).

The following will be provided for fall protection at roof level:

- Cableline restraint system (cyan dotted lines);
- Walkways over the gutters for slopes less than 15° degrees;
- Stepped walkways for slopes over 15° (yellow hatch);
- Rope access anchors (red circles);
- Roof access ladders (purple).

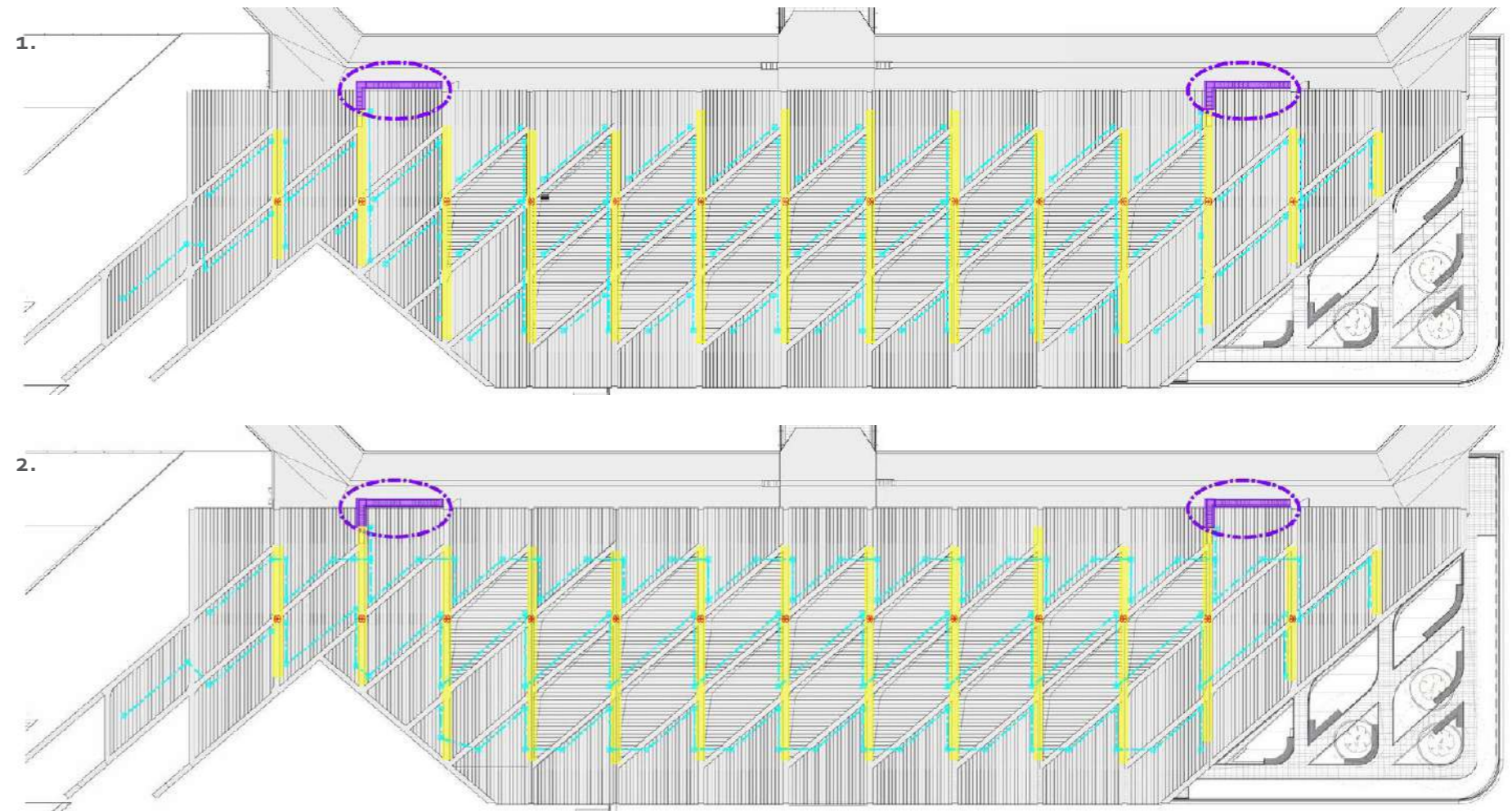


Figure 127: Indicative walkway and steps over gutters



Figure 128: Indicative rope access anchor



Figure 129: Indicative cableline restraint system

Code 1 - Accepted

# 8.3 Facades

## 8.3.1 Facades and MEWP Overview

Low level facades will be accessed by hand, with extendable poles or by podium steps. Taller facades will however, require specialist equipment such as Mobile elevating work platforms (MEWPs).

- West facade - articulated boom MEWP
- North and South facade - articulated boom MEWP
- Internals, lower - single person vertical work platform
- Internals, higher - articulated boom MEWP
- East facade - above canopy by hand from canopy
- East facade - Below canopy by hand from ground floor
- East facade - adjacent to building maintenance zone, scissor lift only. Articulated boom to wide and proximity to OLE a risk therefore, access to immediate vertical facade only
- Roof - access by external stairs, walkways, steps, cableline restraint system and rope access anchors provided
- Platform bridges and canopy roofs - nonslip walkways and cableline restraint systems
- Platform facades / soffits - access by small vertical MEWP, access also possible via small scissor lift
- Internal roof over accommodation blocks - MEWP outreach from concourse or cleaning poles from accommodation roof. Limited access provided

