

TRU

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HUDDERSFIELD STATION AND VIADUCT DESIGN GUIDE



REFERENCE NO:
VERSION:

ISSUE DATE: MARCH 2026
P05



ARUP



Approval

Project Name	Transpennine Route Upgrade	OP Reference	-
SPO Ref	-	SPO Title	-
Project Manager	TBC	Sponsor	TBC

Document Title	STATION DESIGN GUIDE
Version Number	P05
PW Ref	TBC

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Document History

Version	Date	Author	Comments
P01	13.10.2023	JEC	First Issue
P02	14.12.2023	JEC	Minor updates following Kirklees Comments on 07.12.2023
P03	11.04.2025	JEC	Footbridge information added in Section 4.5
P04	07.11.2025	JEC	Access walkway, Footbridge, Subway added
P05	27.03.2026	EN	Tea Rooms added

Huddersfield Station Design Guide

The purpose of this is to provide design information on the scheme at Huddersfield Station. This will be used to supplement Listed Building Consent (LBC) Condition 5

LBC Condition 5 is as follows and is concerned with the production of a Conservation Implementation Management Plan (CIMP):

No works including any works of demolition shall commence until a Conservation Implementation Management Plan (CIMP) for Huddersfield Station has been submitted to and approved in writing by the local planning authority. The approved CIMP will include as a minimum requirement contents based on the model template CIMP structure attached to this list of conditions.

The CIMP will specifically include methodologies for:

- i) fabric removal, masonry repairs, vegetation removal, repointing, metalwork repairs and application of protective paint systems as appropriate;*
- ii) repairs and strengthening to the existing fabric of the train-shed roof at Huddersfield Station;*
- iii) the deconstruction, storage and reconstruction of the Tea Rooms at Huddersfield Station;*
- iv) the identification of historic elements of the fabric which once removed may be reused or preserved, and a strategy for their storage or reuse;*
- v) any improvements to the setting to sustain, enhance and better reveal the heritage asset affected;*
- vi) details of the maintenance access regime with particular reference to the roofs;*
- vii) dissemination of "toolbox talks" to personnel involved in demolition and construction works;*
- viii) provision of heritage interpretation boards during*

construction works;

ix) the exact affixing details of overhead line electrification; and

x) an overarching design guide covering both Huddersfield Station and Huddersfield Viaduct.

The works must be carried out in accordance with the approved CIMP unless otherwise agreed in writing with the local planning authority.



Information Release

Due to the nature of the detailed design process, the information in the design guide will be updated in stages in order to coincide with the various CIMP phases. Below is the list of Phases:

Phase of CIMP	Construction Work (To be undertaken after Phase of CIMP submitted / discharged)	Phase of CIMP	Construction Work (To be undertaken after Phase of CIMP submitted / discharged)
Phase 1	Enabling works to ensure conservation of Tea Room prior to Roof works: <ul style="list-style-type: none"> - Deconstruction of the Tea Rooms - Commencement of storage of Tea Rooms 	Phase 4	Works following commissioning of first span of the footbridge, up to the start of the second blockade, including: <ul style="list-style-type: none"> - Completion of footbridge - Works to new Platforms 5 / 6 - Construction of new canopies - Completion of works to subways - Preparation work for Roof A Leeds End extension
Phase 2	Works prior to first blockade, including: <ul style="list-style-type: none"> - Erection of scaffolding under Roof A - Refurbishment and strengthening of Roof A - Removal of Manchester End bays of Roof A - Works to Penistone Line Canopy 	Phase 5	Works to ensure the conservation, repair and to realise the reconstruction of the Tea Rooms: <ul style="list-style-type: none"> - Storage, repair and reconditioning of the Tea Rooms - Commencement of reconstruction of Tea Rooms
Phase 3	Works during and immediately after first blockade, including: <ul style="list-style-type: none"> - Demolition of signal box / relay room - Demolition of cable gantry - Demolition of Roofs B and C - Piling and foundations for new canopies - Commencement of construction of footbridge - Commencement of works to platforms - Commencement of works to subways 	Phase 6	Works during second blockade and thereafter, including: <ul style="list-style-type: none"> - Completion of Roof A Leeds End extension - Construction of OLE - Completion of works to platforms - Completion of reconstruction of Tea Rooms



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Section 1 Introduction

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Introduction

1.1 TransPennine Route Upgrade

Network Rail submitted a Transport and Works Act Order (TWAO) to authorise changes proposed to Huddersfield station and viaduct as part of the wider TransPennine Route Upgrade (TRU) project. The station is Grade I Listed and as such Listed Building Consent and the work as a whole Planning Consent has been applied for and granted.

The TransPennine Route Upgrade Programme has been established to increase capacity and improve reliability and journey times on the route between Manchester Victoria and York, via Huddersfield and Leeds.

The Programme will be delivered via a series of discrete interventions, of which Huddersfield Station is one. Route-wide signalling and electrification enhancements will also be implemented to support these interventions.

Work was undertaken in 2017 to identify, sift and select options within the Huddersfield to Ravensthorpe section of the route. It was agreed that these interventions should deliver an electrified four-track railway with a grade separated junction in the Ravensthorpe area. They should also provide a railway compliant to modern standards, and the major works should be constructed with proportionate disruption to the current operational railway and other third parties.

The primary focus of the Huddersfield to Ravensthorpe section of the route is to provide sufficient capacity and operational robustness to meet the remitted timetable. Additionally, they must also provide significant journey time improvements through line speed increases and by de-confliction of train services.

All train services on the line will stop at Huddersfield. Stopping services from Manchester will terminate and reverse here; similarly, stopping services from Leeds will do the same. Fast and semi-fast services will continue through to their respective destinations.

Huddersfield Station is the western fringe of the proposed four-track section of railway which extends to Westtown just outside Dewsbury. Beyond Huddersfield the railway reverts to two tracks towards Manchester, with the single track of the Penistone Line diverging from

the route at Springwood Junction.

1.2 Aims for the Huddersfield Area

At Huddersfield Station, the approach for the development of the new platform and roof design was to ensure that the design takes account of the high level requirements of the TRU and stakeholder ambitions for both the short and long term. Whilst this begins with the permanent way design, it also responds to the requirements of the stakeholder consultation with Historic England and Kirklees Metropolitan Borough Council with respect to the heritage significance and exceptional interest of the station.

The approach to the design was to ensure the following core design principles.

- A facility that provides safety, security and comfort to passengers
- A platform arrangement to accommodate forecast numbers
- Platform facilities that provide operational train planning capacity
- Platform arrangement that can be safely and efficiently managed
- Best practice sustainability design principles applied to the design
- Step free access for all in accordance with the Equality Act 2010
- Arrangements to ensure wayfinding routes are easily identifiable
- A design across all levels which complement the existing station, the adjacent context and the character of the area
- Respect for the qualities of the heritage assets and local urban grain

1.2.1 Station interventions

The key interventions proposed for Huddersfield station are as follows:

1. Altered platforms and new track layout in order to achieve the high-level objectives of the TRU Programme.
2. A new footbridge providing alternative access to all island platforms.
3. A new through platform at the rear of the station. This will be accessed via an extension to the existing subway and the footbridge. The existing bay platforms of the existing island platform will be infilled and reduced in width.
4. Platforms extended over the first span of Huddersfield Viaduct to achieve a minimum of 150m and 200m usable platform length for bay and through platforms respectively (excluding the Penistone Line).
5. Modifications to, and partial removal of, the existing roof

structures.

6. A new roof to replace removed structures, and new small-scale canopies over extended platforms.
7. Relocation of the Tea Rooms.

Key constraints at Huddersfield include aspects of the station's heritage significance, along with various limitations imposed by surrounding buildings and structures. Please refer to the Heritage Assessment and Section 3 of the CIMP for further details. There are also a number of constraints from Network Rail requirements that need to be factored into the design. In particular, but not limited to, the Stations Design Principles for Network Rail and Design Standards for Accessible Railway Stations.

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Section 2 Existing Station

02



2.0 Existing Station

2.1 Physical Context

2.1.1 Surroundings

Huddersfield Station forms the west side of St George's Square in the centre of the town. The principal pedestrian approach is through the square, with the strict symmetry of the station façade recently reinforced by public realm improvements in the square itself (Fig.3.1a). Many of the buildings around the square are also listed. These are mostly commercial, with the exception of the George Hotel, and generally reflect the scale and classical architecture of the station building.

The rear of the station is overlooked by two large Victorian railway warehouses which previously formed part of a large railway goods yard, along with a surviving accumulator tower – all listed at Grade II (Fig.3.1b). The goods lift of the larger warehouse, which features an arcade of large Doric columns, is aligned approximately with the central axis of the Principal Building. Although several railway sidings survive, the majority of the goods yard is now a public car park.

The station is overlooked from the south by the Westgate Bridge, which forms the northern portal to Huddersfield Tunnel (Fig.3.1c). To the north, the railway runs over the John William Street bridge and along the elevated Huddersfield Viaduct (both listed at Grade II) with commanding views over the surrounding landscape (Fig.3.1d).

The station is a Grade I listed building, the details of which are further outlined in the Statement of Significance. The station and surrounding buildings form part of the Huddersfield Town Centre Conservation Area.

The site is also part of the Huddersfield Town Centre Blueprint initiative.



Figure 2.1a: Overlooking St George's Square

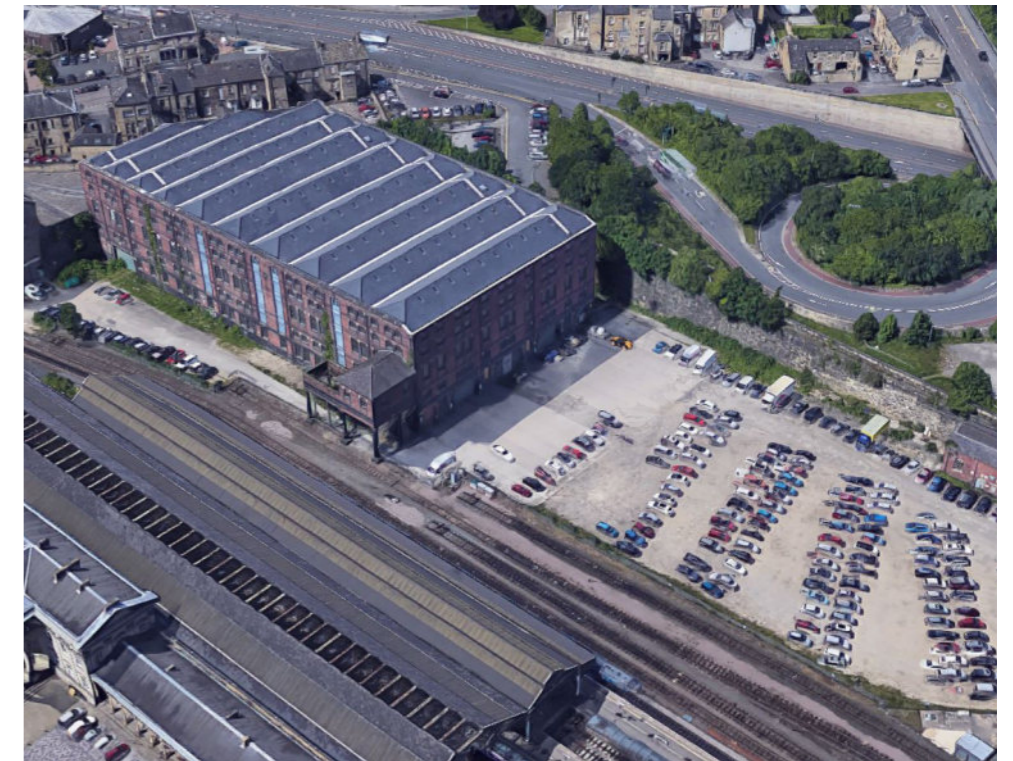


Figure 2.1b: Overlooking the former goods yard



Figure 2.1c: Looking south-west



Figure 2.1d: Looking north over Huddersfield viaduct



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2.1.2 Heritage assets nearby

The station lies within the Huddersfield Town Centre Conservation Area, the boundary of which is indicated on Fig.xxx with a blue dashed line. The list below identifies the listed buildings adjacent to the train station, with the level of designation indicated by the colour key.

Image showing Conservation Area and listed buildings to be included in a later CIMP Phase.

2.1.3 Key views

The views to the right indicate the pedestrian approaches to the site from Railway Street (image 1), St. George's Square (image 2), Brunswick Street (image 3) and Trinity Street (images 4 & 5).

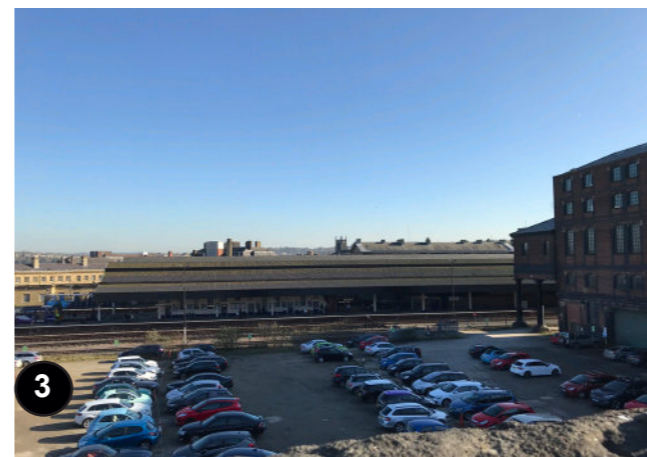
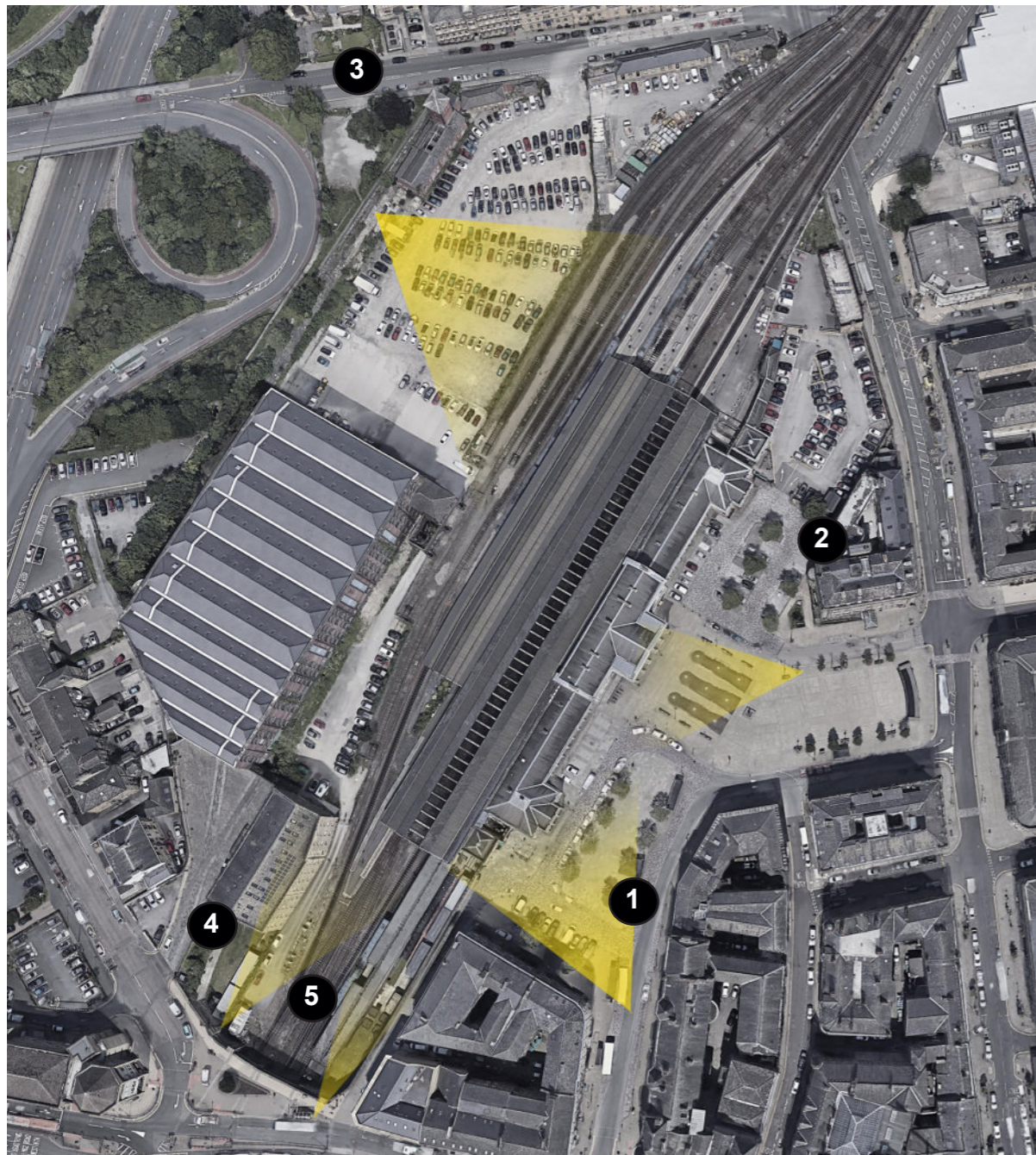


Figure 2.1.3a: Approaches to station

2.2 Station

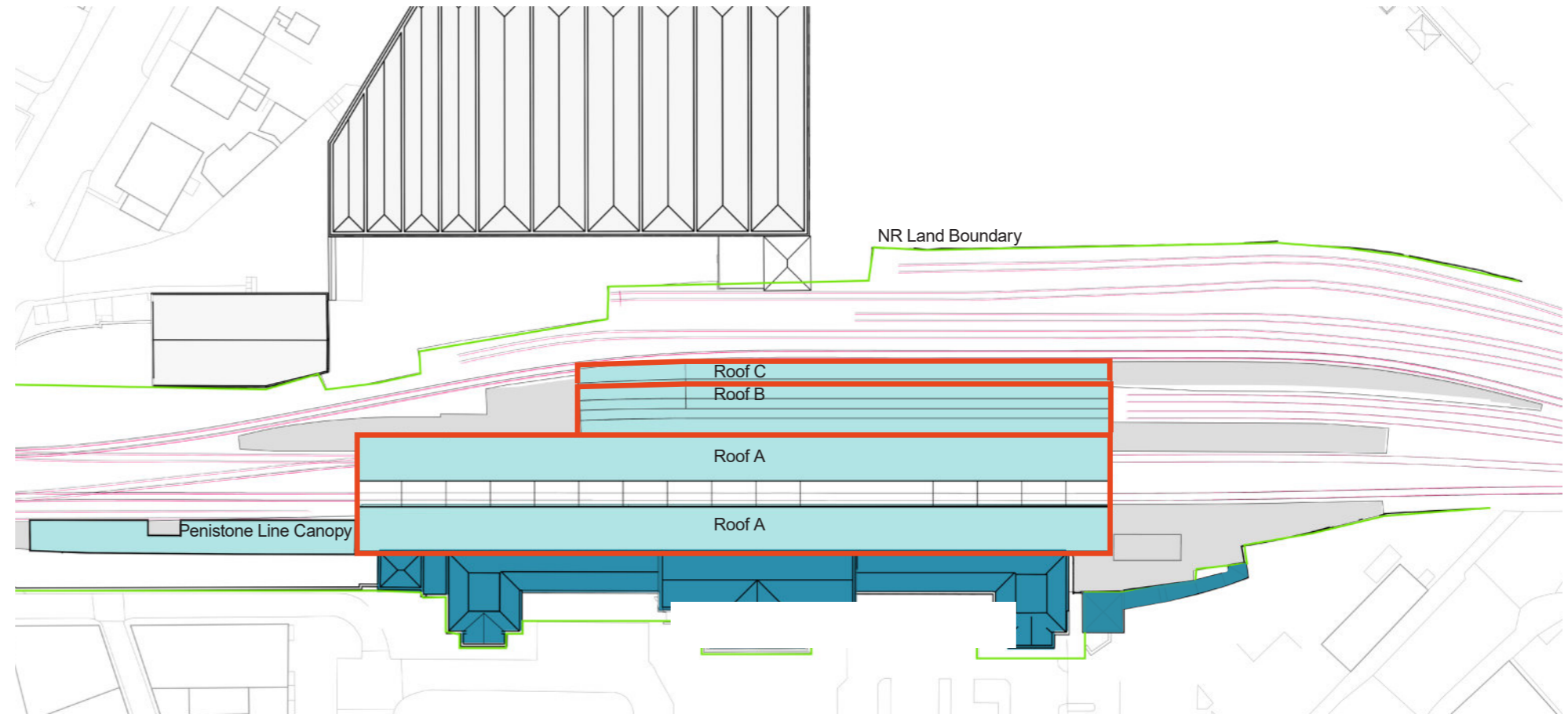


Figure 2.2a: Existing roof plan

1. Relay Room
2. Coffee Stand
3. Acc. WC / Baby
4. Customer Assistance
5. Male/Female WC
6. Waiting Room
7. Cafe
8. Cycle Storage
9. WC's
10. Newsagents
11. Principal Existing Building & Main Entrance
12. Ticket Office
13. Existing Lift & Stair
14. Existing Tea Rooms location

- Existing
- Platform
- Circulation

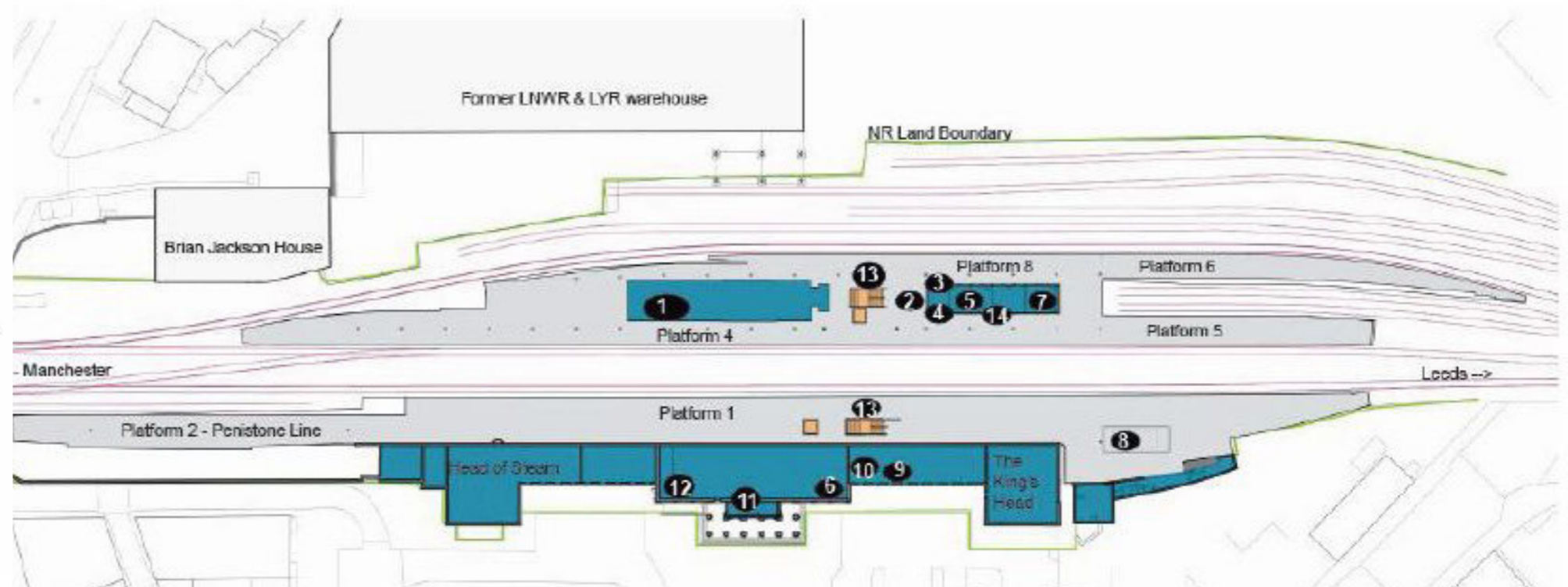


Figure 2.2b: Existing station platform plan

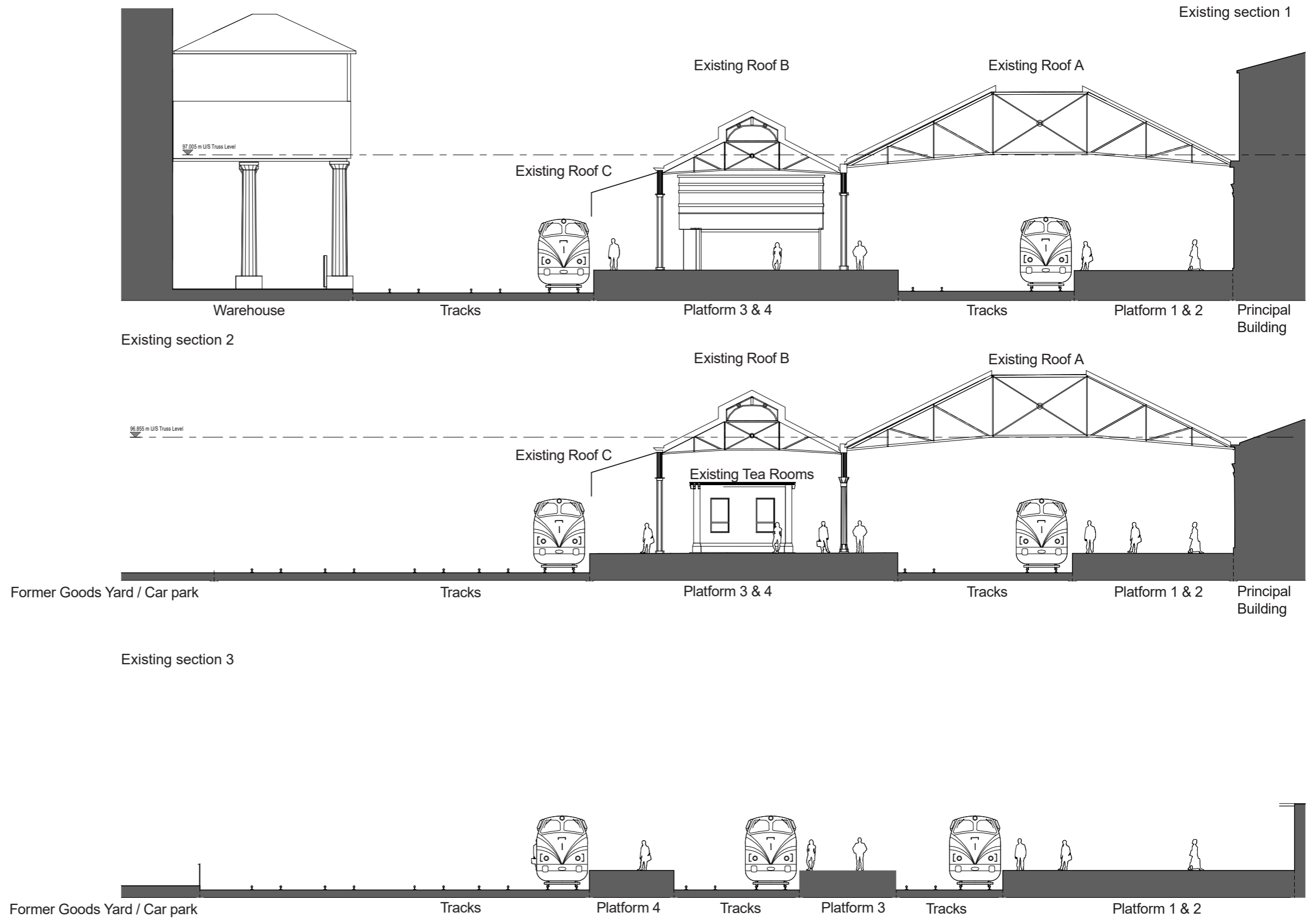
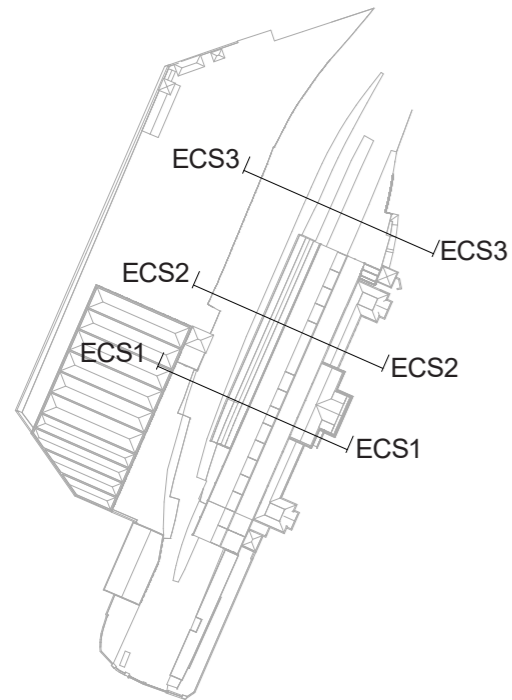


Figure 2.2c: Existing sections

2.2.1 History in brief

Huddersfield Station is a significant piece of architecture and engineering, reflecting the historic importance of the TransPennine rail line, the pioneering railway companies which constructed it and the high civic aspirations of the town of Huddersfield in the nineteenth century.

Huddersfield Station was originally constructed in the 1840s, with two railway companies – the London & North Western Railway (LNWR) and Lancashire & Yorkshire Railway (LYR) – both contributing to a joint development. The trainsheds were enlarged and an island platform added in the 1880s.

2.2.2 Principal Building

The main station building, referred to as the Principal Building, faces St. George's Square. It consists of a central range, faced in stone and dominated by a pedimented Corinthian portico, and two symmetrical arcaded wings with smaller end pavilions.

The main public entrance to the station ticket hall is through the central doors under the portico. On entry, the booking office is to the left; to the right are the train timetables and a newsagent. Passengers pass through ticket gates and leave the Principal Building, again on the central axis, onto Platform 1.

The two end pavilions are now public houses: the Head of Steam and the King's Head. Both pubs are also accessible from Platform 1, the latter for emergency egress only.

The Principal Building, with its magnificent façade, makes a very large contribution to the station's significance. It also derives significance from its relationship with St. George's Square and its role as a focal point for the town. The square was developed in response to the monumental Classicism of the station and remains a public space of memorable grandeur. Its continued civic importance is reflected in its contemporary use as a location for public events, celebrations and civic life.



Figure 2.2.2a: St George's Square 1948 (The Examiner)



Figure 2.2.2b: St George's Square 1980 (The Examiner)

2.2.3 Station roofs

The existing roof plan of the station (Fig.3.2) features a large roof consisting of two main spans. Roof A is the largest of the two, spanning between the rear of the Principal Building and a row of iron and steel columns on the main island platform. Roof B spans across the island platform. Roof C is a non-original additional cantilevering canopy which extends the side of Roof B to the edge of Platform 8.

Roofs A and B date back to the 1880s and are relatively rare surviving examples of large-span 'Euston Roofs'. Truss roofs of this type were a common choice of engineering for station roofs during the 19th century and were notably used by both the LNWR and LYR at various stations.

The existing roof at Huddersfield therefore evidences the engineering which characterised the period of station expansion during the 1880s. It also reflects the historic development of the station and the railway line during this period



Figure 2.2.3a: Trainsheds under construction 1886



Figure 2.2.3b: Inside trainshed, 1954 with Tea Rooms in distance (The Examiner)

KEY

1. Inside trainshed (towards Leeds), 2018
2. Inside trainshed (towards Manchester), 2018
3. Penistone Line canopy, 2018
4. Trainshed gables from Leeds end, 2018
5. Rear of Principal Building from inside trainshed including view of cable gantry, 2019
6. Tea Rooms, 2018
7. Tea Rooms, 2018
8. Tea Rooms, 2018
9. Smaller roof span with former LNWR & LYR warehouse to rear of station, 2018
10. Former LNWR & LYR warehouse to rear of station, 2018
11. View towards former goods yard with Accumulator Tower, 2018
12. View over viaduct at Leeds end, 2018



Figure 2.2.3c: Existing images

2.2.4 Tea Rooms

The Tea Rooms are a small rectangular timber building situated between Platforms 4 and 8 on the island platform. The building represents a common feature of expanding and improving station facilities during the 1880s, offering refreshments and waiting areas to passengers.

The building's position between the two platforms, with entrances on both sides, is of significance – as is its timber construction and some surviving elements.

Today the Tea Rooms contain passenger WC facilities, a waiting room, and a café area with significant surviving joinery around the servery and doorways.

The full draft methodology statement for the Tea rooms will follow shortly in a separate document.



Figure 2.2.4a: Refurbished Tea Rooms

2.2.5 Platforms

Platforms 1, 4 and 8 are the station's only through-platforms. Platform 2 is a bay platform serving the local line to Sheffield via Penistone and Barnsley. Platforms 5 and 6 are bay platforms located on the island.

Automated train announcements, customer help points and digital display screens provide train running information on all platforms.

2.2.6 Relay Room and cable gantry

The Relay Room, a single-storey brick building housing signalling equipment and other services, is situated opposite the exit from the ticket hall. A large steel cable gantry bridge spans across the tracks between the Relay Room and the Principal Building.

2.2.7 Passenger subway

The passenger subway was constructed in circa. 1885 and has undergone several modifications over the decades to meet the requirements for the station. The subway currently provides the only means for passenger access to Platforms 4-8. Access is provided through steps, with step free access via lifts.

2.2.8 Parcel subway

The Parcel subway was constructed in the 1890s and traverses under the two main through lines, from the Principal Building basement to the underside of the Tea Rooms on Platform 3 & 4 where it terminates. The subway was originally used to transfer postal mail and goods to the island platform. The subway is not accessible to the public.

The subway roof is a concrete slab cast on permanent troughed steel formwork. There is a large catchpit in the roof structure positioned between the two lines. The slab originally spanned between the brick subway walls, but steel strengthening works have been installed to reduce the span and increase its capacity.

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Section 3 Design Philosophy & Design Drivers

03



Design Philosophy

3.1 Conservation Approach

The overarching heritage aims for the design have been:

1. to offer a minimal intervention to the listed buildings;
2. to repair and celebrate the historic buildings as far as possible;
3. to design new interventions sensitively, expressing new elements as new.

3.2 Design approach

3.2.1 Summary

The principal architectural aims for the design have been:

- to create a holistic, site-specific scheme which celebrates the best of the existing station, its role on the rail network and its unique situation in terms of townscape and landscape;
- to confidently add an authentic 'next chapter' to the story of the station, delivering the large-scale performance objectives of the TransPennine Route Upgrade scheme with an architectural finish to match.

3.2.2 Taking inspiration from the existing station

The Principal Building is clearly the element of highest significance in the station, although the main train shed (Roof A), with its distinctive Euston truss, is another important component.

The scheme draws on the design of both, in the following ways.

- a. Reinforcing the key axis of symmetry

The portico and wings of the Principal Building exemplify the grand civic ambition of early Victorian railway development. They gave equal prominence to the two original railway companies which jointly built the station. Each of the companies used one of the two end pavilions as a booking office. A corridor originally ran directly through the central block, from portico to platform, along a central axis of symmetry.

The design of the large brick warehouse (separated listed as entry 1228533) to the rear of the station, likely built at the same time as the current train sheds, also acknowledges that symmetry: its loading bay, with three pairs of giant Doric columns, is positioned to lie on the same central axis.

The sense of symmetry has been compromised over time. The central block is now occupied by the booking hall and ticket gates, confusing the clarity of the plan arrangement. Views from the booking hall to the warehouse loading bay have been blocked by the Relay Room on the island platform.

The proposals aim to reinstate the clarity of the central axis by:

- positioning the new roofs and the 'heart' of the redeveloped station as close

as possible to the axis of symmetry, with a central large-scale enclosed space and slender 'finger' canopies extending equally on either side;

- bringing the loading bay back into the composition overall by re-establishing clear views through to it from the rear of the Principal Building;
- removing the Relay Room (see 1.2.2).

- b. Echoing the Victorian roofs

The Euston trusses give Roof A a distinctive, dynamic geometry when viewed from below. Different lines and planes appear more prominently from different angles. Several of these have been used to define the form of the new roofs, so the new blade-like shapes appear to spring naturally from the Victorian structure.

The two blades are designed to descend in scale and angle of inclination, establishing a clear hierarchy of importance in the roof line with the retained Victorian roof as the most dominant element.

Columns supporting the new roofs are aligned with the columns of Roof A.

3.2.3 Upgrading the railway

The station's role on the network is also distinctive, serving as a mid-point between the principal hubs of Leeds and Manchester. It is the most important station for a large catchment area. The original design captured the ambition, scale and adventurous spirit of the Victorian railway, dignifying travel and transportation with a building of real grandeur.

The scheme seeks to elevate the much-degraded environment of the platform area today, to better complement the quality of the Principal Building. It also integrates various features which allow the railway to develop significantly from its Victorian origins.

- a. Improving the experience of passengers

The station will be enhanced for users by:

- installing a new lantern at the top of Roof A (following a similar design to the original version, no longer in place), which is currently open to the elements and contributes to a dismal passenger experience on wet and windy days;
- the full reconfiguration of information systems and signage – including bespoke, fully-integrated floor-standing totems on Platform 2;
- installing inclusive, accessible design features throughout the platform environment;
- new furniture, designed and selected to compliment the architecture on all platforms – including benches integrated with weather-screens for the most exposed areas;
- giving greater prominence to the historic Tea Rooms, which will be relocated slightly to occupy a more central position in the station – and be rotated so that the café is closer to the main flow of passengers to and from the subway;
- increasing the cycle storage provision.

- b. Enhancing public transport

As part of TRU, the station will facilitate increases in passenger capacity and line speed, while making the TransPennine line greener and less vulnerable to delays and cancellations. Key features factored into the design include:

- longer platforms for more carriages;
- more space between the Westgate portal and the platform structures to allow the flexibility of more switches and crossings between platforms;
- platform structures designed to allow good signal sighting, despite the necessary curvature of the tracks;
- allowance for overhead line equipment, with supports fully integrated into the architectural design, to power trains by electricity rather than diesel.

- c. Improving safe access for maintenance and conservation

The efficient operation of a mainline railway station (and the ongoing conservation of a Grade I listed building) demands simple and effective tools for cleaning and maintenance. This will be achieved by a range of new items, including:

- more robust systems for safely accessing the roofs;
- detachable cladding panels to allow inspection of hidden steel elements and connections;
- dedicated housing on site for motorised access equipment.

3.2.4 Respecting the town

The station's civic face – the Principal Building façade – is its most famous and significant feature. It forms an important historic setting with many large-scale Victorian buildings around St. George's Square to the east, and throughout the town centre conservation area.

To the west, physical and visual connections to a former railway goods yard (including two large listed warehouses and various smaller railway buildings of some historic interest) have been severed over time.

The scheme is designed to harmonise with the very different historic context on both sides, in the following ways.

- a. Minimising impact to St. George's Square

Maintaining the existing appearance of the station from the east has been an important design principle. Key views from St. George's Square will remain virtually unaffected, with the new platform roofs well below the height of the retained Roof A. The new lantern will be expressed as modern but with a finish designed to harmonise with the reinstated slate roof covering the retained Victorian parts.

Consideration of these views has also been important to designs for handrails and access equipment affecting visible parts of the eastern pitch of Roof A.

- b. Establishing new views to the goods yard

The blade-like roof forms will be inclined in order to maximise views through from Platform 2, so that passengers entering the platform area have a relatively unobstructed visual connection with the historic goods yard to the west.

The existing Relay Room, a low-quality brick building currently blocking the axial view from the ticket hall doors, will be removed.

Waiting shelters on the new island platform will be positioned behind the Tea Rooms, with respect to the ticket hall doors, to further limit the visual disturbance to this key view.

3.2.5 Connecting to the landscape

Huddersfield is a town nestling in the foothills of the Pennines. Long landscape views are a key characteristic of the town more generally, and the relatively unobstructed view north-east over the Huddersfield Viaduct is a particularly distinctive feature of the platforms.

Extending the platforms to the north, and installing a new footbridge to connect them, will undoubtedly impact the landscape views from the station. The scheme seeks to mitigate this impact by keeping the new 'finger' canopies as low as possible, and by glazing the sides of the footbridge to permit views through and from the raised structure.

3.2.6 Responding to the environment

The station's topographic location, and the north-south orientation of the platforms, generates a range of site-specific constraints concerning sunlight, wind and rain.

The scheme responds to these in a holistic manner, including the following features:

- sawtooth glazed elevations to footbridge, while echoing the angles of the new roofs, are angled to deflect glare from drivers on platforms;
- weather screens on the new island platform provide shelter from the prevailing westerly wind;
- a glazed clerestory connecting the two new roofs, reducing through-winds and protecting the painted timber Tea Rooms building from excess weathering.

3.0 Global Design Drivers

3.3 Tracks & Platforms

3.3.2 Existing arrangement

The existing Huddersfield Station layout comprises three through platforms and two north-facing bay platforms. There is a dedicated south-facing bay platform for the Penistone Line services.

The existing layout is shown on Figs.4.1.2a & 4.1.2b.

Fig.4.1.2c illustrates the following key 'pinch points' which dictate the site boundary and limit the expansion of rail facilities on the site.

- The width of the tunnel portal opening to the south
- The proximity of the goods lift serving the former warehouse to the rear
- The width of the viaduct, and specifically the John William Street bridge

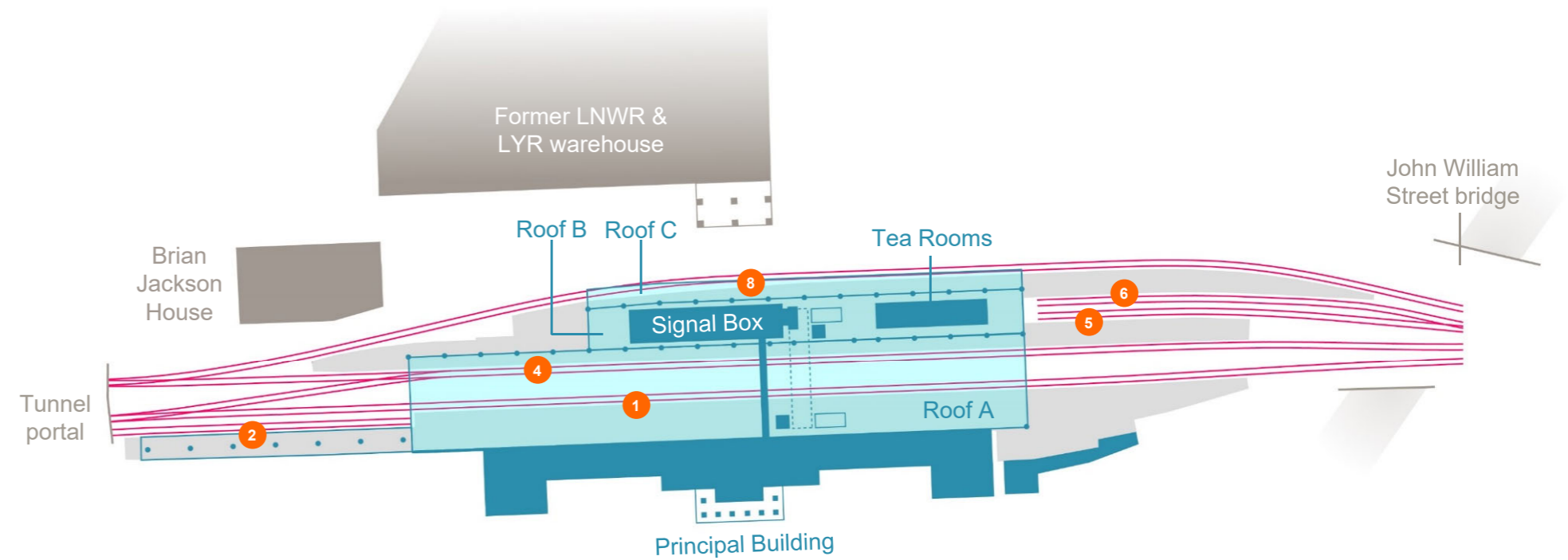


Figure 3.1.2a: Existing station layout

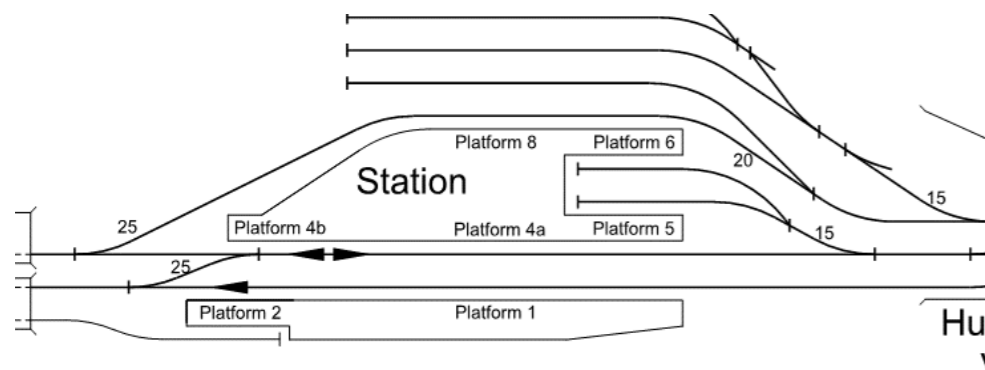


Figure 3.1.2b: Existing track schematic

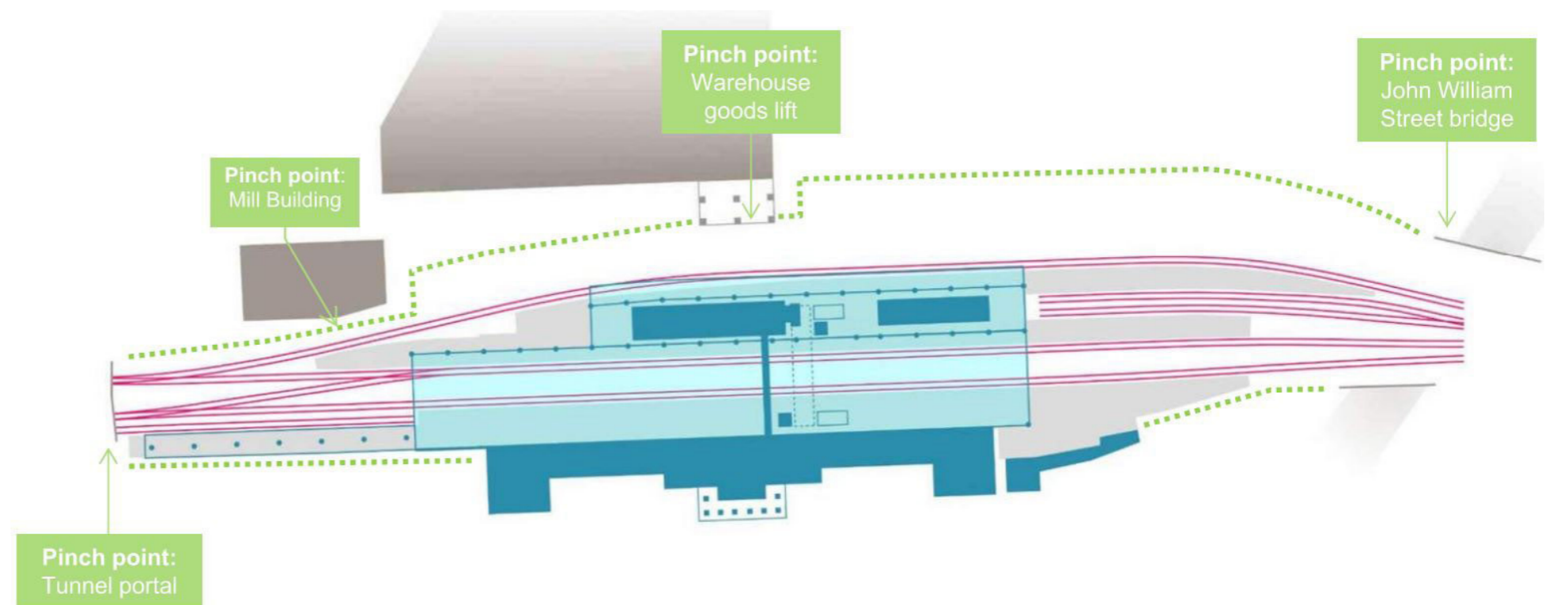


Figure 3.1.2c: Site boundary with 'pinch points'

3.3.3 Changes required for TRU

Operational modelling has shown that the proposed timetable can be supported with the greatest level of reliability with the following changes:

- four through-platforms of 200m length
- one west-facing bay platform of 200m length
- comprehensive junctions to allow train services to be sorted onto the correct platform and line at both ends of the station
- overhead line equipment (OLE) introduced above all tracks

Achieving these interventions between the 'pinch points' noted above will involve the following key changes, as indicated in Fig.4.1.3a.

- The current Platforms 4, 5, 6 and 8 will need to be replaced by two longer islands.
- The number and complexity of switches and crossings required to service the platforms (allowing trains to access multiple lines) cannot fit within the tunnel portal, so they must be located at the Manchester end of the station – effectively pushing the southern end of the platforms towards Leeds.
- The additional width of the new track layout will involve replacing the existing sidings close to the car park occupying the former goods yard, and running closer to the warehouse goods lift.
- The additional length of the platforms will involve extending the station further still towards the Leeds end, meaning that the bridge over John William Street will need to be widened.

Three principal options were explored to achieve this arrangement. Each had different implications for the structures within the station.

The Penistone Line platform is to be extended to accommodate longer trains.

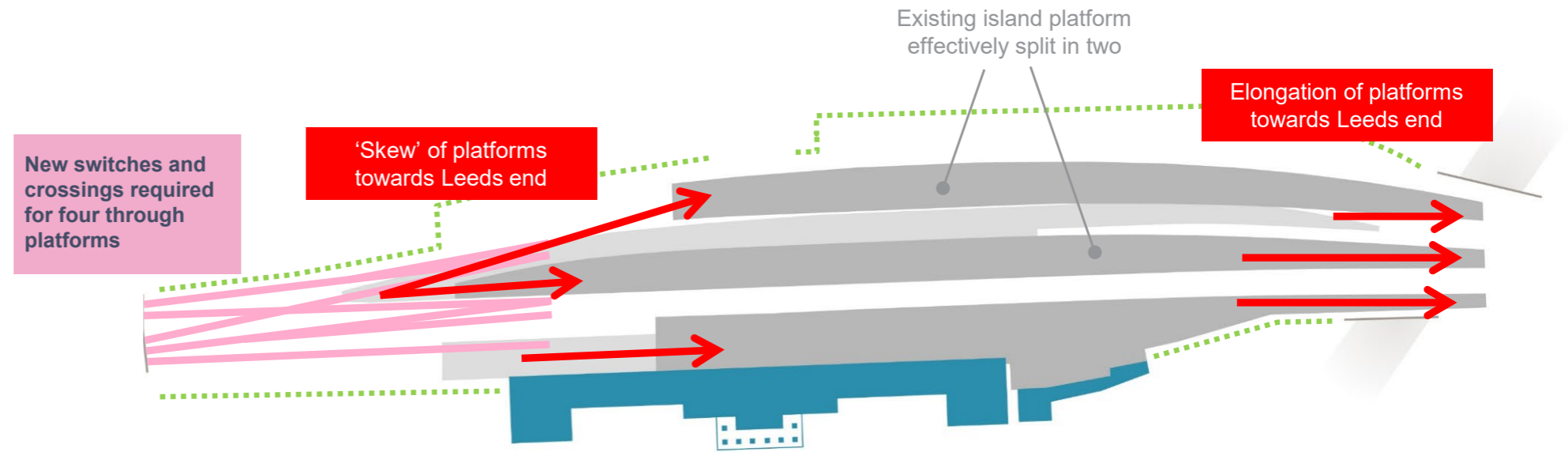


Figure 3.1.3a: Basic implications of track and platform alterations

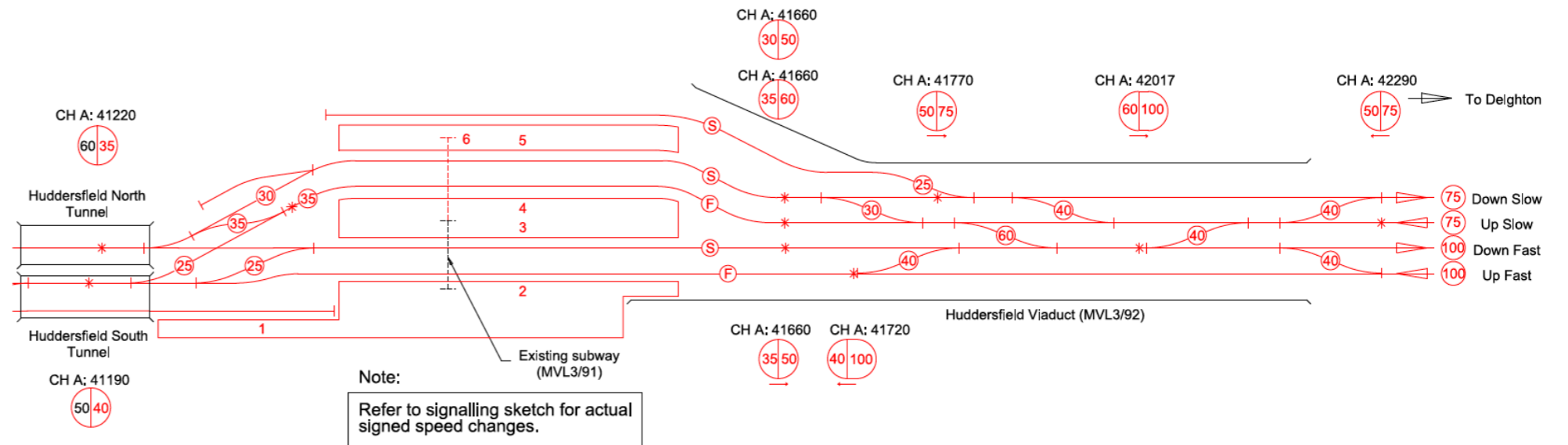


Figure 3.1.3b: Proposed schematic layout

3.3.4 Selected option

This option achieves a radius of >800m to the proposed Platform 4 edge, which improves signal sighting distance for drivers and reduces platform edge distance to train doors in comparison with the existing platform 8. This is a significant safety improvement on the existing station.

Stopping up the existing bay platforms 5 & 6, removing the existing rail sidings, and increasing the radius of existing Platform 8 reduces the width of the existing island platform. This provides space to the west, allowing the new 200m long island platforms 5 & 6 to be positioned to avoid the pinch point with the existing warehouse Goods Lift structure. It also opens land to the north of the Goods Lift for a future bay platform if required.

With this arrangement it will be possible to further expand the station by providing an additional bay platform in the future.

This option requires modification of the existing trainshed, removing two bays of Roof A from the Manchester end of the platform, and the removal of the smaller shed (Roof B) along with its cantilever span (Roof C). New coverage will be required to some of the extended platform areas.

The Tea Rooms may be retained on the central platform but must be relocated slightly to the north-east. The existing stair and lift on the central island platform will also require relocation. The Relay Room will need to be removed, along with the existing gable gantry.

Key design drivers this selection imposes on the design include the following:

- New roof or canopy structures to effectively replace the coverage provided by the existing Roofs B and C.
- A solution to relocating the Tea Rooms a short distance on the island platform.
- A new footbridge providing safe passenger egress from platforms extended toward the Leeds end.

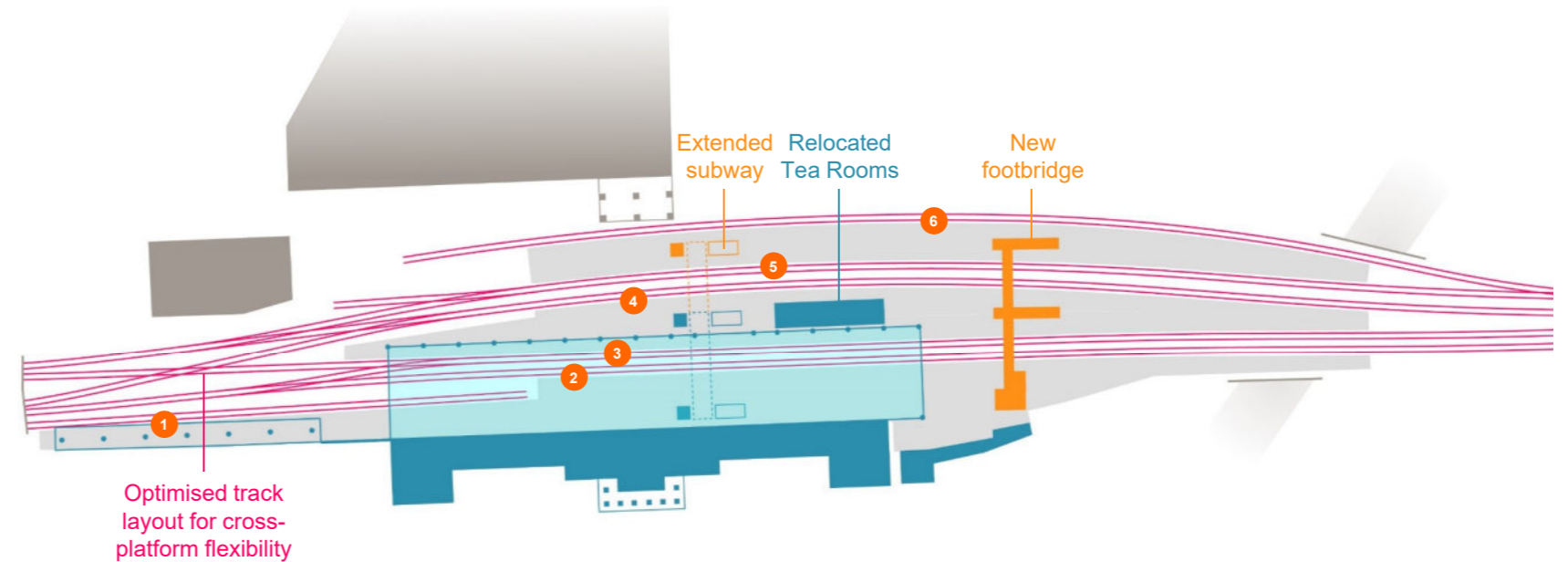


Figure 3.1.4a: Option 0 - basic layout

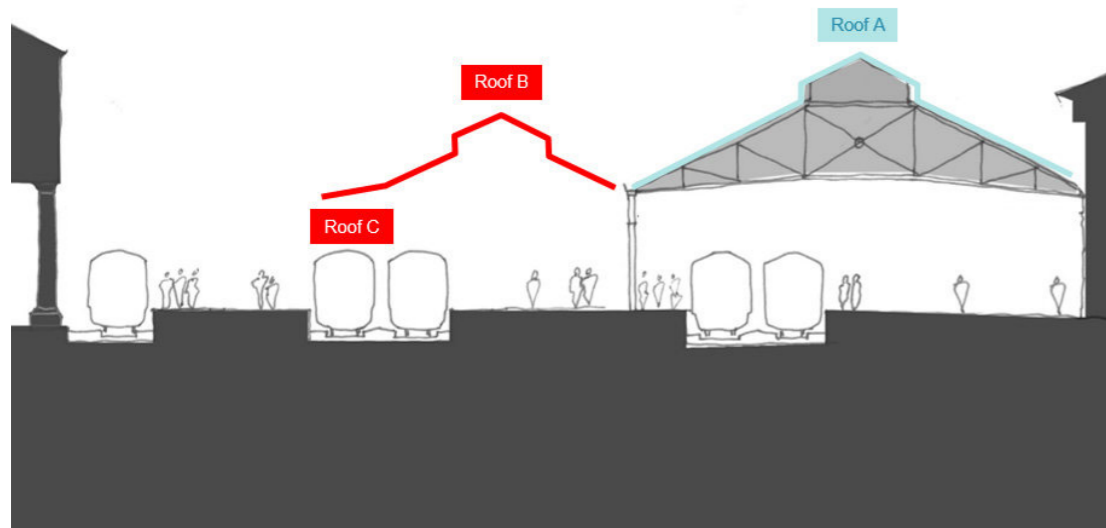


Figure 3.1.4b: Option 0 - key implications (section)

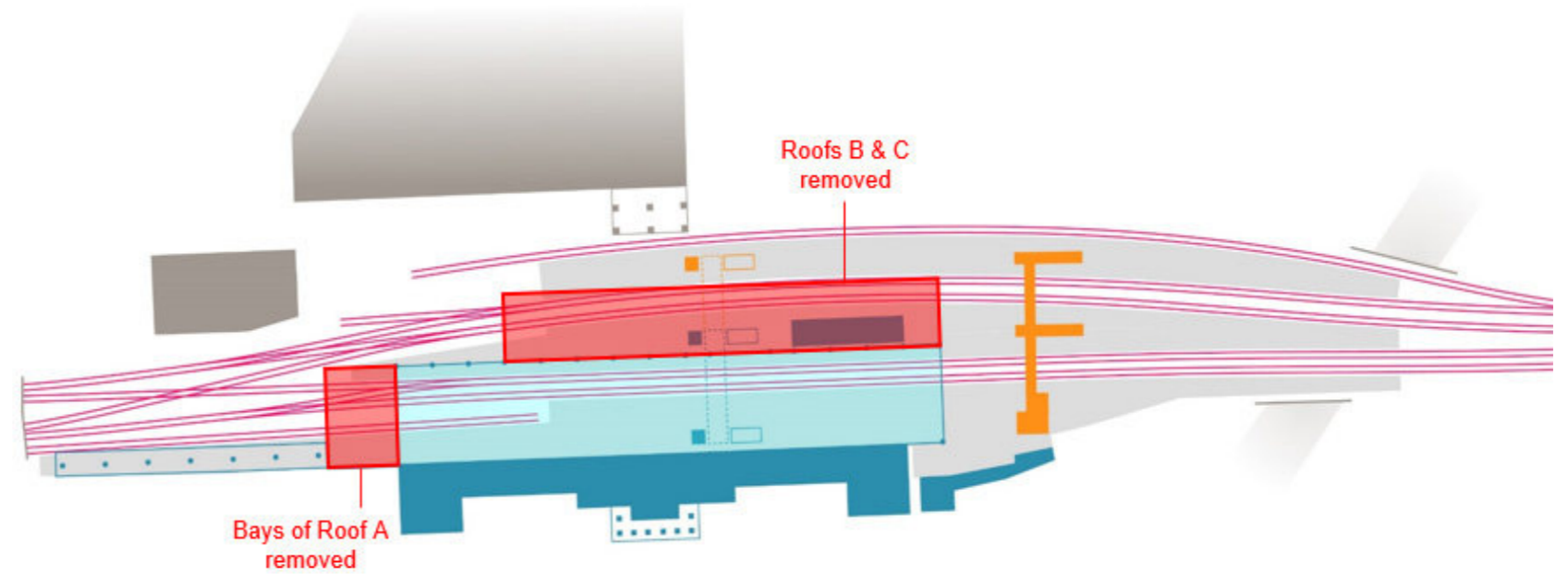


Figure 3.1.4c: Option 0 - key implications (plan)

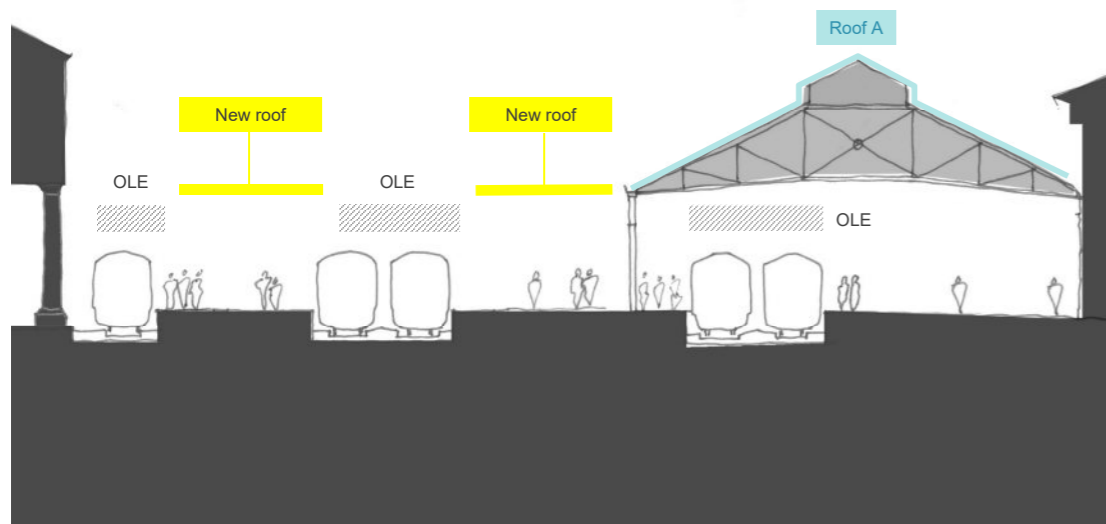


Figure 3.1.4d: Option 0 - new canopy coverage required (section)

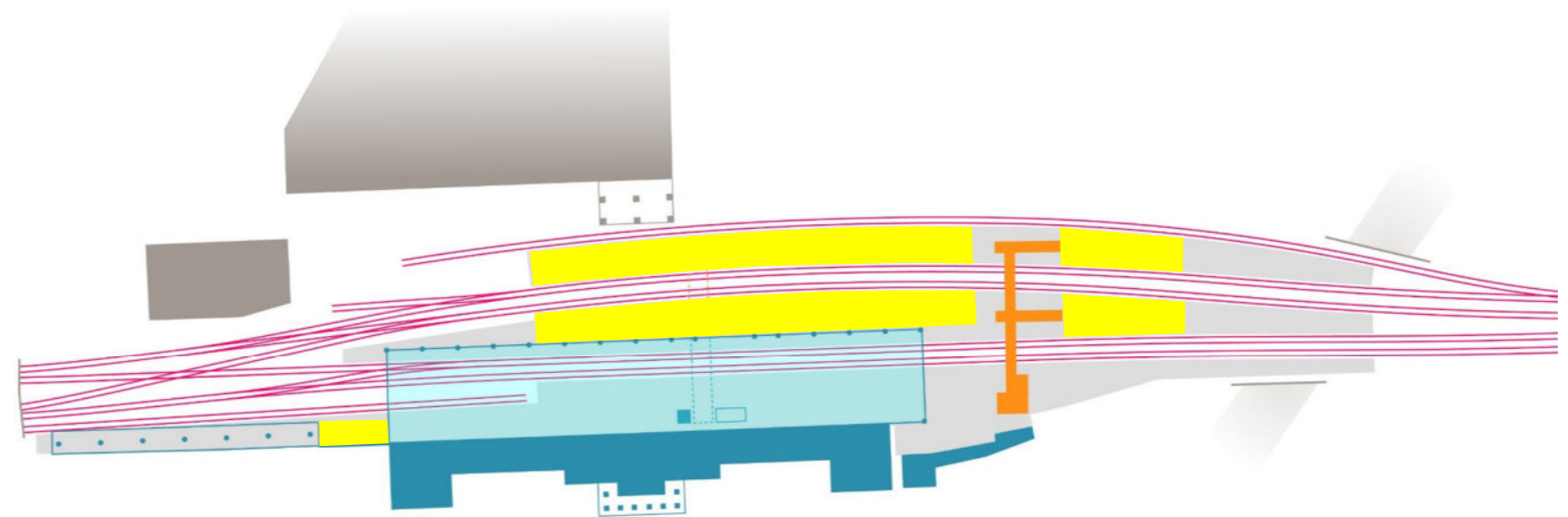


Figure 3.1.4e: Option 0 - new canopy coverage required (plan)

3.4 Platform Coverage

Basic coverage must be provided to the platform areas as indicated in the previous section. This must conform to Network Rail specification in terms of overall coverage.

Passenger coverage is based on providing a minimum of 0.65m² per passenger for forecast numbers through to 2043. Ideally this coverage should be distributed as evenly as possible along the length of the trains in order to avoid passenger bunching.

Minimum coverage based on the above provision should not be less than the existing station.

3.5 Historic significance

The Grade I listing of the station places exacting requirements on the design to avoid harming the historic buildings and their setting. To this end the design team has adopted the following set of general conservation principles, several of which are described in more detail in subsequent sections.

- Preserve/conservate as much original station fabric as possible.
- Where new canopy/roof structures are required, design them in harmony with the rhythm and geometry of the retained trainshed roofs. The emphasis of additional buildings should therefore be on clean lines and angular elements (as opposed to curving/organic shapes, for example).
- Where new canopy/roof structures are required, design them to be sympathetic but expressed clearly as modern. Minimal forms and

simple detailing to help accentuate the distinctive characteristics of the existing shed roofs.

- 'Open up' the station to engage visually with its wider historic setting particularly the warehouses to the rear and surrounding landscape.
- Incorporate OLE elements neatly within the structure, reducing the number of extra OLE specific elements such as stanchions and portals which will detract from the historic station buildings.

3.6 Scale

Given the significance of both the Principal Building and the retained Roof A, the scale of any new intervention should be such that the dominance of the historic station is celebrated and reinforced.

This will involve creating an architectural extension which emphasises the original core grouping of buildings and spaces. In effect it means replacing Roofs B and C with a structure of commensurate size, in an equivalent location.

This also means that coverage provided to the platforms extending away from the central axis of the station will be smaller in scale and more subservient in character.

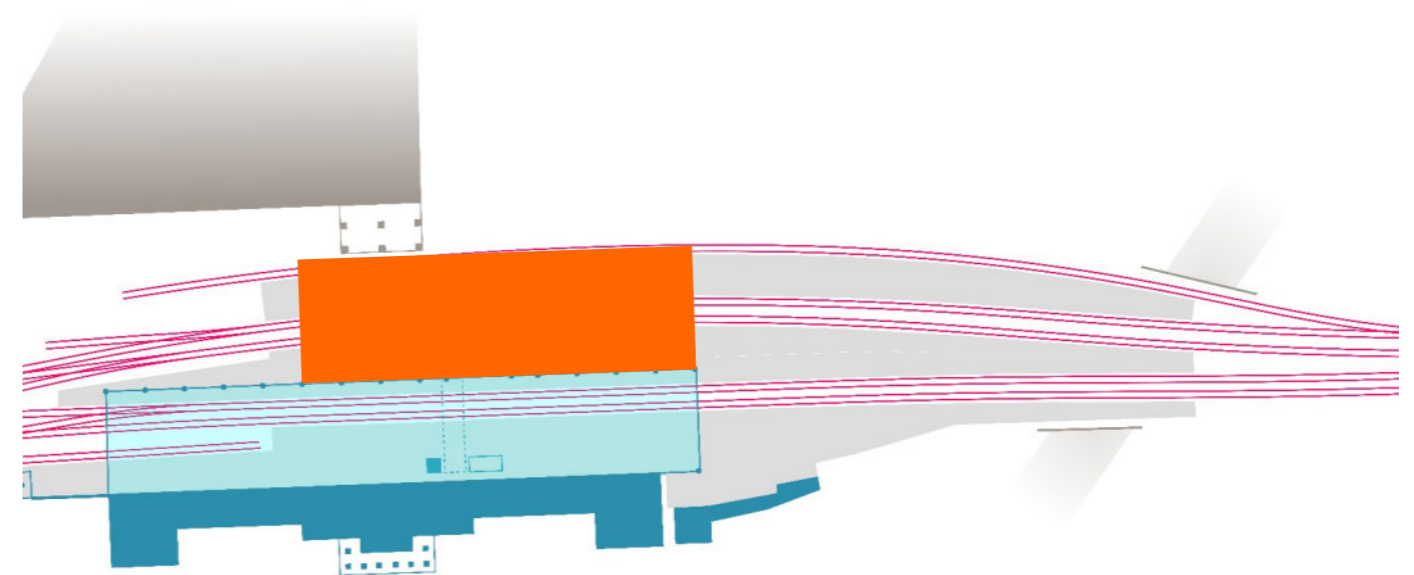


Figure 3.4a: Celebrating and reinforcing the central area of the station

3.7 Balance on Plan

New extensions added to the station should respect the significance of the Principal Building's strict central axis, along which passengers enter and leave the ticket hall. As noted, this axis also aligns with the monumental columns of the warehouse goods lift to the rear.

The consolidating effect of locating a large-scale extension on (or close to) this axis should be reinforced by emphasising each of the extended platform canopies as a smaller architectural 'finger' spreading away from the principal roof space. This will create a balance on plan, with passengers having the option to stay in the central space or move outwards on either side: left towards Platform 1 and the Penistone Line, or right towards the three newly-extended fingers at the Leeds end.

3.8 Views

Although there is a loss of heritage fabric as a result of the removal of Roofs B & C, the scheme offers improvements through the removal of the Relay Room and the Cable Gantry. These changes present an opportunity to reconnect the station visually with the surrounding historic environment and the dramatic landscape it sits within.

Views towards the warehouses and goods yard at the rear of the station should be kept as clear of new structure as possible. There is also an opportunity to create enhanced views into Roof A, celebrating the appearance of the existing roof structure and the rear elevation of the Principal Building. For this reason views through from the new island platforms should also be as unobstructed as possible.

These two requirements create a set of view lines from which the form of new roofs or canopies may be defined – as indicated on Fig. 4.6a.

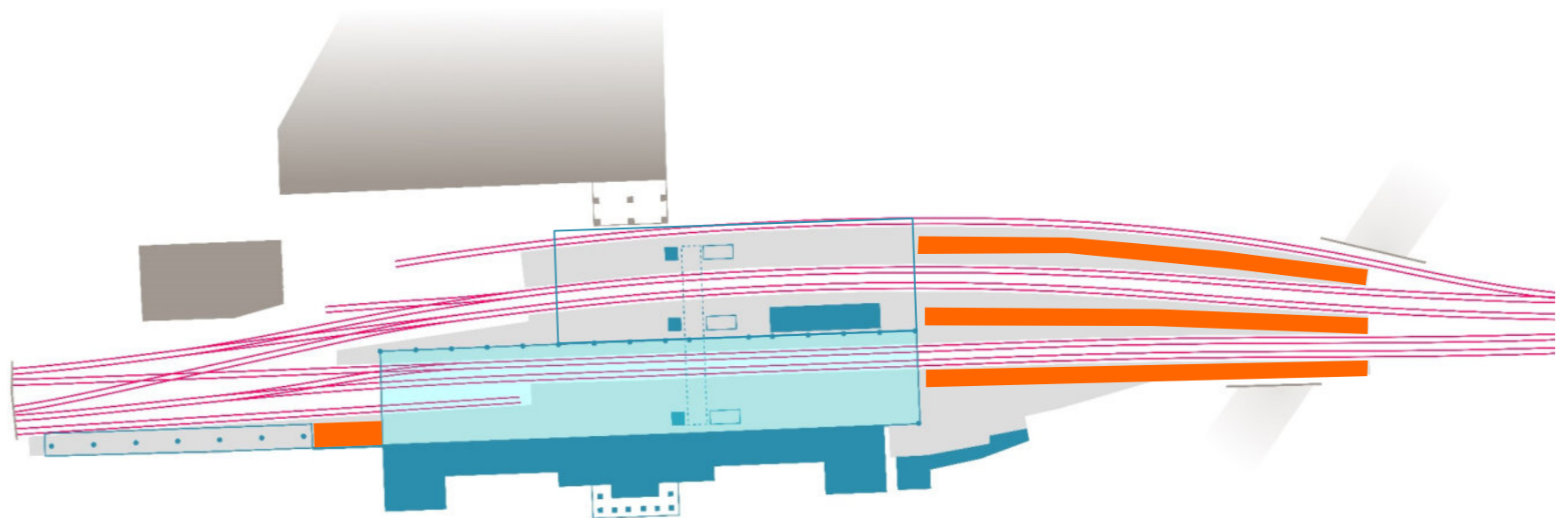


Figure 3.5a: Balance on plan with consistent 'fingers' of canopies

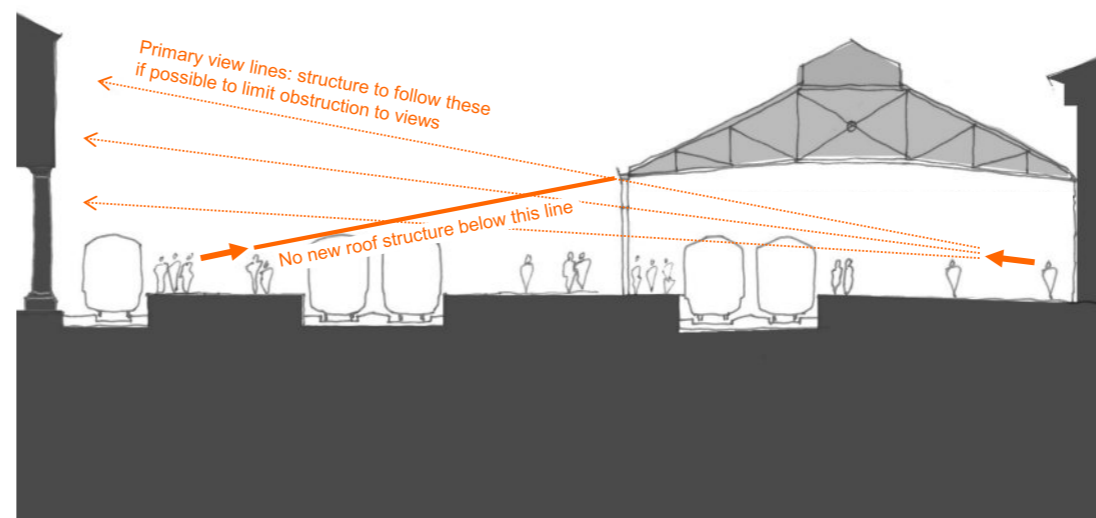


Figure 3.6a: Key view lines on section through Roof A

3.9 Form and structure

New roof/canopy structures replacing Roofs B and C should draw geometrical cues from the strong lines of the retained Euston trusses. This includes using the setting-out indicated on Fig.4.7b, including the eaves line springing point of the Victorian roof, the inclined angle of the bottom Euston truss boom and the pitch of the roof finishes.

Repeating elements such as columns and transverse beams visible within a new structure should align with those of the retained Roof A. Where possible they should be oriented to be as slim as possible, when viewed from the Principal Building, in order to minimise their visual impact from that perspective.

The gables of Roof A, with the roof trusses so clearly visible, should be kept free of any obstructing structures (with the exception of a footbridge, from which the public should be able to enjoy views of the structure at relatively close quarters).

Columns supporting roofs and platform canopies should be aligned longitudinally on plan to limit visual clutter.

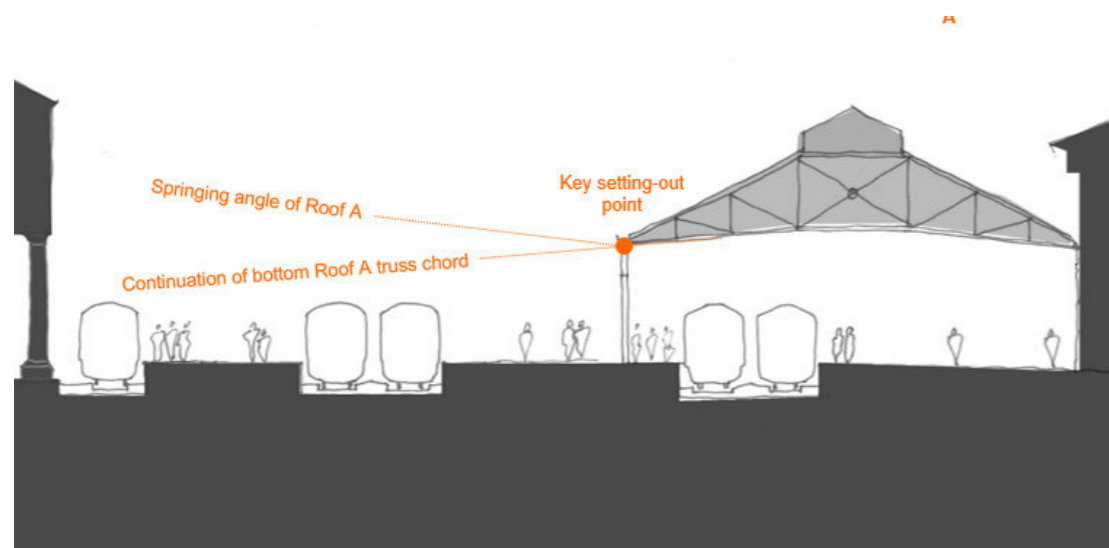


Figure 3.7b: Setting out lines derived from Roof A

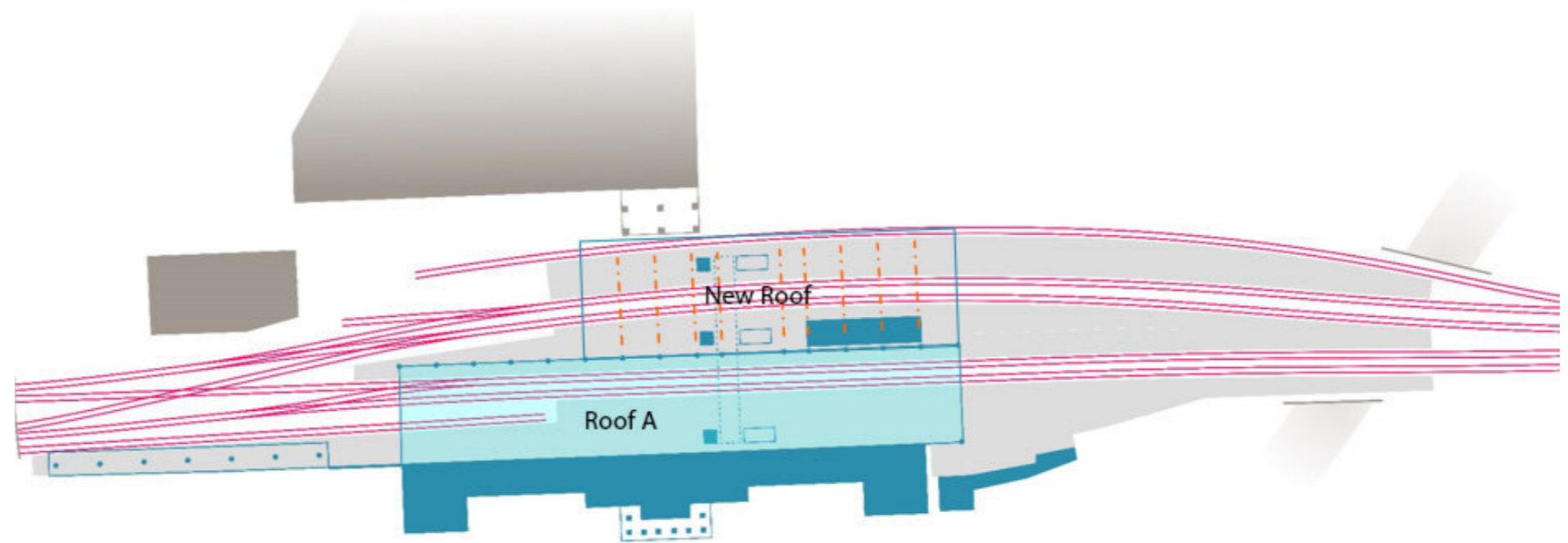


Figure 3.7a: New roof / canopy columns aligned with those of Roof A

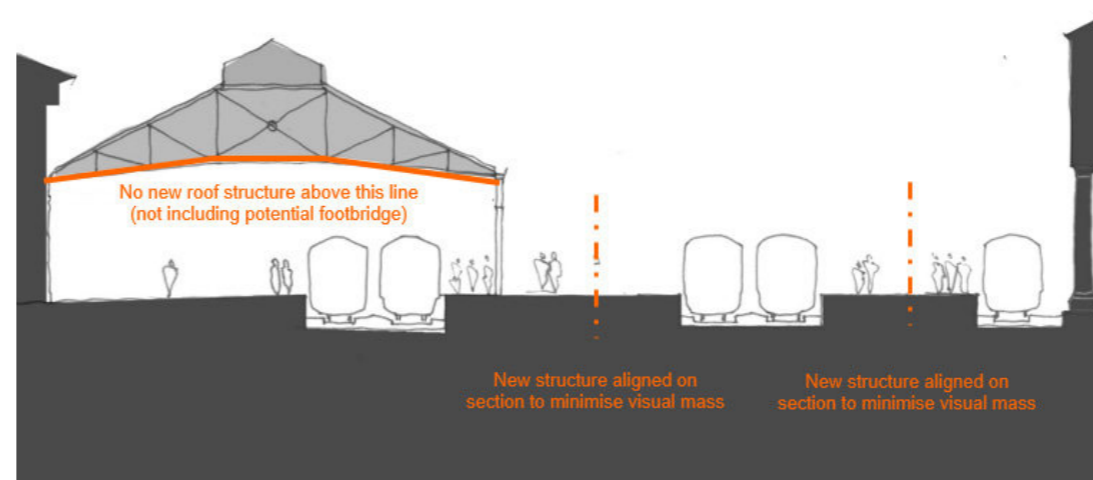


Figure 3.7c: New structure kept clear of Roof A gable; columns aligned on platform

3.10 Station experience

The previous design drivers combine to create a requirement for a coherent environment within the central part of the station, with a scale and quality derived principally from the Principal Building and Roof A. Smaller modern canopies will lead away from this area on all sides, with a diminishing sense of scale and an increasingly open and transient character.

Passengers arriving onto Platform 2 through the ticket hall should feel like they have entered the 'heart' of the station. Views through to the former goods yard connect them visually to the wider historic setting. Clutter-free platforms, sensitive lighting, the careful use of colours and other elements all enhance the consistency of the architecture.

Fig.4.8a indicates several key components of the upgraded station experience.

1. Entrance on axis from St George's Square
2. Enhanced views through the station setting
3. 'Heart of the station' with an integrated and high-quality architectural environment
4. Sense of connection to wider heritage setting
5. Platform canopies balancing the design of the station.

3.11 OLE

Structures supporting OLE elements should fit neatly within the structure, with the number of obtrusive OLE-specific elements such as stanchions and portals kept to a minimum. The design of bespoke components may be required to avoid components which clash with the architecture of the station.

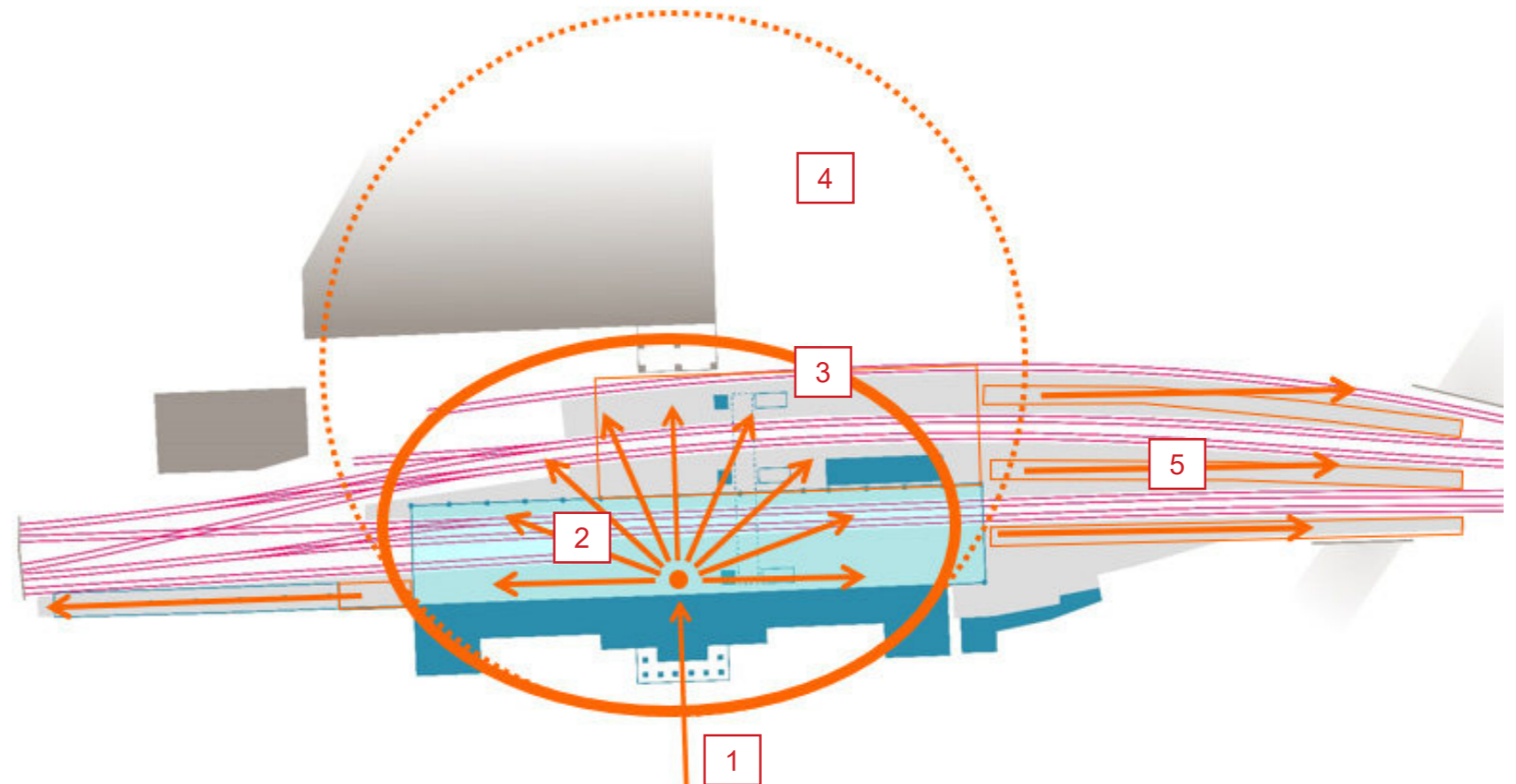


Figure 3.8a: Key components of upgraded station experience

3.12 Signal sighting

The design of new roof/canopy structures must allow clear signal sighting along the new curved platforms. This will require a sufficient set-back from the platform edge, defined by a driver's-eye-view analysis (see Fig.4.10a).

3.13 Passenger Circulation

The existing passenger subway is the sole means of passenger access to the existing and proposed island platforms.

In order to accommodate the forecast increase in passenger flows through the station to the target date of 2043, and to comply with emergency access/egress requirements, a second means of access is required to the proposed island platforms (Platforms 3-6).

To accommodate passenger flow from the longer 6-8 carriage trains, this alternative means of access is in the form of a footbridge located to the north of the proposed Roof A.

Emergency egress routes for passengers are also to be provided at ground level from the southern end of island Platforms 5-6, exiting on to the adjacent Mill land, and from Platforms 1 and 2 around the southern end of the "Platform 1" charity train, exiting into St George's Square.

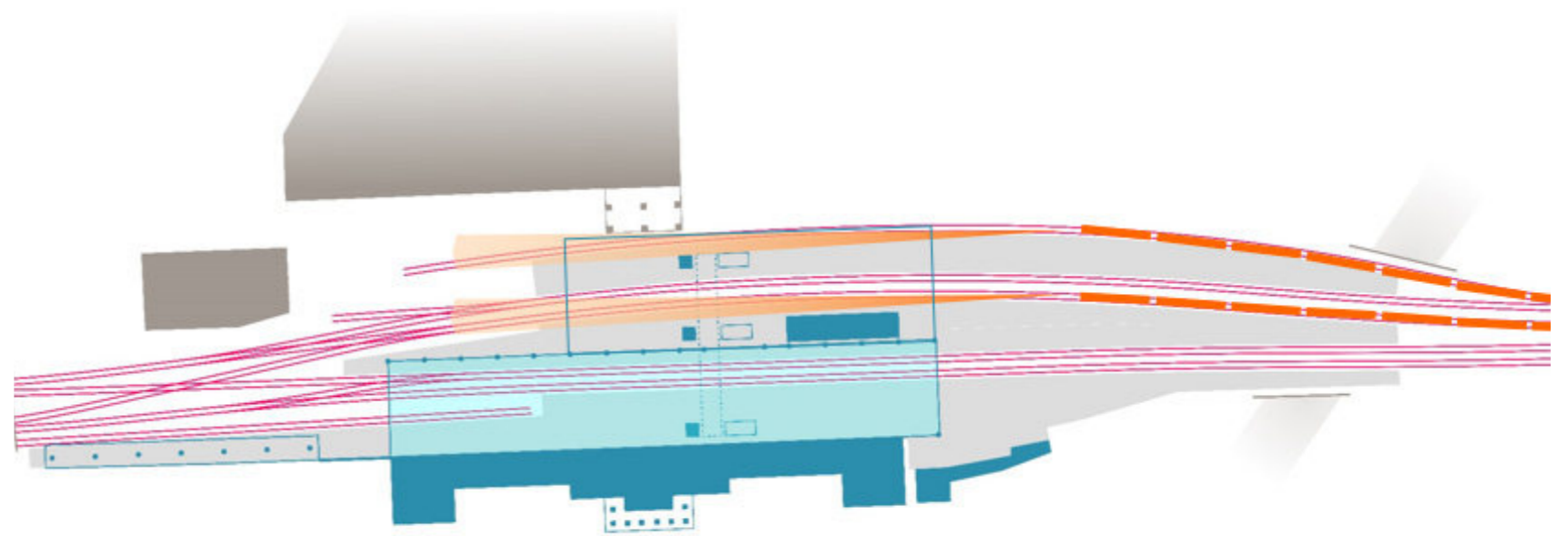


Figure 3.10a: Indication of viewing corridors for adequate signal sighting

3.14 Lighting

A new lighting scheme is proposed to achieve the following design objectives:

- Facilitate safe movement and orientation for a large number of users by defining entrances/exits.
- Identify hazards with local accent lighting such as level changes and platform edges for public and staff.
- Highlight public safety especially when near the platform edge.
- Navigate passengers efficiently around the station by using light as a wayfinding tool to highlight transitions and destination points.
- Achieve the safety and security requirements by providing sufficient illumination for facial recognition and CCTV camera detection.
- Provide a visually comfortable space and accessible environment.
- Incorporate a reliable, user-friendly lighting control system to maximise flexibility, daylight use and energy efficiency.
- Specify high quality LED light sources that will ensure consistent colour and a reduced maintenance cycle.

The lighting scheme within Retained Roof A has been designed in

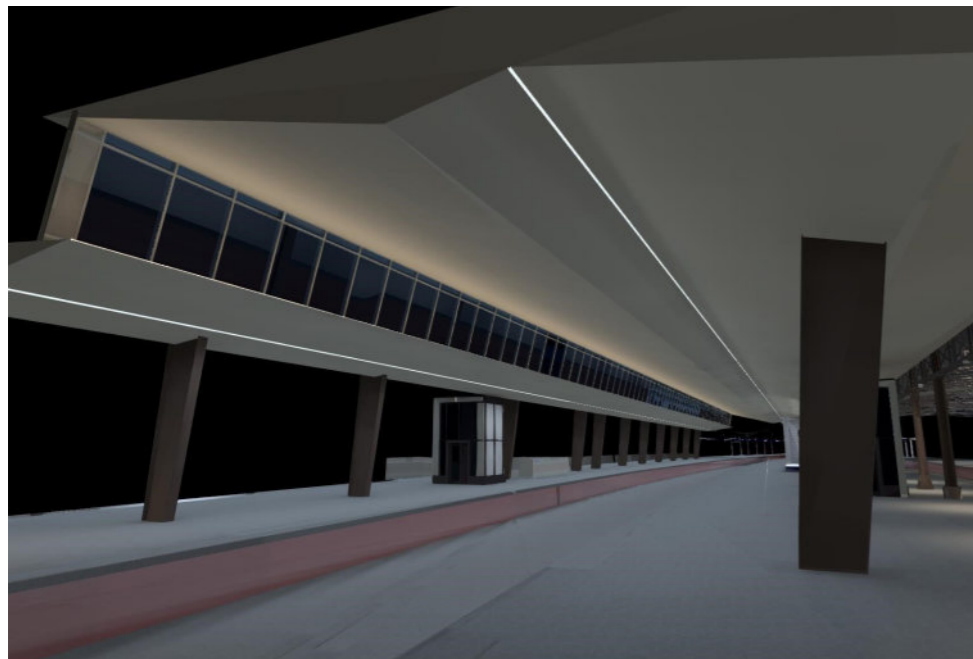


Figure 3.12a: Proposed lighting scheme

accordance with the following guides and standards:

- RIS-7702-INS Lighting at Stations
- RIS-7016-INS Interface between Station Platforms, Track, Trains and Buffer Stops
- BS EN 12464 Part 2: Outdoor Lighting
- BS EN 5489-1:2011 Road and Public Amenity Lighting
- BS EN 5266-1: Emergency Lighting
- BS EN 1838: Lighting Applications - Emergency Lighting
- CIBSE SLL LG15 Transport Buildings (2017)
- ILP GN01 Guidance Note for Reduction of Obtrusive Light

3.15 Accessibility & inclusivity

The new elements of design have been developed in accordance with Part M of the building regulations, BS 8300: 2009- Design of buildings and their approaches to meet the needs of disabled people, the Department for Transport (DfT) Design Standards / Code of Practice (COP) for Accessible Railway Stations (2015) and the Technical Specifications for Interoperability (TSI) for PRM's (Person's of Reduced Mobility).

Circulation around the station and platforms

The new lifts are sized to Network Rail's standard 16 person lifts for wheelchair access, and designed as through lifts for ease of accessibility as explained in the footbridge section of the design statement. Lifts are provided to all platforms via the footbridge or the subway. The new stairs to the subway and the footbridge are designed for ambulant disabled use following the guidance stated within the above documentation.

Horizontal circulation

All obstacle-free routes, footbridges and subways will have a free width of a minimum of 160cm between handrails such as the stairs and width of the footbridge.

The first and last steps shall be indicated by a contrasting band and, as a minimum, tactile warning surface indicator shall be installed before the first descending step. The wider access and maintenance strategy for the station will be covered in Section 5 of the CIMP.

3.16 Access and Maintenance

An Access & Maintenance Strategy is required for Huddersfield Station that not only provides safe access to areas above Overhead Line Equipment but also does not impact on the heritage value of the Grade I listed station elements.

3.17 Sustainability

The Architectural design approach is to design upon an overarching sustainable strategy. We will provide creative and viable solutions that will introduce innovative and flexible ways for the station to operate in the future, driven by delivering value for operational and maintenance aspects of the station.

References have been made to current and emerging design standards and environmental assessment methods, ranging from familiar practices such as BREEAM, the Well Building Standard and biophilic design which focus on the impact of buildings on the human body and promotes high quality, healthy and inspiring internal environments for building users.

Network Rail has embraced a need to ensure it provides for a safer, more reliable railway, with greater capacity that contributes towards a low-carbon economy with better connections between people and jobs. Network Rail is one of the largest purchasers of energy in Great Britain and, as they continue their programme of electrification of the network, the requirement for more electricity will grow.

Network Rail recognises it has a responsibility to make a contribution to achieving government carbon reduction targets through a combination of energy efficiency and low carbon procurement strategies and this is set out in detail in the Network Rail Sustainable Development Strategy. This applies to both design of the track, associated infrastructure and stations.

The design seeks to maximise passive and active measures to achieve a sustainable design, for example, the availability of natural daylight in order to lower life cycle costs for the retained roof and the new roofs and canopies. Less energy consumption costs and maintenance costs for lighting result from intelligent passive design.

Reduce energy demand

As a starting point, the design aims to reduce demand and the design team will also continue to input into the design of the new station elements to ensure passive and active design principles are incorporated including:

Passive sustainable methods include:

- Platform canopies with open side façades facilitating natural cross ventilation.
- Façade optimisation including the provision of appropriate solar shading and solar control glass to limit the amount of solar thermal gain on the footbridge, reducing the need for mechanical cooling as well as controlling disability and discomfort glare to occupants.
- Rainwater recycling of the roof and canopies. There will be high usage for the station toilets, rain water can be used to flush the WC's in the station.

Active technologies in the design include:

- Use of low energy consumption light fittings including LEDS and efficient light distribution to minimise overall lighting energy.
- Integrated intelligent controls strategy relating to the ventilation of the Tea Rooms.
- Low water consumption design for new toilets and wash hand basins through the use of low flow fittings and intelligent control systems.
- Embodied energy addresses how sustainability should encompass the construction methodology, including the processes on site.
- Use of local materials, minimising embodied energy (including transportation)
- Demolitions should facilitate a strategy for recycling materials on site or other sites.
- Construction waste minimisation strategy – adopting core procedures that will reduce the amount of construction waste and waste to landfill including; prefabrication, modularisation, off site storage / delivery and waste take back schemes when looking at

the procurement of the new roof, footbridge and canopy design.