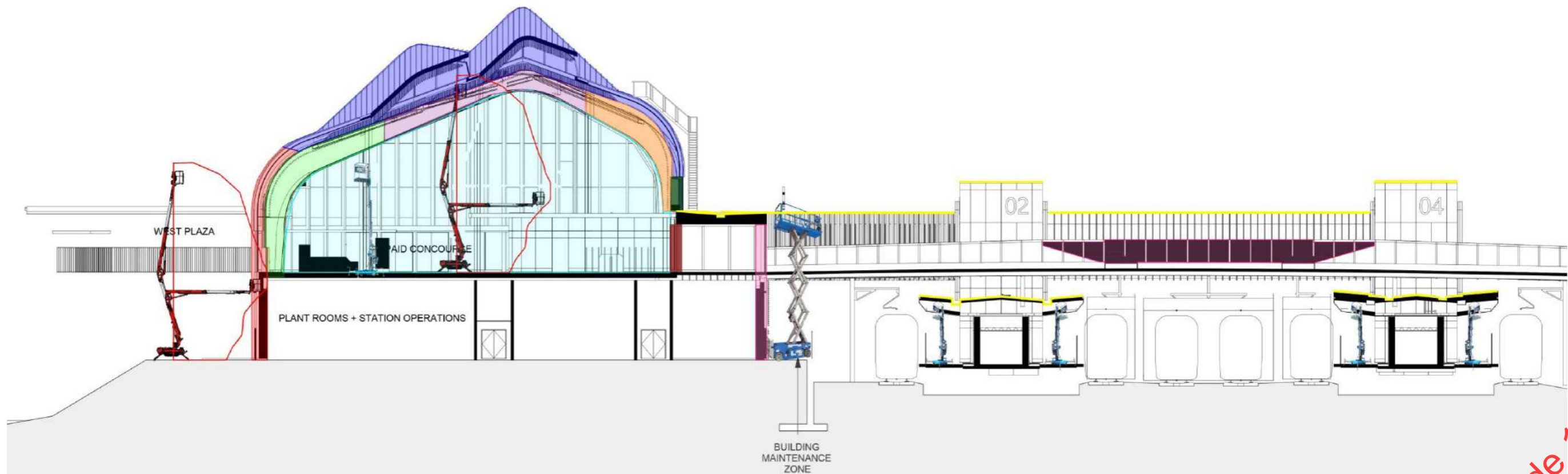


Figure 130: Facade and MEWP strategy overview

Code 1 - Accepted

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*Code 1 - Accepted*



Code 7 - Accepted

# 9. Sustainability



# 9.1 HS2 Sustainability Goals

HS2's ambition is to build the most sustainable high speed railway of its kind in the world. The aim is to develop a high speed railway network which changes the mode of choice for inter-city journeys, reinvigorates the rail network, supports the economy, creates jobs, reduces carbon emissions and provides reliable travel in a changing climate throughout the 21st century and beyond.

Overarching the project, HS2's sustainability policy identifies five themes reflecting the economic, environmental and social aspects of sustainability, as detailed on the right. These guide the design, construction and operation of HS2.



Figure 131: HS2 Sustainability Goals

Code 1 - Accepted

## 9.2 BREEAM

BREEAM (Building Research Establishment Environmental Assessment Methodology) is a method for rating and certifying the performance of domestic and non-domestic new buildings and refurbishment projects.

BREEAM covers various categories of sustainable design. Each category is sub-divided into a number of assessment issues focussed upon sources of impact on the environment. Each sub-issue is assessed against a pre-defined performance target or standard and awarded on a 'credit' basis.

The issues and categories are as follows:

- Management
- Health and Wellbeing
- Energy
- Water
- Transport
- Materials
- Waste
- Land Use and Ecology
- Pollution
- Innovation

BREEAM uses a percentage system to award ratings based upon credit scores obtained from each of the 9 sections plus the Innovation section. Each section is individually weighted and culminates in an overall BREEAM credit score (%) and a BREEAM rating. HS2 has targeted BREEAM Excellent as a requirement for the Station.

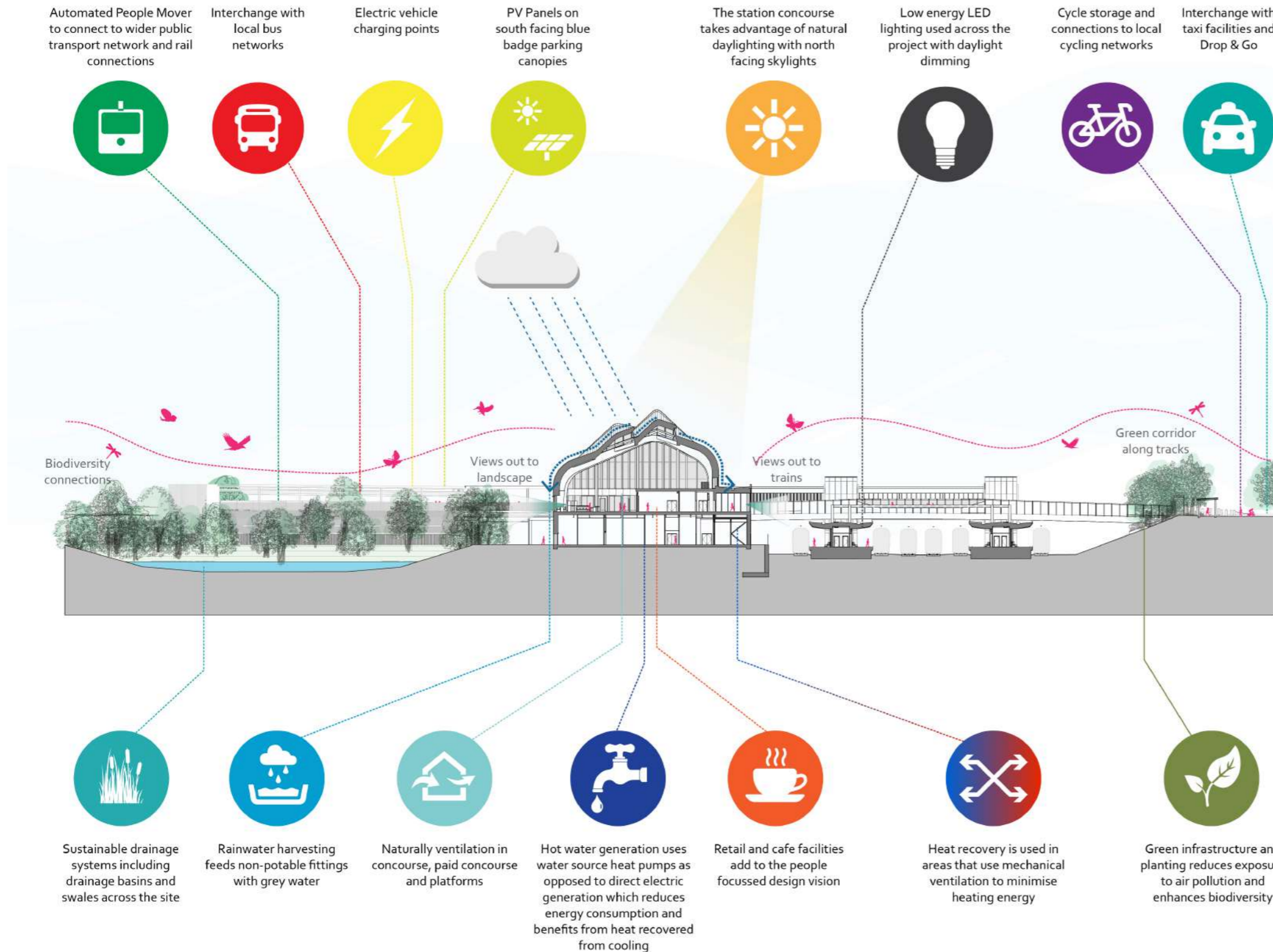
The wider site masterplan and urban realm proposals for the Station play a significant and meaningful part in contributing to the creation of a more sustainable and environmentally conscious design for the station which take into account its landscape setting. The proposals have been developed to help deliver a climate resilient scheme including strategies for hard materials, street furniture and planting proposals.

Sustainability initiatives have been reviewed and coordinated within the design team to develop a series of proposals that contribute to the targeted BREEAM credits whilst also adhering to HS2 Technical Requirements.

The diagram on the next page establishes the elements of the landscape and urban realm proposals that can contribute to the targeted BREEAM credits.

Code 1 - Accepted

# 9.3 Sustainable Strategies



Code 1 - Accepted

## Rainwater Harvesting

The design incorporates rainwater harvesting by directing run-off from the station building via a network of underground pipes into a rainwater harvesting tank. This will assist in providing part of the building's water requirements. The estimated volume of the rainwater harvesting tank is 150m<sup>3</sup>. Overflow from the tank will be drained into the retention pond to the south of the station.

## Landscape

The landscape approach is seeking to:

- conserve and enhance the landscape character, use local materials, and where possible, retain distinctive features;
- enhance the landscape character through the adoption of a bold design strategy;
- restore landscapes that have lost or are losing their intrinsic qualities; and
- transform landscapes by increasing opportunities and connectivities.

The West Plaza references the Green and Blue Infrastructure of the site, for example, rainwater from part of the station the roof will be collected and directed down to ground level and expressed through a series of basin features. This is in addition to the rainwater harvesting described above. The key features of the West Plaza area are a series of linear bands which incorporate raised planters, rolling lawns, and dwarf walls with integral seats, all taking their cues from the articulation of the station roof. Set between two legs of the roof at the end of the primary circulation corridor is a shallow pool or rain garden. This sunken bed will accept rainwater discharged from the station roof, feeding it into the connecting ditch. Large sandstone boulders or megaliths, hopefully excavated during the HS2 excavations, will be located within this bed.

As part of the SuDs network, there is one drainage basin that is designed to hold water permanently in order to provide a positive visual amenity immediately adjacent to the Station concourse. Views over this retention pond being a major part of the passenger experience at the Station.

The sides of the basin are heavily planted with trees and shrubs and the grass on the slopes is left long. This is to reduce the attractiveness of the pond to large water fowl.

## Air Quality

The Station is located in an area surrounded by three major roads and with

Birmingham Airport close by. Recent research work has shown that green infrastructure and planting can have a significant beneficial effect in terms of reducing the level of exposure to air pollution. Working with the Forestry Research Group at the University of Birmingham, the design team has been able to develop a programme of study aimed at improving Air Quality within HS2's operational area.

## Transport

The Station will serve a significant number of passengers arriving by private car. Due to its proximity to Birmingham Airport and the NEC, it will also serve the airport and major events via a People Mover which will connect with Birmingham International Railway Station.

The Station will provide transfer to other transport modes including taxi, bus, People Mover and private cars. Interchange with buses, coaches, taxis and Drop & Go facilities is sited as close as possible to the station forecourt, to encourage the use of more sustainable transport options, with surface car parks located immediately beyond the other multi-modal provision.

Cycle routes are provided to allow north-south and east-west transit through the triangle. Each cycle route consists of a minimum 3.0m shared-use pedestrian and cycle path. At the triangle boundary, the routes link with the off-site cycle facilities designed by EWC. The existing link across the site that is currently via Middle Bickenhill Lane is maintained as a route for cyclists and pedestrians.

Cycle storage is located both on the west and east plazas, in close proximity to both entrances and is integrated in the urban design strategy. The cycle provision consists of 176 cycle parking spaces. Space planning allows for the potential 5% mode share (400 cycle parking spaces) to be accommodated in the future.