- Any new paving to be permeable paving to aid the SuD's design.
- Inclusion of bicycle stores for sustainable travel.

3.18 Sustainability assessment and assurance

The sustainability performance of TRU is being assured and assessed using the CEEQUAL v6 infrastructure assessment methodology. CEEQUAL v6 offers the opportunity to innovate and challenge beyond what is considered 'business as usual' in terms of sustainability performance. The scheme gives the consistency, structure and built in assurance process required to drive sustainability objectives throughout the life-cycle of the programme, ultimately delivering a more sustainable railway. Implementing CEEQUAL v6 offers third party, globally recognised, certified assurance that provides lasting industry-wide improvement in the rail sector and beyond.

3.19 Carbon reduction

The Government has set a target to reduce carbon emission by 80% by 2050, compared to 1990 levels. Network Rail is committed to reducing energy consumption and carbon emissions across the rail network, as outlined in the Network Rail Energy and Carbon Policy. (<https://safety.networkrail.co.uk/home-2/environment-and-sustainable-development/energy-and-carbon-management/energy-and-carbon-policy-and-strategy/>)

In order to achieve these objectives, the carbon reduction hierarchy (Build Nothing, Build, Less, Build Clever, Build Efficiently) outlined in the Publicly Available Specification PAS 2080:2016 (<https://shop.bsigroup.com/ProductDetail?pid=000000000030323493>) has been applied at key decision points throughout the option selection and development process.

3.16 Remove Existing Structures

3.16.1 Removal of the services gantry

The proposal includes the removal of the services gantry. This currently provides access to services between the main station platform and entrance and the opposite platforms. This is not part of the original scheme and will have been added to provide services intervening with the tracks.

The gantry is of detriment to the visual expanse of the station and

will benefit being removed. Services will be connected underground.

3.16.2 Removal of the signalling box building

The signalling box building is not original to the railway station and was a later addition to provide more advanced and better access to the signals. Unfortunately this structure has blocked off a large portion of the visibility to the main station. The architecture is not in-keeping with the design intent and aesthetic and is proposed to be removed as part of the major works. The removal of the signalling box will provide clear views from the main station building through to the opposite warehouse, which is reflective of the original design intent.

TRU

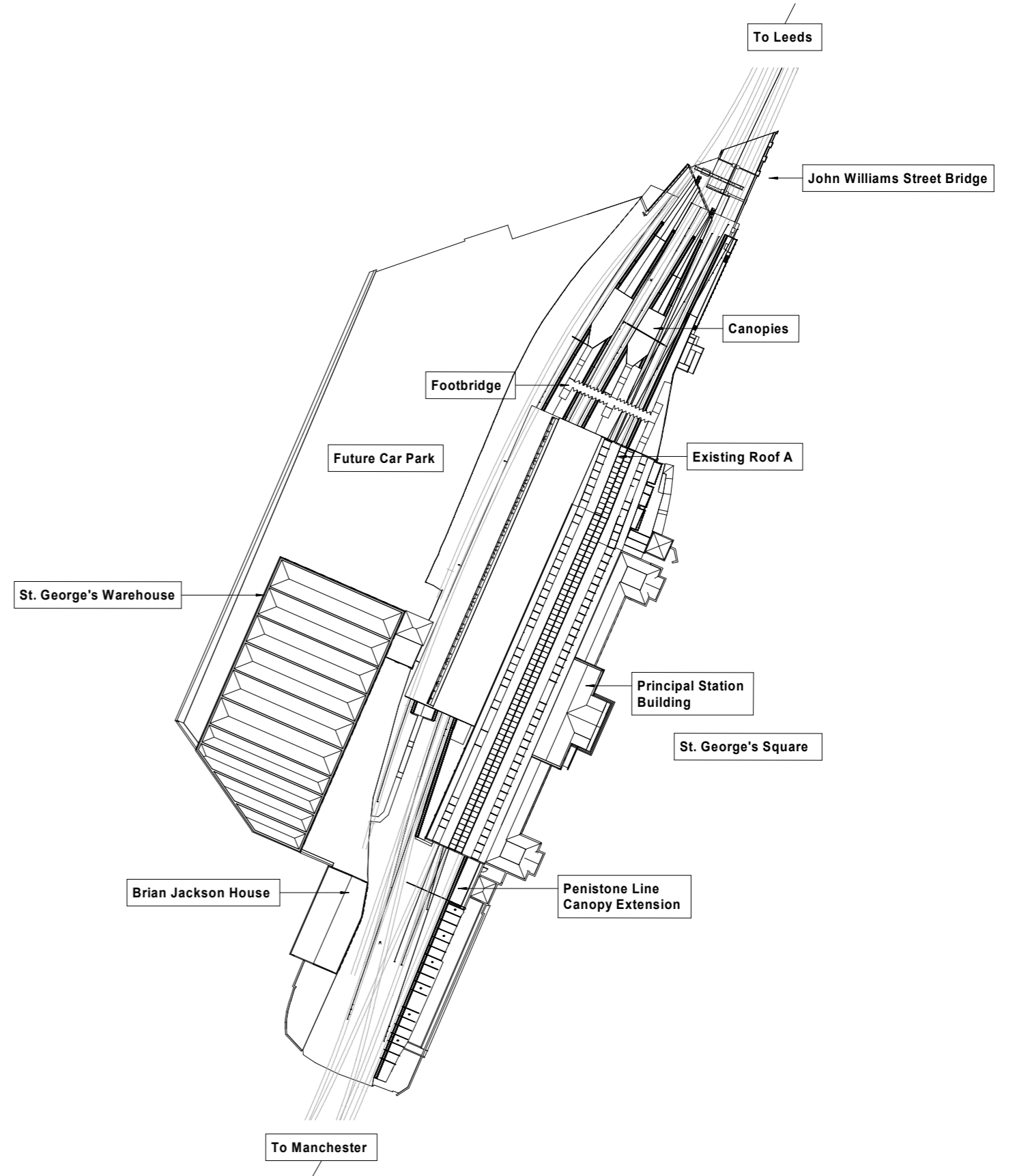
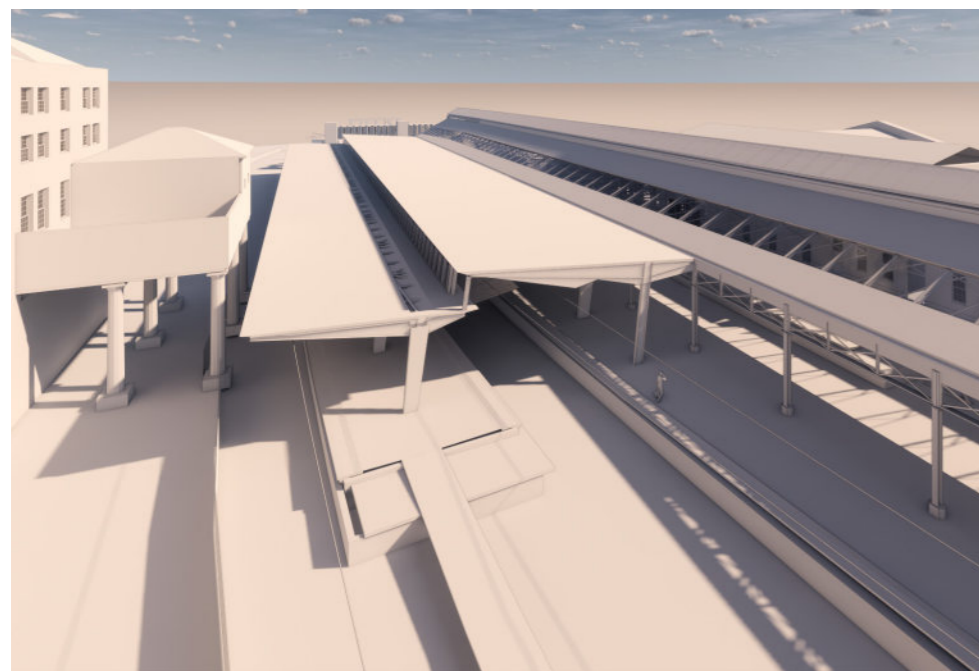
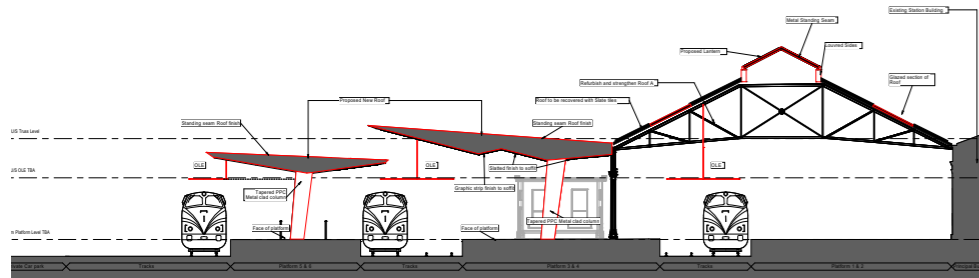
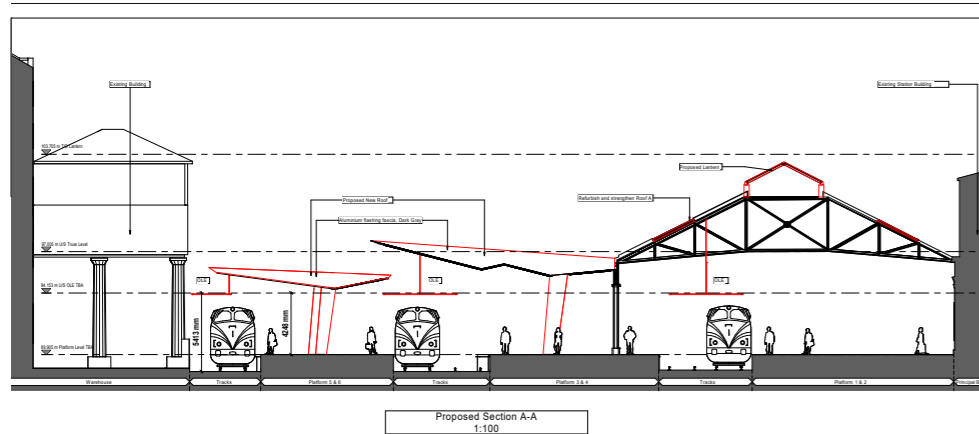
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Section 4 The Scheme

04



4.0 Proposals



4.1 Retained Roof A

4.1.1 Specific drivers

Roof A is part of the Grade I Listed Huddersfield Station and substantially contributes to its historic significance. It is one of the last surviving examples of a Euston truss roof on the railway network today. Through recognition in the Statement of Significance this has led to the retention of the structure, which will be strengthened and refurbished to meet modern standards with new roof covering and as much of the existing structure maintained.

4.1.2 Relocated bays

Due to the new track and platform alignment/extension, 2 bays (18m approx.) of Roof A will need to be removed at the Manchester end of the station. To rebalance the symmetry of the roof and to continue to provide adequate coverage for the new train stopping locations, 3 bays (27m approx.) are to be reintroduced at the Leeds end of the station.

The two bays of structure removed from the Manchester end cannot be reused at the Leeds end, as the span differs.

The Leeds end extension will be tapered in line with the last retained bay and will follow the path of the original 2 roof bays which were removed in the 1980s.

4.1.3 Lantern

The original design of Roof A included a lantern that sat atop the roof which would have acted as an exhaust to encourage the ventilation of the space below. It also would have provided continuous shelter from inclement weather. This was removed leaving a large opening along the length of the trainshed for much of its recent history. It is believed to have been removed sometime between the 1940s and 1950s and, as such, has remained in its present state for at least 70 years. There was a proposal put forward in the 1980s to reinstate a lantern but covered in corrugated polyester, but this was never completed.

As part of the refurbishment, it has been agreed there is an opportunity to reinstate this which will provide increased platform coverage from the elements, therefore improving passenger comfort and maintaining historic fabric.

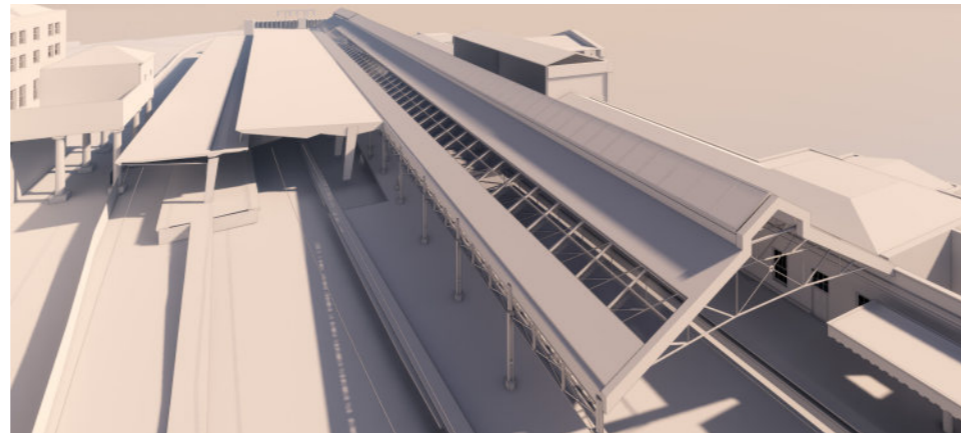


Figure 4.1.3a: Roof A aerial view

Different roof coverage approaches were explored from fully glazed to solid. These were reviewed with the following in mind:

- Historic narrative
- Daylight requirements
- Visual aesthetic
- Management and maintenance

A study was completed on the history of the roof with further research completed on the original design intentions of Roof A. It is still unknown as to why the lantern was removed but we reflected on the fact that the roof has been missing for longer than it was a part of Roof A and therefore it was important to find a way to celebrate all of the building's history.

Following an historic assessment which confirmed there was originally a lantern and it was glazed, a daylight study was completed to determine whether, for operational purposes, a replacement structure would also need to be glazed. An assessment was completed for lighting at different times of the day. It was determined there would be little advantage to the overall daylighting within the space if the lantern was glazed instead of solid.

Visually the key design criterion was to ensure the lantern was reinstated and pitched. The ethos of the design process is to conserve the historic fabric and, where new intervention is required, that it is sensitive and in-keeping to the historic fabric, but also find a balance of honesty and complementary design. This led to considering something that created a balance of both.

The lantern will be situated above live OLE wires. This means that the OLE would need to be shut down if glass panels were to break and require replacement: a highly onerous condition for the operation of the railway.

For these reasons it is proposed that the new lantern roof would be finished in modern standing seam sheeting. The seams of the roof finish would mimic the glazing bars of the earlier patent glazing, and would match the finish of the other new roof elements proposed for the station (see subsequent sections). Maintenance for an opaque roof would require significantly less frequent maintenance than a glazed version.

Train diesel fumes will need to be ventilated from the roof space. This will be achieved by providing a sufficient area of fixed louvres in the short side walls of the lantern.

4.1.4 Materials

The roof will be re-clad with a mix of traditional and modern materials. The main roof covering will be slate as the original. There is a structural reason for this in that the additional load applied to the structure by the slates will combat any wind uplift.

The soffit of Roof A will be timber boarding running in parallel to the tracks in reference to the original cladding, drawing your eye along the roof helping to appreciate its expanse.

The covering for the lantern will be standing seam with metal louvres in a colour to match the slate.

4.1.5 Colours

Extensive colour options have been researched and assessed to determine how the shades of colours proposed for the underside of the timber soffit and Euston Truss would work together. The conclusion was that a dark colour should be used for the Euston Truss and a lighter shade should be used for the underside of the soffit. This will emphasise and celebrate the structural elements of the roof.

The soffit for the lantern will likely be a metal slatted material with closed joints which will be a modern interpretation of the original boarding.

The transverse & longitudinal trusses, and the columns supporting them, will be painted in a mid tone that will make them stand out and be celebrated against the soffit.

4.1.6 Lighting

Retained Roof A provides the mounting framework for the luminaires required to illuminate the platforms below.

The existing lighting scheme shown in Fig.5.1.6a comprises a combination of suspended and wall-mounted luminaires to illuminate the platform. The luminaires distribute light onto the platform in a downward direction only without any upward illumination. By only having a downward distribution of light, the lit effect results in an oppressive, flat environment that also provides minimal enhancement to the highly decorative architectural elements of the roof. The downward illumination exaggerates the contrast between the light source and the dark roof and increases the perception of glare.

The existing lighting scheme and luminaire positions were modelled in lighting software alongside the proposed platform rearrangement. It was concluded that the existing luminaire positions are inadequate for safe illumination of the platform edge.

The lighting scheme was installed circa 1990s (Fig.5.1.6b), therefore the luminaires are at the end of their lifetime and hold no heritage significance.

Lighting options were explored to achieve the design objectives whilst considering the key viewpoints and user journeys around the platform. These options are listed below:

1. Suspended, decorative luminaires
2. Continuous linear luminaires positioned below the trusses
3. Discrete luminaires with strategically-placed light

The preferred solution was a combination of option 1 and 3 as shown in Fig.5.1.6c. The discrete solution minimises the visual clutter within the space whilst illuminating key elements and surfaces.



Figure 4.1.6a: Retained Roof A existing lighting scheme



Figure 4.1.6b: Retained Roof A lighting scheme in 1990s

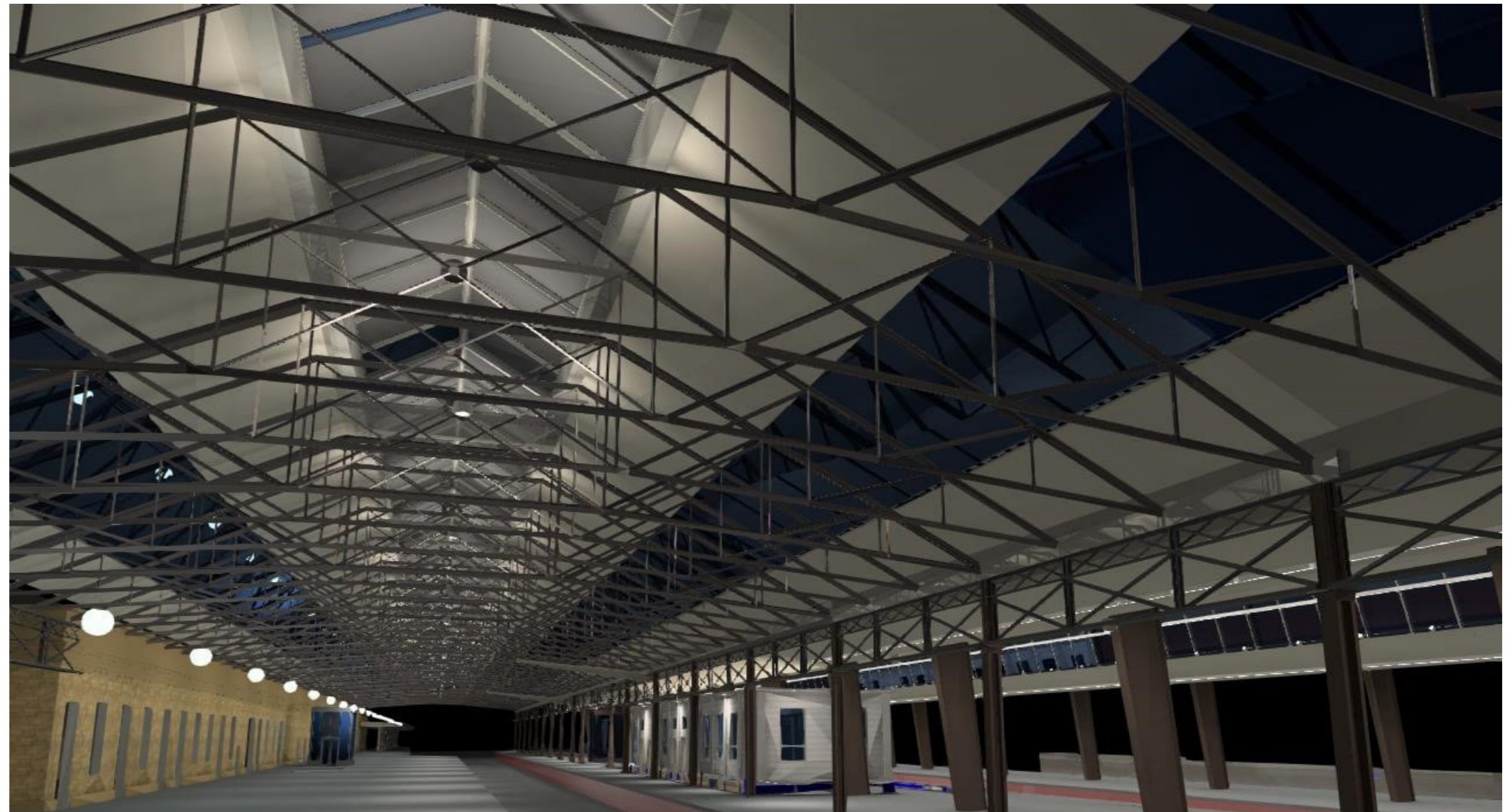


Figure 4.1.6c: Proposed lighting scheme

The lighting scheme will comprise the following elements:

- Discrete downlights surface-mounted to the underside of the trusses to provide safe illumination at platform level. The downlights will be positioned in two rows; one row on the widest section of the platform closest to the station building and one row on the Tea Room platform.
- A row of suspended, decorative pendants will be mounted on the platform closest to the station building. These luminaires will provide safe illumination at platform level and will also distribute light into the roof void to create a welcoming, low contrast environment.
- A discrete, linear luminaire will be positioned on the topside of the trusses to illuminate the architecture and structure of Retained Roof A. The uplight element will provide a visually comfortable environment by minimising the contrast between light and dark in the evening.

4.1.8 Structural considerations

The existing trainshed roof trusses are formed from a series of tees, flats, bars compound I-section connected with rivets, bolts and wedge details. The roof has undergone a number of structural interventions throughout its history including the removal of the original lantern and strengthening works in the 1980's and again in 2013.

A number of further interventions are required as part of this scheme. This section summarises the structural design for each of these.

4.1.8.1 Design approach

The principles followed in the development of the structural design are as follows:

- Conservation to be the first assumption
- If conservation is not possible in place, then repairs and strengthening works will be applied
- Repairs are not to replicate the effects of ageing
- Modern elements are to be expressed as modern

Following the conclusion of GRIP3, a number of surveys have been undertaken to develop a detailed understanding of the geometry,

condition and material properties of the structure.

The results of tests on the material composition concluded that the original roof is formed from early poor-quality mild steel. The only exception to this are the two cast-iron columns adjacent to the subway on the existing island platform.

The dimensional survey results were incorporated into structural design models of the roof. The behaviour of the roof has been considered under a range of load conditions including roof finishes, access, wind, snow, and the reinstatement of the lantern.

Adjusting the load allowance for roof finishes gave scope to influence the behaviour of the roof. By increasing the roof finishes, design issues associated with wind uplift has been minimised.

4.1.8.2 Strengthening works

The results of the design models showed that a number of elements across the length of Roof A require strengthening for the roof to be safely retained.

The proposed strengthening details typically involve bolting additional mild steel plates to the existing sections to increase capacity. This approach minimises the visual impact of the works and follows similar approaches taken for previous interventions.

The diagonal elements on Fig.5.1.9.2a are to be strengthened across the entire length of the roof. Flat plates will be bolted to either side of the web and to the top of the flange of the tee section in order to achieve the required capacity.

The first 6No. retained trusses at the Manchester end of the roof are subject to wind uplift. The effects of the wind uplift have been minimised through the use of roof finishes, however, given the slender nature of the bottom boom, this causes a buckling issue in the current condition. As well as strengthening the central section by bolting flat plates to either side, plan bracing will be provided between the first two trusses with ties provided to the subsequent four. This is required to limit the effective length of the bottom boom. Where the Principal Building projects above the eaves of the roof, snow drifting causes the top boom adjacent to the building to

become over-utilised. In this location it is not possible to attach flat plates to the existing elements to achieve the required strength due to roof coverings. In this instance angle sections will be bolted to the section to create an I-section.

4.1.8.3 Lantern reinstatement

The lantern structure will be formed as a portal frame from mild steel sections following the proposed profile. The frames, spanning the existing opening to the centre of Roof A, will be located on each truss line.

Eaves and ridge beams will span between each frame to tie them together.

The structure will be stabilised in the longitudinal direction by bracing to the end bays at either end. The bracing will be formed from steel bars.

4.1.8.4 OLE support structure

OLE is to be supported at up to four locations within the existing roof. The support structure will be formed of vertical drop tubes with restraining cables splayed to limit movements to within satisfactory limits for the operation of the OLE. The structure will be supported from beams spanning between the top booms of the existing trussed roof.

4.1.8.5 Removal of Roofs B & C

To facilitate the proposed P-way to the west of the station, the existing Roofs B & C are to be removed. A full historic recording of Roofs B & C will be carried out prior to demolition. The design of Roof A considered the impact of this loss of structure. It was concluded that Roofs B & C provide no lateral stability to the retained Roof A and, as such, it is structurally acceptable for them to be removed.

The Contractor will be required to approach the demolition of Roof B & C with caution to ensure that no damage is caused to the retained roof, particularly when working on the shared column line between Roof A and Roof B.

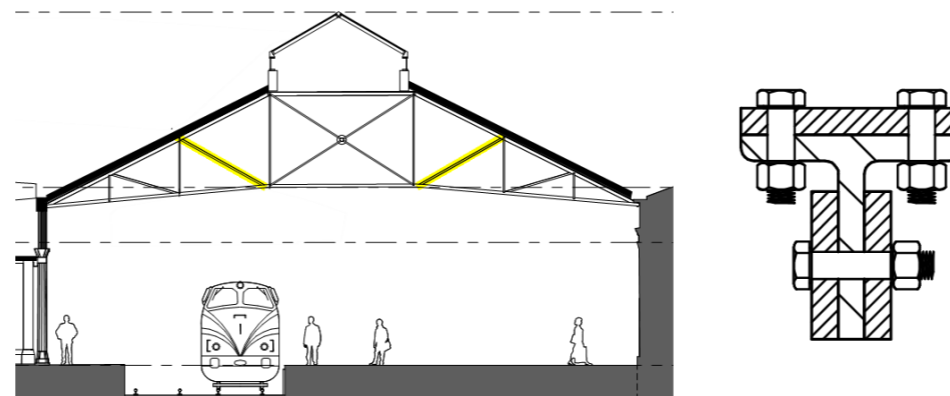


Figure 4.1.9.2a: Strengthening detail to diagonal elements

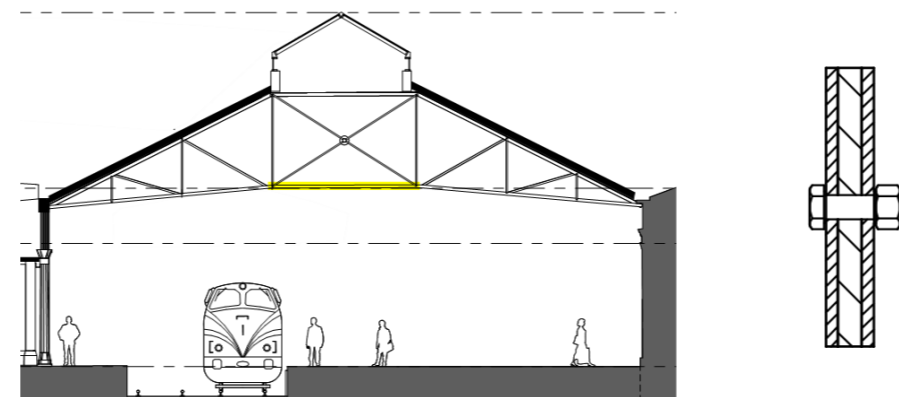


Figure 4.1.9.2b: Strengthening detail to bottom boom of 6No. trusses at Manchester end of Roof A

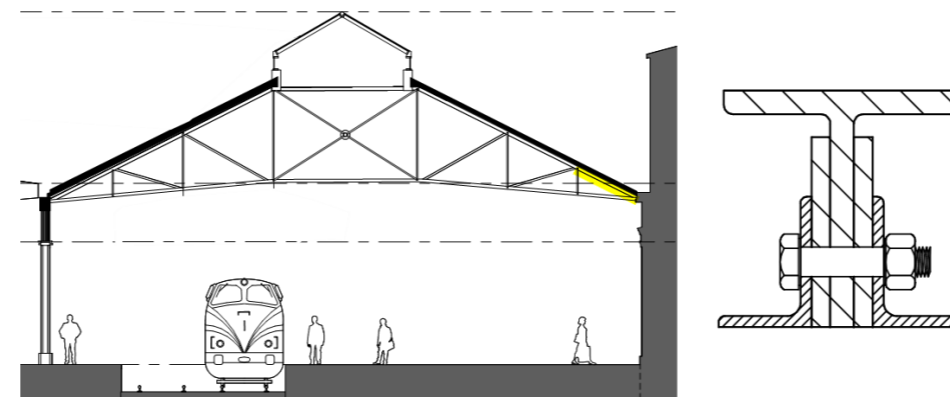


Figure 4.1.9.2c: Strengthening detail to top boom

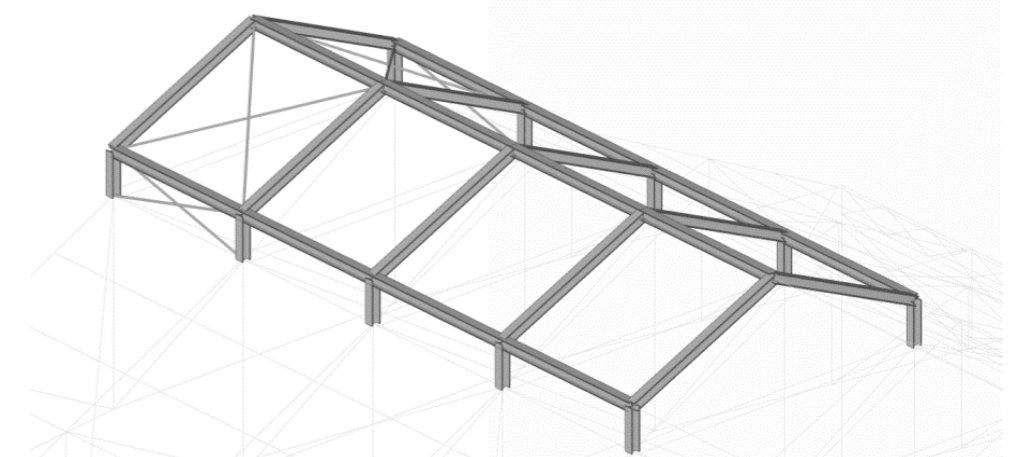


Figure 4.1.9.3a: Proposed lantern structure

4.2 Detail Development Roof A

4.2.1 Roof A Build up

The new build up for Roof A will be from the outside, new slate roof tiles sitting on 25 x 50mm timber slate battens on a sarking layer which will sit on 25 x 50mm timber counter battens which will prevent water from being trapped in the build up.

This will then be sat on a metal liner tray deck that will provide a substrate that can be installed more safely and faster than traditional timber joists but will remain concealed. This will then be underdrawn with 150 x 25mm square edge timber boarding, coloured off white on 25 x 50mm battens.

The underside of roof A will respect the heritage of the building while also employing modern construction techniques to provide a safe and efficient solution.

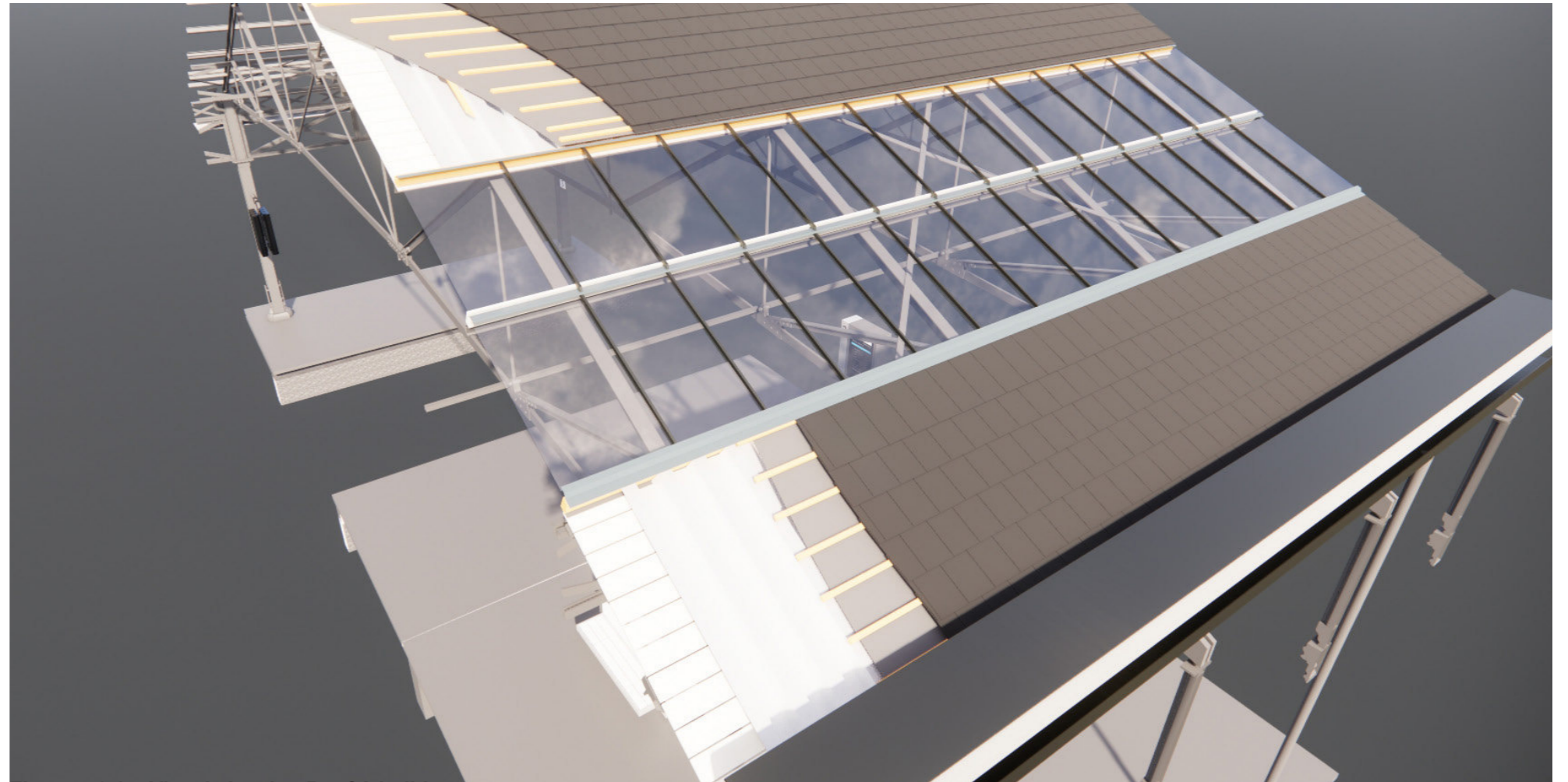


Figure 4.2.1a: Visual showing Roof A build up



Figure 4.2.1b: Visual showing underside of Roof A

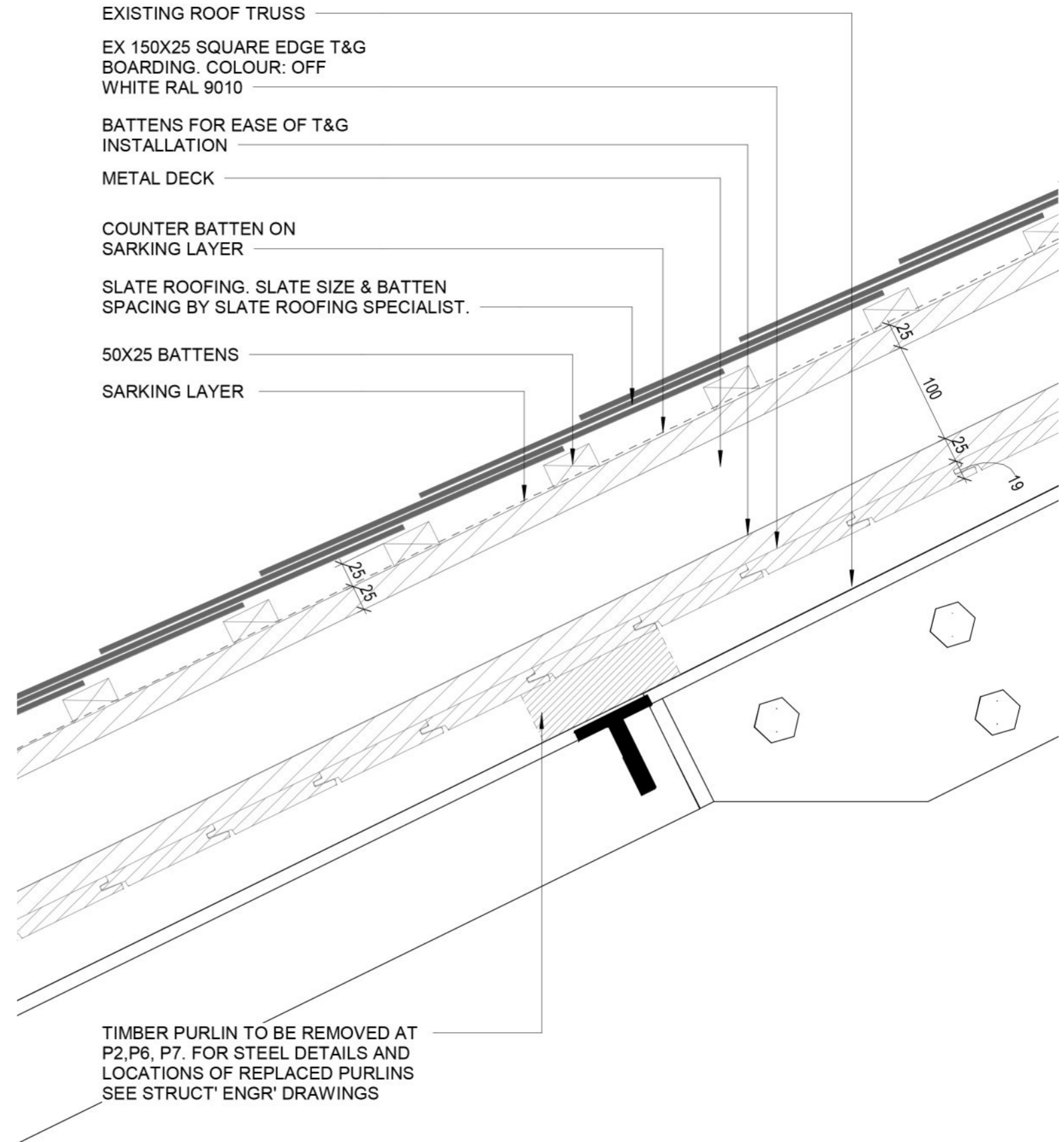
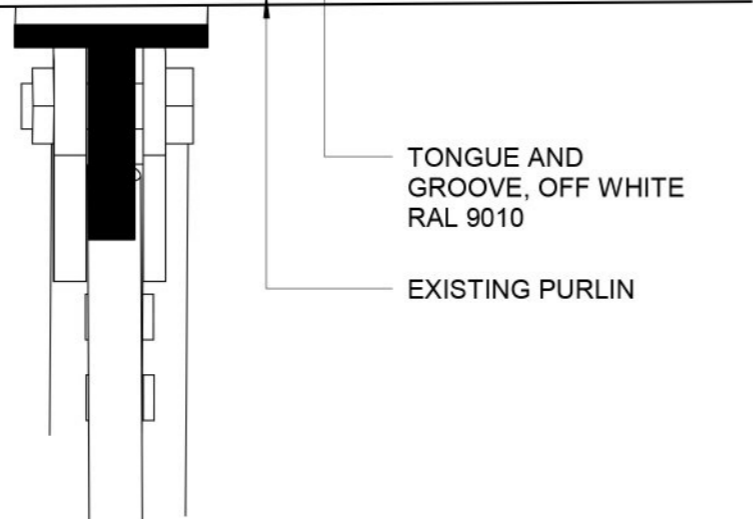
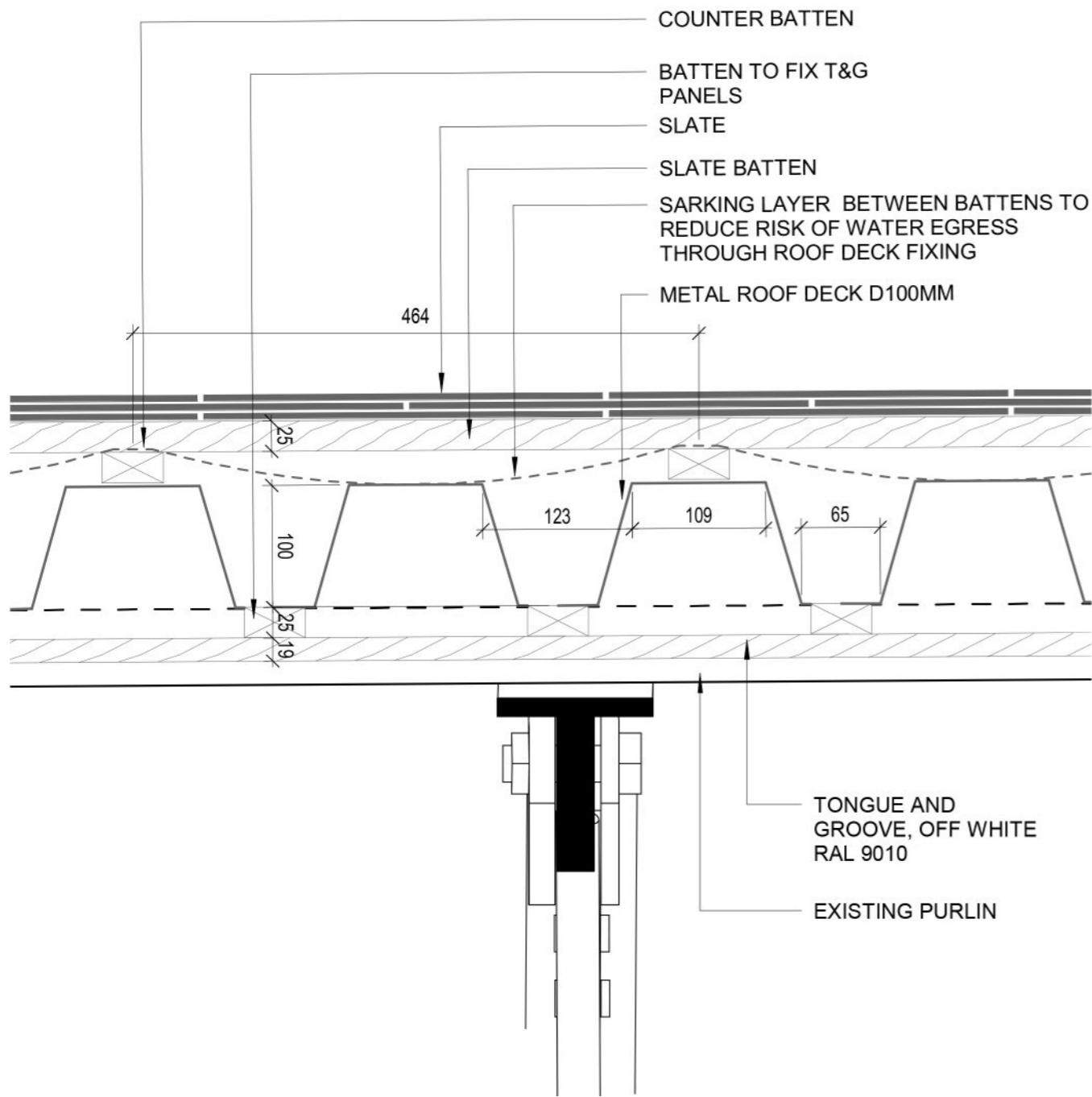


Figure 4.2.1c: Section details showing build up of Roof A

4.2.2 Polycarbonate Roof lights

Instead of traditional glazing, polycarbonate is being used as the material for the rooflights that are being reinstated in Roof A, these have been chosen due to their light weight properties that will improve the safety and speed of installation as well as replacement. This has been reviewed by the Station Security Group.

We have chosen a glazing rhythm that would have been similar to that of the original roof, respecting the heritage even though this is a modern material, again providing a safe and efficient solution.