The car parking also makes provision for Electric Vehicle (EV) charging. EV charging facilities will be located in Car Park C and comprise provision to provide power to 222 spaces.

## Earthworks

As part of the Station development, earthworks are required over most of the site, however, outside of Stonebridge Quarry, the cut and fill heights are modest (typically <2m). The cut-fill balance (i.e. surplus or deficit of fill won from site) is therefore sensitive to small changes in levels.

The proposed ground levels have been developed to meet multidisciplinary design considerations, including highways alignments, pedestrian access to the station building, drainage falls to basins and importantly for sustainability, targeting an earthworks cut-fill balance to limit the removal/disposal or import of fill and to reduce associated on-site/off-site vehicle movements. The design has also sought to minimise the number of retaining

structures and piles, reducing construction activity (noise and vibration) and the use of concrete

Following the separation of very small volumes of suspicious materials from cut earthworks, testing is expected to show that only 0.5% of Made Ground materials from cut volumes need to be removed from site for disposal (or potentially used elsewhere on HS2). This is a critical assumption that will require review when the EWC's revised Remediation Strategy is available. The approach to earthworks has also been developed to render soft/wet materials found on parts of the site to be suitable wherever possible for re-use within the station earthworks for car parks, for which the geotechnical demands are limited.

## Sustainability, Energy and CO<sub>2</sub> emissions

A holistic approach which takes into account the building design and proposed MEP engineering system is essential in achieving the energy target and optimising the building performance. The energy strategy proposed for the station development is based on the incremental approach of "Be Lean use less energy", "Be Clean- meet demand efficiently" and "Be Green- use low-and zero carbon (LZC)/ renewable technologies". The Station is required to meet the following energy targets:

- Planning requirement- low or zero carbon energy generation will be provided to meet a carbon reduction equivalent to a minimum of 20% of predicted energy requirements.
- HS2 requirement for all new buildings which are required to comply with Part L of the building regulations will achieve a building CO<sub>2</sub> emission rate (BER) of less than or equal to zero kgCO<sub>2</sub>/m<sup>2</sup>/ annum.
- BREEAM "Excellent".

Code 1 - Accepted

# 9.4 Sustainable Drainage

## 9.4.1 Existing Drainage

There are two known existing watercourses, these are Hollywell Brook and an Un-named watercourse. Hollywell Brook carries flow from the existing rural catchment together with controlled flow from Pendigo lake (a flood storage pond within the NEC complex to the west of the site). The Un-named watercourse is understood to drain rural catchments. Both watercourses discharge into the River Blythe, a designated Site of Special Scientific Interest.



Figure 132: Existing watercourses within the triangle site

## 9.4.2 Drainage Design

Blue Infrastructure (urban infrastructure relating to water) is a critical component of the landscape and urban realm design for the new Station. A significant aspect of this is the careful design and integration of sustainable water management through rainwater harvesting, SuDS measures, and habitat creation.

By adopting a SuDS approach, the following techniques have been employed in the stormwater drainage strategy:

- Infiltration Swales and Ditches within the car park areas with associated hedgerows and trees to reduce the burden on surface water drainage whilst naturally irrigating planted areas.
- Non-Infiltration Swales and Ditches in the car park areas (where infiltration is not possible due to underlying ground conditions);
- Permeable Pavement;
- Rainwater Harvesting for the main station building; and
- Detention and Retention ponds to manage the rate of flow into existing watercourses.

SuDS elements such as swales and ditches contribute to the drainage strategy as well as creating a more natural environment within the car parks with ecological and habitat benefits.

The site wide storm water can be split in following five storm water catchments:

1. Car Park A and Station Access Roads (Inbound and Outbound A452 Link Roads) - Outfall into Hollywell Brook (Catchment-A);
2. Car Park B and East Station Access Road (East) - Infiltration (Catchment-B);
3. Car Park C (North Part) and Station Access Road (West) - Outfall into Un-named watercourse (Catchment-C);
4. Car Park C (South Part) and Station Building - Outfall into Hollywell Brook (Catchment-D); and
5. Station Platform Drainage - Outfall into MWCC's track drainage (Catchment-E).

The indicative catchment boundaries are shown on the opposite page.

Code 1 - Accepted

## Car Park A

In Car Park A, shallow depth grassed swales are proposed along the verges and footpaths. Weep holes in roadside kerbs and pipes underneath the footpaths and verges are proposed to drain the car park runoff into the swales. Where the underlying geology is deemed suitable for infiltration (i.e. in the central area of Car Park A) swales are designed for a diffused infiltration system. The swales are designed to accommodate a 1:5 year rainfall event, i.e. they will be full of water once every five years. They are also designed to drain down within 72hrs in order to reduce the extent of standing water.

In the remaining areas of Car Park A, the outflow from swales and ditches will be discharged into Hollywell Brook via a detention basin and piped network. Grassed ditches are proposed around the perimeter of the car park to collect runoff through kerbside weep holes which drain into a piped network. The drainage networks within Car Park A will be combined and flow into a detention basin where flows are attenuated and discharged into Hollywell Brook.

## Car Park B

Based on known geological data and ground investigation reports, Car Park B is considered favourable for infiltration due to the presence of underlying sand and gravel. Runoff from the car park is designed to drain into the permeable pavement for infiltration. Excessive runoff will be drained into the infiltration swales through weep holes in roadside kerbs. As such, no detention basin is proposed for this area.

## Car Park C (north)

This catchment drains runoff from the West Station access road and Car Park (North part) into the Un-named watercourse via a detention pond and piped network. Open water features are the only conveying system as the underlying geology in this area is not suitable for infiltration, primarily due to poor infiltration ground capacity, however, the swales/ditches are not lined so there will be some infiltration.