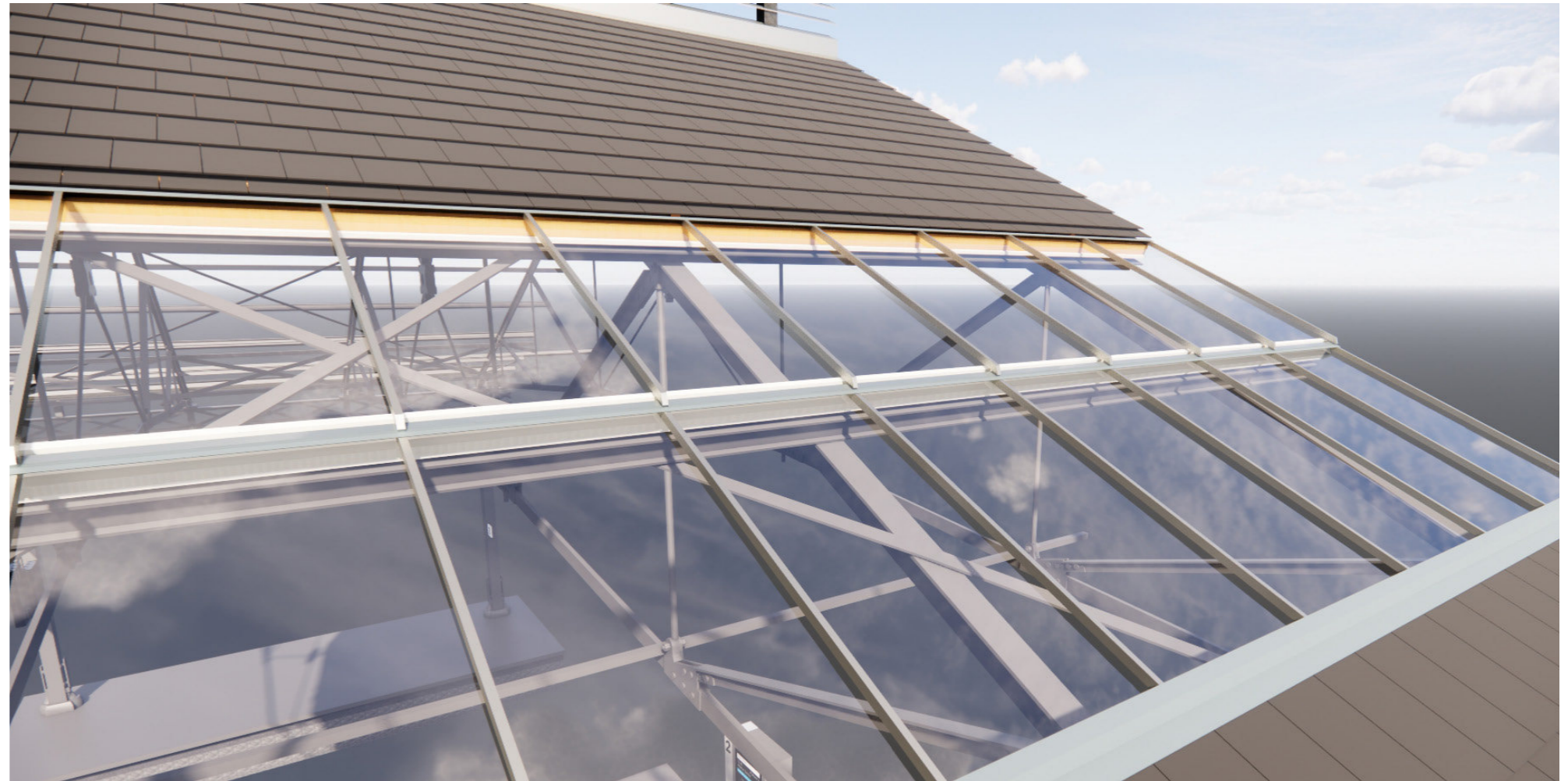


Figure 4.2.2a: Visual showing polycarbonate rooflights

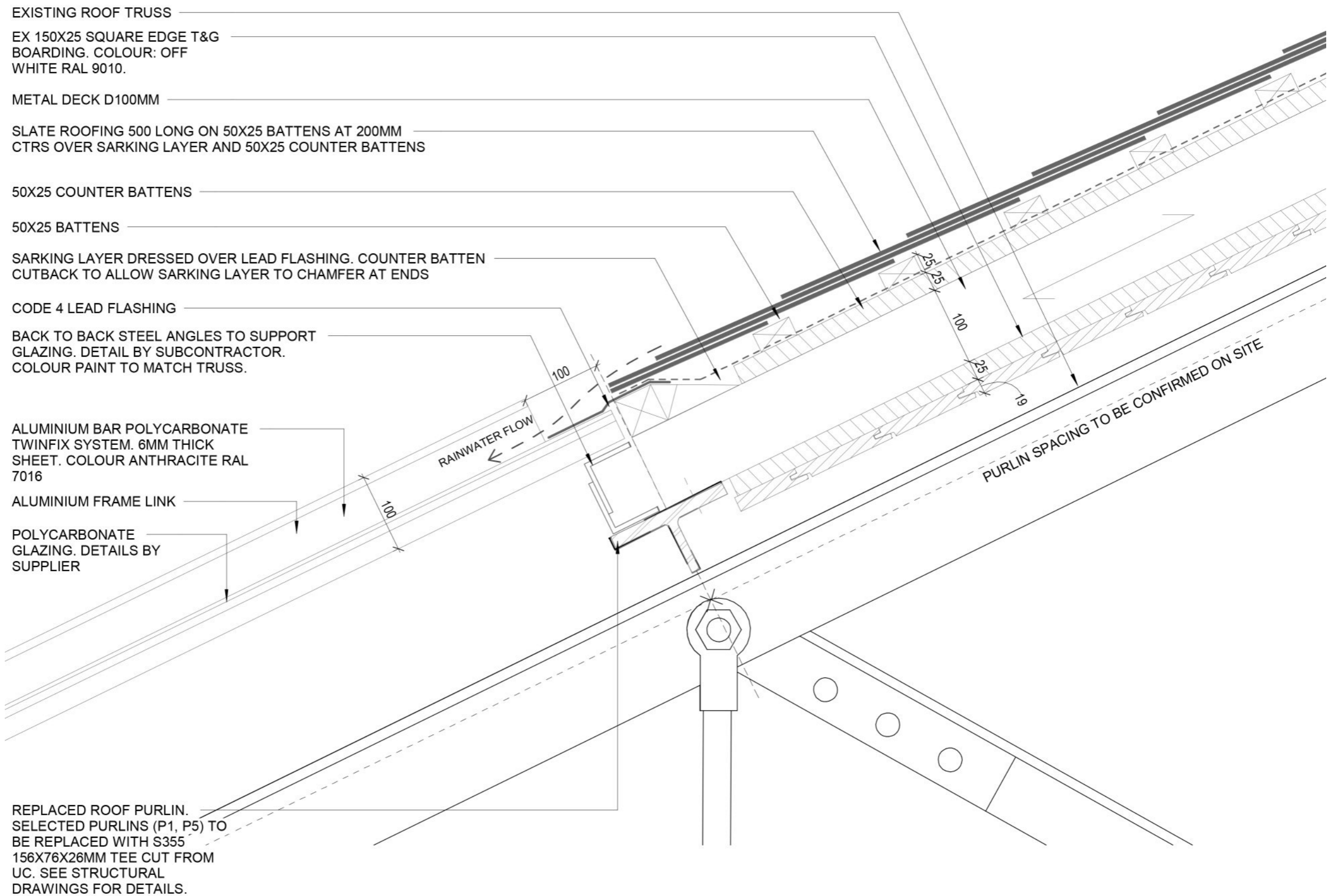


Figure 4.2.2b: Section detail showing roof light and slate roof interface

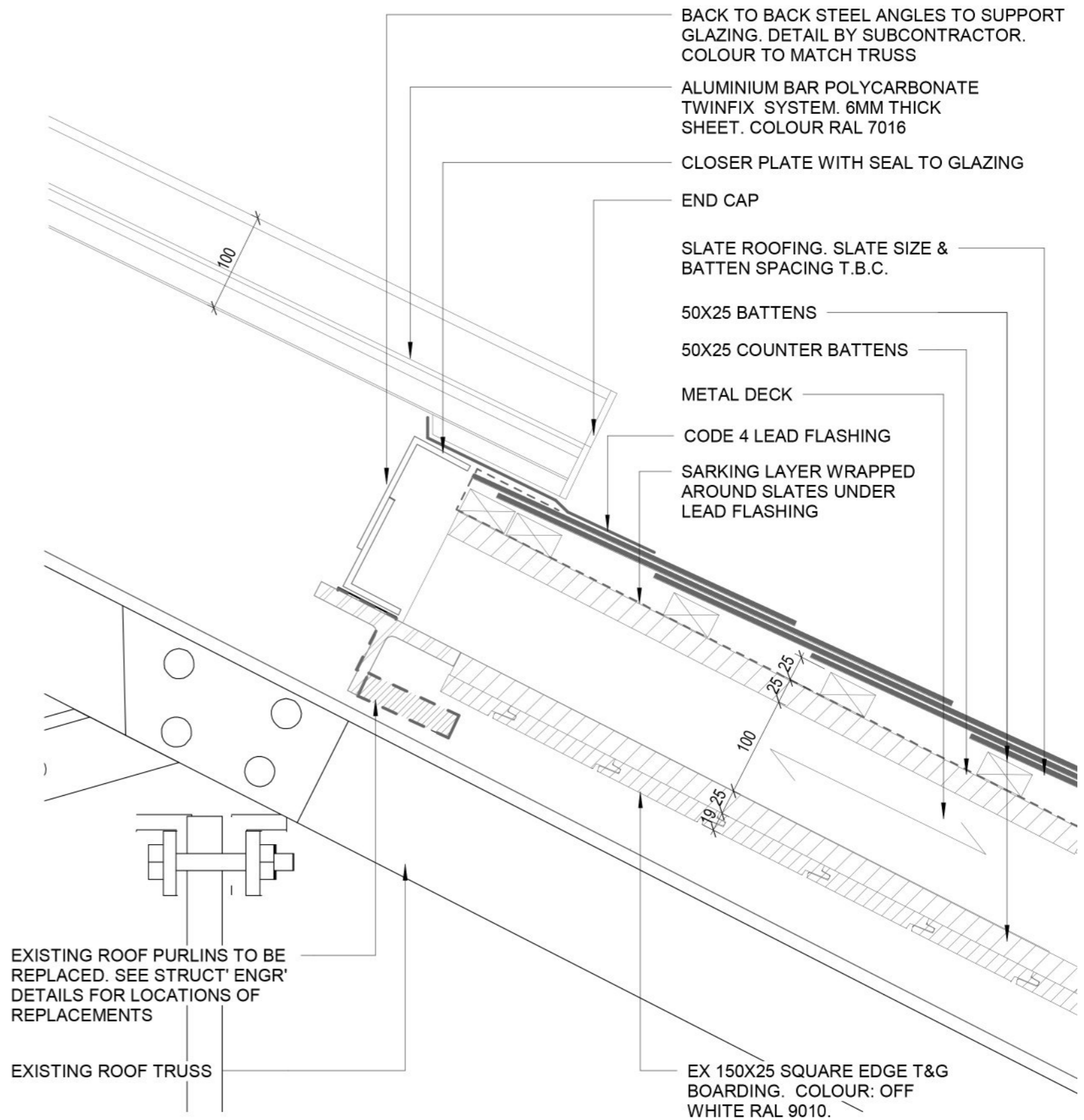


Figure 4.2.2c: Section detail showing roof light and slate roof interface

4.2.3 Lantern

The lantern will be reinstated using modern materials as opposed to providing a heritage aesthetic. This is so that we are honest about the new interventions at the station and also making it easy to understand the ongoing evolution at the station through its detailing.

This new section will have a standing seam roof which is part of an insulated cladding panel, chosen so that it can span between trusses without additional purlins. The underside of the panel will be coloured the same as the Roof A soffit with the grooves of the cladding panel running in the same line as the Roof A soffit.

To the sides of the lantern we are proposing static louvres coloured grey.

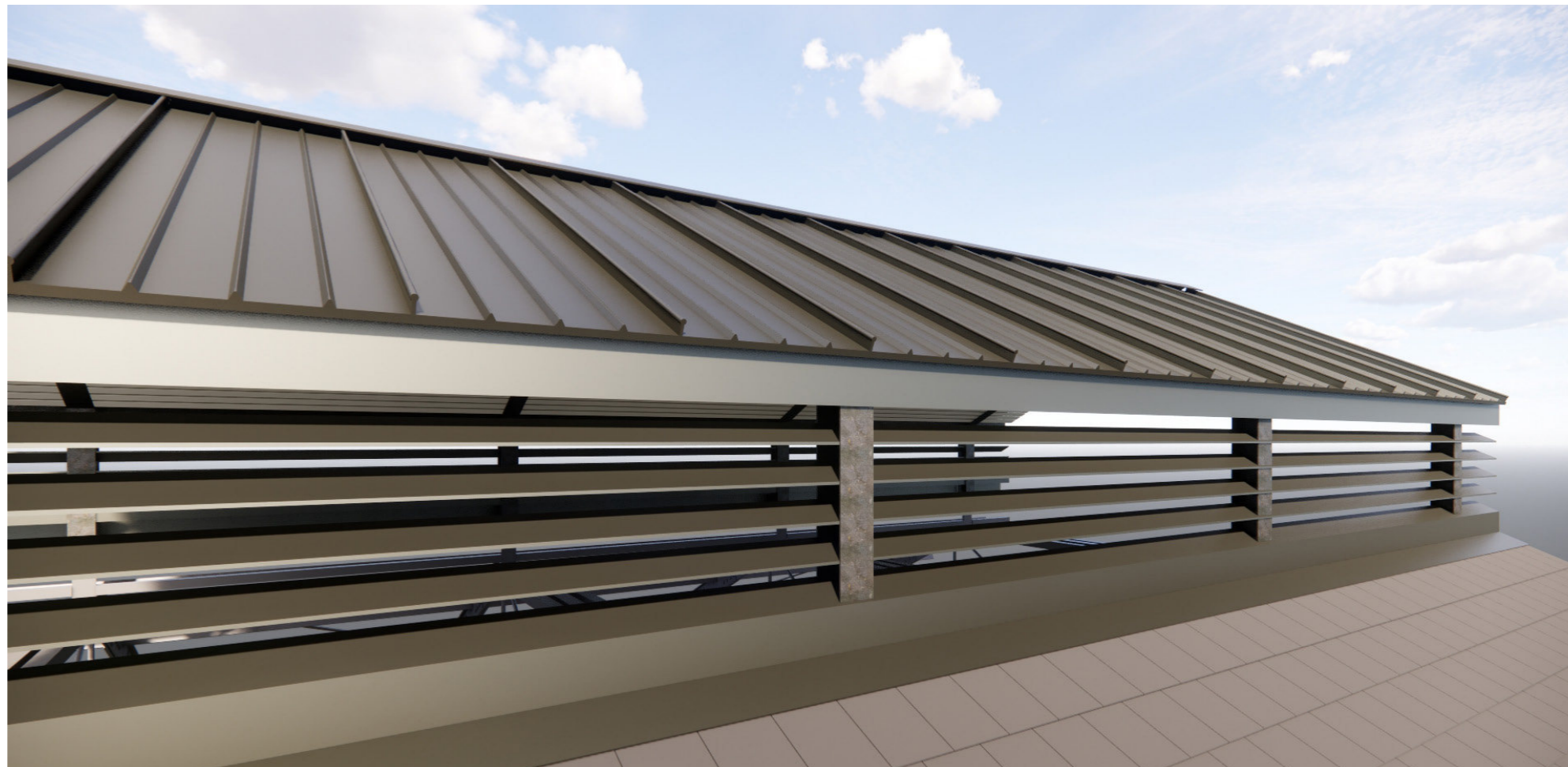


Figure 4.2.3a: Visual showing new lantern

INSULATED STANDING SEAM ROOF PANEL. KINGSPAN ZIP IP OR SIMILAR. CEILING UNDERLAY TO HAVE A OFF WHITE COLOUR RAL 9010.

KZ1-500 HALTER CLIP AT RIDGE AND EAVES POSITIONS ONLY. SELF-DRILLING SELF-TAPPING FIXINGS WITH MINIMUM 19MM DIAMETER NON-FERROUS EPDM BACKED WASHER. MAX 300MM FROM RIDGE LINE. SEE SUPPLIER DRWGS FOR DETAILS

SIDE JOINT FILLER BEDDED ON GUN GRADE SEALANT

STITCHING SCREWS WITH MIN. 14MM DIAMETER

ALUMINIUM FASCIA

18MM PLY EXTERNAL GRADE

TIMBER PACKING

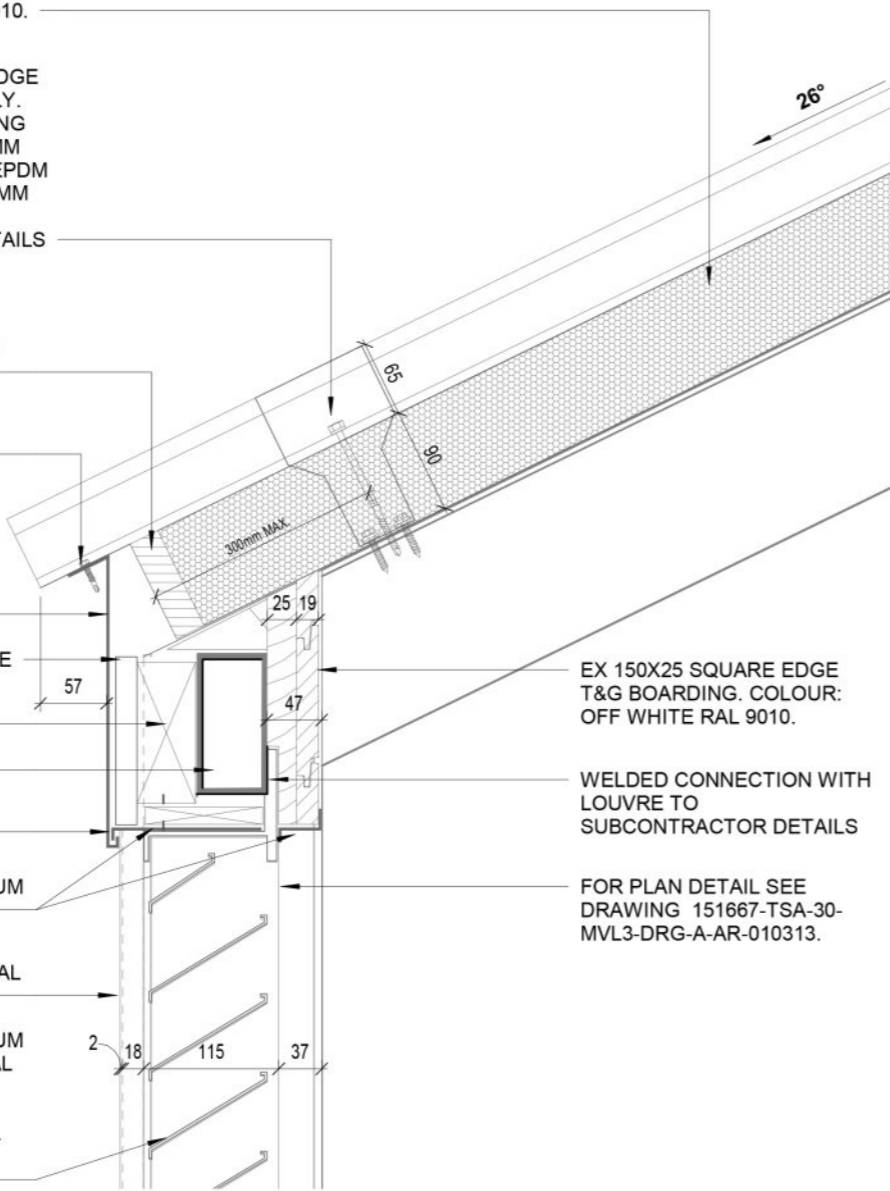
120X60 EAVES TIE

WELTED DRIP DETAIL

POWDER COATED ALUMINIUM CLOSER FLASHING

METAL CLADDING TO PORTAL FRAME MEMBRANES

POWDER COATED ALUMINIUM LOUVRES BETWEEN PORTAL FRAMES. SELF-TAPPING SCREWS TO TOP AND BOTTOM STEEL SUPPORTS. INTERNAL FIXINGS BY SPECIALIST



INSULATED STANDING SEAM ROOF PANEL. KINGSPAN ZIP IP (KS1000) COLOUR ANTHRACITE GREY 7016. CEILING UNDERLAY TO HAVE A OFF WHITE COLOUR RAL 9010. INTERNAL FIXINGS BY SPECIALIST

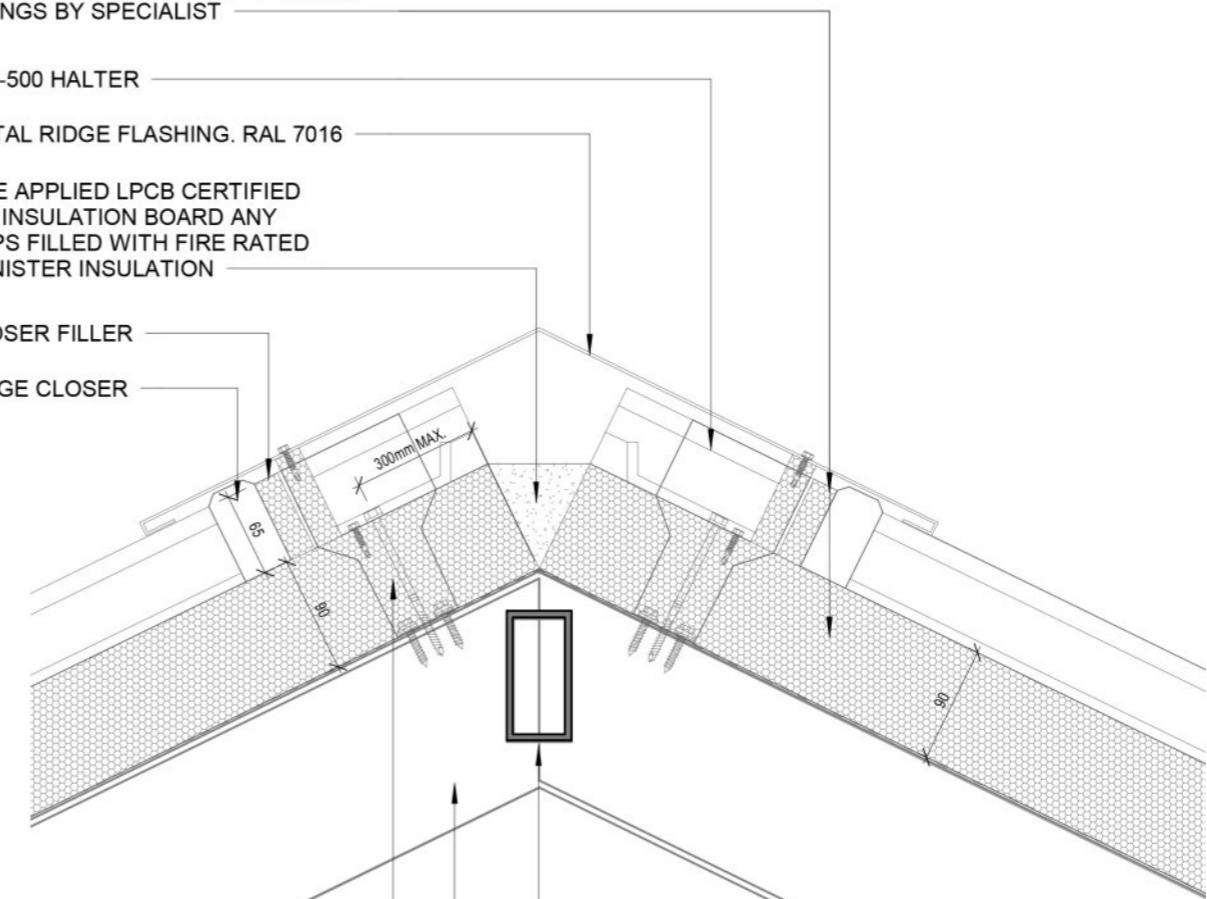
KZ1-500 HALTER

METAL RIDGE FLASHING. RAL 7016

SITE APPLIED LPCB CERTIFIED PIR INSULATION BOARD ANY GAPS FILLED WITH FIRE RATED CANISTER INSULATION

CLOSER FILLER

RIDGE CLOSER



KZ1-500 HALTER CLIP AT RIDGE AND EAVES POSITIONS ONLY. SELF-DRILLING SELF-TAPPING FIXINGS WITH MINIMUM 19MM DIAMETER NON-FERROUS EPDM BACKED WASHER. MAX 300MM FROM RIDGE LINE. SEE SUPPLIER DRWGS FOR DETAILS

152X152X23 PORTAL FRAME

EX 150X25 SQUARE EDGE T&G BOARDING. COLOUR: OFF WHITE RAL 9010.

WELDED CONNECTION WITH LOUVRE TO SUBCONTRACTOR DETAILS

FOR PLAN DETAIL SEE DRAWING 151667-TSA-30-MVL3-DRG-A-AR-010313.

Figure 4.2.3b: Lantern section details

4.2.4 Lantern gable

The majority of the gable end will be open, apart from the lantern section which will be glazed. This will protect the soffit to a degree and the top chord of the Euston Truss at the Manchester end of the station. The flashings will be metal and coloured blue to match the footbridge and the new gable end of Roof B.



Figure 4.2.4a: Visual showing Roof A gable end

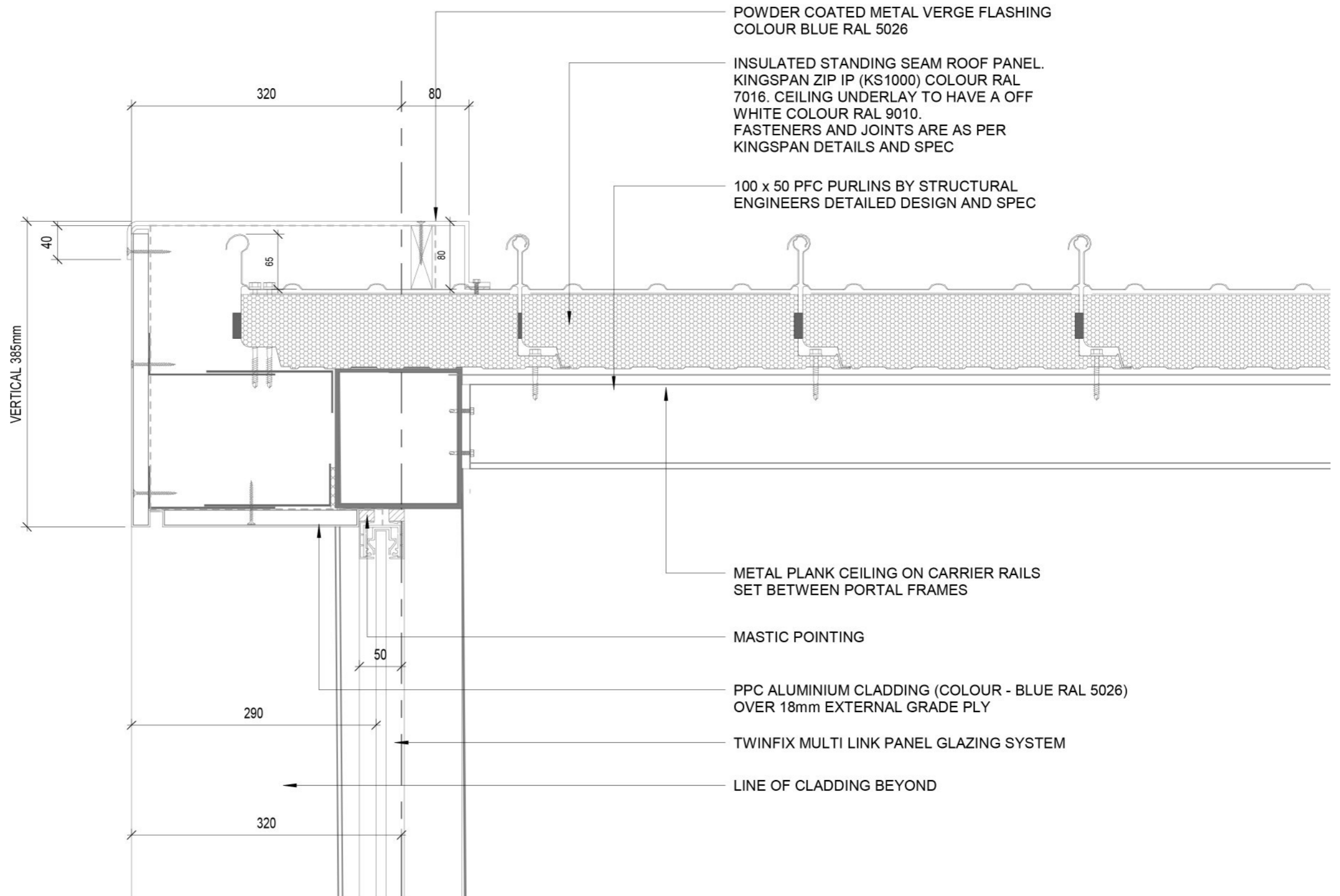


Figure 4.2.4b: Section detail through top of roof A gable end

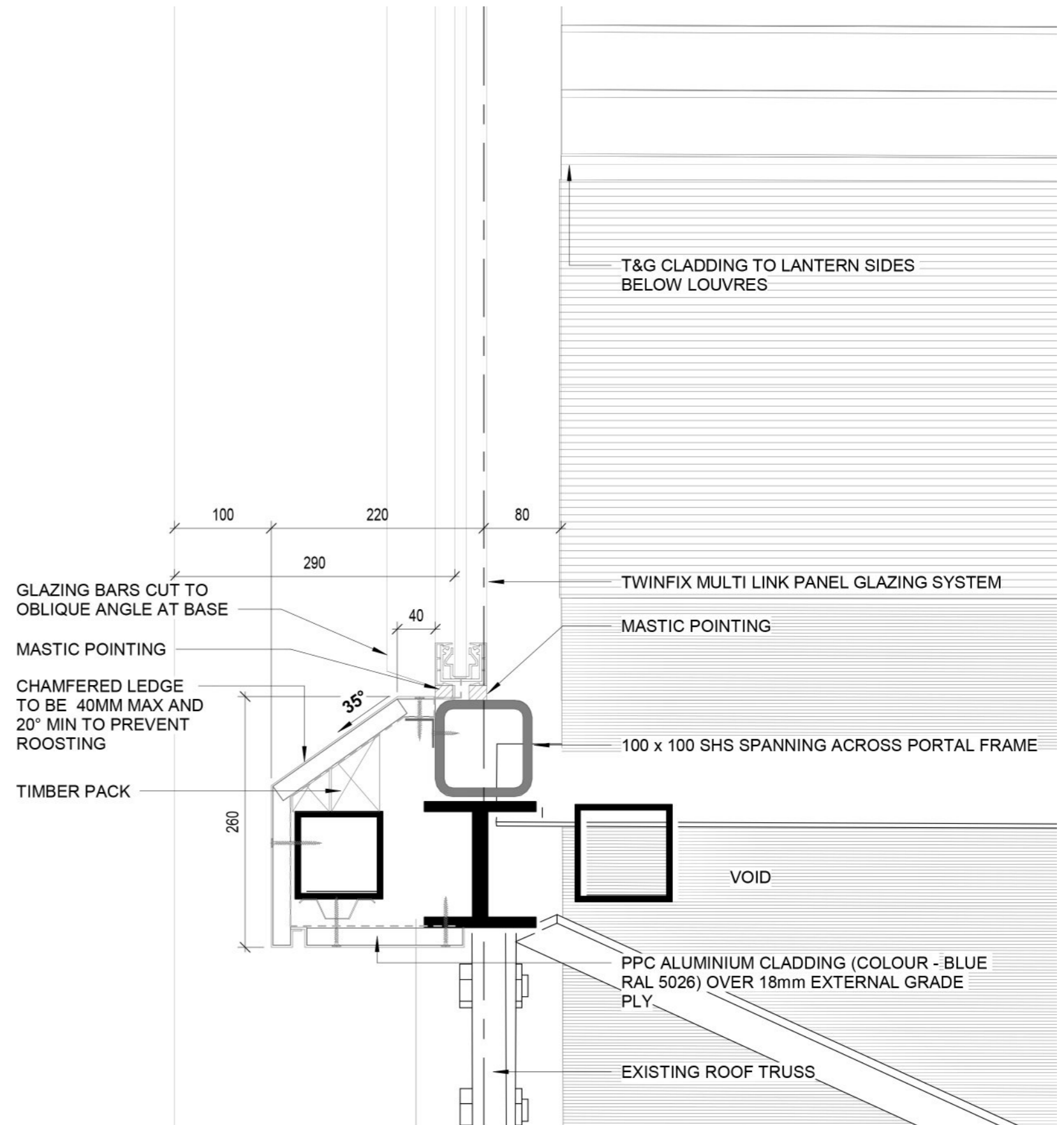


Figure 4.2.4c: Section detail through bottom

4.2.5 Access walkway

The eastern section of Roof A will be accessed in the same manner as it is now. Access is provided through the Principal Building onto a walkway at the interface between Roof A and the Principal Building façade or parapet. This access and walkway will be replaced and upgraded. There will be a provision of a fall arrest system alongside the walkway. The extent of the system will be indicated in the Access and Maintenance drawings in chapter 5.

The walkway will continue to the new extension of the Leeds end of roof A with a guard rail. This section is only visible from the car park. The walkway will stop 3000mm from the both ends of Roof A to prevent operatives from falling over the roof edge.

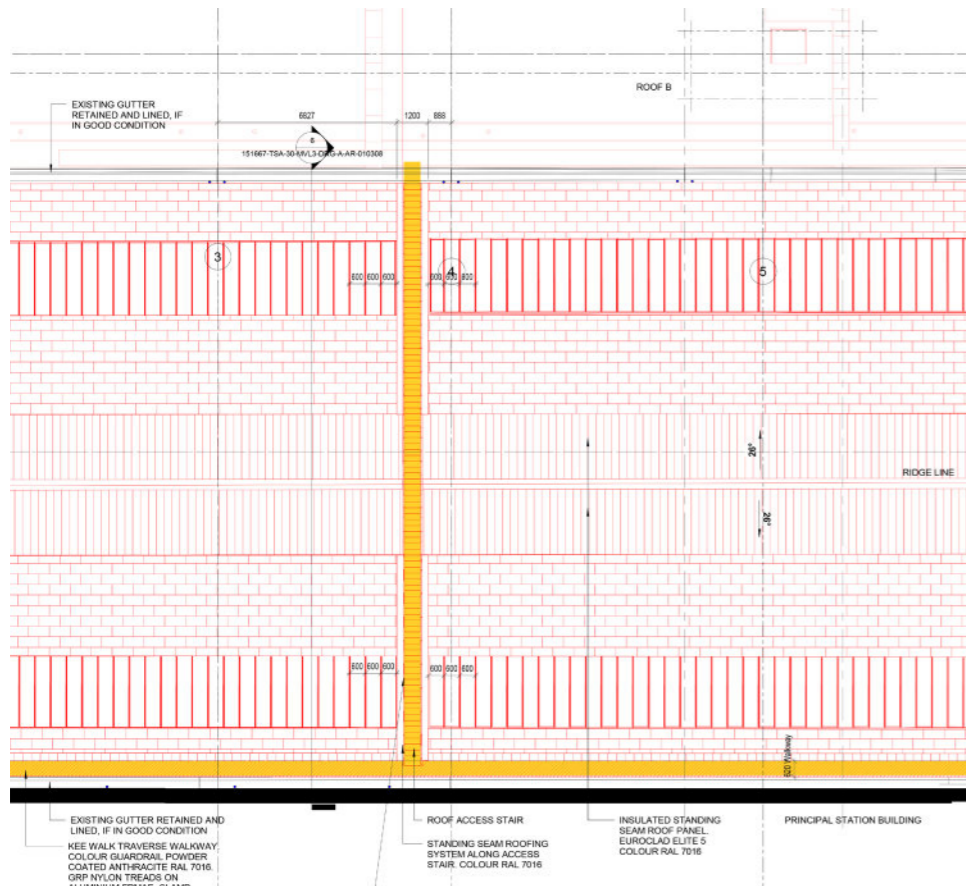


Figure 4.2.5a: Roof A plan, showing access walkway highlighted

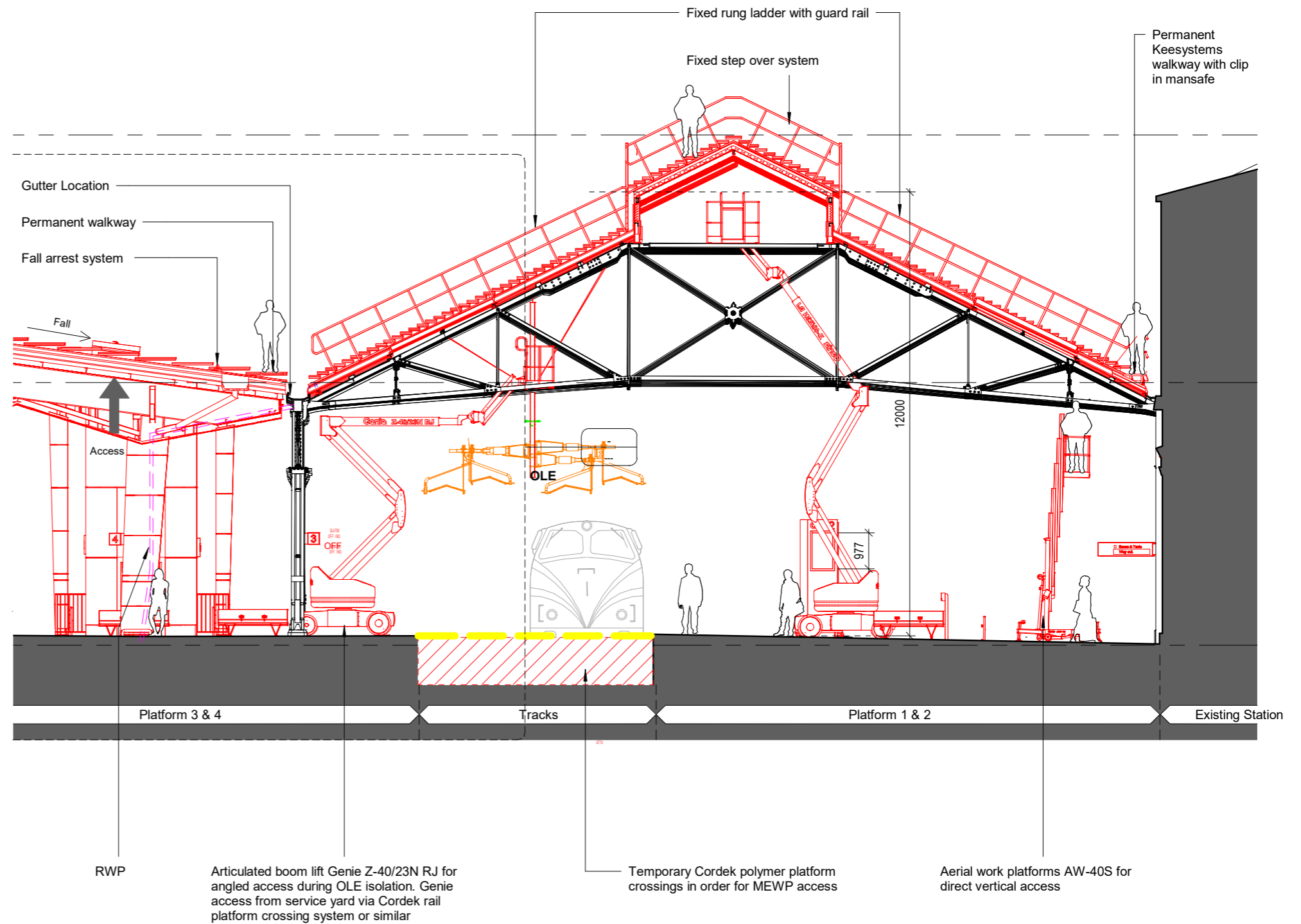


Figure 4.2.5b: Access walkway section over roof A lantern

To access between the both sides of roof A, a permanent stepped access will be centred behind the principal station building in order to reduce the visual impact from St George's square. All of the elements of the access walkway, for the exception of the new extension guard rail, are hidden behind the station principal building.

Temporary walkways can be added such as the BroadWalk, or equivalent other, by a single operative to access areas further away from the walkway located at the eaves. This is to carry out tactile inspection of the lantern.

There is an emergency ladder access to the walkway onto the new roof A extension that sits between the two cycle park units to allow alternative means of escape.

All the guard rails and stepped access equipment are to be coloured according to the Project's colour specification for the station, as reflected in the Materials Schedule submitted to discharge Condition 2 attached to the granted LBC.

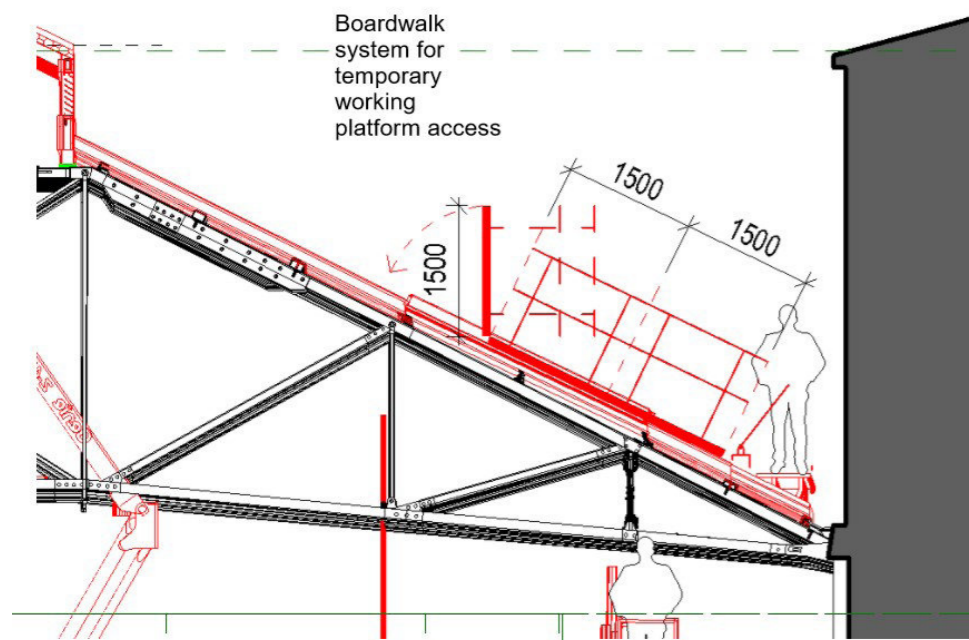


Figure 4.2.5c: Broadwalk temporary access system

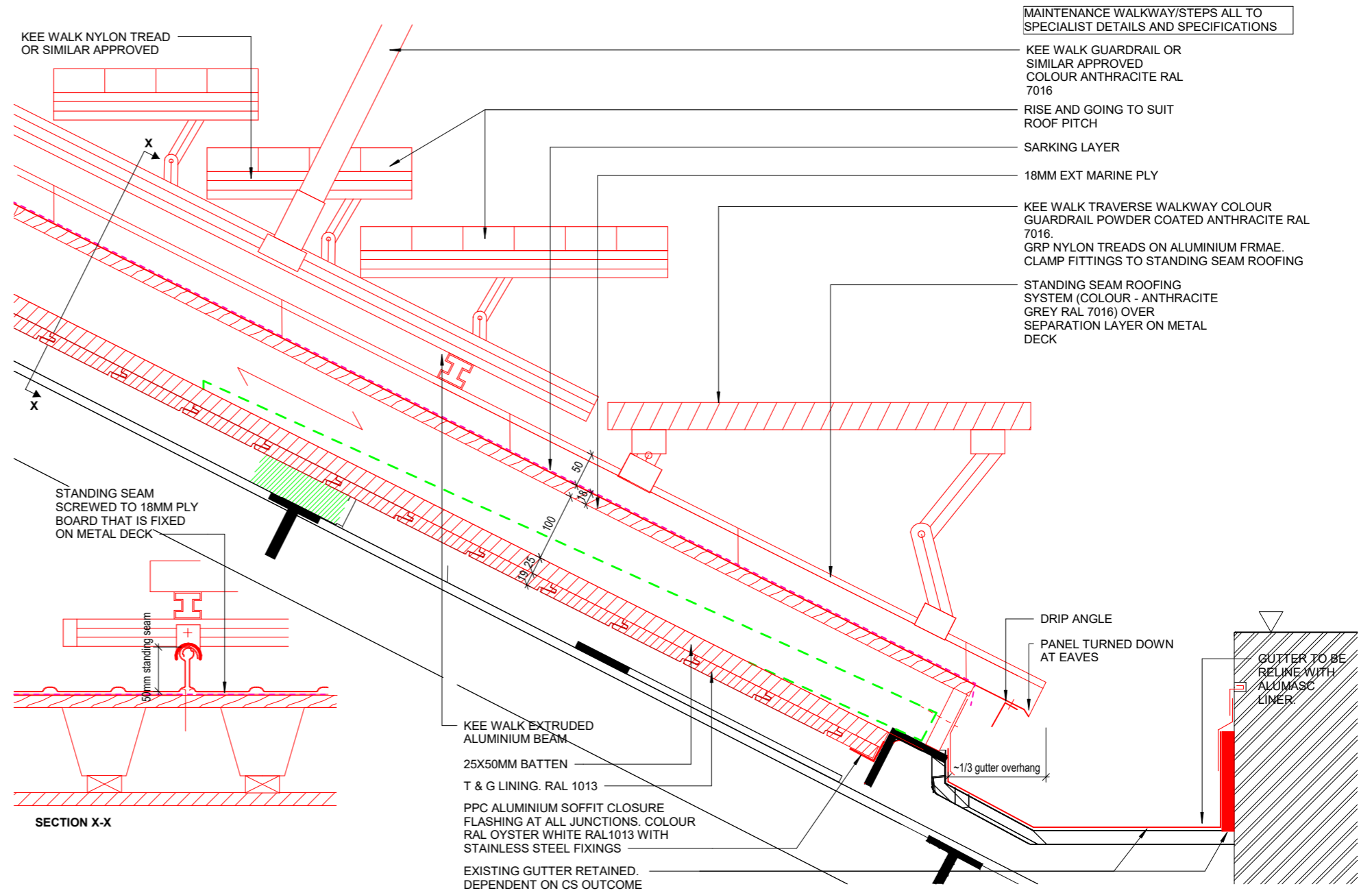


Figure 4.2.5d: Access walkway section at eaves with station building

To access between the both sides of roof A, a permanent stepped access will be centred behind the principal station building in order to reduce the visual impact from St George's square. All of the elements of the access walkway, for the exception of the new extension guard rail, are hidden behind the station principal building.

Temporary walkways can be added such as the BroadWalk, or equivalent other, by a single operative to access areas further away from the walkway located at the eaves. This is to carry out tactile inspection of the lantern.

There is an emergency ladder access to the walkway onto the new roof A extension that sits between the two cycle park units to allow alternative means of escape.

All the guard rails and stepped access equipment are to be coloured according to the Project's colour specification for the station, as reflected in the Materials Schedule submitted to discharge Condition 2 attached to the granted LBC.

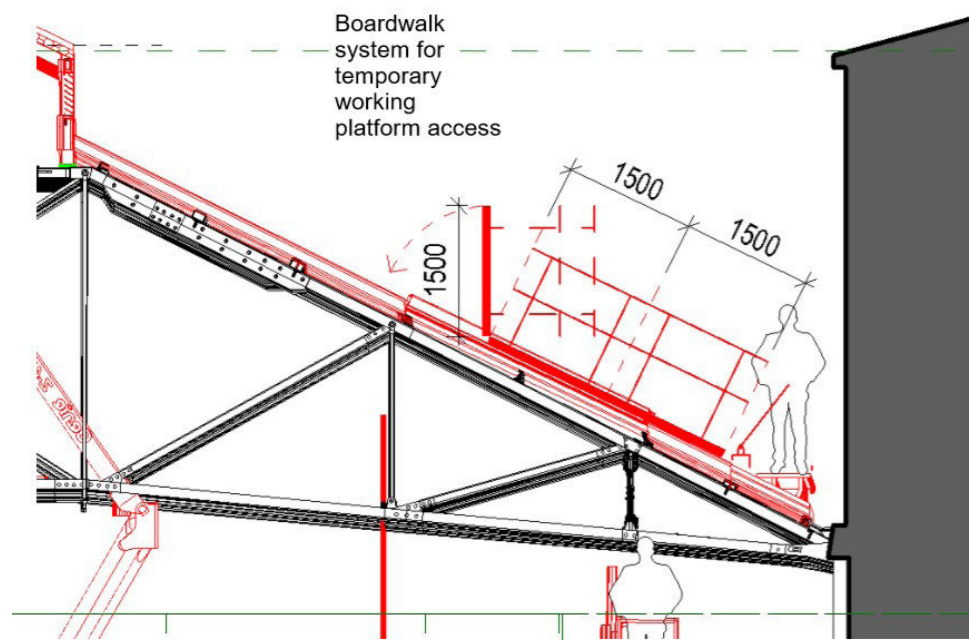


Figure 4.2.5c: Broadwalk temporary access system

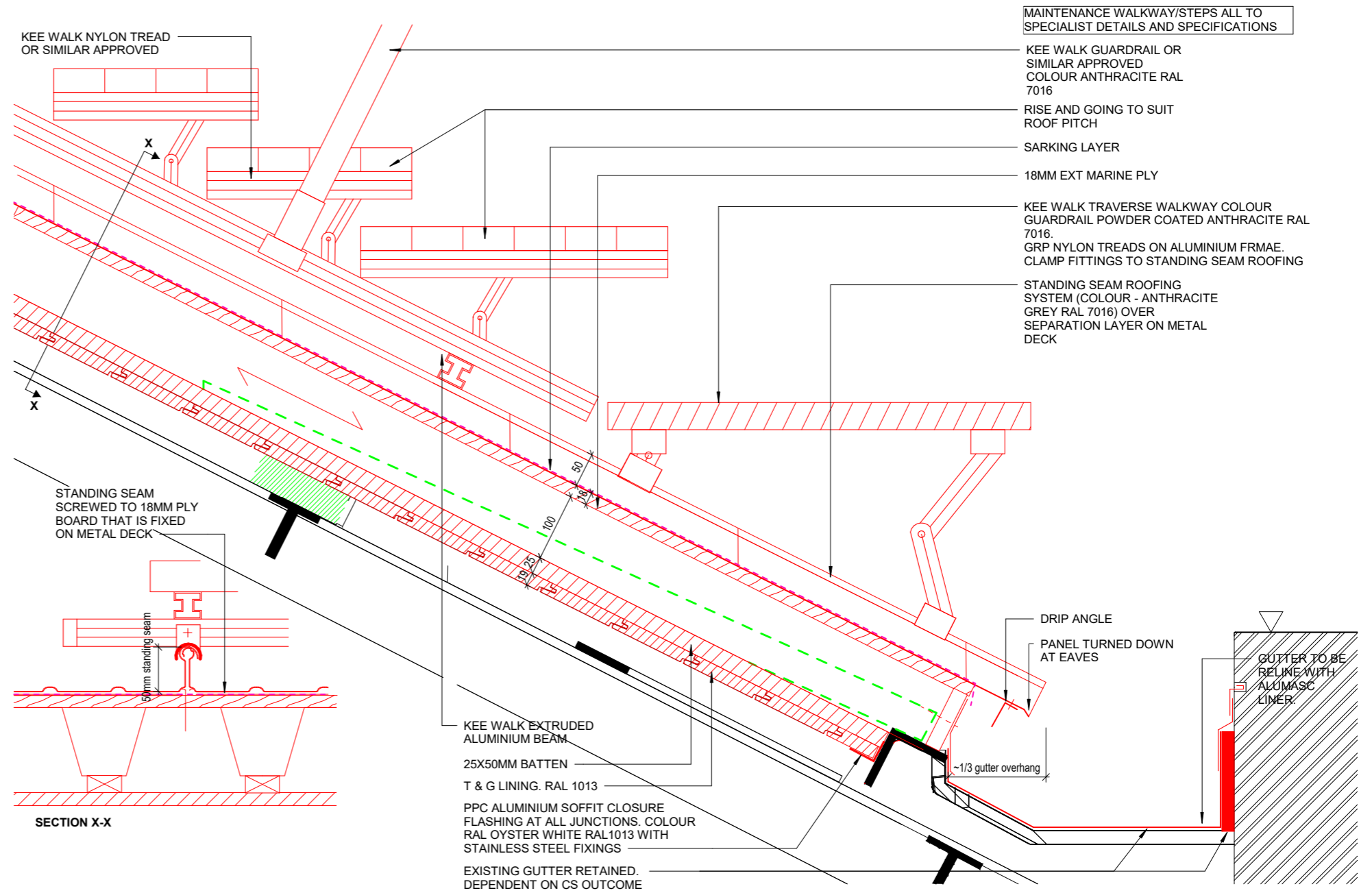


Figure 4.2.5d: Access walkway section at eaves with station building

Access to the western side of the roof will be via permanent access ladders which will pop up from the rooms at the back of lift shafts up on the island platforms onto Roofs B and C.

There will be a walkway on the standing seam with a fall arrest system that will allow access to the valley gutter between roof A and B and the glazing on Roof A. Where Roof B finishes, access will be from a mobile platform along Platform 3/4 at the Manchester end.

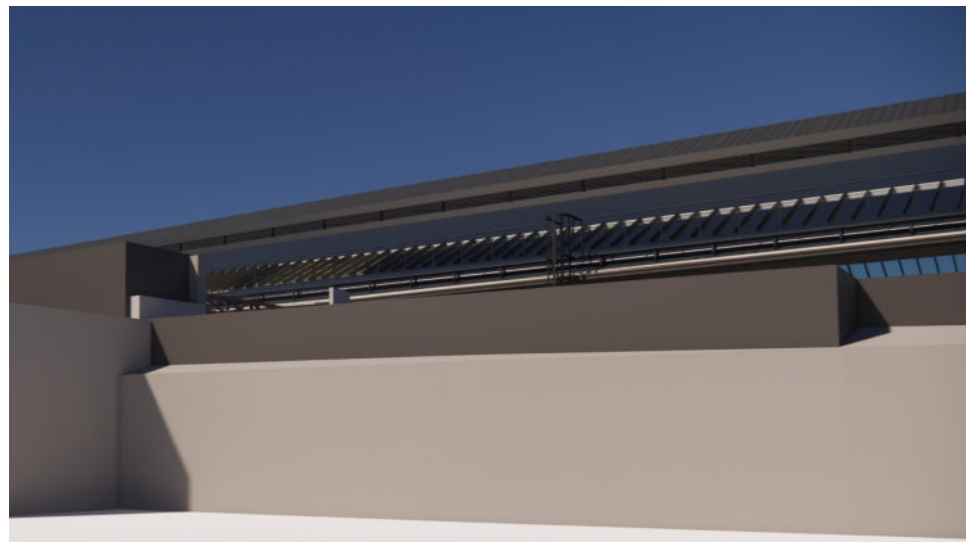


Figure 4.2.5e: Roof A extension walkway view from car park



Figure 4.2.5f: View from St George square

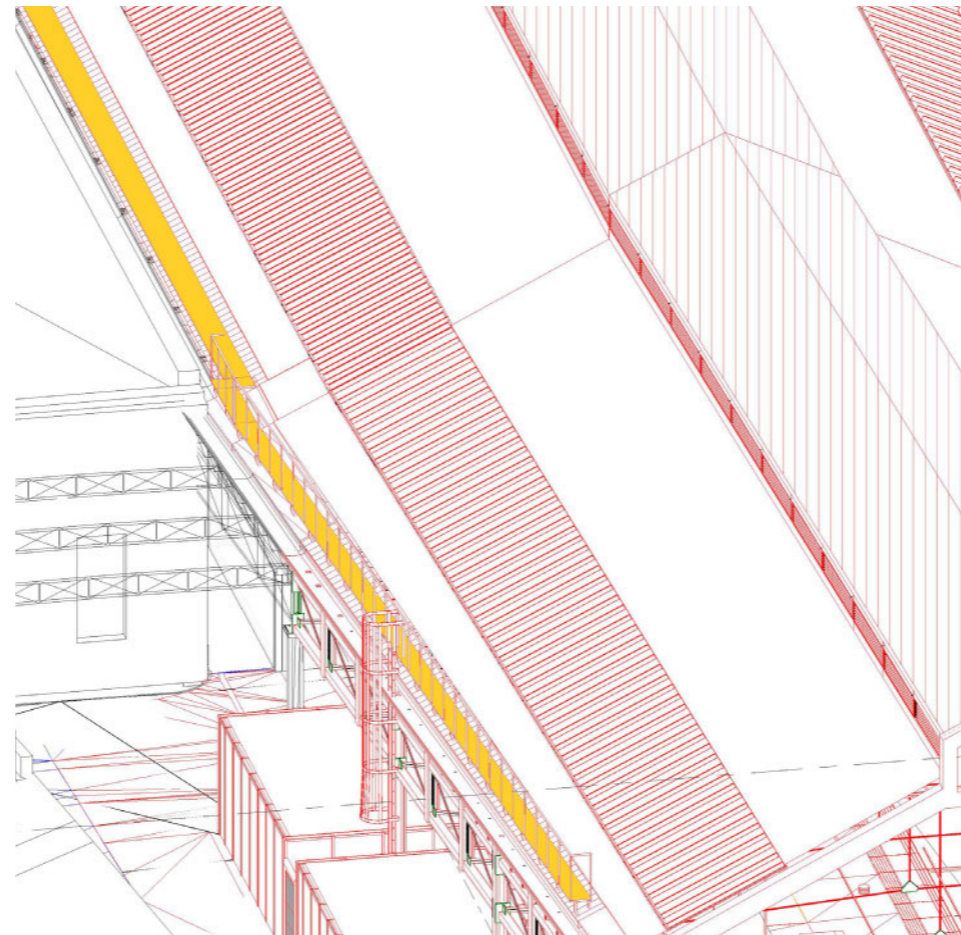


Figure 4.2.5g: highlighted access walkway on roof A extension with emergency ladder

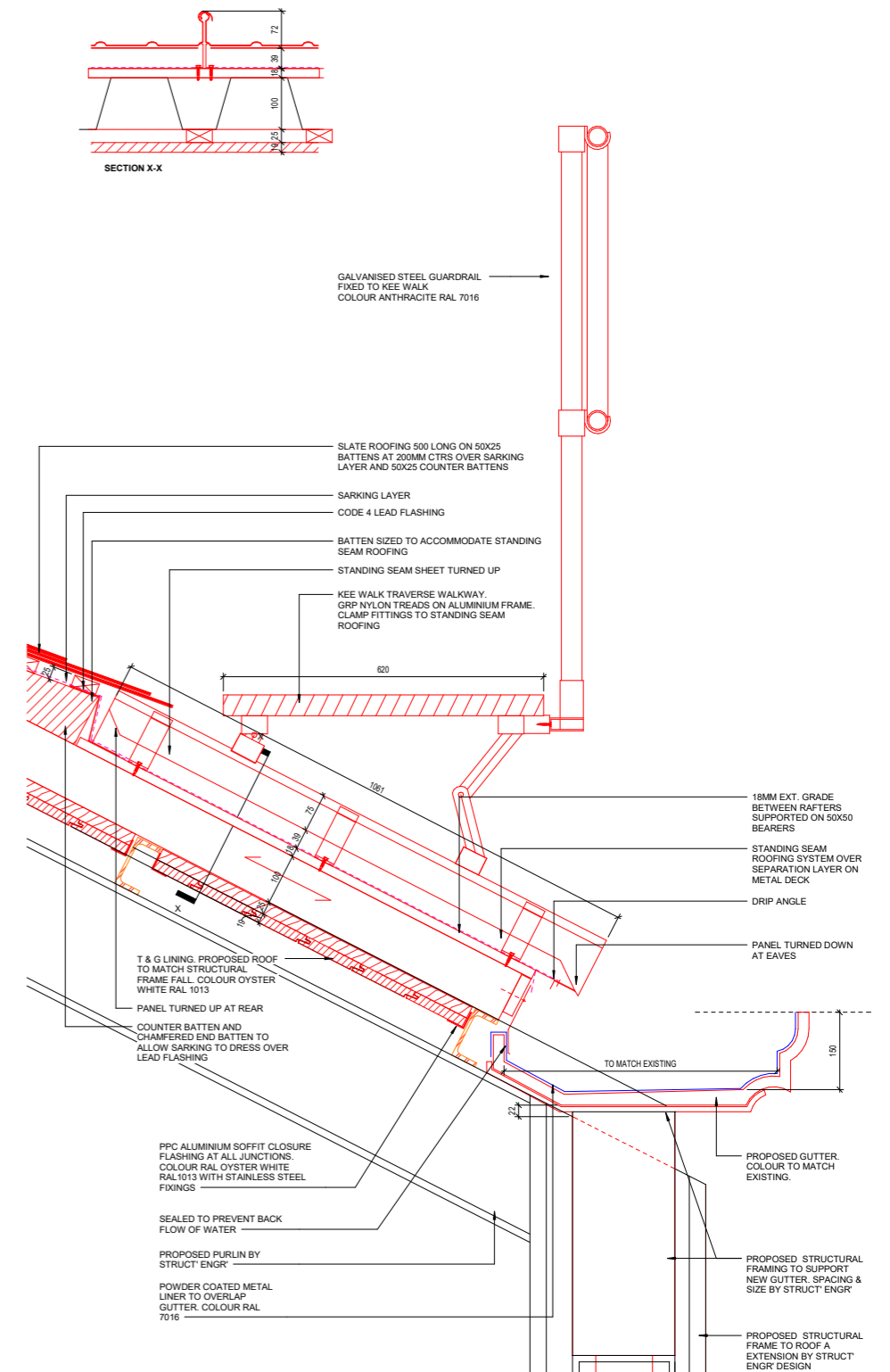


Figure 4.2.5h: Access walkway section on roof A extension eaves

4.3 Detail Development Penistone Line

An extension to the Penistone line canopy is required where the existing Roof A is cut back. It was decided that this extension should retain a similar envelope to the existing canopy while using a new structure to show the honesty of the new interventions.

This will also include new timber dagger boarding that will also feature on the existing canopy where the front is needed to be cut back to allow for the new track alignment



Figure 4.3a: Visual showing Penistone Line canopy

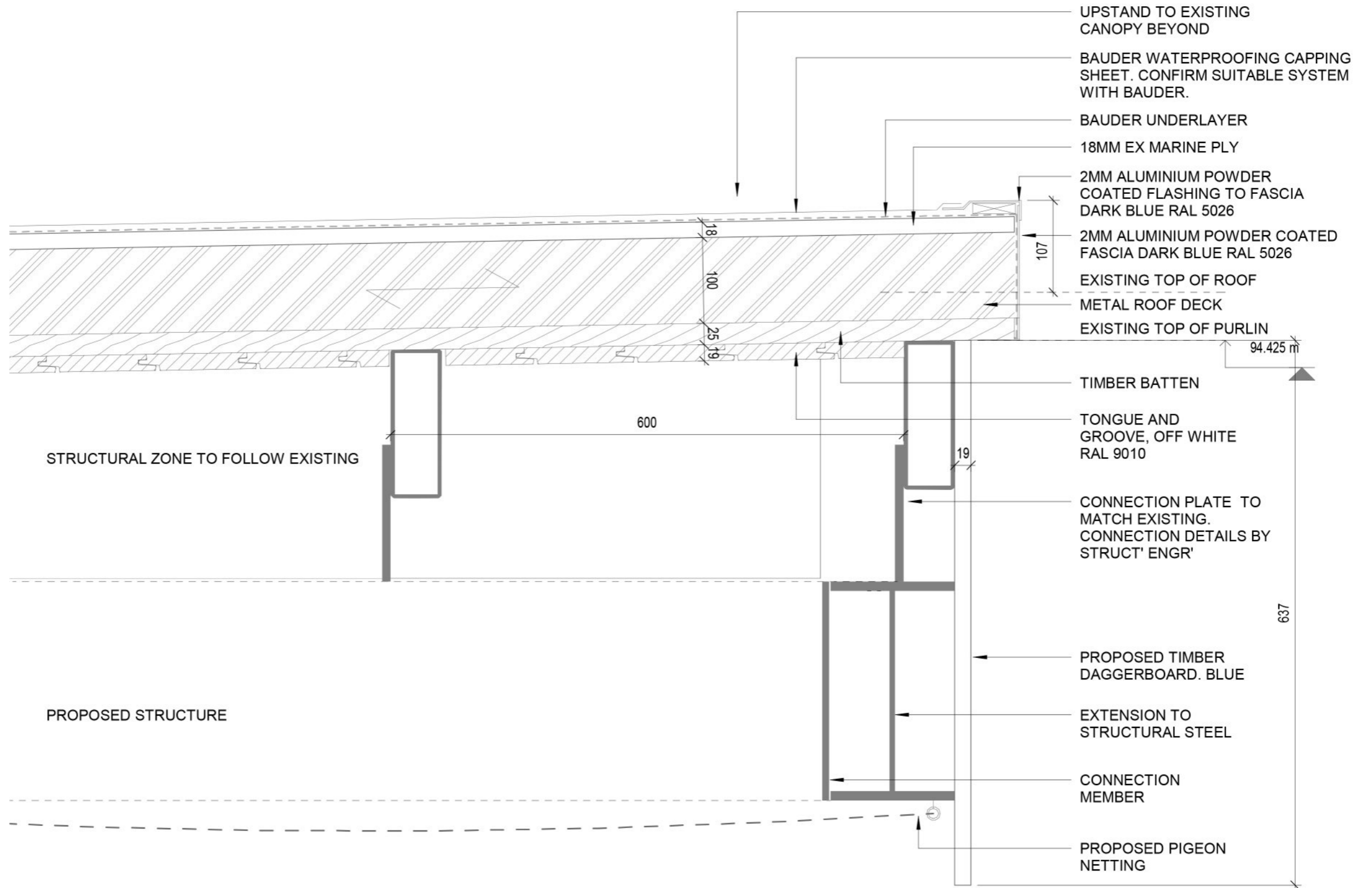


Figure 4.3b: Section detail the Penistone Line canopy

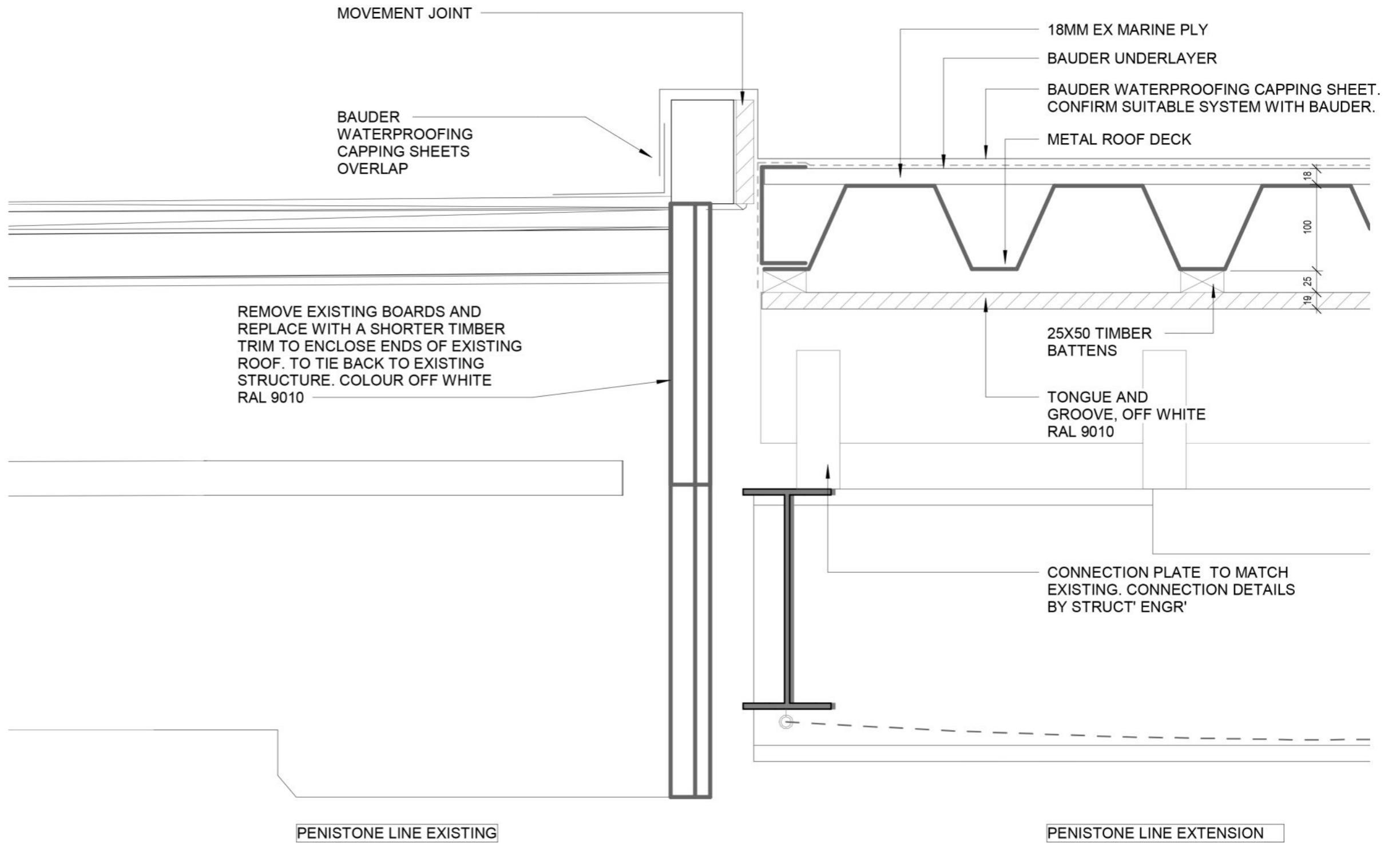


Figure 4.3c: Section detail the Penistone Line proposed and existing interface

4.4 Detail Development Roof B & C

4.4.1 Roof B & C Design

The main drivers for the location, scale and form of the new roof are outlined in section 3.0. More specific design drivers include the following:

- to respect and celebrate the geometry of the adjacent Victorian structure;
- to provide a high-quality, bespoke architectural environment befitting the Grade I station;
- to provide suitable shelter from adverse weather, given that the prevailing wind will blow into the open western side of the station.

In order to better understand the last of these drivers, a microclimate study has been carried out to establish the effects of wind and wind-blown rain on a range of proposed roof forms. The results of this study pushed the design towards a closed roof form spanning between the new platforms 4 and 5.

4.4.2 Proposed form

The proposed roof form consists of two large 'blades', both straight and parallel on plan. The form of the blades has been drawn from the geometrical cues from the strong lines of the retained Euston trusses. They are designed to be complementary to, and respectful, of the Victorian structure: for this reason they decrease in span, height and angle of inclination as they move away from it.

The blades were linked with a continuous glazed clerestory, that have now been removed to satisfy ventilation requirements in case of a fire. This has been designed to allow the structure to span over the tracks while allowing clear views through to the large warehouse behind the station. Linking the two blades in this way will mitigate the effects of adverse weather as far as possible.

The soffit of the larger blade has been faceted to break up a large clear expanse of ceiling cladding. This will provide visual interest and an additional geometrical link back to the adjacent Roof A. Recessed shadow-gap joints in the cladding align with the Roof A trusses.

The columns supporting the new roof on platform 4 are arranged in a straight line, aligned with those of Roof A. The columns on the new island platform (platforms 5 and 6) are arranged on a curve, matching

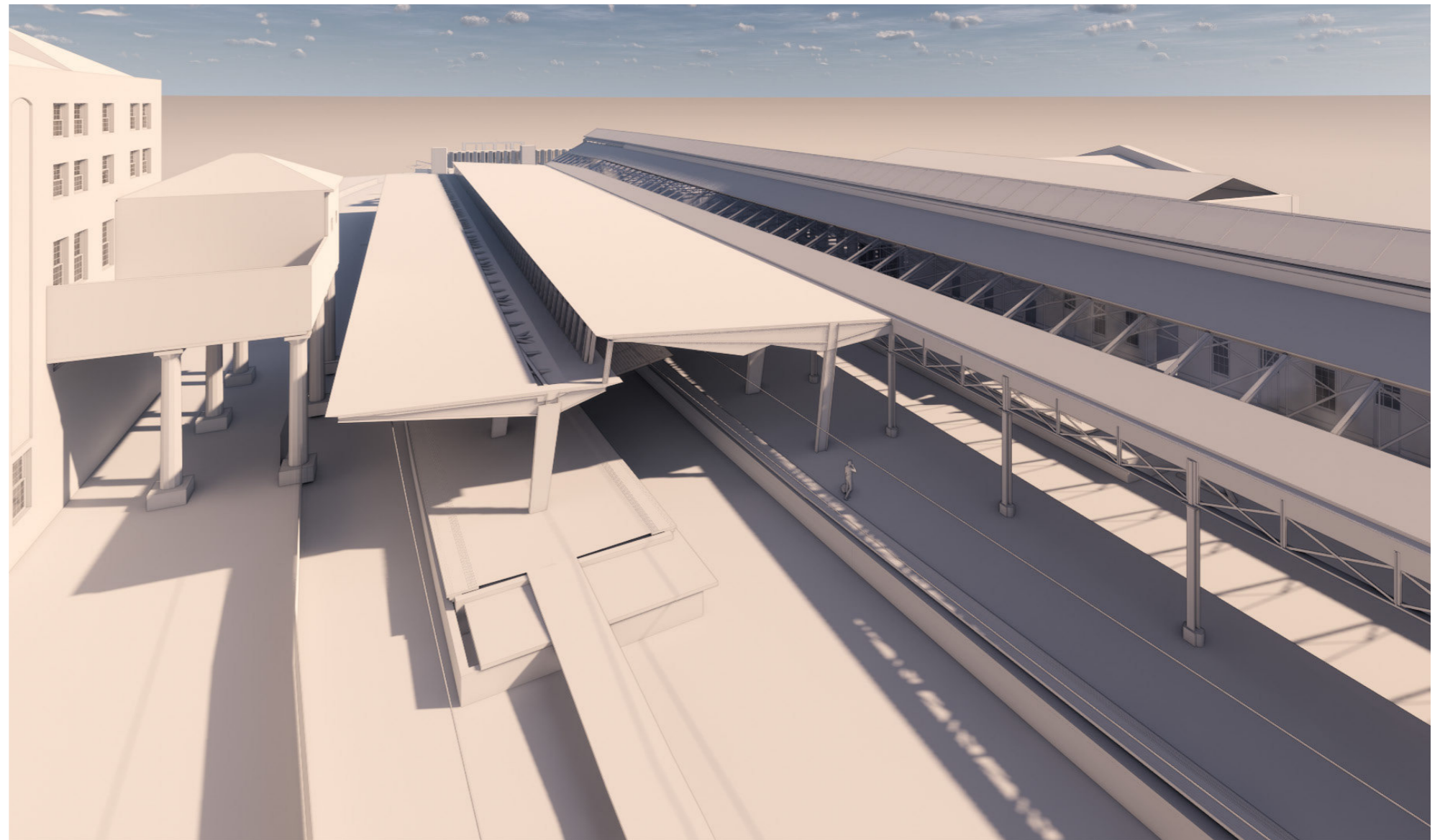


Figure 4.4a: Aerial view showing descending hierarchy of roof forms from Roof A to the proposed new roof

the curve of the platform itself. The interplay between straight and curved lines generates a second sophisticated soffit form above the island platform.

4.4.3 Materials

Through our study of Roof A we have determined a colour and tonal scheme that will best complement and express the Euston Truss and trainshed volume. The columns will be encased in a coloured grey metal cladding so they tie in with the roof A structure.

The soffit will be clad in a white metal slatted panel with open joints which will make a visual reference to the Roof A soffit but will also

help with acoustic reverberation in the space. These will run in parallel with the tracks but a larger joint adjacent to this will be expressed to emphasise the structural grid that relates back to Roof A. The roof covering for the new roof will be a standing seam, coloured to match the existing.

4.4.4 Colours

To make the New Roof relate further to the original, we have kept the essence of the Roof A colour scheme and evolved it, thus further representing another progression in the ongoing story at Huddersfield Station.

All colours are to specified in the project's colour specification for the station, as reflected in the Materials Schedule submitted to discharge Condition 2 attached to the granted LBC.

4.4.5 Graphic strip

It is proposed that one of the faceted soffit planes above platform 4 is filled with a large-scale site-specific artwork running the length of the platform. This would be printed onto metal cladding panels.

This colourful plane is intended to break up the large blank expanse of the roof soffit. It would accentuate the cranked form of the roof, and add visual interest and a high-quality bespoke element to the platform environment. The final approach to the graphic strip will be defined at a later CIMP phase.

4.4.6 Lighting

Lighting options were explored to achieve the design objectives whilst considering the key viewpoints and journeys around the platform and coordination with the lighting scheme in Retained Roof A.

These options are listed below:

1. Discrete lighting solution with surface-mounted downlights
2. Suspended, decorative luminaires
3. Continuous linear luminaires
4. Illumination of the structural columns
5. Uplight of the roof soffit

The preferred solution is shown in Fig.4.4.2c. The continuous linear luminaires will accentuate the architectural form and the angular nature of the roof. The uplighting element will highlight the roof and harmonise with the lighting treatment in Retained Roof A.

The lighting scheme will comprise the following elements:

- Continuous linear luminaires running parallel to the platform lengths to provide safe illumination levels at platform level. The linear luminaires assist with providing a uniform distribution of light and are an effective method for assisting with navigation around the station.
- Concealed luminaires will be positioned along a channel at high level and provide a gentle wash of light across the roof. Illumination of the roof surface will ensure a visually comfortable environment by minimising the contrast.



Figure 4.4b: Image of clerestory cladding. *Graphic strip to be included in later phase of CIMP

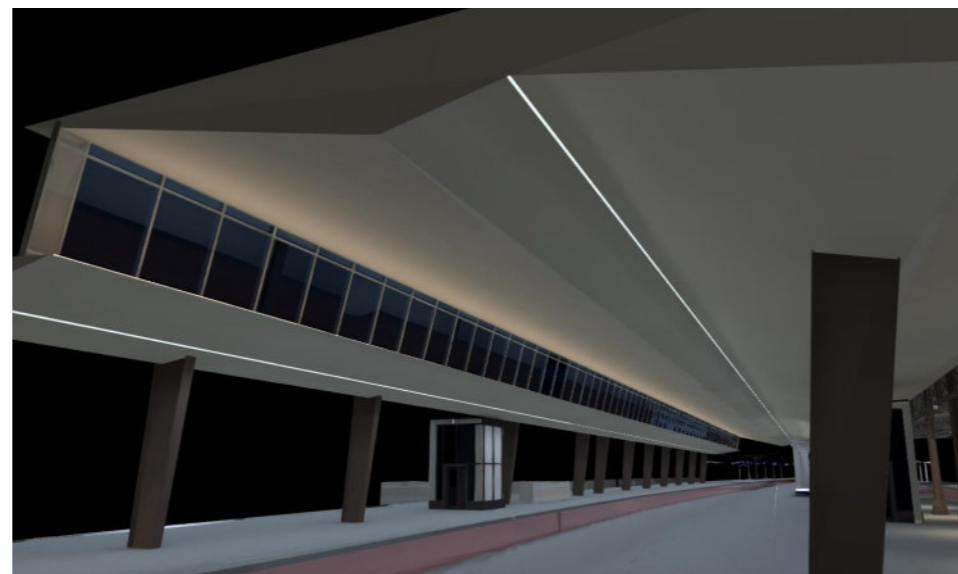


Figure 4.4c: View of clerestory cladding from platforms



Figure 4.4d: View of clerestory cladding from the LYR warehouse

4.4.7 OLE

The OLE will be situated at several locations along the span of the new Roof B. This will be fixed back to the roof structure and the drop rods will be coordinated so that they fit seamlessly into the new soffit cladding.

4.4.8 Structural considerations

The structural framing of the new roof has been designed to follow the envelope of the architectural design set out above. The new roof will support the loads applied including snow, wind and OLE. The design adopts a repetitive structure as far as reasonably possible in order to provide a cost-effective design for fabrication and speed of installation. The roof has been designed so that the majority of the structure can be fabricated off-site, minimising the on-site construction time.

Columns are standard sizes but are inclined and clad to create a tapered profile to the architectural intent. They are typically spaced at c.9m to match the existing structural column grid of the retained trainshed roof. The spacing changes to c.12m centres local to the subway and lifts shafts. This is to ensure that clear access is maintained to the stairs and lifts and the subway is not overloaded. To enable this column spacing, the new roof above the stairs is supported by a pair of columns, rather than a single column, supported off the walls on either side of the stairs. The roof is typically formed with fabricated sections to suit the architectural envelope.

At column lines, they form a portal frame which steps in section at the clerestory line (shown in Fig.4.4g) between platforms. The vertical element of the frame through the clerestory is minimised to limit the visual impact of the structure whilst maintaining stability.

At intermediate locations, the sections cantilever from trusses spanning along the platforms between columns. The sections taper in profile away from their supports to meet the architectural intent. The tip of the cantilevers from Platform 3/4 are propped off the back-span cantilevers on Platform 5/6. The props, along with horizontal beams between the cantilevers, form Vierendeel trusses on the clerestory line. This provides additional stiffness to the structure whilst avoiding bracing which would obstruct views.



Figure 4.4e: Sectional view of the new roof at a column line

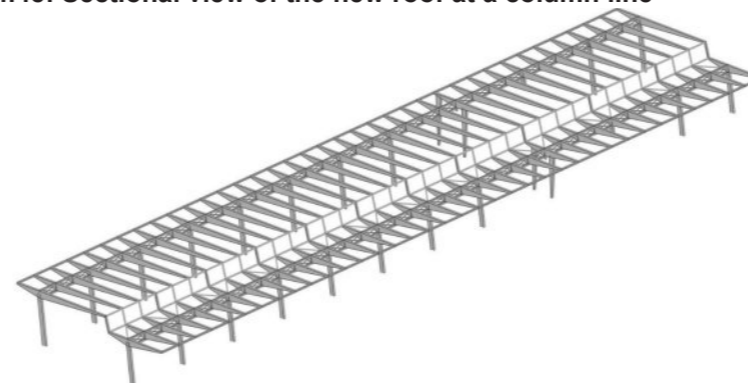


Figure 4.4f: Structural framing of the new roof (view from the North-West)

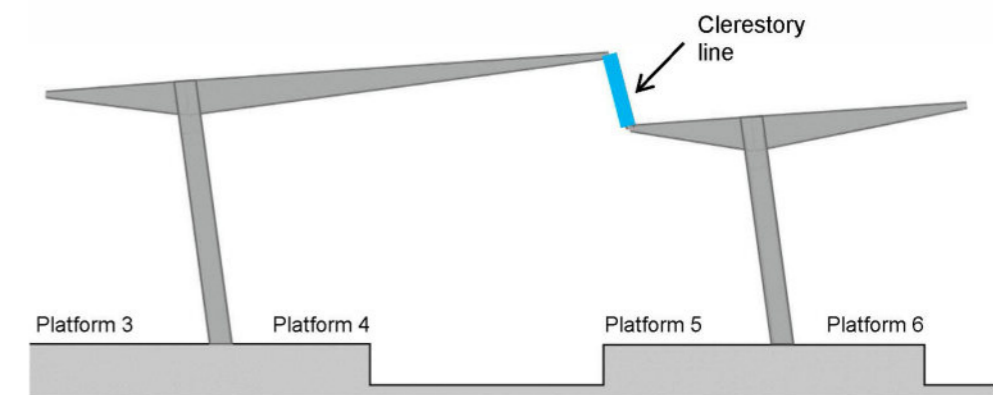


Figure 4.4g: Sectional view of the new roof at a column line

Secondary framing will be placed within the depth of the structure to support the roof finishes and cladding. The final profile of the roof will be expressed through the finishes and cladding. Based on the initial ground desk study and an assessment of the loads, it is envisaged that the roof will be founded on piles.

4.4.9 Soffit Details

In terms of design integration, the curvature of Roof C is particularly well-suited to the SAS 760 system from Valcan, or equivalent other. The panels are segmented into 100mm wide sections—narrower than those in the SAS 330 system—allowing each panel to flex and accommodate subtle shifts in the roof geometry. This segmentation enables a smooth and consistent soffit finish across the entire span of the curved roof while maintaining structural and visual integrity.

Importantly, the updated GRIP 5 design retains the same soffit outline as established in GRIP 4. The soffit panels will continue to align with the Roof A trusses, maintaining the design rhythm and intent using a recessed shadow-gap joint between panels (seen in figure 4.4e). This detail ensures a clean visual break while enhancing depth and definition across the soffit plane.

4.4.10 Clerestory Details

The clerestory glazing curtain wall connecting Roofs B and C above the proposed Platform 5 was initially introduced to link the two structures and provide weather protection for the Tea Rooms.

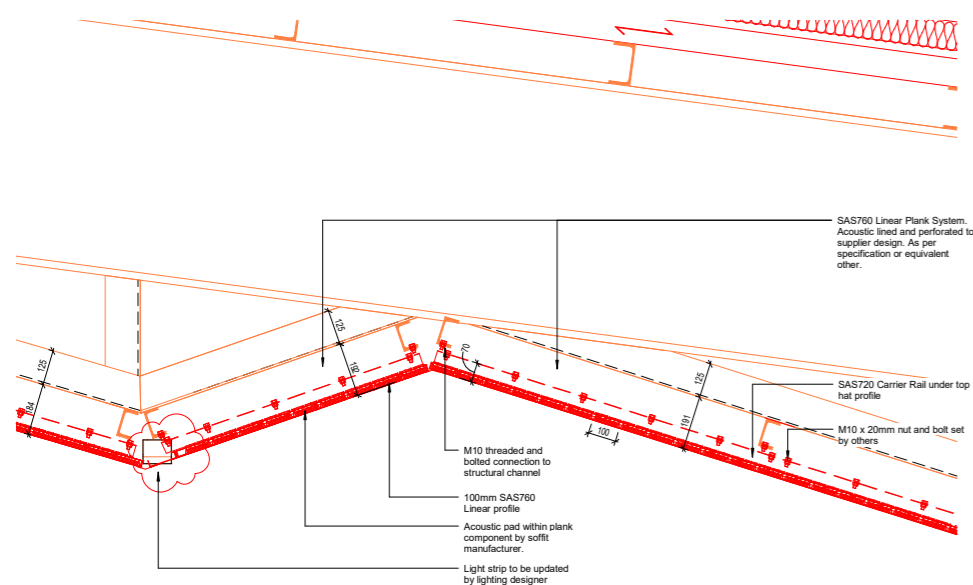


Figure 4.4j: Ceiling panels section

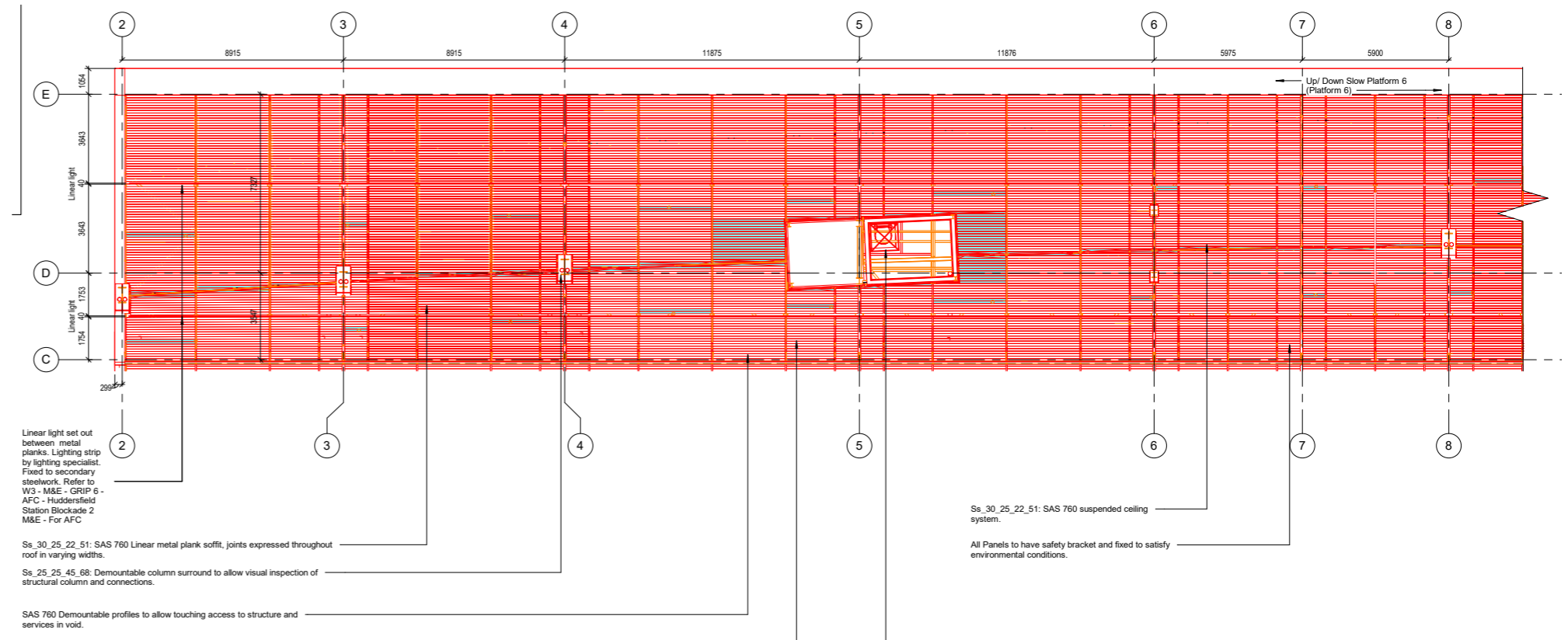


Figure 4.4h: Soffit plan for roof C, showing the curve following the platform shape

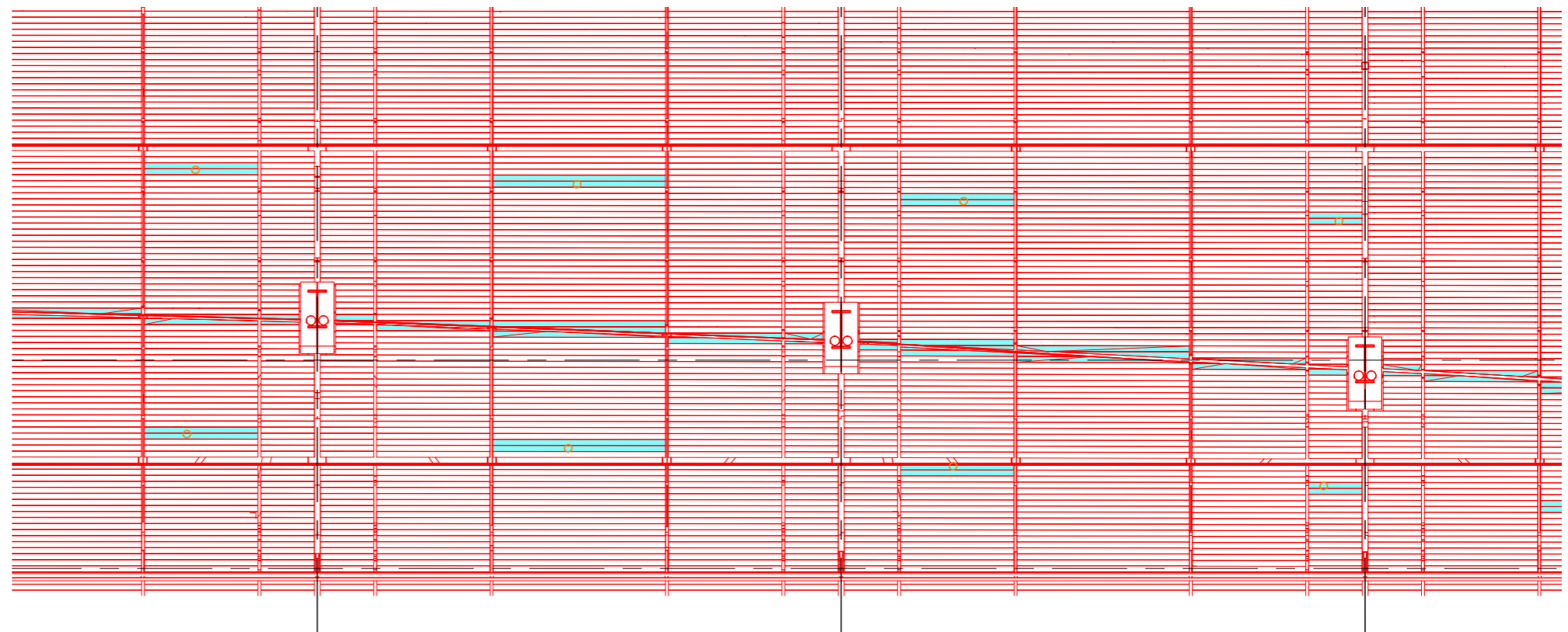


Figure 4.4i: Soffit close up plan for roof C, showing the custom cut panels to suit, the curve, speakers and vertical cladding locations

However, in the event of a fire, this design created the potential for smoke buildup, requiring 50% of the glazed area to be openable.

This requirement led to a bulkier, more complex façade, reduced daylight into the station, and necessitated additional structural supports for the operable system. Furthermore, the inclusion of automated mechanisms introduced spatial and technical challenges, such as accommodating electrical drivers and mechanical equipment on the roof.

These deviations significantly departed from the original design intent established during the earlier GRIP 4 stage, which emphasized visual transparency and simplicity.

Microclimate studies have since shown that the overlapping roof design alone effectively minimises the impact of adverse weather on the Tea Rooms. As a result, the decision was made to remove the glazing and return to the early pre-GRIP 4 concept. This change left the structural columns that connect the two roofs exposed. In the proposed GRIP 5 design, these columns will be clad in steel to match the existing.

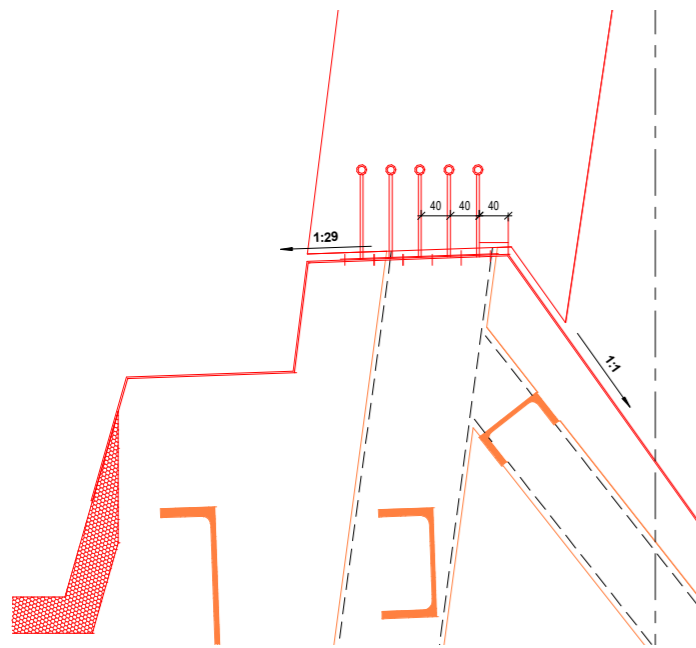


Figure 4.4k: Bird wire detail

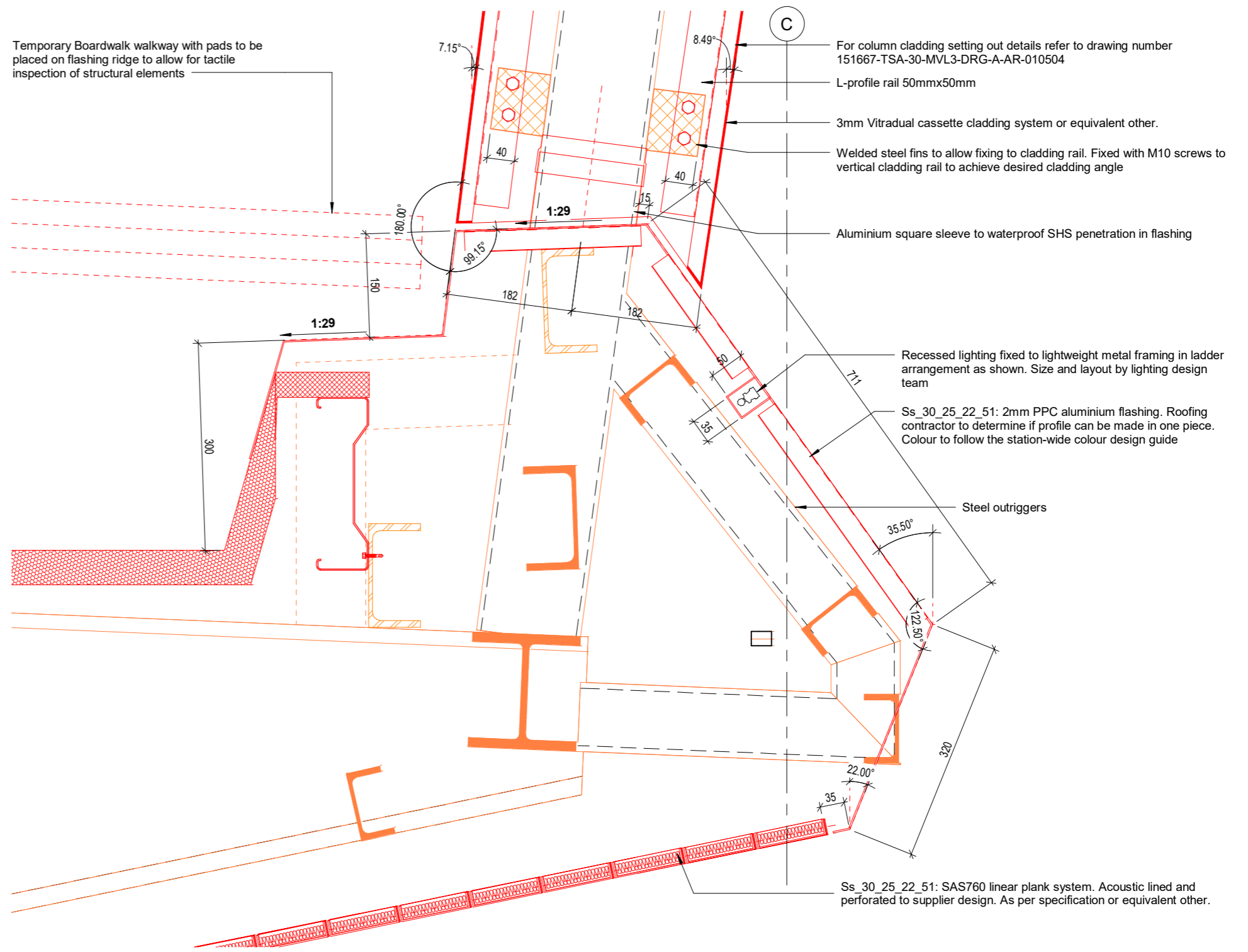


Figure 4.4l: Clerestory bottom detail

Platform column finishes, visually tying the two roofs together and maintaining consistency with the station's overall material and colour palette.

The removal of the glazing also meant an increased risk of falls from the maintenance walkway into the station. To mitigate this risk the gutter and the walkway swap positions, away from the edge of the roof. Paired with a fall restraint system that runs along the length of the walkway the risk is reduced.

The open area may also provide area for pigeon roosting and perching and bird wires will be proposed on the ridge line of the clerestory sections, as seen in figure 4.4k. The angle on the internal side of the ridge is to be 35° minimum.

4.4.11 Roof B & C Column Detail

The column casements size and angles have been amended to accommodate several updates from structure's column and base plate sizes, rainwater pipe clearances, larger plinth sizes and most importantly steering clear of the 3.3m minimum clearance zone for the unobstructed route from the platform edge.

The intention of the column casing is to follow the same size of the base plate and taper on a splayed angle to the soffit. The casing has increased in size from GRIP 4, albeit a minimal change. This includes the casing widths increased to allow for a larger 160mm external diameter rainwater pipe to fit in the between the flanges of the column.

The angle of the columns for platforms 3 and 4 have been updated to a shallower angle. This is to avoid the end column plinths clashing with the 3.3m zone, mentioned above.

The column casings are steel cassette panels with the vitreous finish, Vitranamel from Vulcan or equivalent other. The exterior coating is very durable and is highly resistant to graffiti, abrasion and impact damage and is low maintenance. The panels are used in high traffic areas such as the London underground.

The Vitranamel cladding has a C-shaped panel that is fixed vertically on the narrow end of the column only with no horizontal fixings required. Each panel is sized up so that they achieve the allowable size tolerances from the manufacturer.

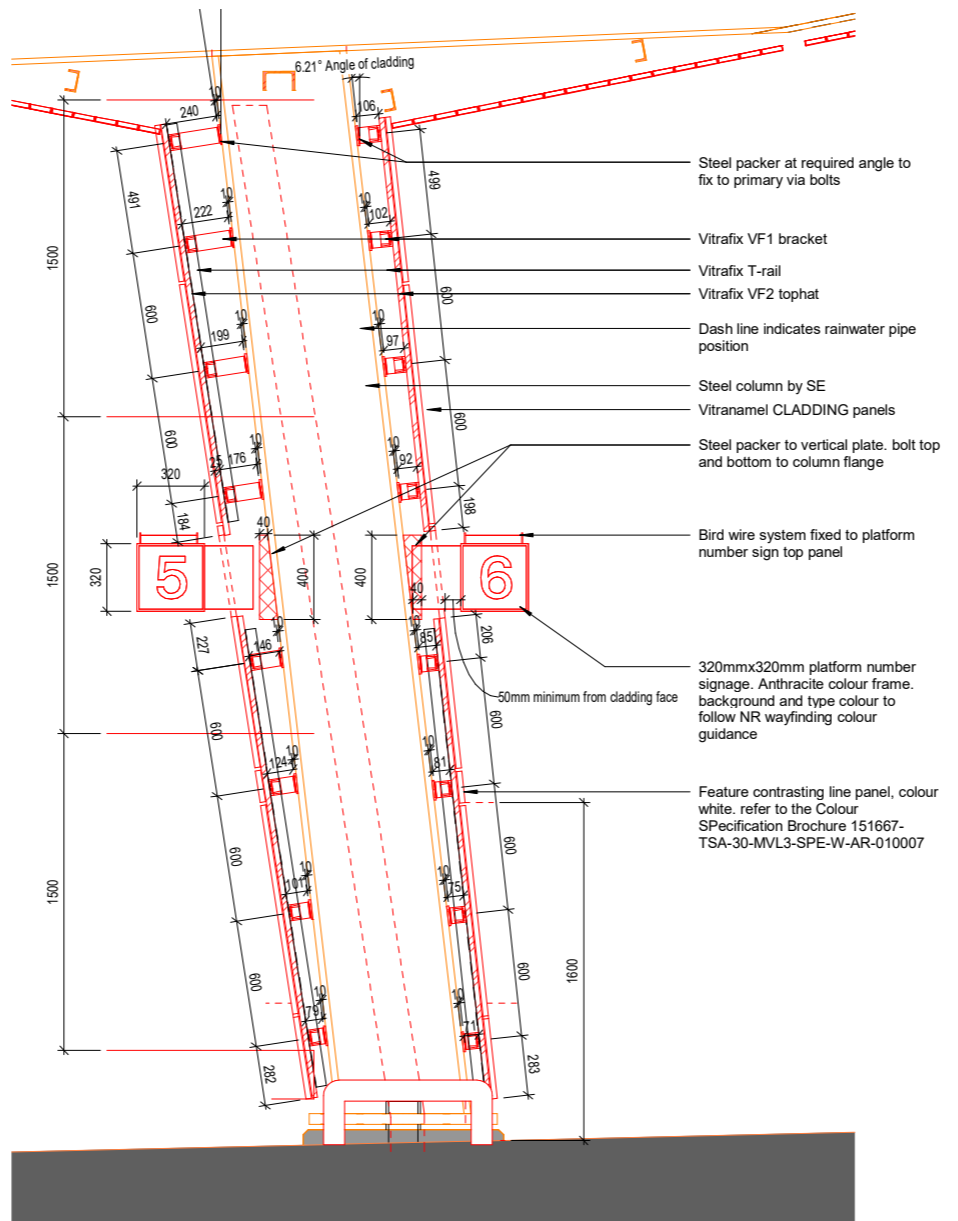


Figure 4.4m: Column cladding section & visual

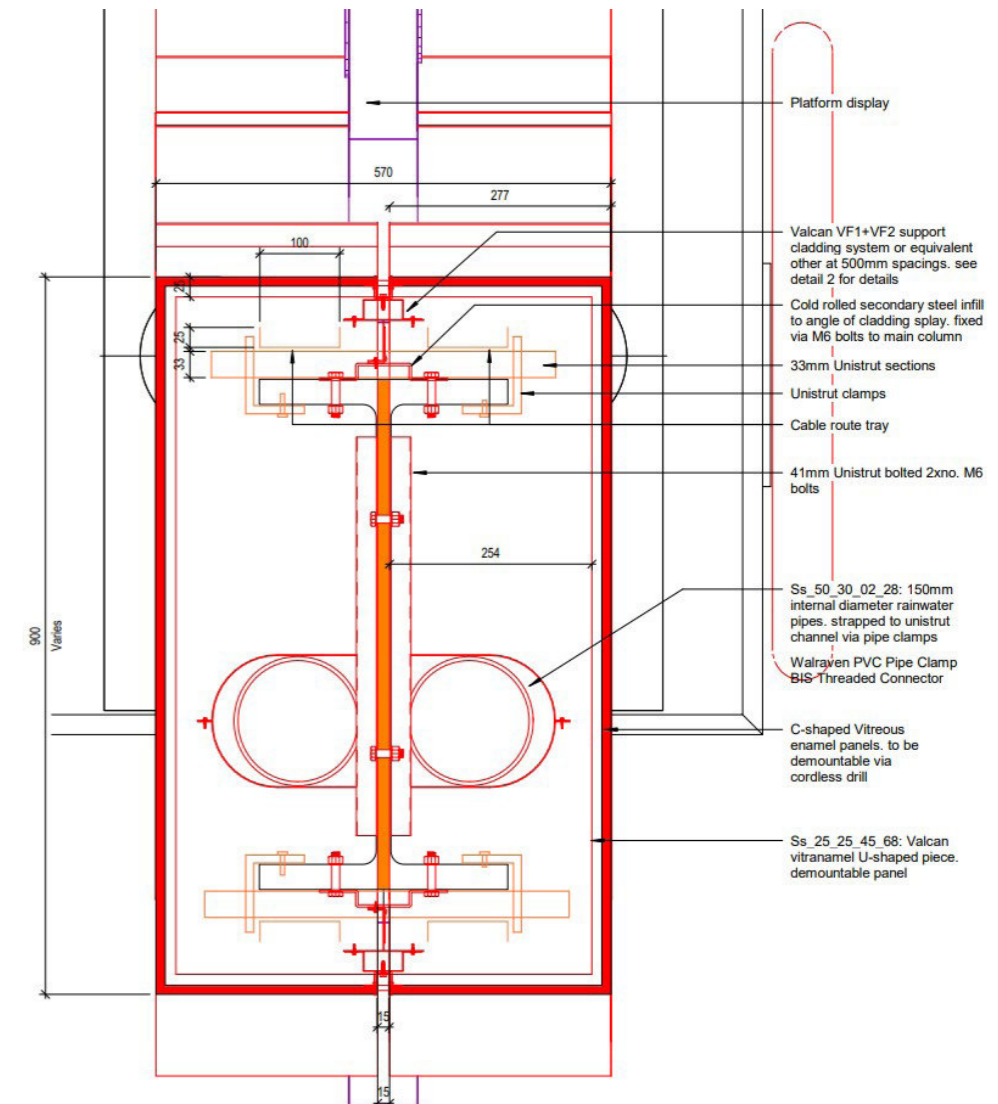


Figure 4.4n: Column cladding plan detail

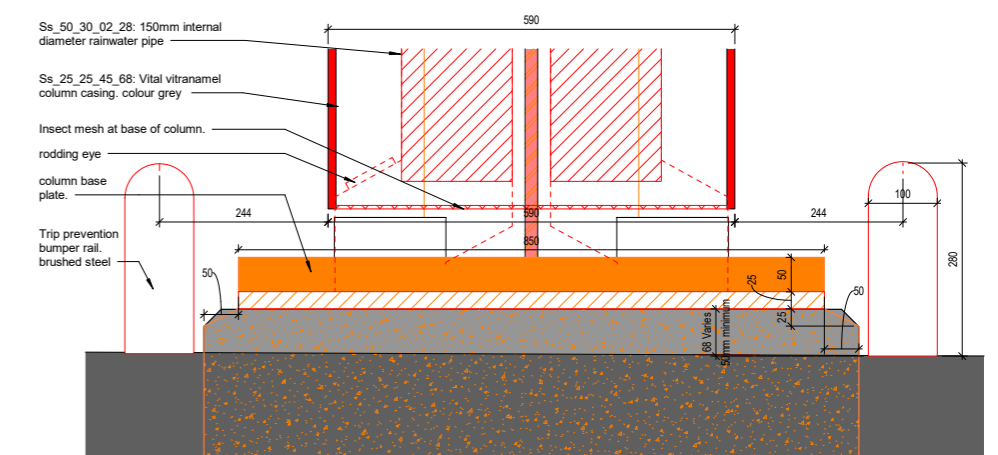


Figure 4.4o: Column plinth section detail

The casing houses rainwater pipes and cable route trays that are not necessarily at each column. The cladding can be notched to allow signage and CIS screens to penetrate through.