In Car Park C, there may be some areas where swales and ditches are not feasible due to spatial constraints. In these areas, runoff will be collected using gullies/channels and drain into ditches/swales/pipe network. Weep holes in roadside kerbs and pipes underneath the footpaths and verges are proposed to drain the car park runoff into swales.

## Car Park C (south)

Drainage from this catchment includes Car Park C (South section) using swales and ditches with limited piped network, the car park road and external hardstanding around the station building - gullies/channels with pipe network; and the station building roof.

Primary pollution treatment is from grassed swales and ditches with secondary pollution protection as artificial oil interceptors (where deemed necessary).

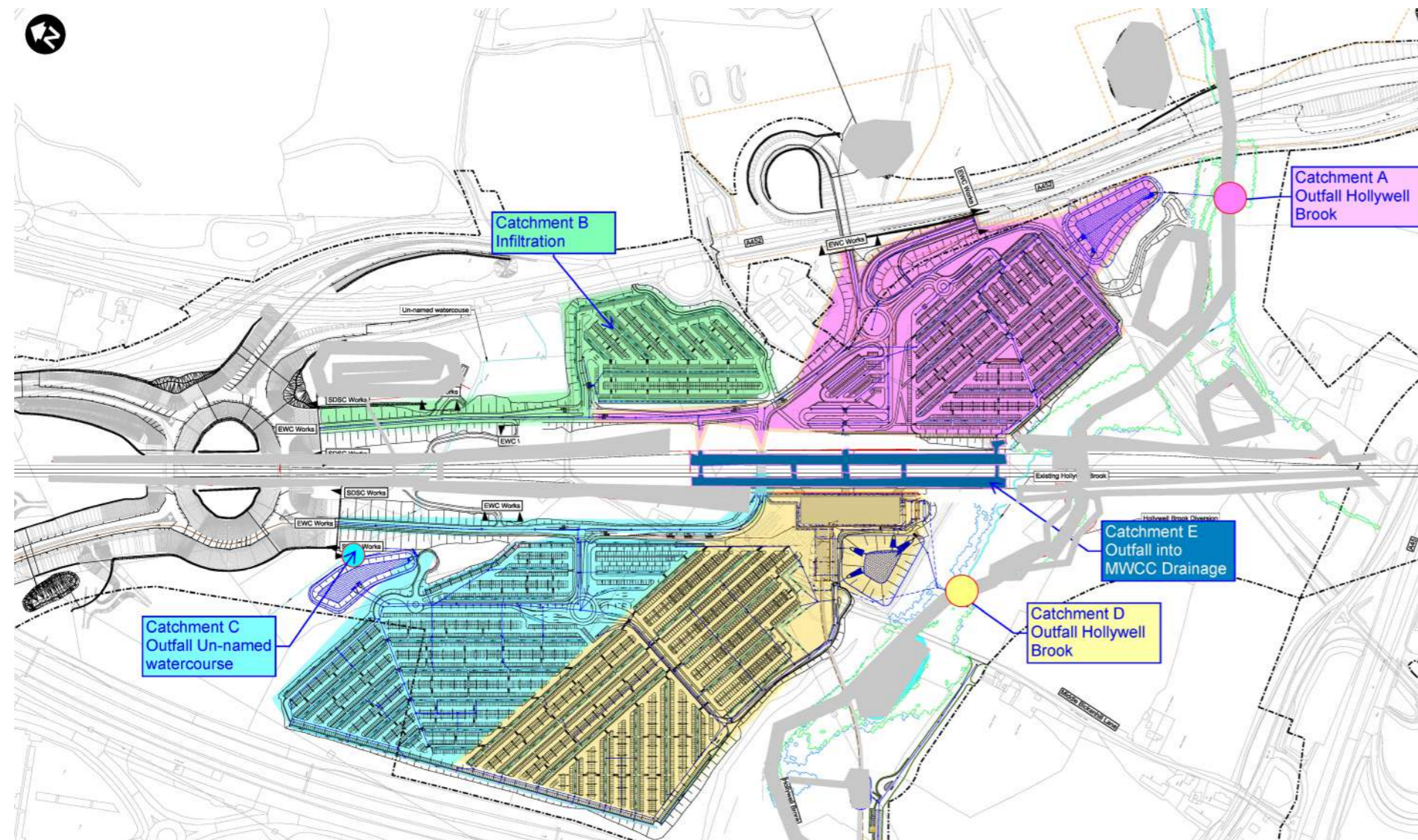


Figure 133: Catchment boundaries across the site

Code 1 - Accepted

# 9.5 Attenuation/Infiltration Basins

In total there are seven attenuation basins at Interchange. The intention is for these basins to be dry with the exception being the pond closest to the Station, which remains permanently flooded but has a variable depth of water. The basins will be grass bowls with shallow inclined sides.



Figure 134: Attenuation basins and existing waterways at Interchange

Code 1 - Accepted



Figure 135: Sketch section of attenuation basin adjacent to the car parks

Code 1 - Accepted



## 9.6 Biodiversity

The station and surrounding environment has been designed to incorporate areas of mitigation and new habitat creation, to address the loss of areas of habitat that will result from the station development.

Opportunities to enhance biodiversity are also embedded within the landscape strategy, for example, by utilising a wide range of planting typologies, featuring both native and local species, the site will provide varied food and habitats for wildlife. Habitat creation which will provide foraging habitat and places of shelter for a range of invertebrates and birds includes:

- Various woodland habitats including wet woodland, high ground woodland, heavy screening woodland, areas of parkland and ornamental shrubs (~91,000m<sup>2</sup>);
- Extensive areas of grassland including wildflower, lineside, heathland and amenity grassland (including highway verges) (~96,500m<sup>2</sup>); and
- Native species-rich hedgerows (~5,265m).