The Integrated Risk and Readiness Development (IRRD) states in item RR-W3-TRU-3357 that 'All building assets minimum design life of 40 years. 25 years design life for finishes'

The access ladders shown in GRIP 4 is also removed from within the column casing to avoid increasing the casing size further. The latter is now relocated into a separate room within the lift motor room.

4.4.12 Roof Access

Roof B will also be access through the permanent ladder through the Tea Room. As mentioned previously there is a permanent walkway clipped to the standing seam that will provide access to the valley gutter.

The top section of Roof B is only 4° so most this roof can be accessed using a clip in fall arrest system and we only use walkways to traverse the standing seam to avoid any trip hazard.

There will be a man-safe wire that leads to a permanent set of steps that will provide access to the lower section of Roof B that is 3° in pitch so again access is only by fall arrest system. There will be a secondary point of access from Platform 5/6 up into the lower section to Roof B through a platform store.



Figure 4.4p: Lift motor room view within platform

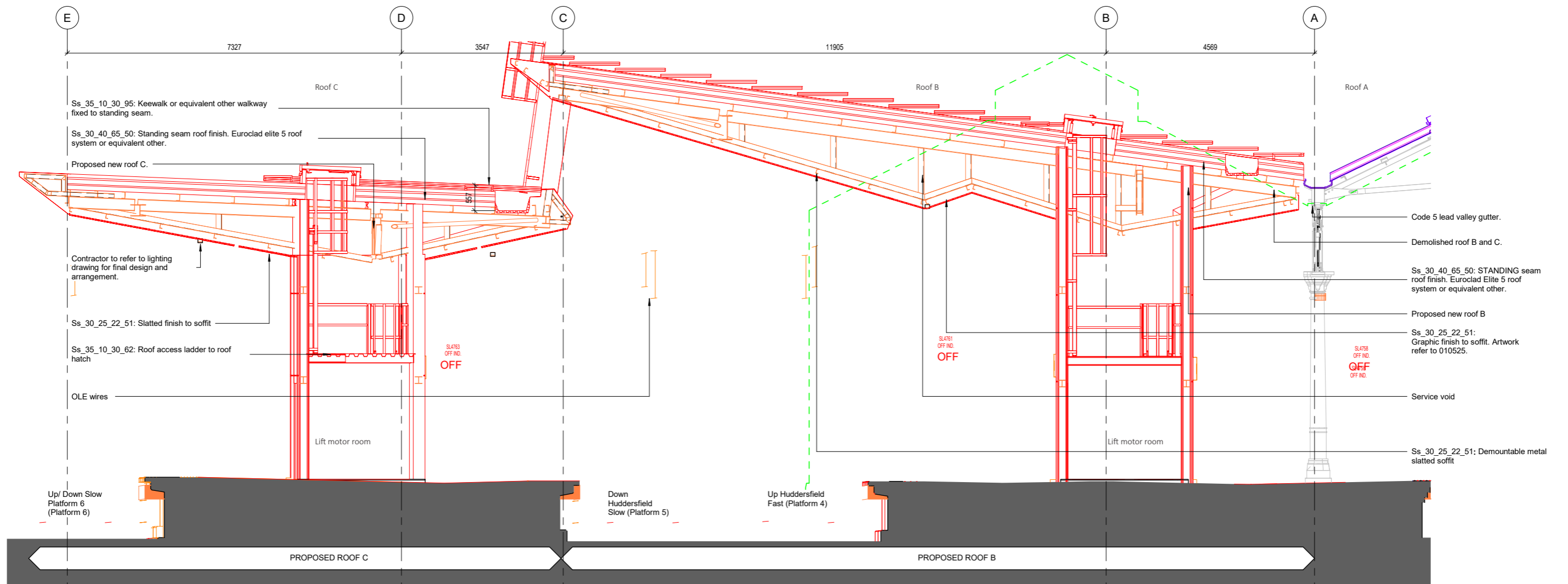


Figure 4.4q: Roof B & C section showing access ladder locations

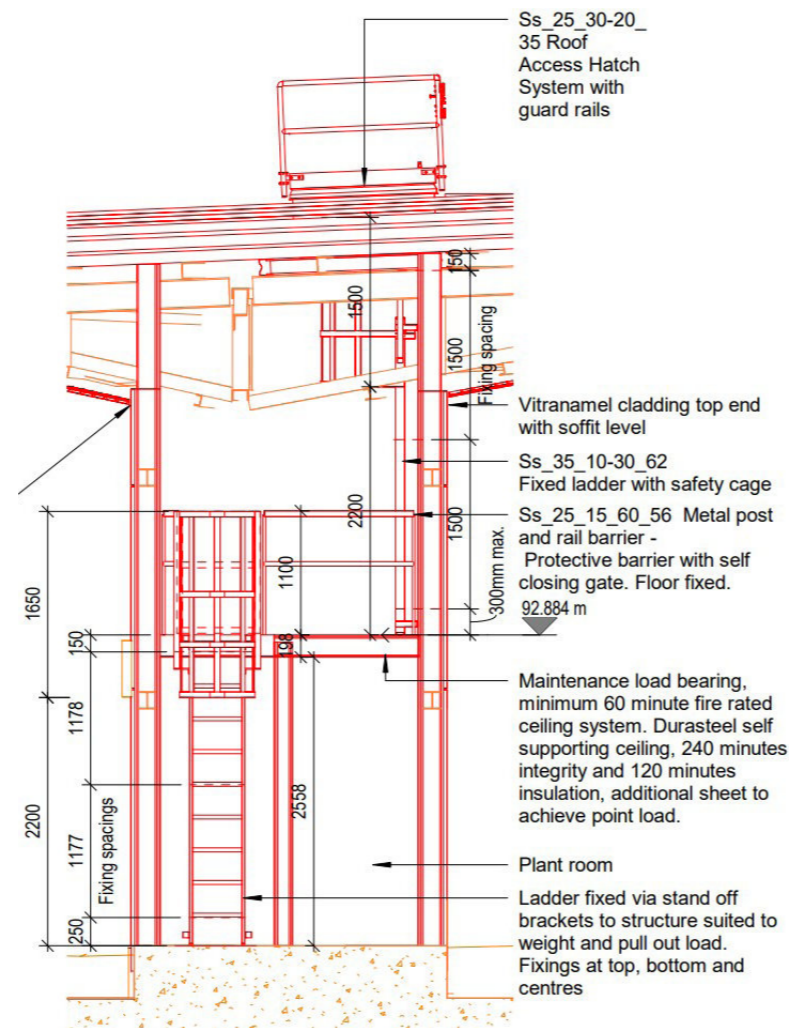


Figure 4.4r: Roof B & C access room section detail

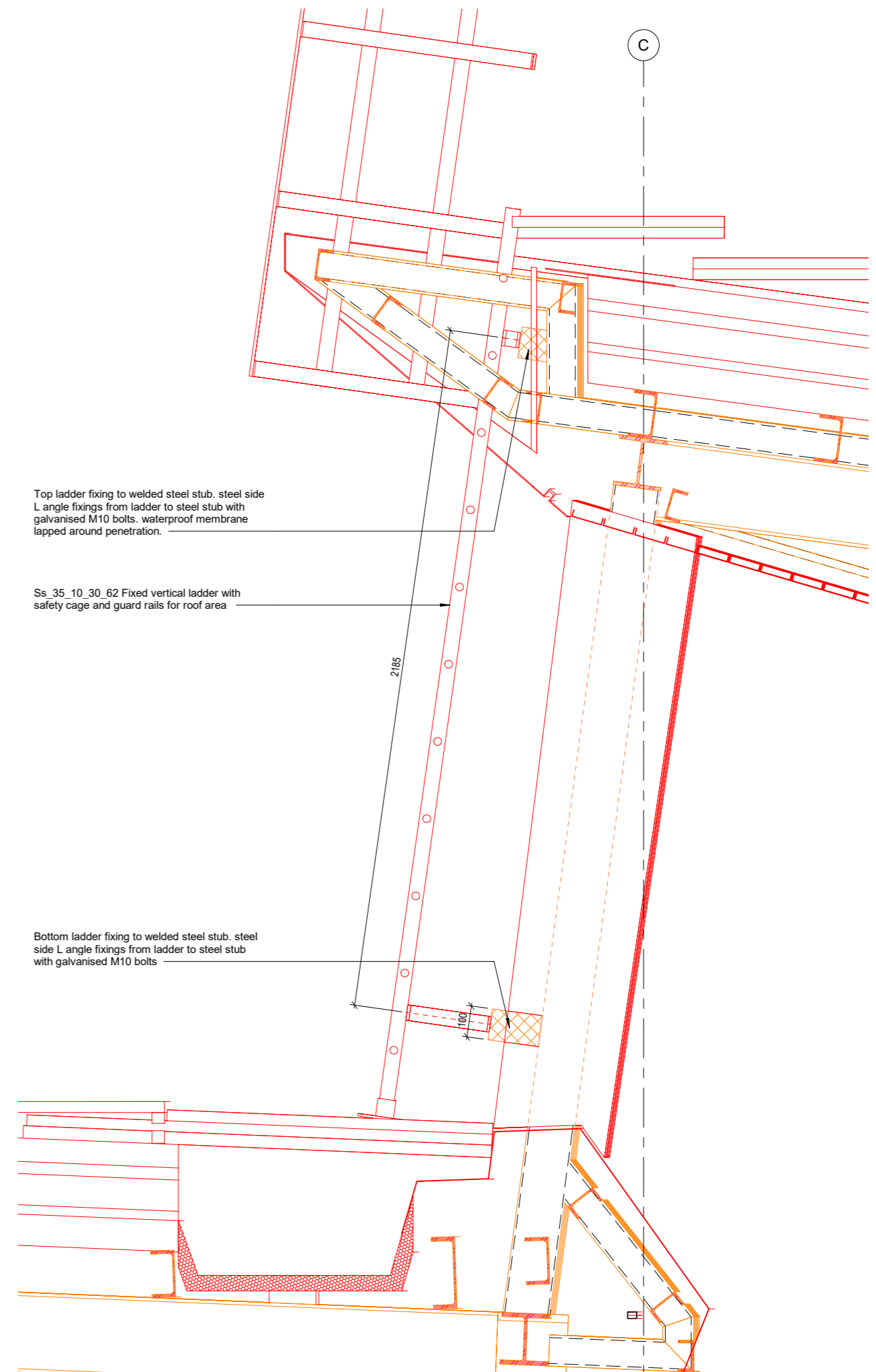


Figure 4.4s: Roof B & C section showing access ladder at clerestory zone

4.4.13 Lift and Motor Room Detail

As mentioned previously the access ladders are located in a separate compartment within the lift motor room. The update was to create a direct line of access from platform level to the roof and reducing the amount of hatches and demountable panels needed to be removed to gain access. Hence, the design decision to have the lift motor room extend into the roof void, as seen in figure 4.4t.

The access ladder has more secure points of support up the wall to the roof. Visually the lift motor room forms a similar unit in height with the lift shaft and no longer acts as bolt-on unit to the lift shaft. The lift motor room will remain fire rated and isolated from the access room.

Another benefit of extending the lift motor room vertically is to allow for much needed distribution of services to and from the roof, such as rainwater pipes, M&E and telecoms cabling, water supply, etc. that otherwise could not be provided. These services can only be allocated within the column casings. Therefore, the lift motor room's location is critical to allocate the mentioned services, bridging a large gap of 33m between the closest usable columns, as seen in figure 4.4u.

The two access hatch locations within the lift motor room are sufficient to provide access to both roofs B and C. Their locations satisfy fire regulations with maximum distances for several means of escape from the roof.



Figure 4.4t: Lift and motor room view



Figure 4.4u: Lift motor room and access room visual

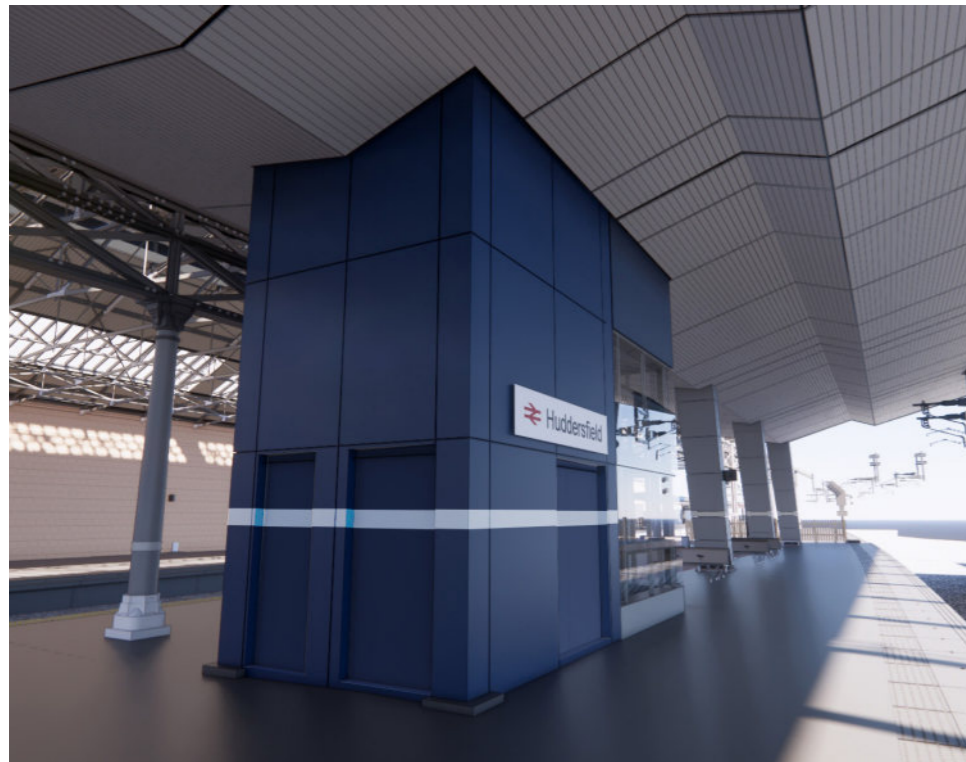


Figure 4.4v: Shadow gap view of the wall and ceiling

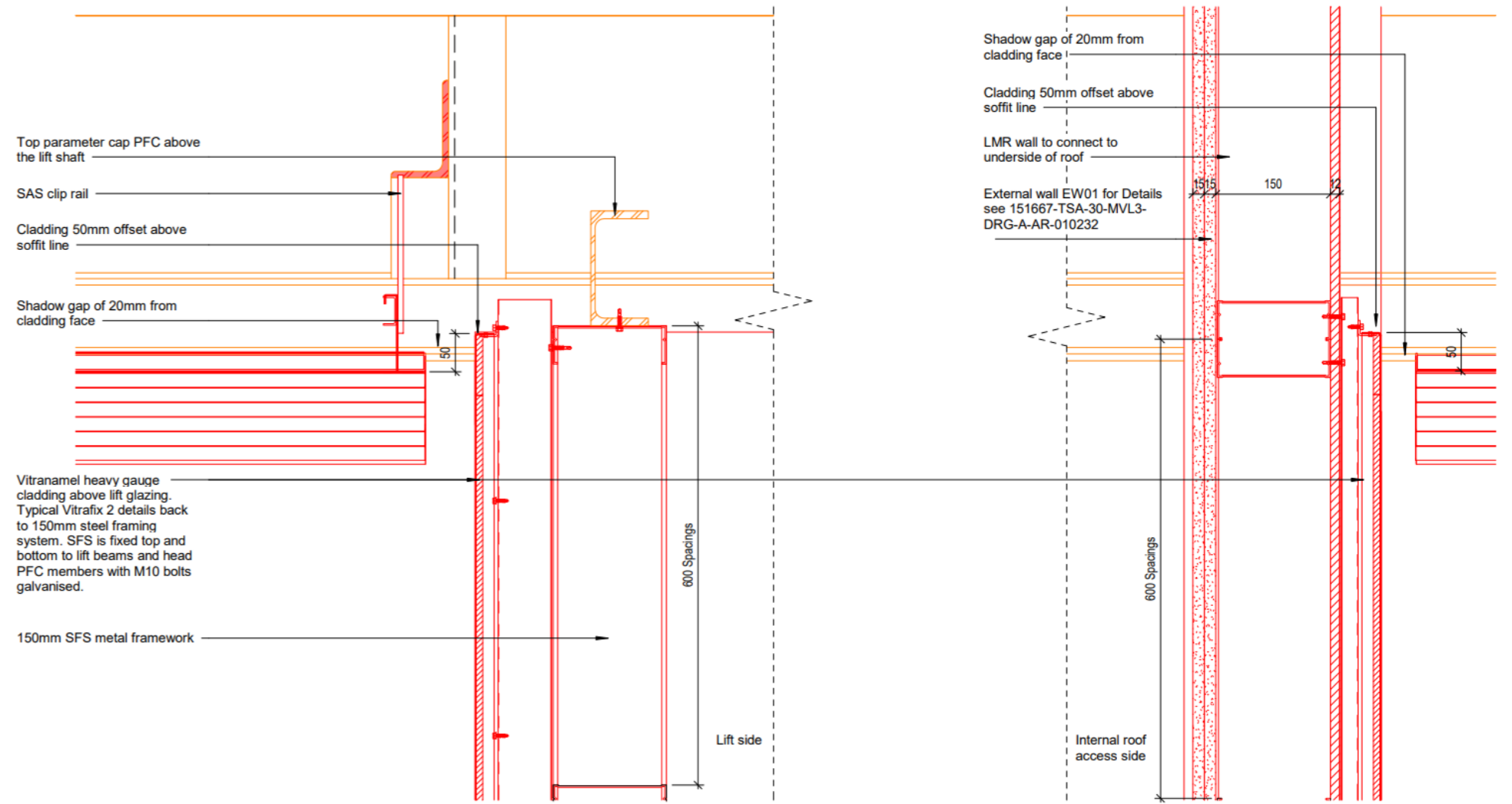


Figure 4.4w: cladding and ceiling connection detail

4.5 Detail Development Footbridge

4.5.1 Footbridge Design

Network Rail standards dictate the geometry of the footbridge to a large degree. These include minimum distances from platform edges, minimum heights above OLE wires, minimum balustrade dimensions above OLE wires, etc.

The materials of the footbridge must all be easily maintainable without disabling the OLE system. This has important implications for glazing, for example, which cannot easily be cleaned unless it is accessed from the floor deck of the bridge itself without having reach beyond it.

To enable a safe and comfortable passenger experience throughout the station, continuous shelter should be provided from Roof A to the new platform canopies. This means that the footbridge will require a roof.

Given its large size and prominent location close to Roof A, the bridge should be as transparent as possible: both to limit its visual mass and to allow impressive views towards the retained roof structure at close quarters.

Balustrades on open-sided bridges are required to be opaque to a height of 1800mm above OLE wires.

A glass-sided bridge must be designed to minimise reflected glare.

This is particularly important on the south facing side of the bridge, where the bridge may reflect the sun into the eyes of train drivers in the station below.

As a fully-accessible route through the station, the footbridge must include elevator access for people with reduced mobility, preferably using through-lifts to avoid having to rotate within the elevator cars. Lifts should also be given equal visual prominence to the stepped access.

4.5.2 Proposed form

The proposed bridge features full-height glass panels on both sides, minimising its visual impact. A unique sawtooth form has been developed in order to complement the faceted forms of the new roof structures.

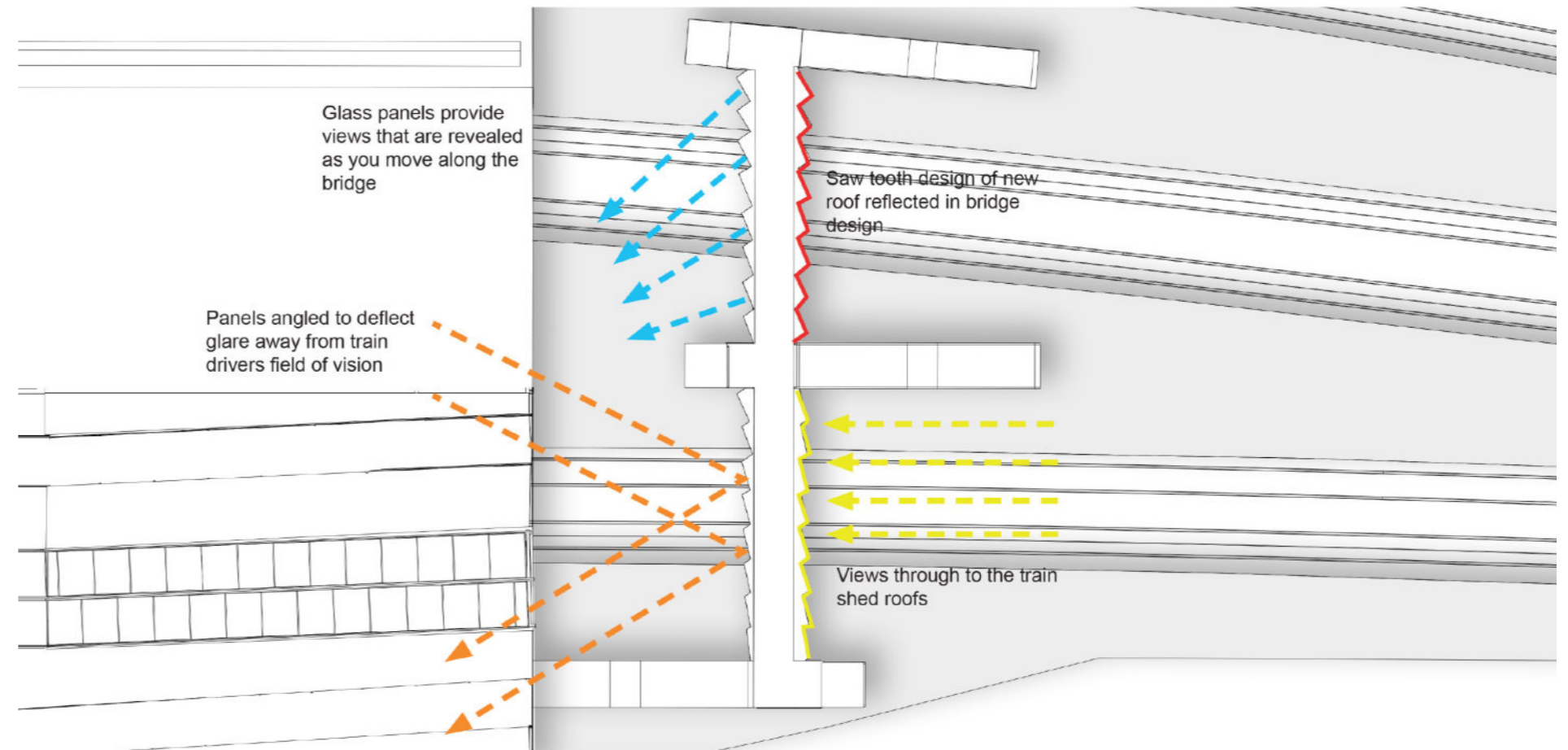


Figure 4.5.1a: Proposed footbridge design drivers

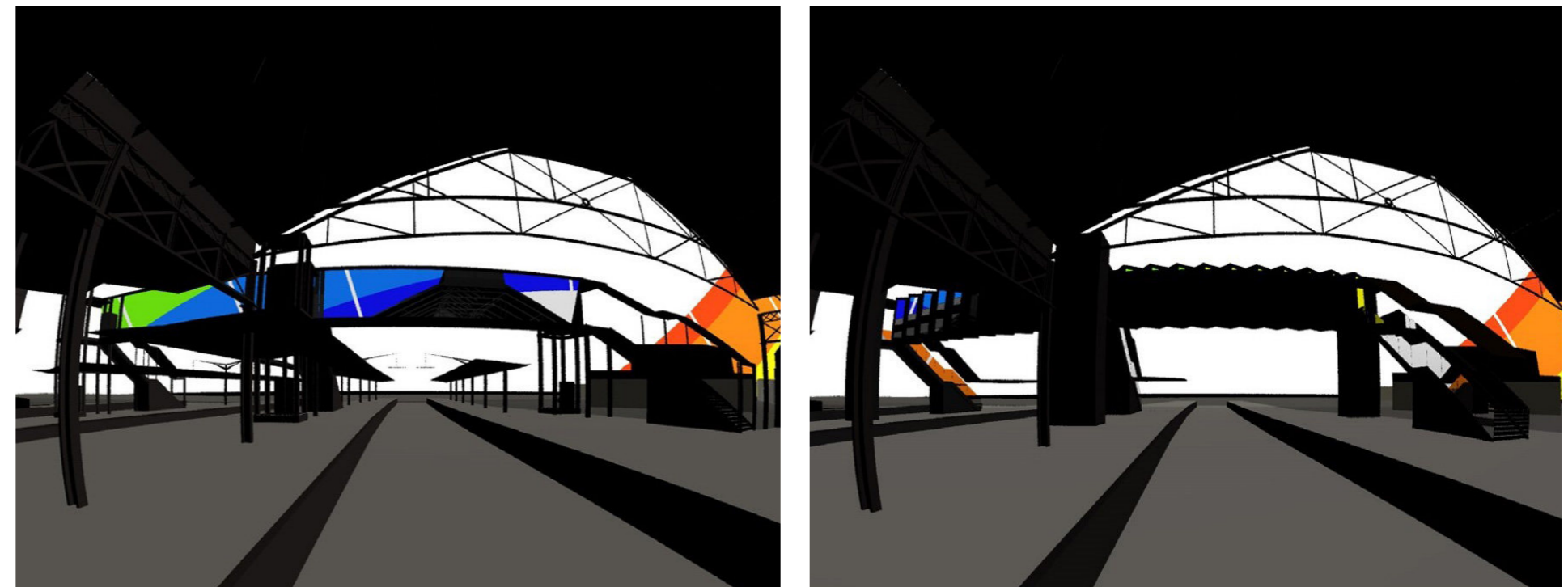


Figure 4.5.2a: Glare study - flat glass (left) -v- sawtooth design (right)

This arrangement has been optimised to the site's geometry, using sun-path analysis to minimise the extent of glare reflected towards the tracks.

Fig.4.5.2a shows the glare study of the footbridge from the driver's perspective. The rainbow colours indicate when sunlight is shining into the driver's eye; black indicates no glare.

Fig.4.5.2b shows the glare study of the footbridge with reflected sun-paths (in red) at different times of the day, superimposed for multiple times in a year. Each image shows a plan view of the platforms and tracks beneath Roof A at the Leeds end. The five top images show the analysis for a bridge with flat glass walls; the bottom set illustrates the same situation with a sawtooth design.

4.5.3 Accessibility and inclusivity

The proposed footbridge features staircases and through-lifts on each platform. The staircase on Platform 2 has been positioned to run below the gable of Roof A. All routes are covered to allow a continuous sheltered walkway. Restrictions due to narrow platforms mean that it is not possible to position lifts and staircases side-by-side with equal visual prominence from both angles of approach.

4.5.4 Materials

The roof of the bridge will be a standing seam on the stair that will tie in to the new elements of the lantern and the new replacement Roof B. The bridge span will be a mix of laminated glass and metal cladding that will need to be matte in texture and colour so as not to create any new glare issues. The lift cores and undercroft areas will be clad in a hard-wearing vitreous enamel.

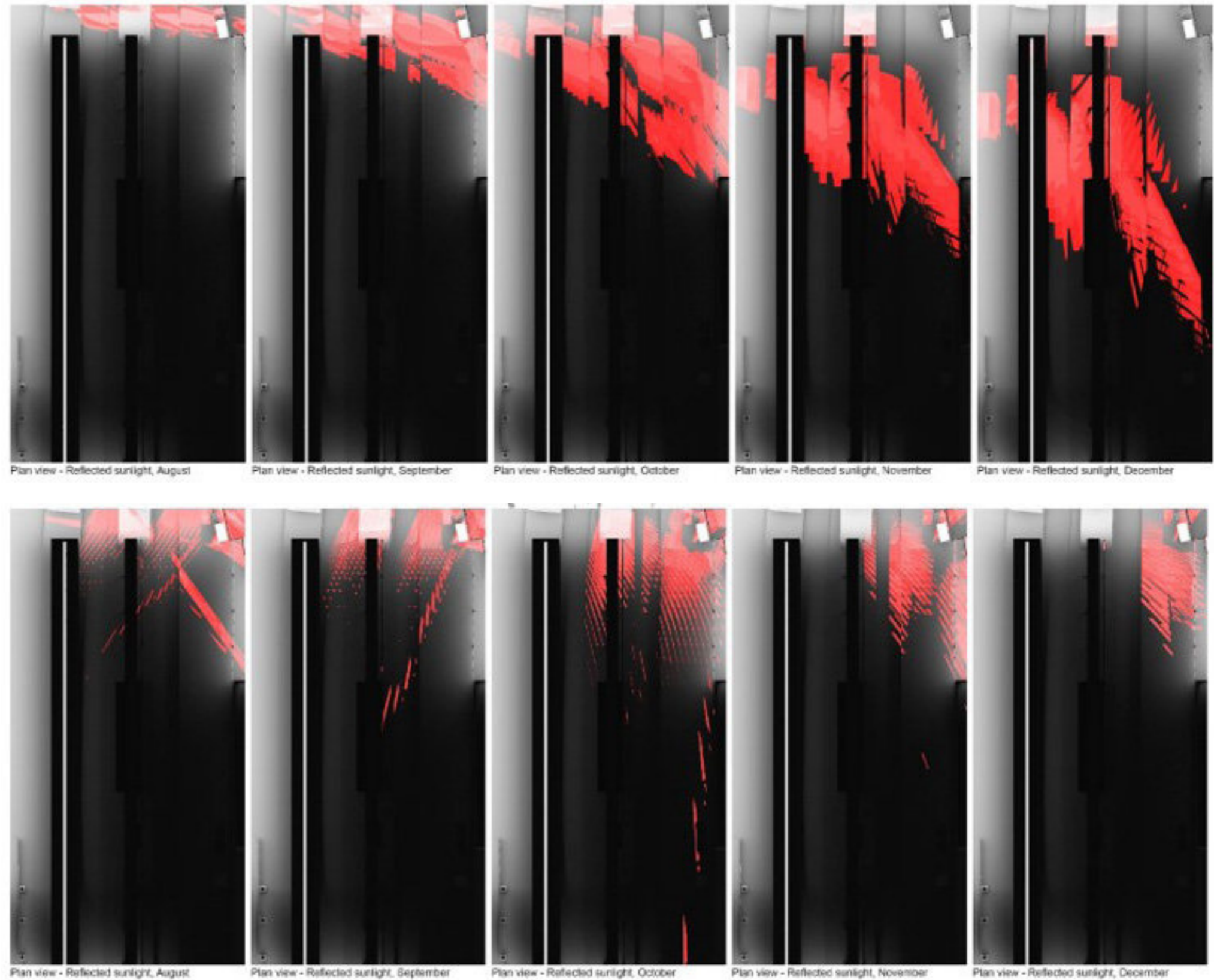


Figure 4.5.2b: Sun path study - flat glass (top) -v- sawtooth design (bottom)

4.5.5 Colours

For the colour scheme, we will be relating back to the colour schemes determined for Roof A, B, the Penistone Line and Platform Canopies. We will be using the same grey as the Roof A and new replacement Roof B structure to articulate the bridge structure, the bridge span will be a similar grey which will emphasise the horizontal element while the lift shafts will be a subtle shade of blue which will include feature banding that will break up the façade. The blue will relate back to the blue elements of the Penistone Line and Platform Canopies.

4.5.6 Graphic Strip

It is proposed that the underside of the bridge features a large-scale site-specific artwork to accompany the similar strip under the new shed roof. As with that strip it would be printed onto metal panels and add colour, detail and a bespoke contemporary edge to views through the station. This is will be presented at a later CIMP stage.

4.5.7 Lighting

Lighting options were explored to achieve the design objectives required for the footbridge and adjoining stairways. These options are listed below:

1. Circular downlights
2. Linear luminaire variations
3. Wall-grazing in the vertical and horizontal orientation for the footbridge only
4. Handrail lighting for the stairways only

Option 4 was preferred for the stairways and option 2 within the footbridge and these are shown in Figs.4.5.7a and 4.5.7b.

The lighting scheme will comprise the following elements:

- Linear lighting integrated within the handrails to provide uniform illumination of the stair risers and treads to ensure safe transitions. Handrail lighting will be a discrete, robust way of achieving the lighting requirements whilst ensuring a comfortable, low glare solution.
- The angular architectural arrangement of the window reveals will be accentuated when travelling within the footbridge and from platform level by using linear luminaires connecting each window joint. Coordination of the luminaires with the architecture



Figure 4.5.5a: Footbridge perspective view showing colours

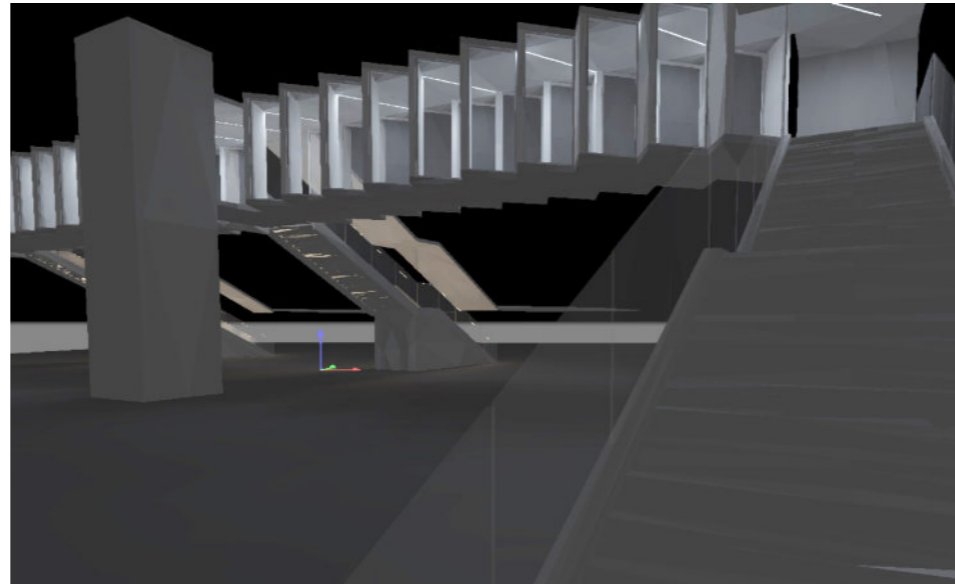


Figure 4.5.7a: Lighting scheme from stairways

will provide the lighting requirements whilst also creating a unique experience for users. The option to incorporate carefully selected coloured light within the luminaires will be explored.

4.5.8 OLE

It is not anticipated that the OLE will require attaching to the footbridge, it will be free-running.



Figure 4.5.7b: Proposed lighting scheme within footbridge

4.5.9 Maintenance access

The footbridge roof will have access from a temporary ladder and access hatch at the top of the Platform 2 stair. Once on the roof there will be 2 fall arrest systems to clip in to simultaneously to prevent falling from the sides of the footbridge. The glazing will have a self cleaning coating on the outside to reduce the cleaning requirement.

The access and maintenance is indicative at this stage and will be further defined and confirmed at a later CIMP phase

4.5.10 Structural considerations

The new footbridge consists of a steel frame supported off concrete foundations. The structural members are closed steel sections and provides an unrestricted walkway for passengers to access the platforms. To allow unobstructed views through the windows, the structural elements are all within the façade of the footbridge. The steel column supports are aligned with the staircase and lift shafts to maintain the clear platforms. The footbridge is accessed through via staircases with lift providing step free access.

The steel frame construction of the footbridge permits off site fabrication, with assembly and installation undertaken on site to reduce disruptions to the station operations.

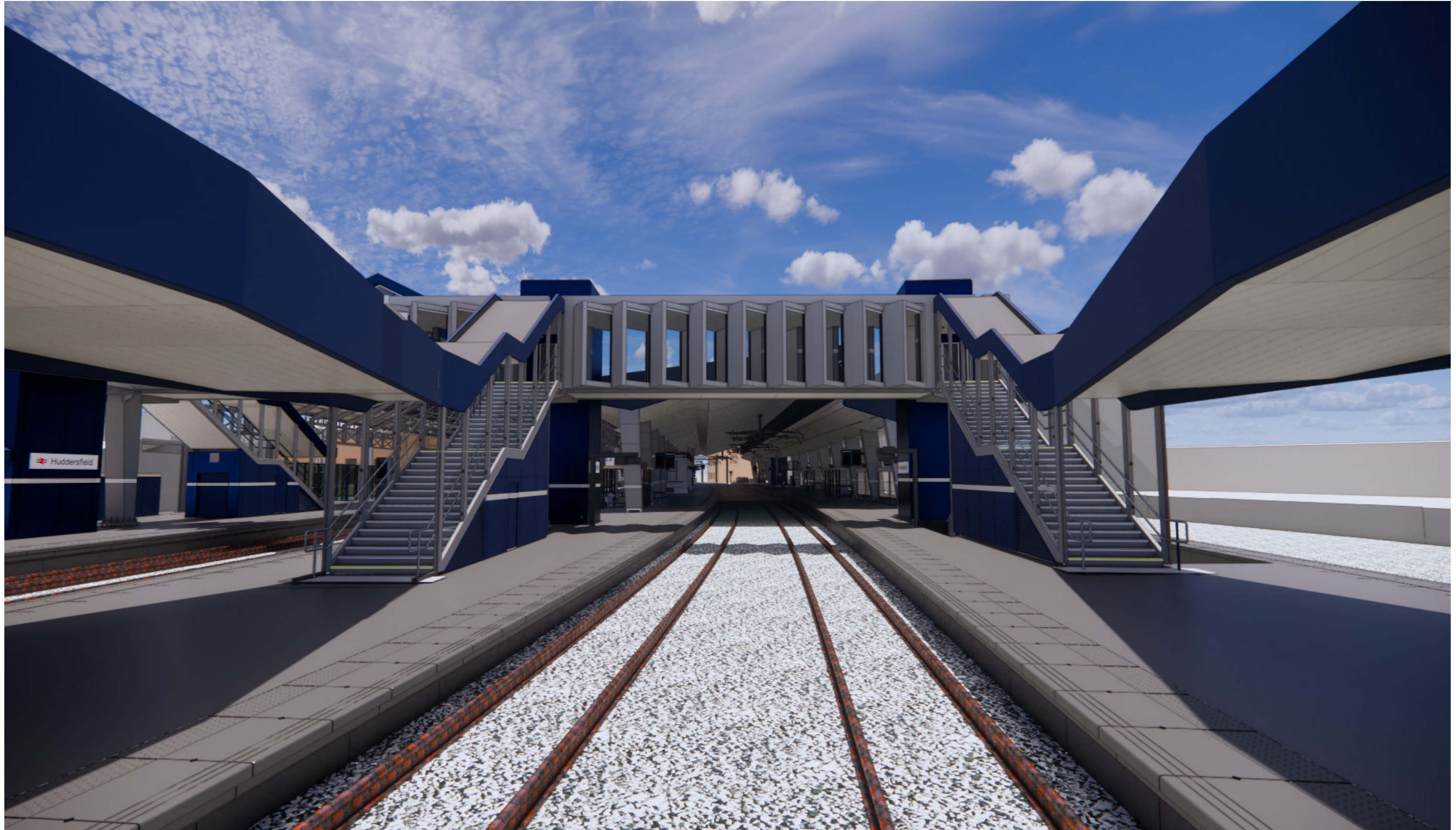


Figure 4.5a: View of footbridge stairs and main span

4.5.11 Footbridge Lifts

The lift shafts and the undercrofts will be clad in a vitreous enamel cladding that will be coloured blue to tie it back into the colour scheme on existing Roof A and new replacement Roof B. They will have flat roofs and concealed downpipes keeping the surfaces free of clutter.

Each lift shaft will have a waiting canopy.

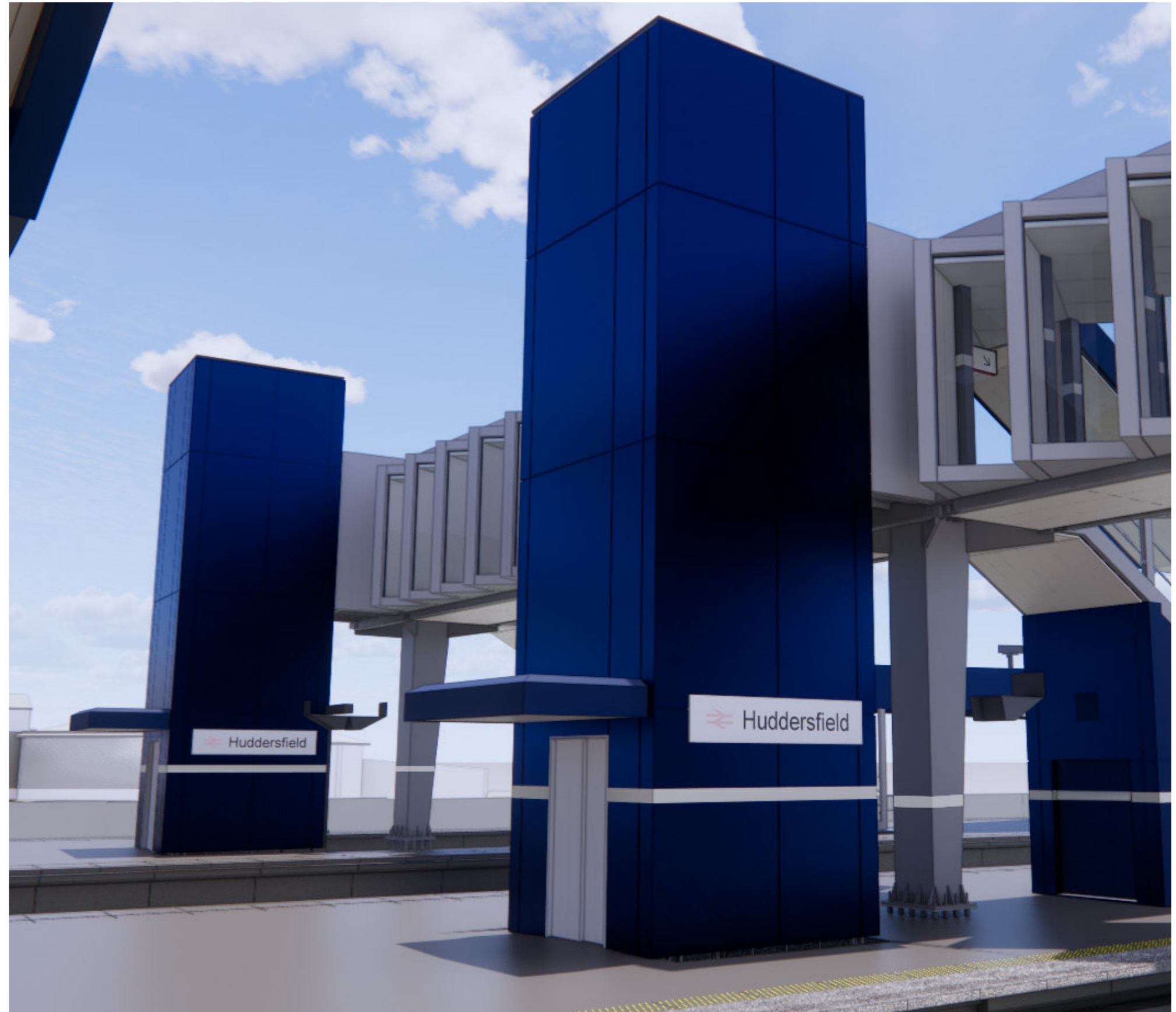


Figure 4.5.11a: View of footbridge lift shafts

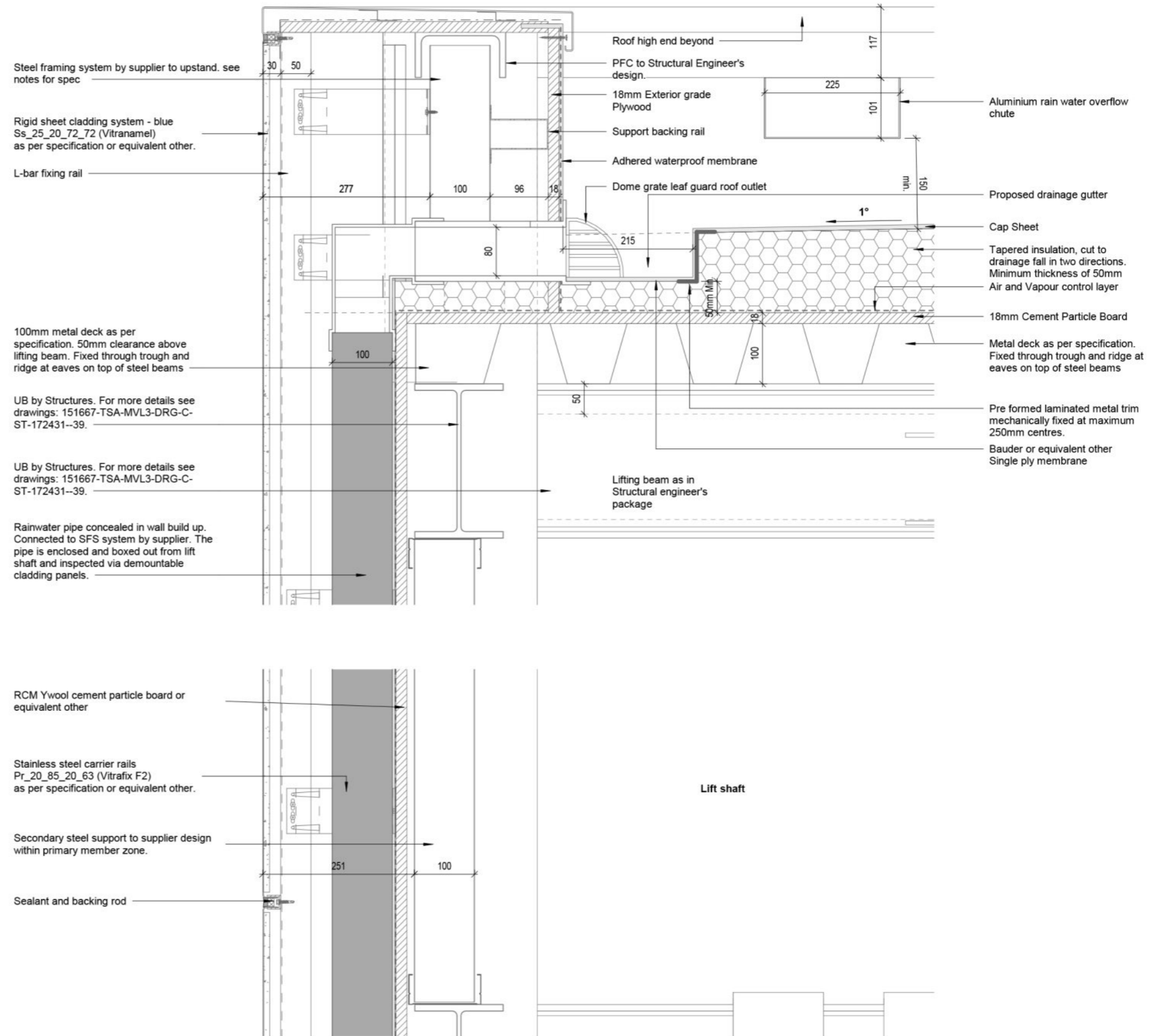


Figure 4.5.11b: Proposed lift shaft detail

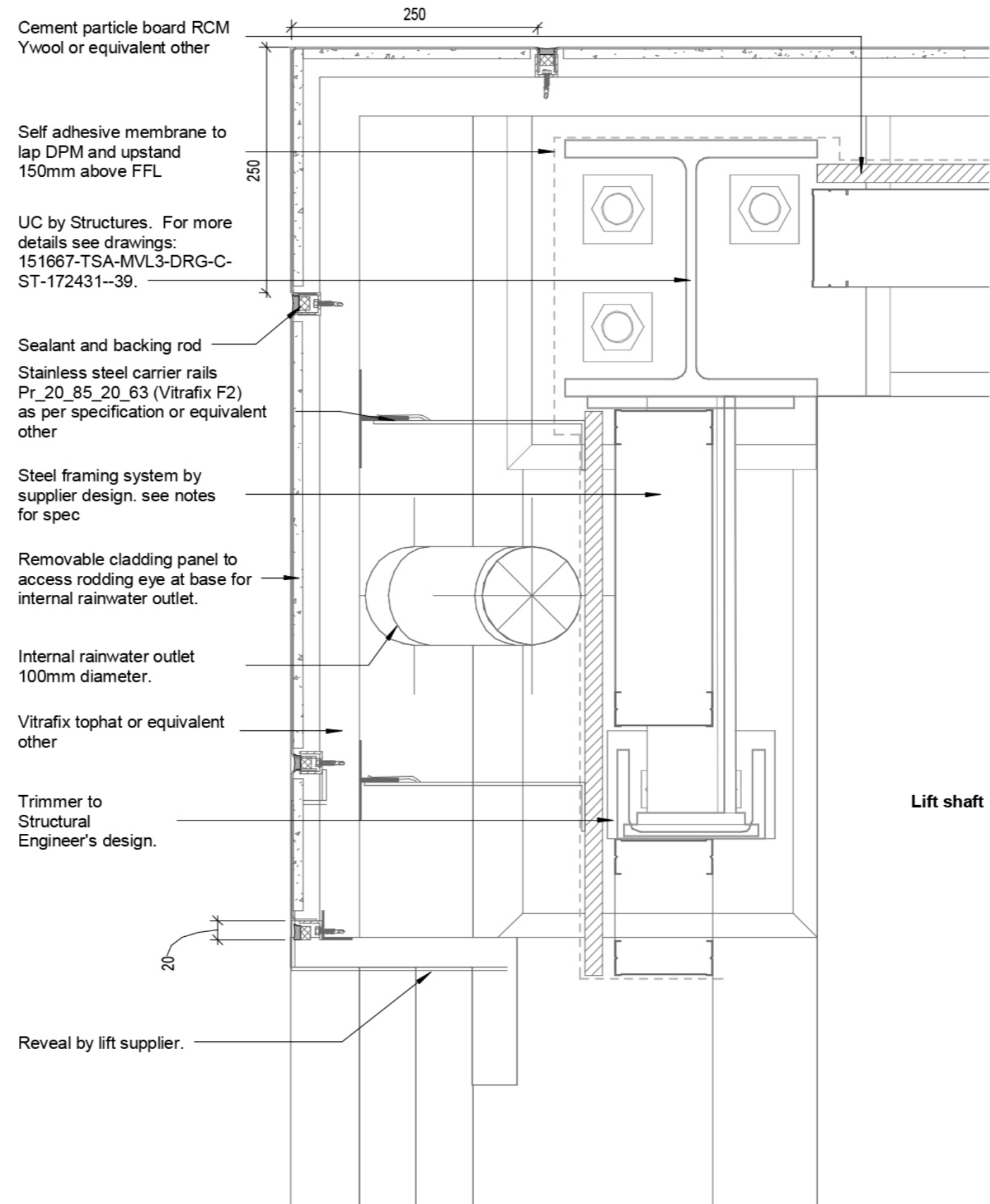


Figure 4.5.11c: Proposed lift shaft detail with concealed downpipes

4.5.12 Footbridge Undercrofts

The stair undercrofts will house lift motor rooms and small plant rooms that will serve the station. This will reduce the requirement for additional structures elsewhere on the platforms. These have been kept as small as possible so that they do not increase the visual mass of the footbridge.