In addition, wetland habitats will be created through the:

- Retention pond to the south of the station with floating, submergent, emergent and marginal plants to be introduced to the pond and its edge providing foraging and breeding habitat for a range of invertebrates, amphibians and birds (~477m<sup>2</sup>); and
- Attenuation basins (~9972m<sup>2</sup>) and car park swales (~5265m) containing marshy grassland which will provide foraging habitat for a range of invertebrates and birds.



Figure 136: Soprano Pipistrelle



Figure 137: Common Blue Butterfly

Code 1 - Accepted



Figure 138: Computer generated image of the retention pond with surrounding landscape

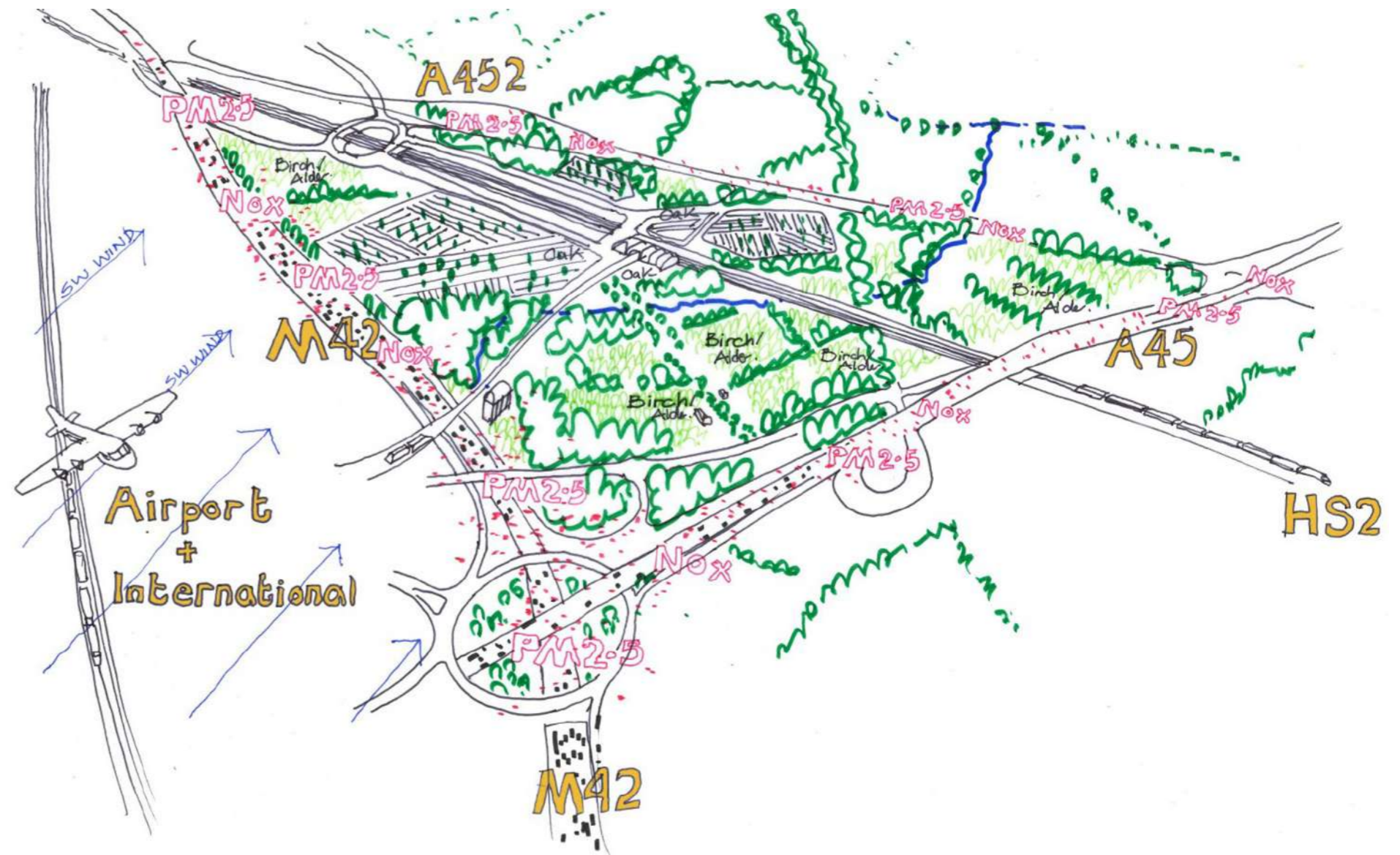
Code 1 - Accepted

# 9.7 Air Quality

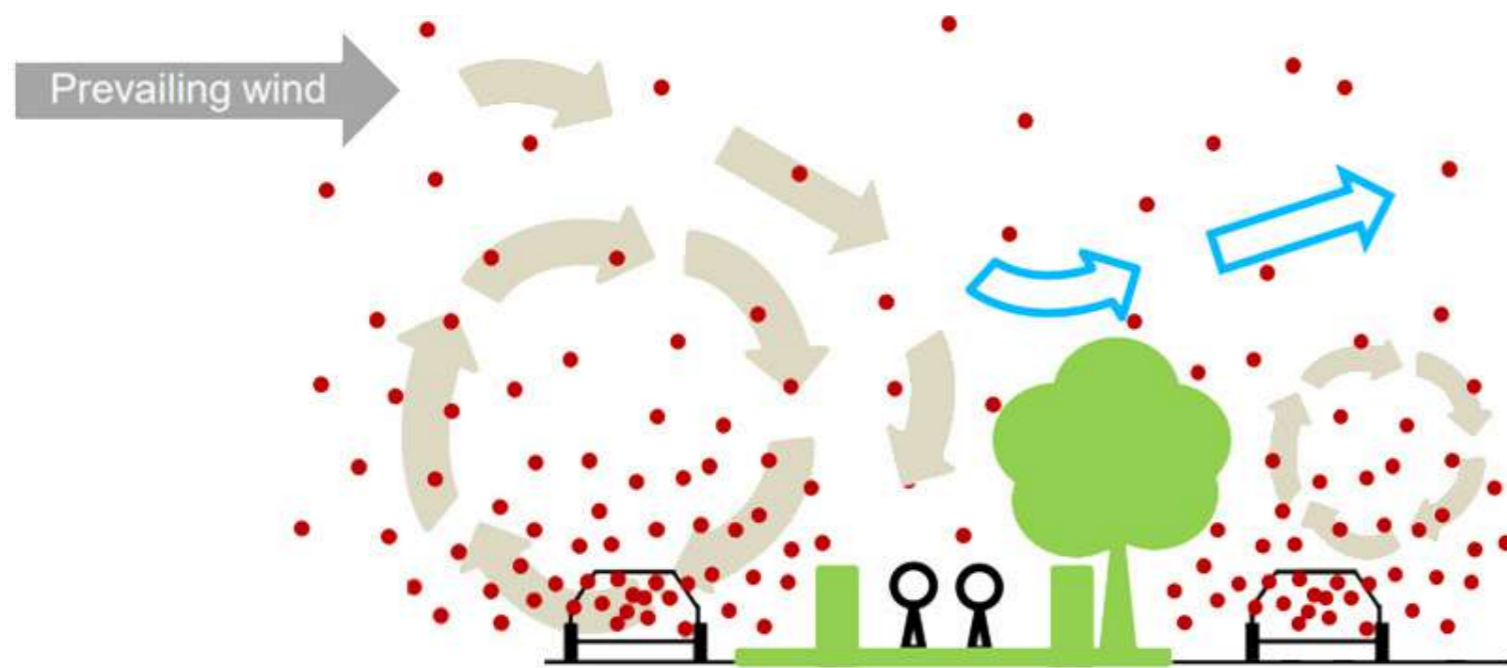
Air quality is an important consideration for the Interchange site due to the large number of vehicles expected to use the site and the proximity to three major roads. The quality of air will affect the wellbeing of HS2 customers and staff alike, particularly those most vulnerable i.e. the very young or aged or those with respiratory issues.

Recent research work has shown that green infrastructure and planting can have a significant beneficial effect in terms of reducing the level of exposure to these damaging pollutants. Working with the Forestry Research Group at the University of Birmingham, the design team has been able to develop a programme of study aimed at improving Air Quality within HS2s operational area.

Large scale planting will be effective in offering site wide mitigation, a 15-metre-high tree belt is proposed which will reduce pollution effects for as much as 50 metres downwind. The most beneficial effects will occur where a barrier is placed between the pollution source and the