These will be clad in vitreous enamel cladding that will be coloured blue.

The main columns that support the bridge span will be exposed steel but painted grey to match the structural elements on Roof A and the new replacement Roof B canopies. These will also be tapered in design so that they tie in with the design intent of the other new structural elements.

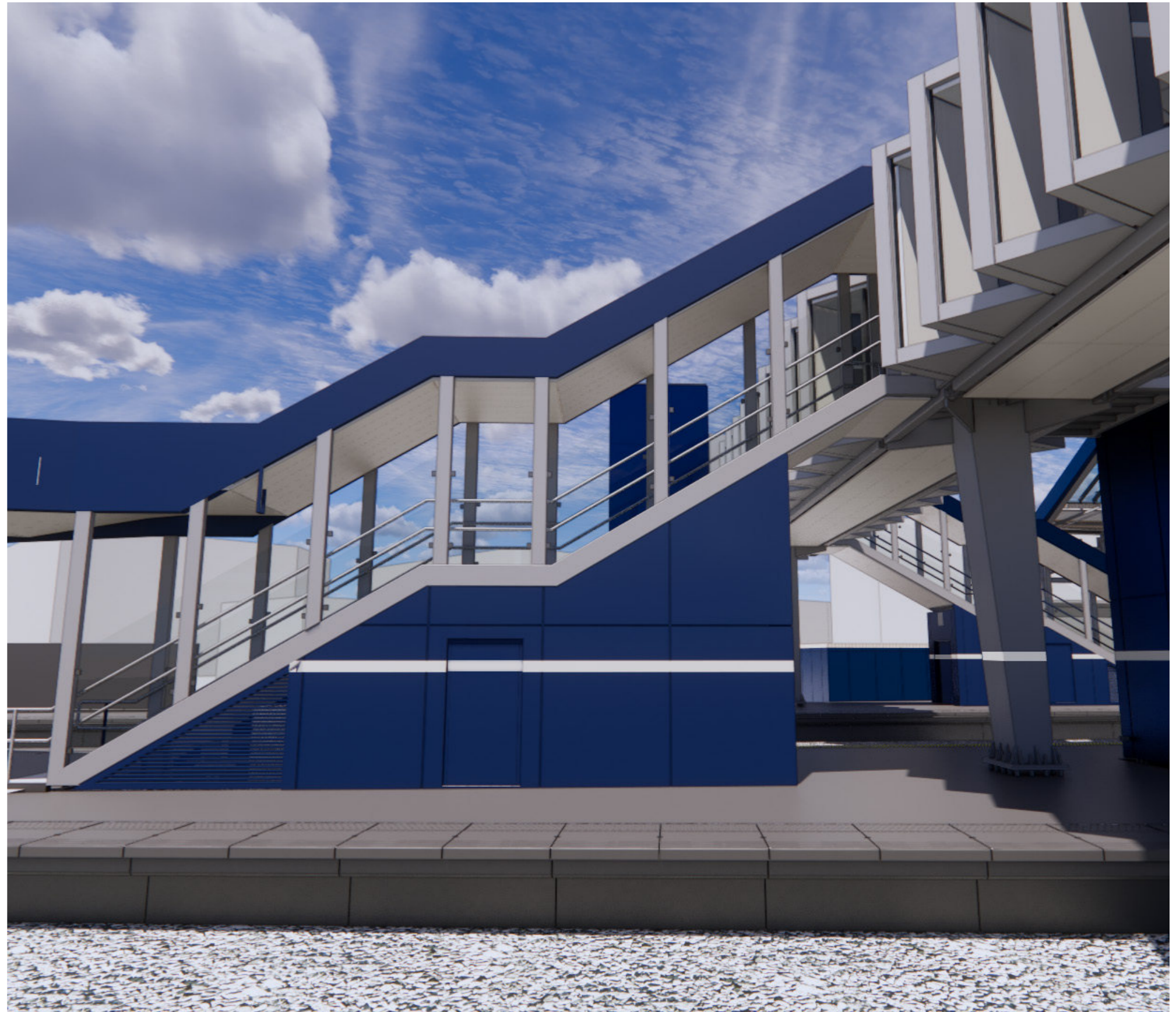


Figure 4.5.12a: View of footbridge undercroft areas

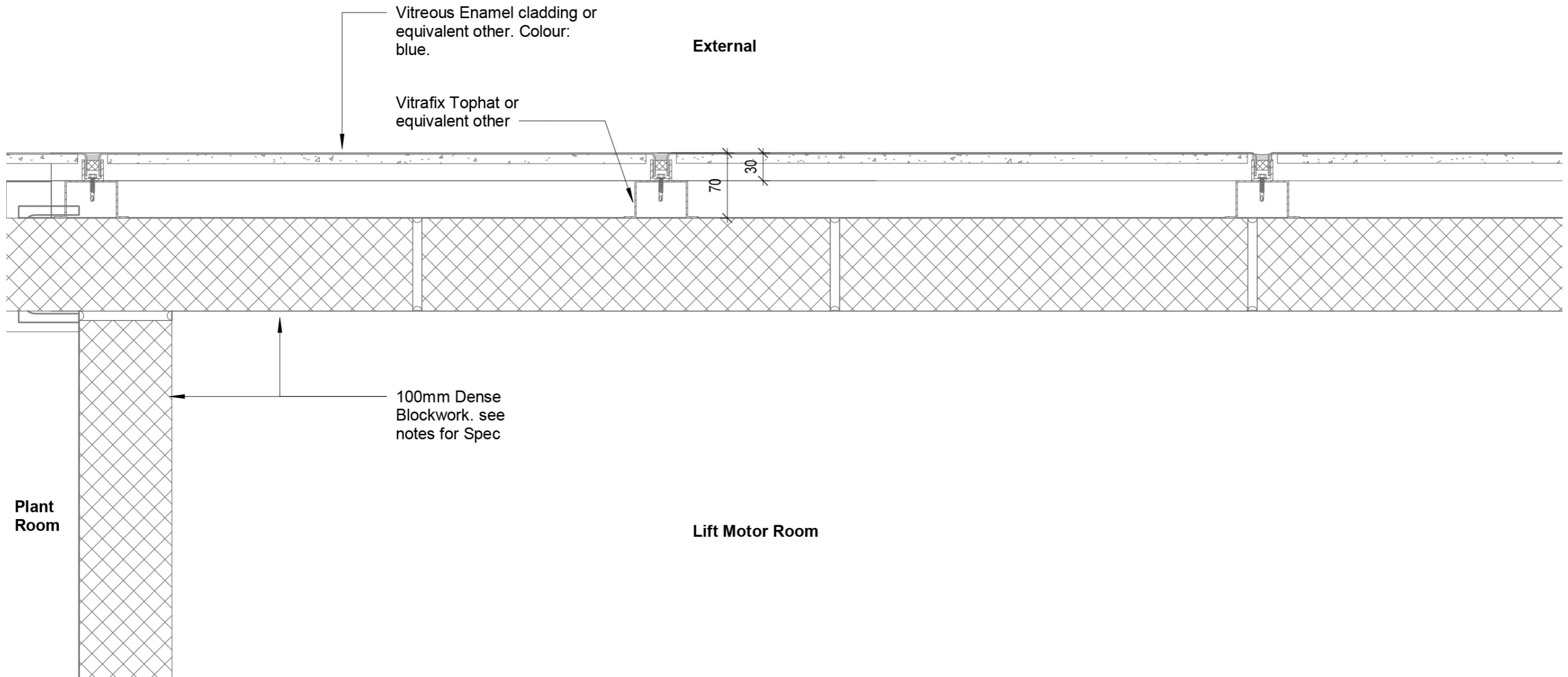


Figure 4.5.12b: Typical undercroft wall build up

4.5.13 Footbridge Bridge Span

The bridge span will be clad in secure glazing that is positioned to reduce glare for train drivers waiting to depart from the station but also to provide views to back across to the inside of the original Euston Truss in Roof A. They are also clad in vitreous enamel cladding that will be coloured grey.

Inside the bridge span the floor will be a grey resin with a colour contrasting guidance strip, the walls will be a grey enamel cladding and the ceilings will be an off white metal panel system similar to the system used in the new replacement Roof B that will reference the geometry of the bridge from the inside.



Figure 4.5.13a: View inside bridge span

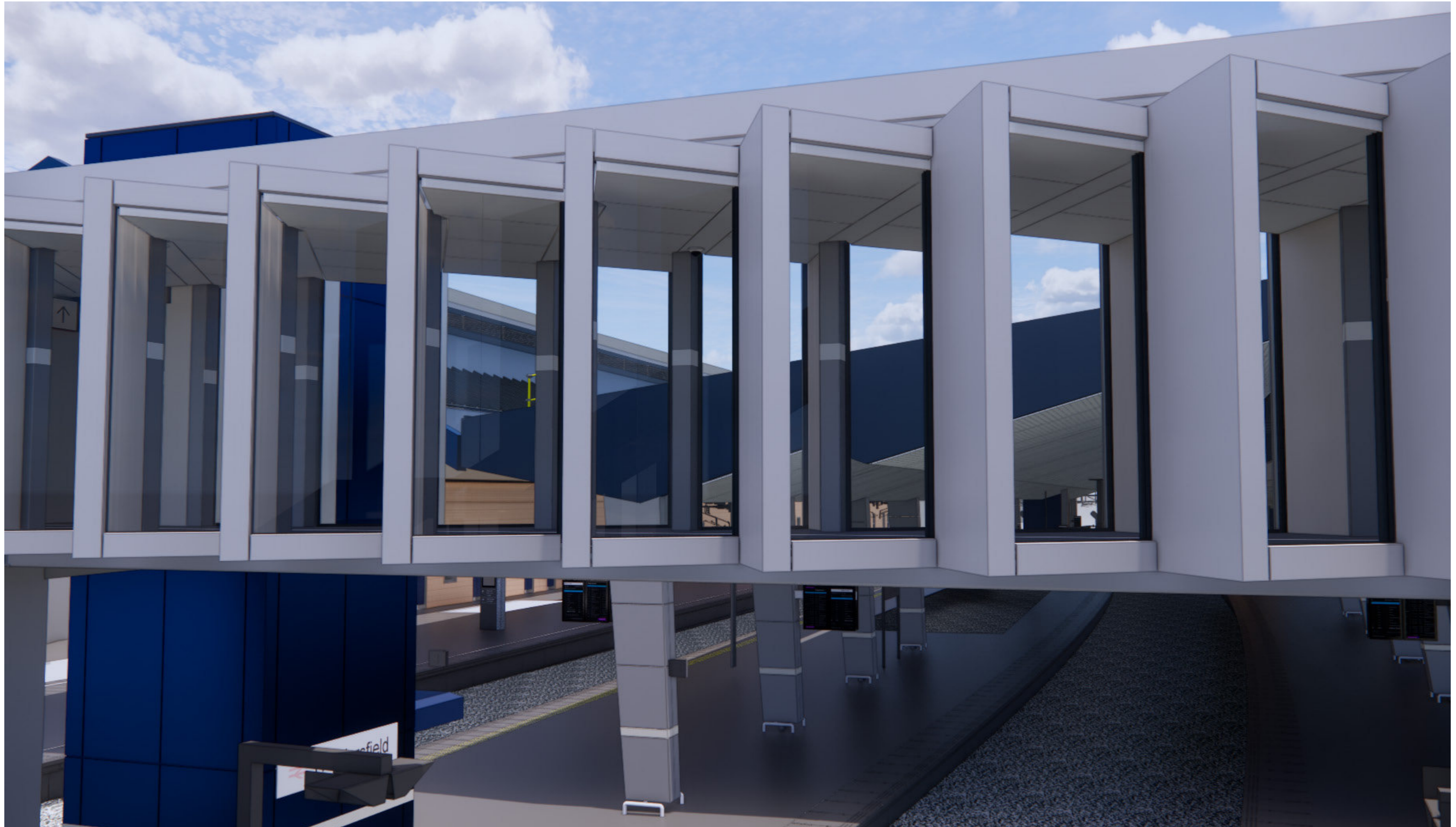


Figure 4.5.13b: View of footbridge span

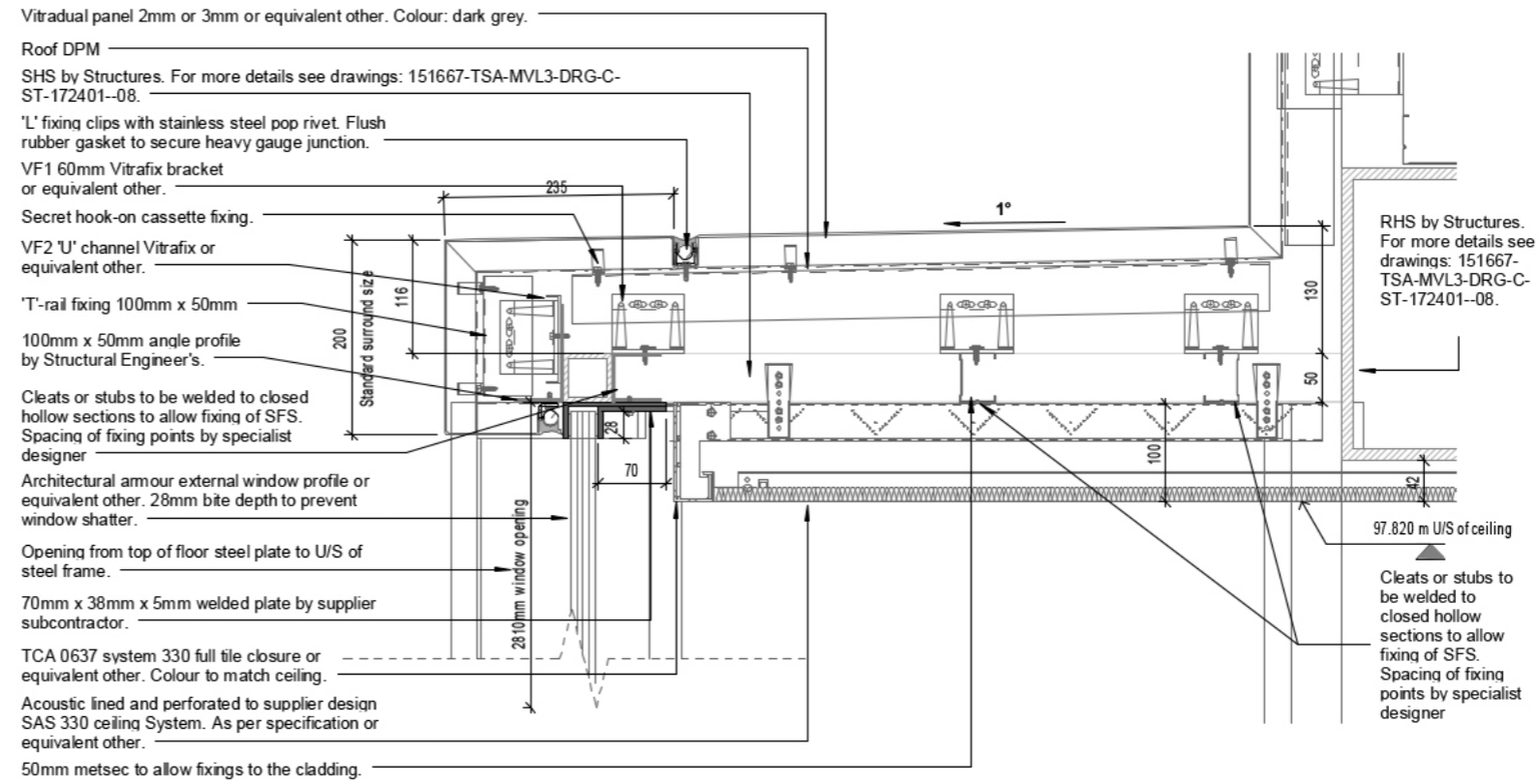


Figure 4.5.13c: Typical glazing head detail

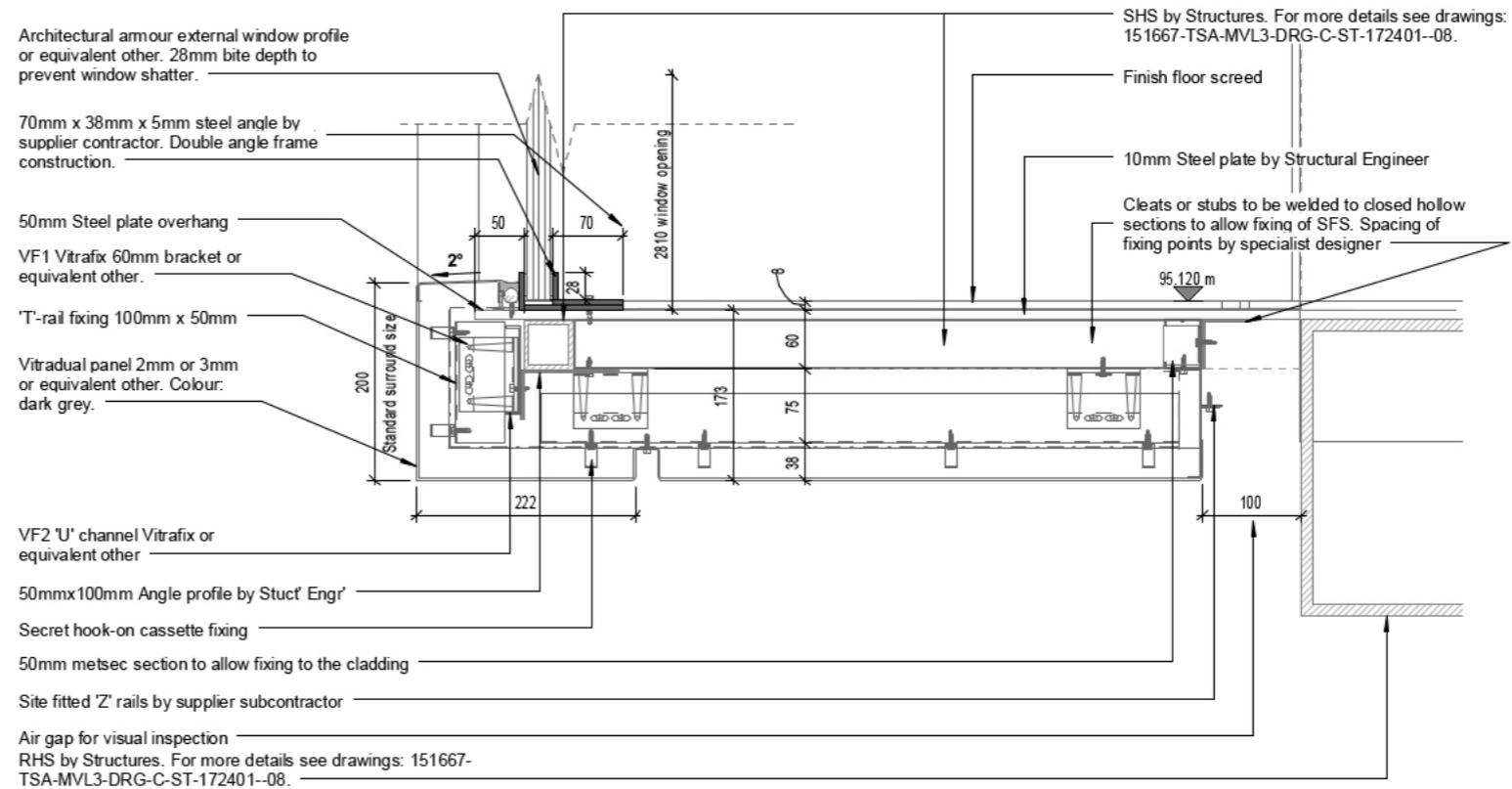


Figure 4.5.13d: Typical glazing cill detail

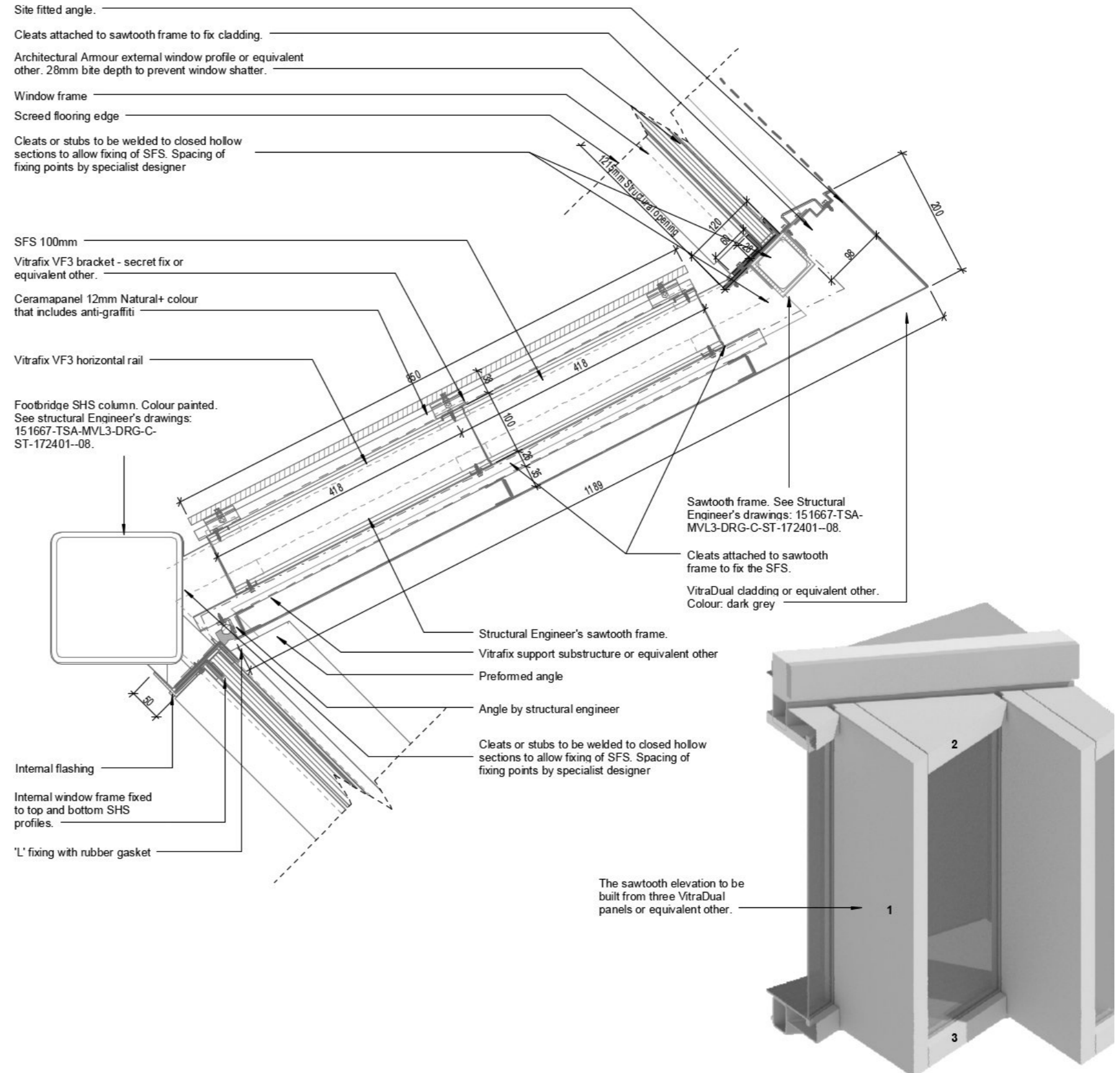


Figure 4.5.13e: Typical glazing plan detail

4.5.14 Footbridge Soffit

The soffit of the footbridge will be constructed using a similar cladding system to the underside of the new replacement Roof B. This is demountable but is also arranged so that visible and tactile inspection of the main structural members can be achieved without removing the cladding.

The soffit will also include a graphic strip that links visually back to the one on Roof B. This will be defined at a later CIMP phase.

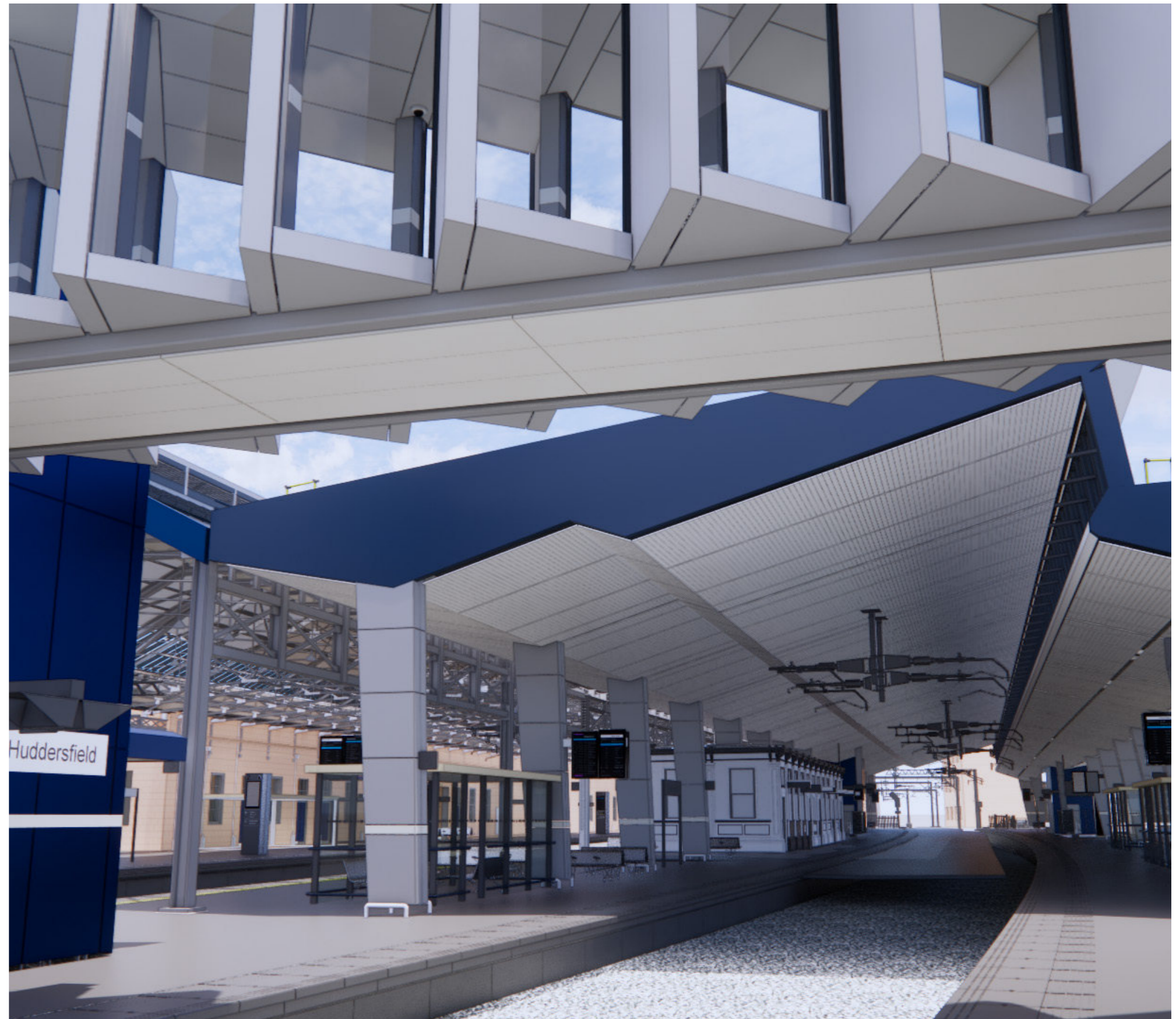


Figure 4.5.14a: View of footbridge soffit

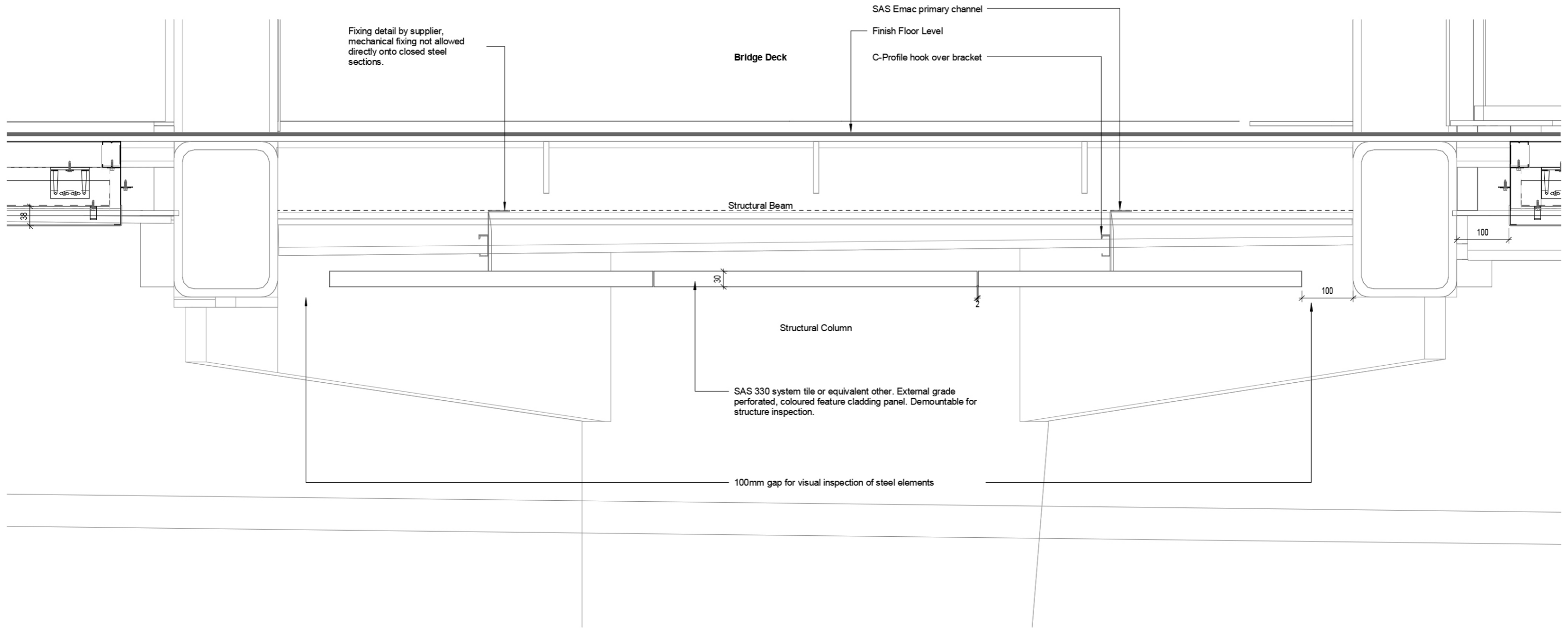


Figure 4.5.14b: Proposed soffit detail

4.5.15 Footbridge Roof

The footbridge roof will be clad in a single ply membrane that will be coloured grey. It will be set back on the main bridge span to reduce the visual impact of the bridge from platform level.

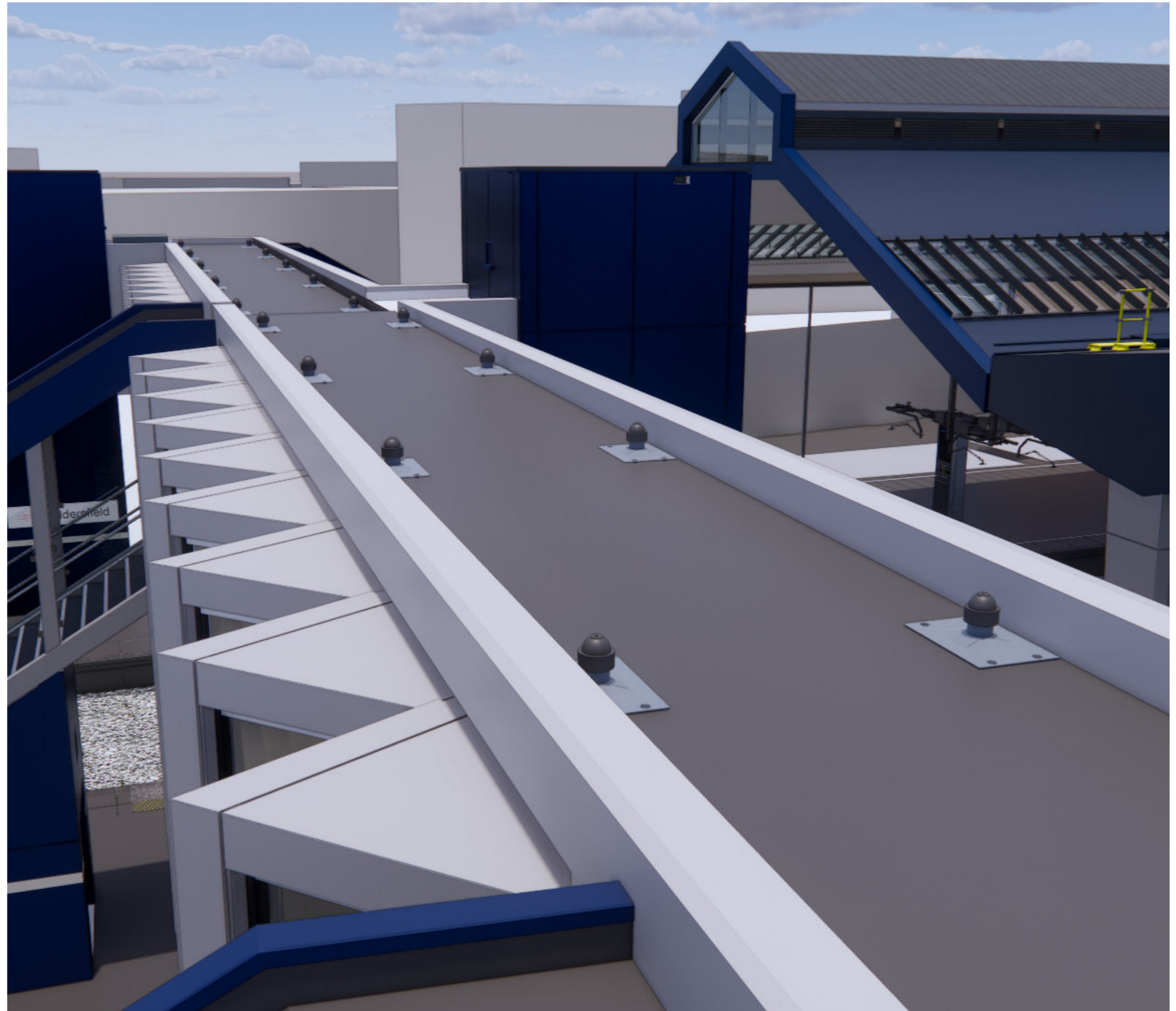


Figure 4.5.15a: View of footbridge roof

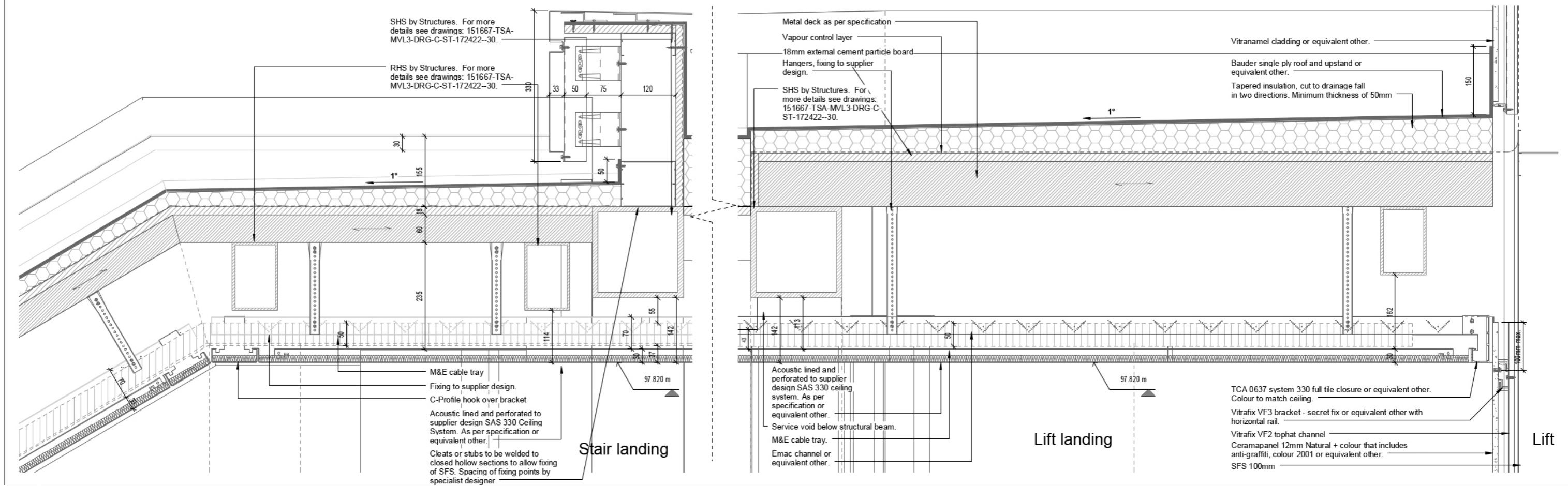


Figure 4.5.15a: Proposed footbridge roof detail

4.5.16 Footbridge Stairs

The footbridge stairs will be clad in a grey GRP covering with colour contrasting nosings. These will be white apart from the top step and the bottom step which will be yellow.

The handrails will be brushed metal with integrated lighting and a glazed balustrade.

The stairs will be supported by a grey metal stringer and each staircase will be covered with a single ply roof with blue fascia flashings to match the platform canopies, lift shafts and flashings on the new replacement and refurbished roofs.



Figure 4.5.16a: View of footbridge stairs

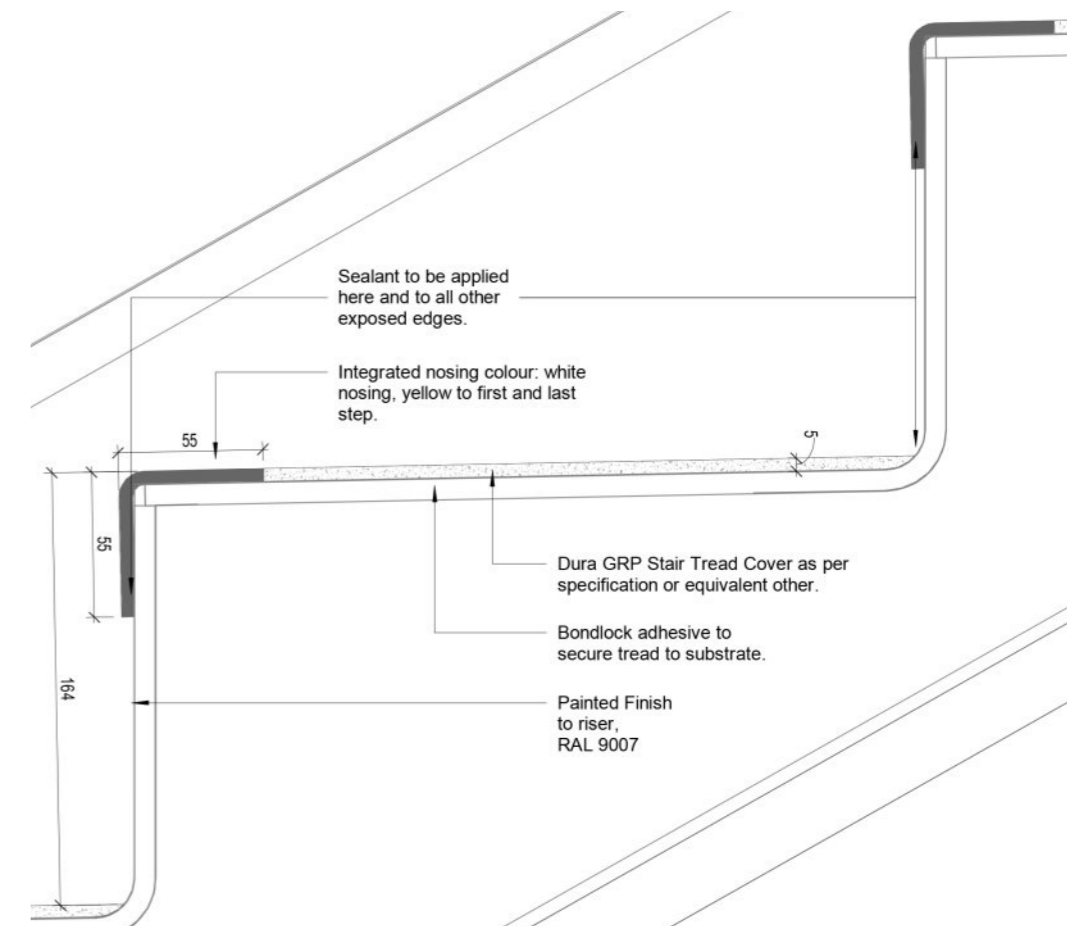
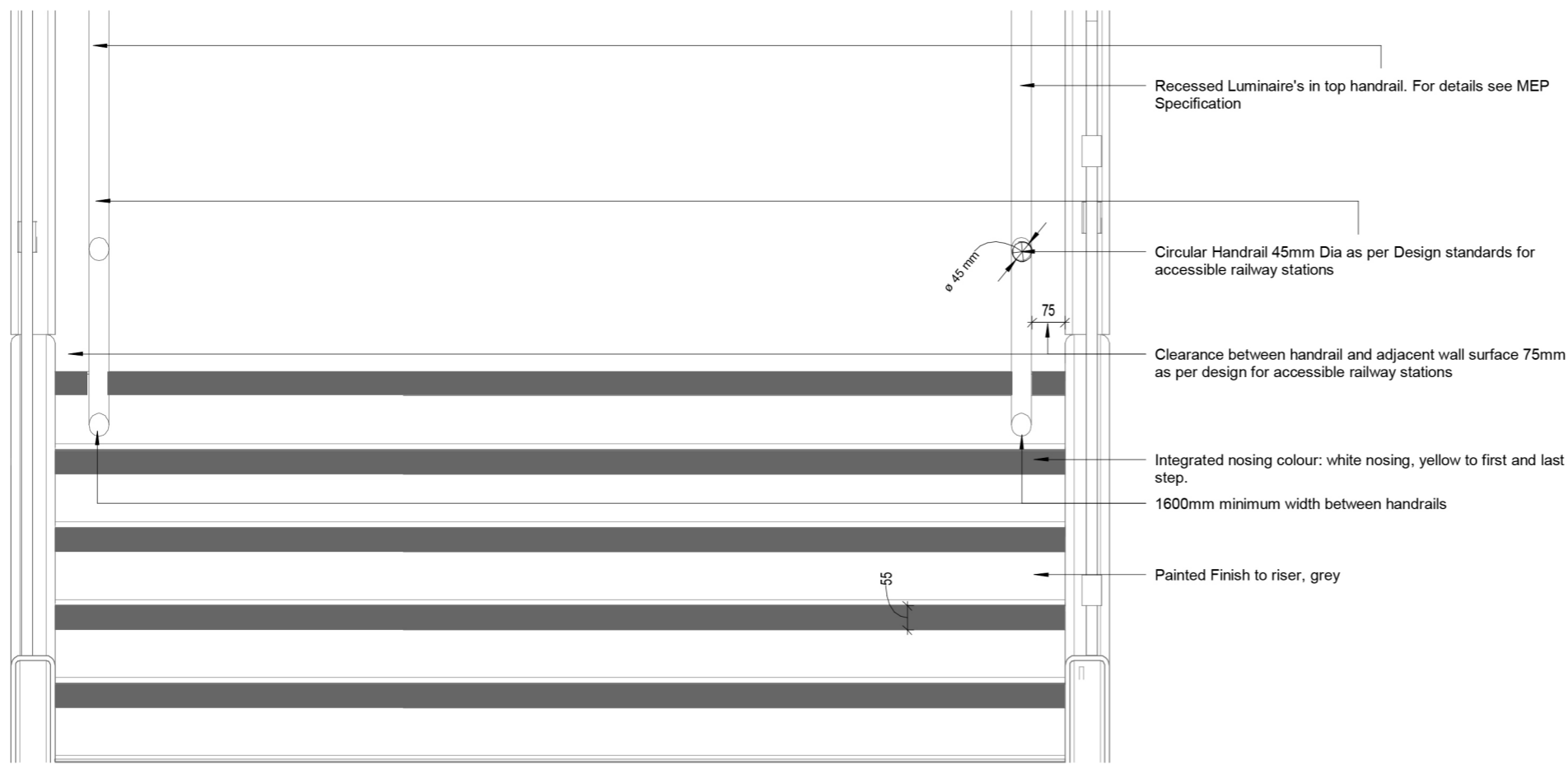


Figure 4.5.16b: Footbridge stair details

4.6 Detail Development Platform Canopies

4.6.1 Proposed form

Due to the new track alignment and platform extension towards the Leeds end of the station, there is now a requirement for platform coverage. The intention is to provide coverage for the full width of the platforms to a length suitable to provide adequate coverage for

passengers queuing to enter the footbridge after alighting trains.

The Leeds end platform canopies are similar in scale to the Penistone Line canopy and will therefore be designed so the two sets of canopies will bookend Roof A and Roof B. This will mean the new canopies will be visually unobtrusive and will not detract from the gable end view of Roof A and Roof B.

The soffit for the canopies will be undulated in a similar style to the

new soffit in Roof B this further tying the design together.