receptor. Therefore, planting within the car parks, where pedestrians will be walking is where the mitigative effects are likely to be most beneficial. The detailing of the car park reservations where the path is contained between hedges will be a very effective method of reducing pollution levels.



Code 1 - Accepted

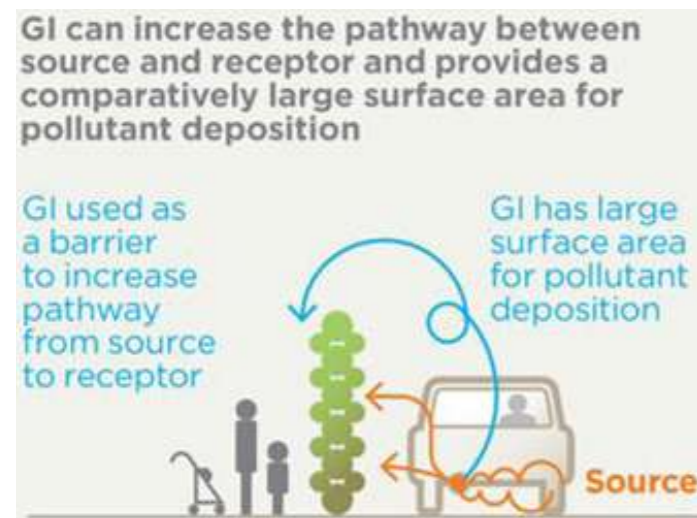


- EXTEND/PROTECT: GI screening to keep pollution at source where people are near roads
- A barrier of height, (H) protects up to  $(3H) - 3$  metres downwind under the right wind conditions.  
 E.g. A 2m high barrier can protect up to  $(3 \times 2) - 3 = 3\text{m}$  downwind  
 E.g. A 10m high barrier can protect up to  $(3 \times 10) - 3 = 27\text{m}$  downwind



- When and where is Green Infrastructure useful?

From: Hewitt, C. N., Ashworth, K., & MacKenzie, A. R. (2019). Using green infrastructure to improve urban air quality (GI4AQ). *Ambio*, 1-12.



- EXTEND/PROTECT: temporary screens during construction
- EXTEND/PROTECT: GI screening to separate people and pollution, e.g. green tunnels and hedges

Ferranti, E. J. S. and MacKenzie, A. R. and Levine, J.G. and Ashworth, K and Hewitt, C.N. (2019) First Steps in Air Quality for Built Environment Practitioners. Technical Report. University of Birmingham & TDAG.

Code 1 - Accepted

# 9.8 Building Sustainability and Energy Strategy

## 9.8.1 Planning and Regulatory Requirements

The station design adopts Solihull Metropolitan Borough Council's Draft Local Plan P9 "Mitigating and Adapting to Climate Change" by:

- Reducing energy demand through energy efficiency measures.
- Supplying energy efficiently
- Providing energy from renewable or low carbon sources.
- Promoting connections for electric vehicles
- Adopting a layout and design that minimises the need for energy for heating and cooling.

The hierarchical energy strategy proposed is based on the following principles:

- Be Lean- Reduce energy demand ("passive design"): Reduce energy demand in the first instance using passive measures.
- Be Clean- Meet demand efficiently ("energy efficiency"):
- Supply energy efficiently by using high efficiency technologies.
- Supply energy from high efficiency source.
- Be Green: Use low-and zero carbon (LZC) / renewable technologies.

In order to meet the planning requirement of at least 20% of the predicted energy requirement of the development to be produced by low or zero carbon technologies and HS2 requirement for the building CO<sub>2</sub> emission rate (BER) to be less than or equal to zero, the approach taken has been to create a more effective building design which focuses on reducing the energy demand in the first instance, prior to applying low carbon technologies and renewable energy technologies.

The station building design maximises the benefits of natural light, uses controlled daylight, controlled sunlight and natural ventilation to create a comfortable internal environment for occupants and also minimises energy use by minimising the requirement for the use of electric lighting during daylight hours.

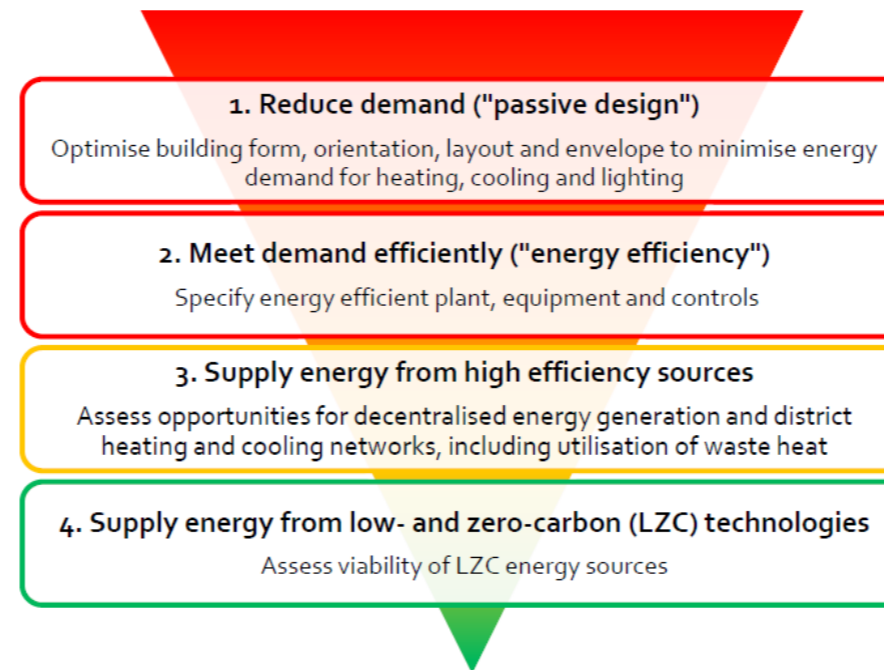


Figure 139: HS2 Energy strategy

Code 1 - Accepted

## Be Lean

### Building Form, Orientation and Shading

Optimising the building form and orientation with respect to the climate is important to create comfortable and environmentally welcoming spaces that give a sense of warmth, freshness and light. The performance of the building fabric is important to reduce heat loss in winter via conduction through the walls and glass and also the infiltration of outdoor air through small gaps. In summer the performance of the building fabric is important to prevent overheating. Fabric U-values and air tightness were based on the values in the Building Regulations Part L as a minimum requirement and these have been improved upon where it is found that there was a significant advantage in doing so.

### Direct Sunlight and Solar Shading Provision

Interchange Station has a north/ south axis that is driven by the alignment of the track. The station has long elevations that face east and west that are subject to the low sun angle in the morning and later afternoon. To address this, facade engineering studies and thermal modelling has been conducted to optimise the amount of glazing and refine the facade design on the western facade to reduce the solar gain and direct sunlight into the concourse area and optimise the daylight into the space using the northlight at high level.

## Be Clean

The principles of passive design have been applied throughout the station to reduce the energy demand in the first instance where feasible. In specific cases mechanical systems are provided to achieve the demands and performance requirements of the space, i.e. to meet a specific ventilation rate requirement, or in areas where there is high amount of heat gains. To meet the required energy performance, all engineering systems include appropriate energy efficiency measures.

The following energy efficiency features for the M&E systems are included in the design:

- High efficiency air source heat pumps with heat recovery (for heating and cooling)
- Variable speed pumping systems with premium efficiency motors and drives to reduce pumping energy
- Energy recovery devices incorporated into mechanical ventilation systems
- Demand controlled ventilation where feasible
- Use of natural daylighting and daylighting sensors to reduce electrical loads automatically based on occupancy and available natural lighting
- Highly efficient interior and exterior lighting systems
- Low energy lighting ballasts
- Metering and sub-metering
- Building Automation / Building Energy Management System (BMS)

## Be Green

Due to the fact that majority of the energy demand for the station will come from electrical requirement, it is proposed that photovoltaic (PV) is utilised as the Low Zero Carbon (LZC) energy source. The PV will be mounted on the canopies for car parking spaces in the external carpark area. This location is suitable as it is safe and accessible to maintain and is flexible to future growth.

Due to proximity of the interchange station to the Birmingham International Airport, the potential glare from the PV has been considered through stakeholder engagement and informed the design.

Code 1 - Accepted



Code 1 - Accepted

# 10. Appendices



# 10.1 Verified Views



Code 1 - Accepted