This will be enclosed with a new modern interpretation of the Penistone dagger boarding. The undulations will be positioned so that guttering can be installed adjacent to the tracks in the low points of troughs away from the OLE. It is important from a heritage perspective that these canopies impact on the gable end view of the trainshed and new roof as little as possible.

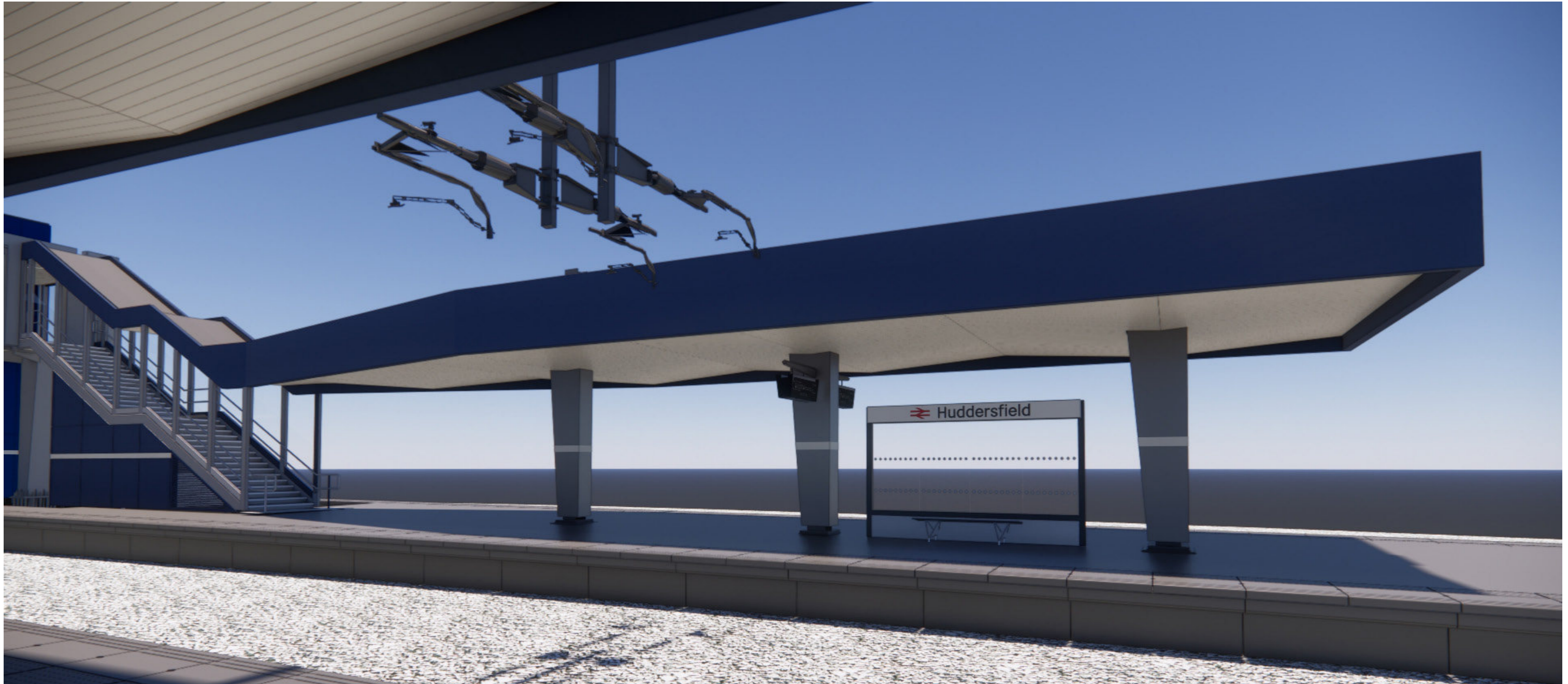


Figure 4.6a: Footbridge canopy visual

4.6.2 Materials

The Leeds end platform canopies will be designed to tie in with the new roof elements regarding the Penistone Line canopy which serves as the other book end. The undulating soffit will be the metal slated cladding of Roof B. The commonality of material in the new sections will further tie them together but will also aid with orientation and wayfinding around the station. The fascia material will be a metal cladding.

4.6.3 Colours

The colour scheme for the canopies will take queues from the Penistone line canopy. The fascia boarding will be a subtle blue tying into the Penistone Line and some of the elements on the footbridge. The column cladding will be light grey tying into the Penistone Line columns and the Roof A and B structure. Finally, the colour scheme for the soffit material will reflect the off white of Roof B which in turn ties back to Roof A. All colours to follow the Project's colour specification for the station, as reflected in the Materials Schedule submitted to discharge Condition 2 attached to the granted LBC.

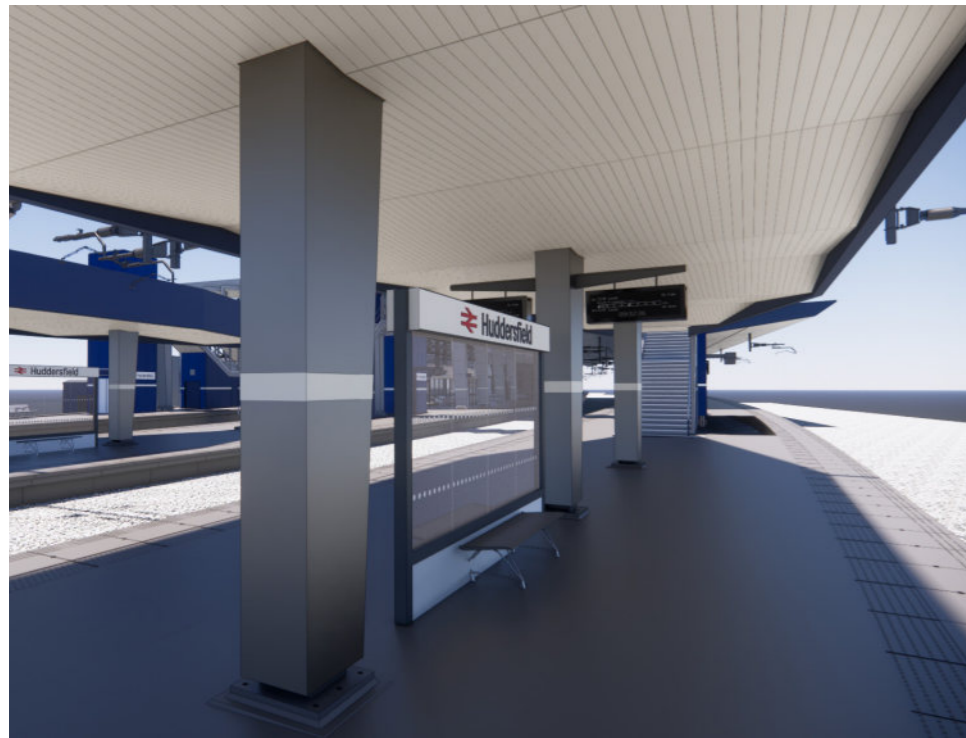


Figure 4.6b: Footbridge canopy soffit

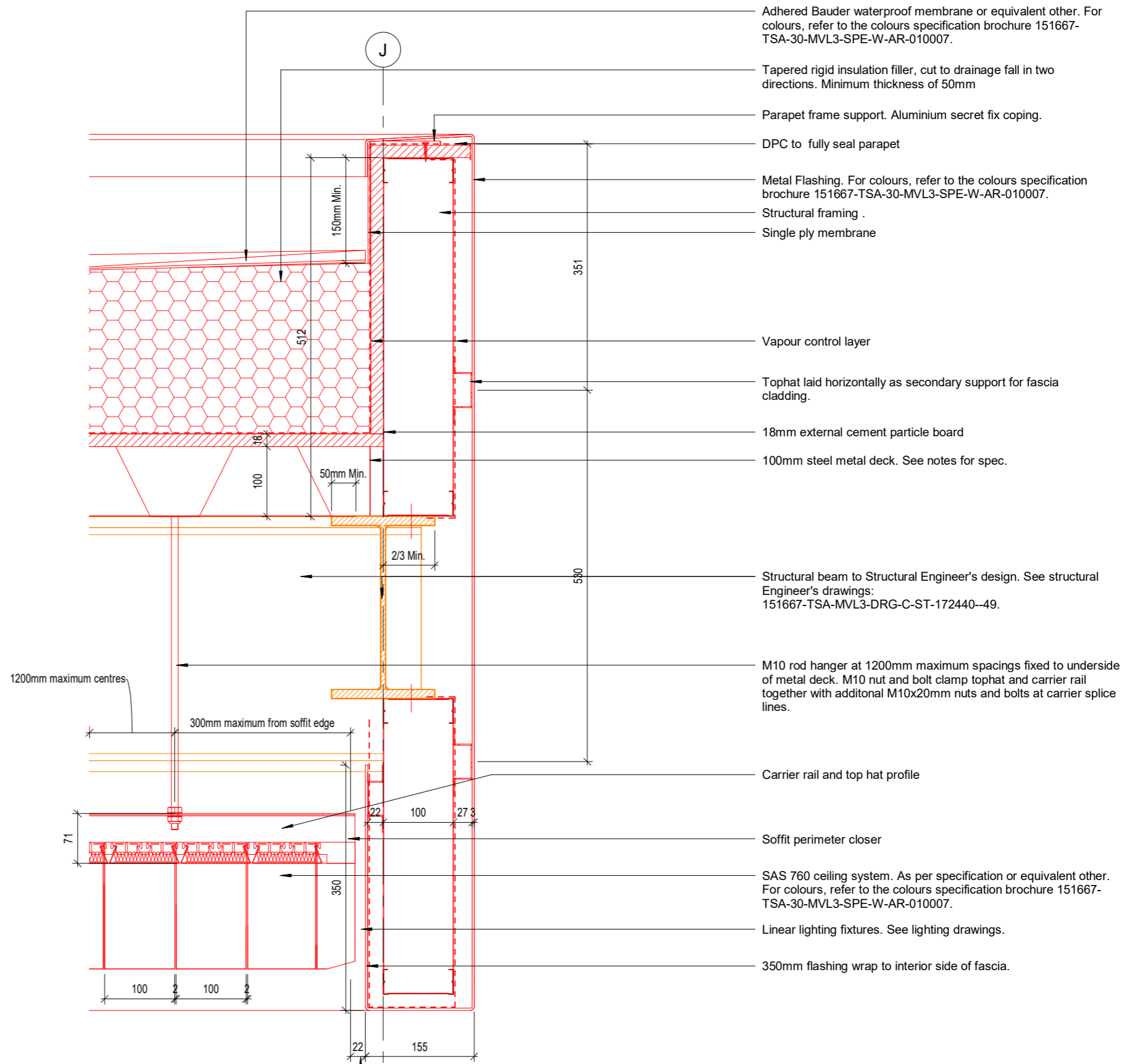


Figure 4.6c: Footbridge canopy edge detail

4.6.4 Lighting

The lighting scheme within the platform canopies has been designed in accordance with the following guides and standards:

- RIS-7702-INS Lighting at Stations
- RIS-7016-INS Interface between Station Platforms, Track, Trains and Buffer Stops
- GI/GN750 Guidance on Lighting of Railway Premises
- BS EN 12464 Part 2: Outdoor Lighting
- BS EN 5489-1:2011
- BS EN 5266-1: Emergency Lighting
- BS EN 1838: Lighting Applications - Emergency Lighting
- CIBSE SLL LG6 The Exterior Environment (2016)
- CIBSE SLL LG15 Transport Buildings (2017)
- ILP GN01 Guidance Note for Reduction of Obtrusive Light

As the Penistone Line Canopy is an existing and extended canopy that will follow the same line as Retained Roof A platform, the same lighting scheme will continue from Roof A into this canopy. A smaller version of the suspended luminaires will be mounted to illuminate the platform. The distribution of light from the suspended luminaire will also create a soft-glow of illumination on the canopy roof.

The Leeds end canopies will continue the same linear luminaire theme as the New Roof lighting. Continuous linear luminaires will

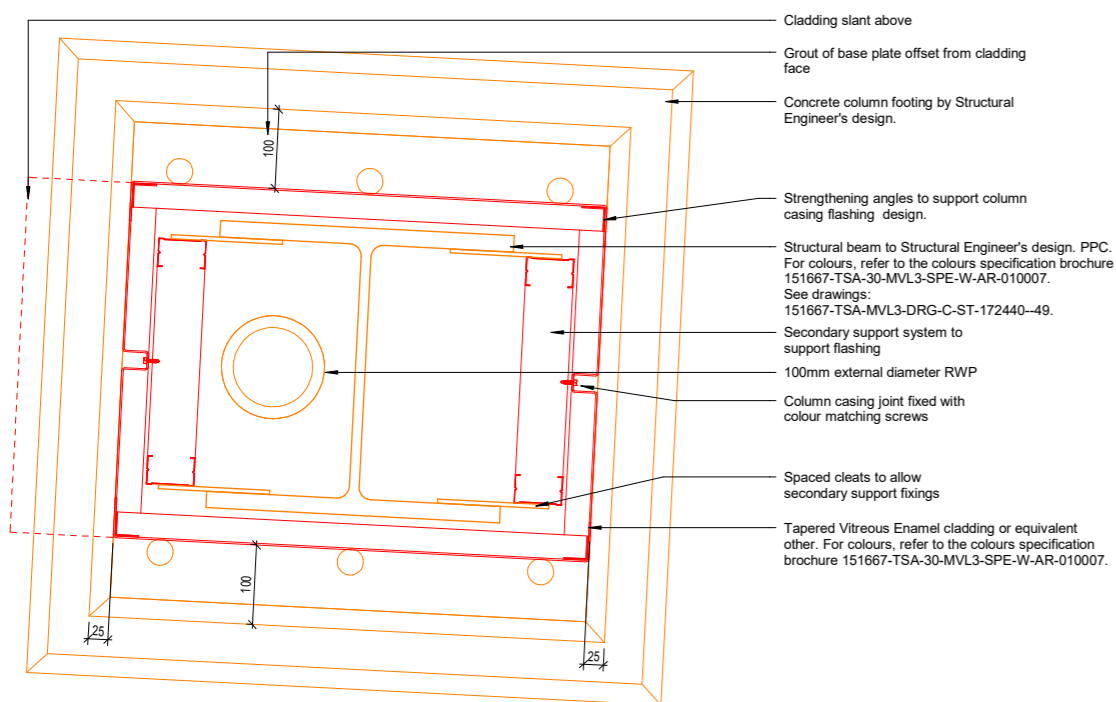


Figure 4.6d: Column casement plan detail

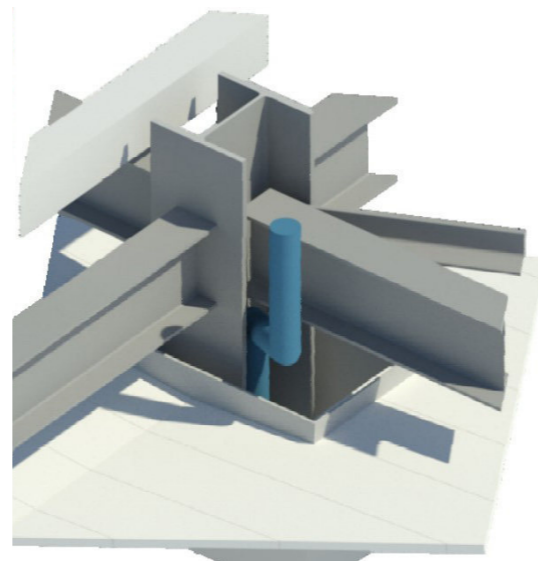


Figure 4.6e: Rainwater pipe axo view

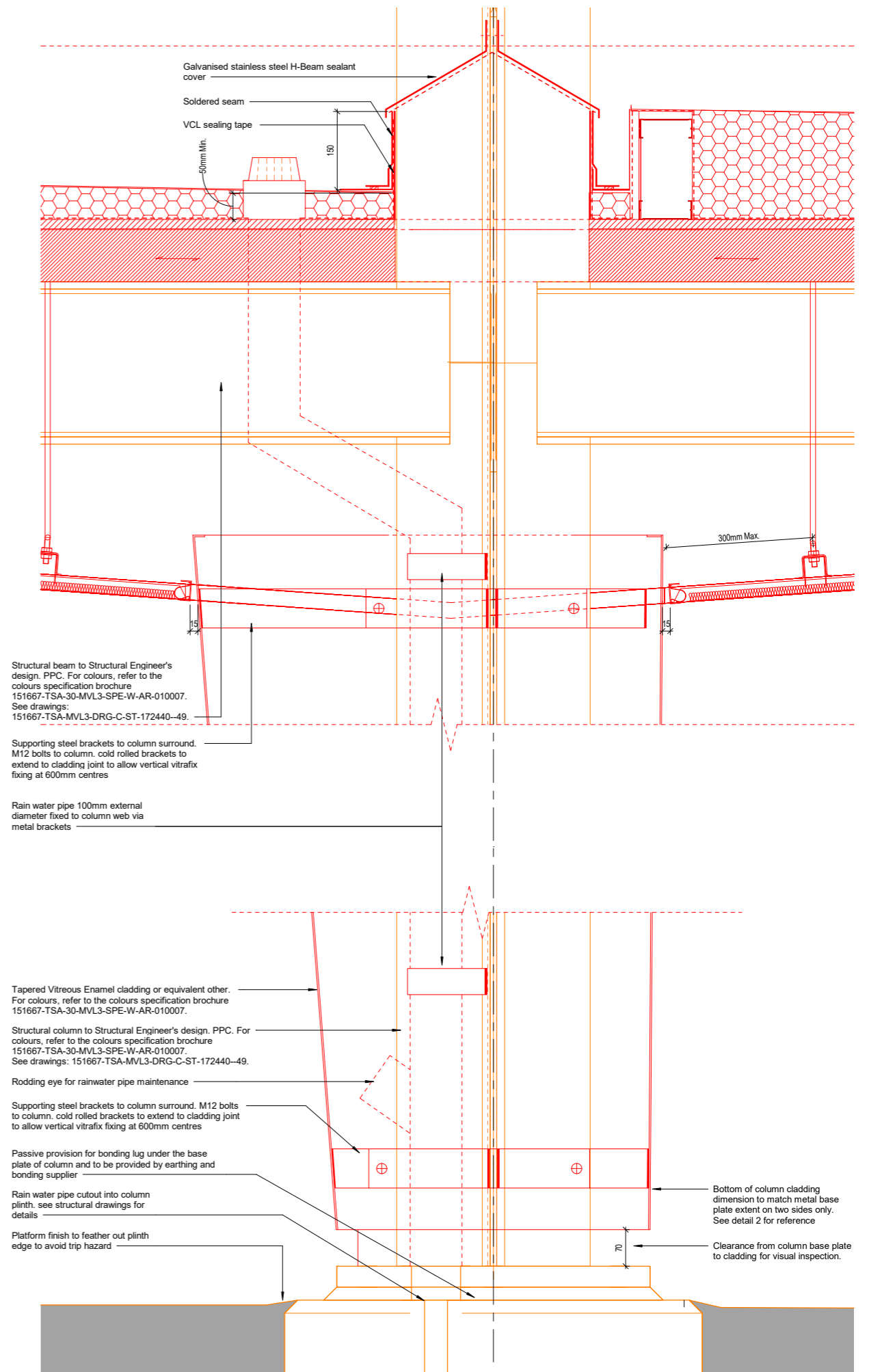


Figure 4.6f: Column casement section detail

be positioned to run parallel to the platforms and integrated within the architectural ceiling. The linear luminaires will provide a uniform lighting level which clearly defines the platform edge.

4.6.5 OLE

There will be a requirement to interface overhead line equipment into the canopies. Due to the lower height of the canopies, it will need to be situated on top. It will sit on the column locations and cantilever out over the track. Visually the OLE masts will be designed so they reference the geometry of the new roof which is derived from the Euston Truss.

4.6.6. Maintenance access

The platform canopies will be accessed from hatches on the underside. The gutters for drainage will be situated at the low points of the undulations away from the OLE. There will be a single fall arrest system line running along the centre of each canopy to allow inspection along the length.

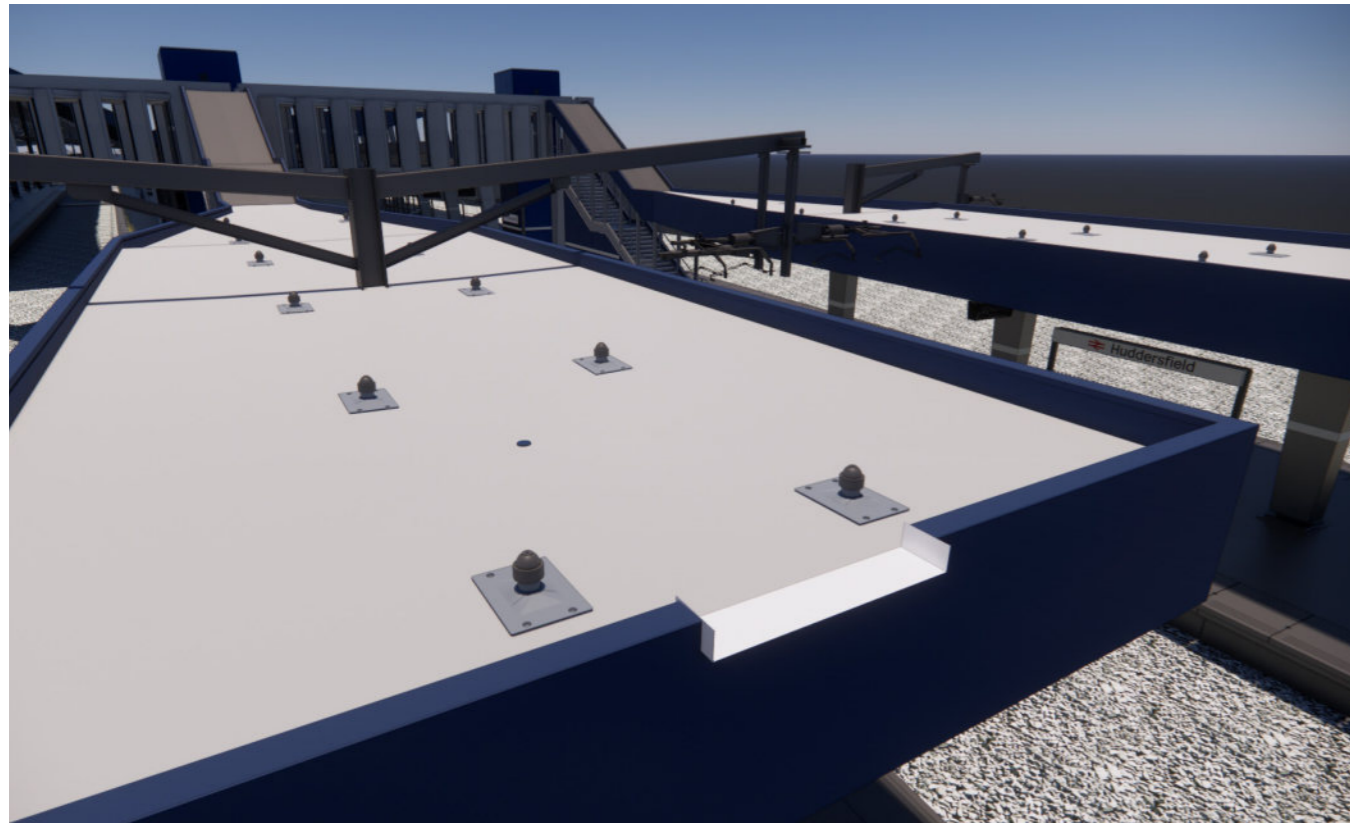


Figure 4.6g: Canopy roof visual

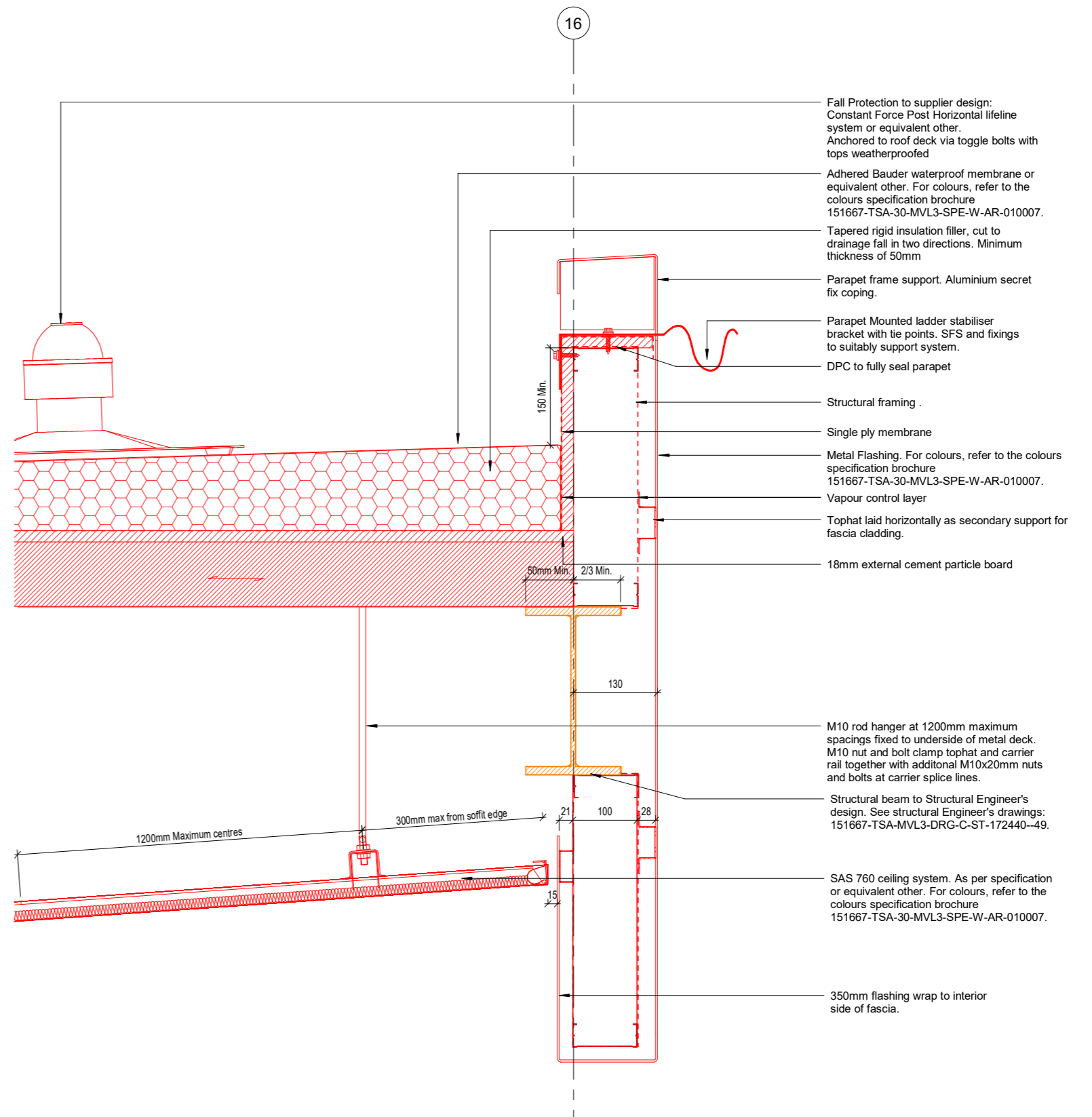


Figure 4.6h: Canopy overflow section detail

4.7 Detail Development Platforms

4.7.1 Proposed form

Proposed platforms positions and lengths are driven by the track and signalling layouts, refer to section 4.1 for details. A usable platform length of 200m is mandated in the TRU head specification for through platforms at Huddersfield Station.

A clear distance of 3.3m is required from platform edge to any platform obstruction such as lift shafts, stairs, columns, seating, waiting areas, etc. This provides sufficient space for station staff to position a boarding ramp and turn a wheelchair at any point along the platforms.

A passenger refuge area is proposed at the Leeds end of Platforms 3-4 and 5-6 to provide a safe area for persons of reduced mobility in the event of a train fire. Fire escape routes are provided at the end of the remaining platforms.

4.7.2 Accessibility and inclusivity

The platforms have been designed to meet the requirements of BS 8300: Design of an accessible and inclusive built environment, The Department of Transport Design for Accessible Railway Stations and the relevant TSI for Persons with Reduced Mobility. The platforms provide an anti-slip surface with falls between 1:80 to 1:40. Tactile paving and visual platform warning markings are provided to demarcate platform edge. Platforms shall be covered by CCTV with Help Points located on platforms.

4.7.3 Obstacle free routes

Obstacle free routes will be provided that interconnect the following public areas of the station:

- accessible entrances and exits
- information desks
- visual and audible information systems
- ticketing facilities
- customer assistance
- waiting areas
- toilet facilities
- platforms

Obstacle-free route floor surfaces and ground surfaces will have low reflecting properties to aid with visual contrast.



Figure 4.7a: Platform visual

4.7.4 Facilities within the station

Disabled WC provision with wheelchair access is provided within the station itself on Platform 1, and new facilities are to be located on Platform 3 & 4. Baby changing facilities are currently provided on Platform 1, accessible to both men and women and this location will remain unchanged.

4.7.5 Materials

The existing platforms will have their existing asphalt finishes maintained. The platform riser walls will be pre-cast concrete and the new platform finish will also be asphalt.

4.7.6 Furniture

Platform furniture and structure is to be located centrally on the platforms and include a 3.3m clearance from platform edge to allow for the placing of wheelchair threshold ramps to the train doors. This requirement has been driven by the Technical Specifications for Interoperability (TSI) for PRM's. Seating will be placed at 50m intervals to allow PRM's to rest at 50m intervals to meet the requirements of

BS8300 and the Department for Transport (DfT) Design Standards / Code of Practice (COP) for Accessible Railway Stations (2015).

Any items of furniture to the new platforms and free-standing devices at stations shall contrast with their background and have rounded edges and follows the project's colour specification for the station, as reflected in the Materials Schedule submitted to discharge Condition 2 attached to the granted LBC. A separate document detailing platform furniture has been produced to discharge Condition 4 attached to the LBC, which specifically necessitates such detail.

4.7.7 Structural considerations

The new platforms and extensions consist of L-shaped concrete riser walls with solid back fill to form the platforms surface. The riser walls shall support the pre-cast concrete coper, with a tactile paving behind the coper. The platform height to edge of the coper shall be 930mm from the rail and offset 730mm from the nearest rail. Provision of a recess beneath the platform edge is provided. The recess shall be 480mm high with a minimum width of 300mm from the rail level.

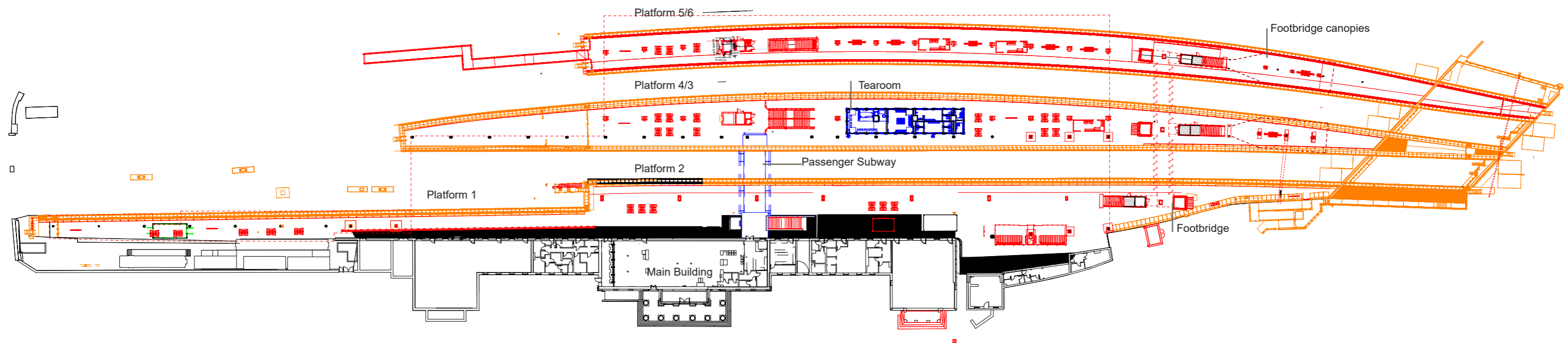


Figure 4.7b: Overall platform plan

4.7.8 Drainage

4.7.8.1 Existing station drainage

The basis of the drainage system for the existing station is as old as the station itself and is shown in Fig.4.7a. The key features are two large stone culverts.

The first of these, referred to as the Station Culvert, originates at the tunnel portals to the south of the station and provides the main drainage outfall for these tunnels. It runs northwards along the side of the station building, the rear of Platform 1. It is located deep enough to pass under the pedestrian subway. The trainshed roofs drain down rainwater pipes within their support columns, which are collected in platform storm water drainage systems. There are no restrictions on the quantity or flow-rates of the storm water discharging from the existing station drainage system.

The other existing culvert is located to the north of the station and can be accessed from a grid in the retaining wall under John William Street Bridge. This is referred to as the John William Street Culvert, see Fig.4.7e.

The main foul drainage for the station building passes northwards along a cellar walkway under the rear of Platform 1, collecting internal station connections as it proceeds, see Fig.4.7f. There is a foul drain from Platforms 3&4 which carries discharge from the Tea Rooms and operational building, this passes under the railway to connect into the main foul drain.

4.7.8.2 Proposed station drainage

The proposal is to keep significant parts of the existing drainage system operating unaltered, but supplement these with all-new drainage systems to service the remodelled parts of the station. The proposed drainage scheme is shown in Fig.4.7g. For new drainage systems, there are stringent criteria governing the discharge of storm water to reduce the risk of flooding within Huddersfield. These criteria do not apply to existing unaltered drainage systems. These criteria include the following:

- reduction in the storm water runoff peak flow rate to the surrounding sewers of 30%.
- within the drainage models, simulated storm rainfall intensities to be increased by 40% to allow for future climate change.
- this restriction requires storm water to be held within the station in

a new attenuation tank with a flow control.

- the design will demonstrate compliance with these criteria for the storm return period of 1 in 100 years for the station as a whole and for 1 in 200 years for the specific railway infrastructure.

The existing culverts will remain largely unaltered. New connections will be required to this culvert and the upstream end which passes under the railway will be diverted clear of the works. There are no works planned to the John William Street culvert.

For the southern half of the station area, the existing drainage principles will remain. Tunnel and railway track drainage systems will be provided, discharging into this culvert. However other existing flows will be removed to new drainage systems, resulting in an overall reduction in discharge from this culvert to the John William Street sewer.

The station platforms and shed roofs are to be largely re-modelled, therefore a new drainage system will be required complying with the above criteria. A separate track drainage system will be provided, also flowing north to a similar cross-drain. These will both discharge into a new storm water attenuation tank, to be located within the depot site adjacent to Fitzwilliam Street.

In principle the foul drainage system will remain as existing. The primary drain will be in the cellar walkway, draining the station building. The pipe from the Tea Rooms on Platform 3&4 will remain.

Some modification will be essential due to changes in the surrounding infrastructure, however these will be minimised as far as possible. The existing outfall to the John William Street sewer will remain and flow rates should not significantly change.



Figure 4.7c: Platform 2 visual

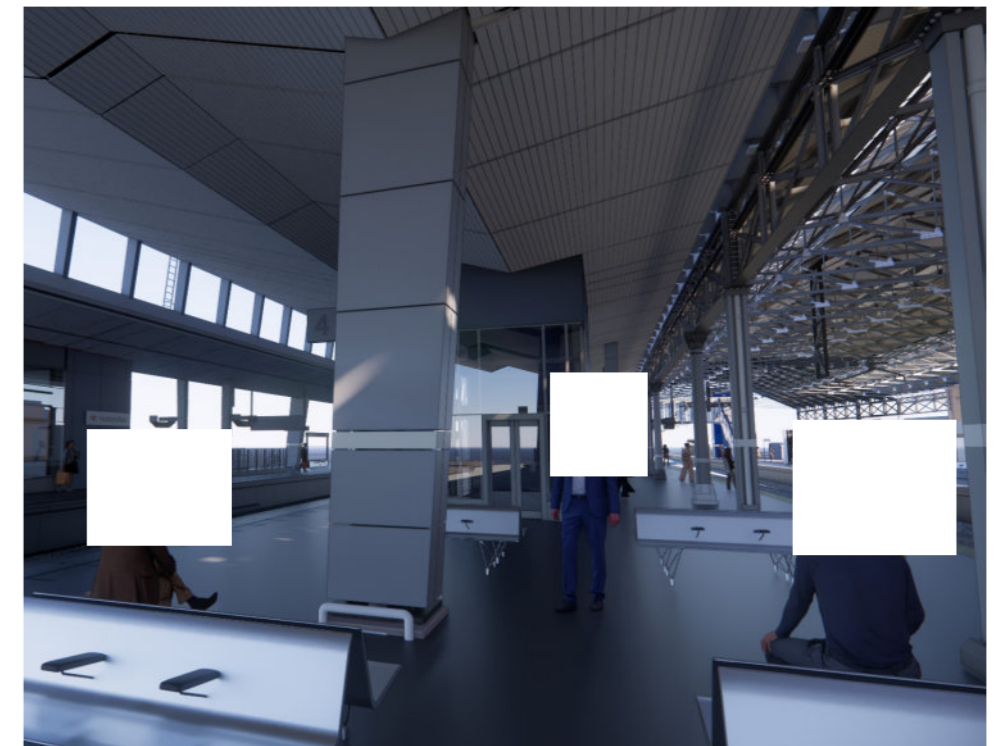


Figure 4.7c: Island platform visual

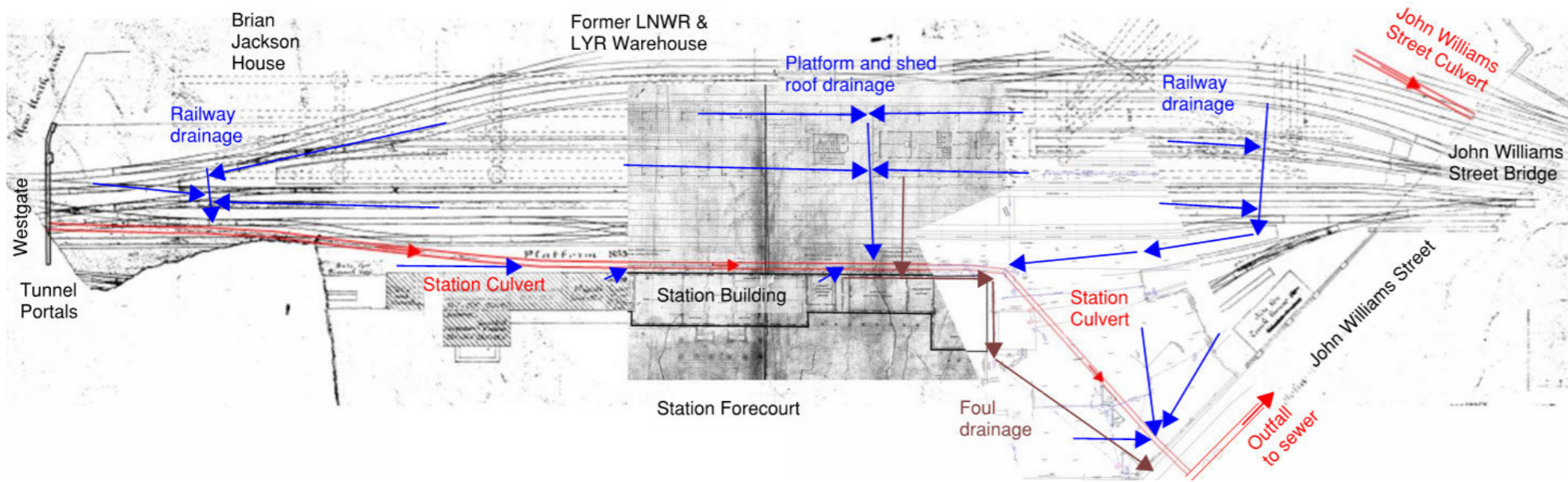


Figure 4.7d Existing drainage systems



Figure 4.7e: John William Street culvert

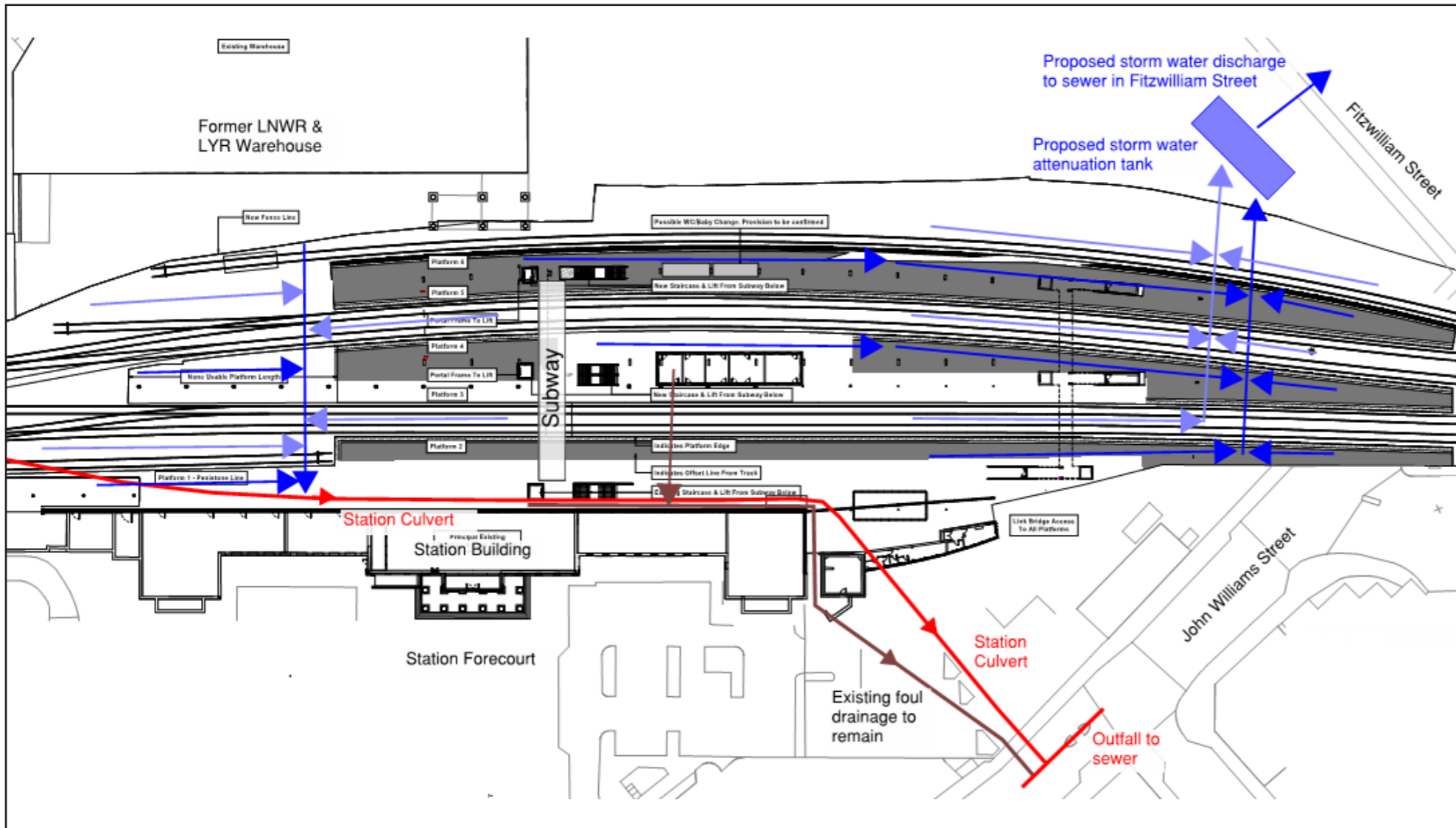


Figure 4.7g: Proposed drainage systems



Figure 4.7f: Foul and roof water drainage within station cellar walkway

4.8 Detail Development of the Tea Rooms

Refer to the approved Phase 1 CIMP and accompanying Methodology for Deconstructing, Storing and Reconstructing the Tea Rooms (Methodology) document.

4.8.1 Introduction

The late 19th century timber-boarded waiting and refreshment rooms, or Tea Rooms, are a distinctive part of the historic platform environment at Huddersfield station. They have a high heritage significance: both for their architectural quality and for their functional role as a building designed for use specifically on an island platform, with access from doorways on both sides.

As part of the station upgrade, the Tea Rooms will be deconstructed, stored, repaired and reconstructed on the new station island between platforms 3 and 4. The proposals will retain the building's function and preserve the building's established spatial relationship with surrounding structures.

The background to the Tea Rooms project is described in the Methodology document, along with a summary of the building's construction and heritage significance.

This section of the Design Guide outlines the design philosophy behind the proposals for alterations, upgrades and spatial reconfiguration to improve the building's functionality and user experience and to integrate the Tea Rooms building with the new station design. These principally concern the internal layout, fit-out of the building interior and some reordering of the door and window cladding bays to suit. Structural alterations include the installation of a new foundation and internal stability elements.

The Conservation Architect's AFC drawings set out the design of the reconstructed Tea Rooms where it departs from the dismantled structure. All reconstructed components will follow the original arrangement, using surveys and drawings prepared during dismantling to ensure accurate reassembly.

Further information on recording, dismantling, repairs, and reconstruction is provided in the Methodology document. The repair strategy is being developed with the specialist contractor and will be refined following the outcomes of repair trials.

4.8.2 Key Design Drivers

Integrate Tea Rooms with New Station Design

- Reorientate the building so the cafe faces the new footbridge approach.
- Reposition the building to suit new platform geometry.
- Integrate the structure with the new platform gradient and new roof B columns.

Preserve and Enhance Significance

- Retain the building's island-platform position with entrances on both sides.
- Maintain the building's dual-aspect form with matching window and door arrangements each side.
- Repair and reinstate significant historic fabric, including timber cladding, windows, cast iron console brackets and timber frame construction.
- Restore the café counter and glazed side screens and reposition them for improved accessibility.
- Enhance the building's existing use as a cafe, waiting room and toilet facility.

Improve Functionality and User Experience

- Re-plan the internal layout, circulation and door operation to improve accessibility.
- Reconfigure café and waiting areas to optimise layout and seating.
- Improve café counter layout and facilities.
- Upgrade toilet facilities and baby change provision.
- Better heating, ventilation, lighting and customer information provision



Figure 4.8a: The Tea Rooms prior to dismantling

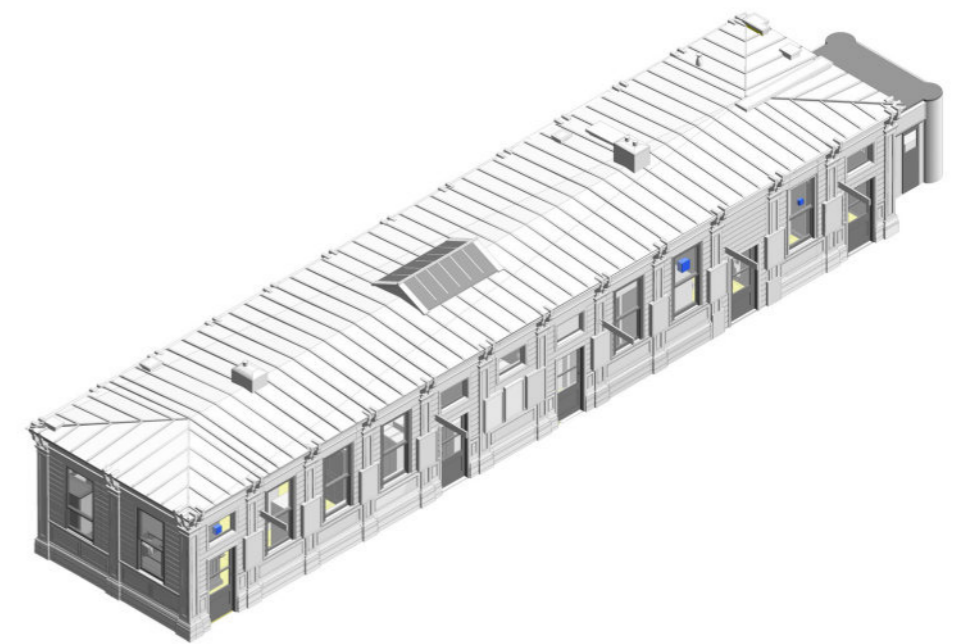


Figure 4.8b: Model of the existing Tea Rooms

4.8.3 General Design Principles

4.8.3.1 Fire

Due to the original timber construction, opportunities for improving fire safety are limited and the building will continue to present a significant fire risk. In theory fires could spread around the ends of each wall once external walls have been breached.

The dismantling and reconstruction process allows for targeted fire safety enhancements that minimise impact on the historic fabric. These include upgraded electrical services, new fire detection and emergency lighting systems, and the formation of three fire compartment zones using 60 minute masonry compartment walls, internal fire rated doors, and appropriate fire stopping around service penetrations. Collectively, these measures enhance life safety and improve the likelihood of retaining historic fabric in the event of a fire.

4.8.3.2 Security

Due to the timber fabric of the building, opportunities to enhance security and blast-resistance performance are limited, and residual risks remain broadly consistent with the pre-dismantling condition.

The proposed scheme introduces targeted improvements, including new laminated single-glazing to windows, doors and the roof lantern, new lockable external doors, and refurbished operable and lockable windows. Internally, CCTV coverage will extend across the waiting areas, with provision for a tenant-operated system within the café.

4.8.3.3 Accessibility

Prior to dismantling, the building exhibited significant barriers to accessibility, including restricted internal circulation space, compromised toilet facilities, and a café layout that restricted wheelchair movement due to tight entrance conditions adjacent to the counter and the absence of assisted-opening mechanisms.

The proposed scheme delivers inclusive-design improvements while avoiding harm to the historic fabric to create an environment that is welcoming and usable for all visitors.

Key improvements include:

- Assisted-opening entrance doors throughout the building.
- An open-plan internal layout with generous circulation spaces and sufficient wheelchair turning circles.
- The introduction of very shallow 1:60 ramps at changes in floor level
- Improved café counter access, including increased space to allow wheelchair users to access to both sides of the counter.
- Remodelled toilet facilities incorporating larger, more accessible cubicles with improved manoeuvring space.

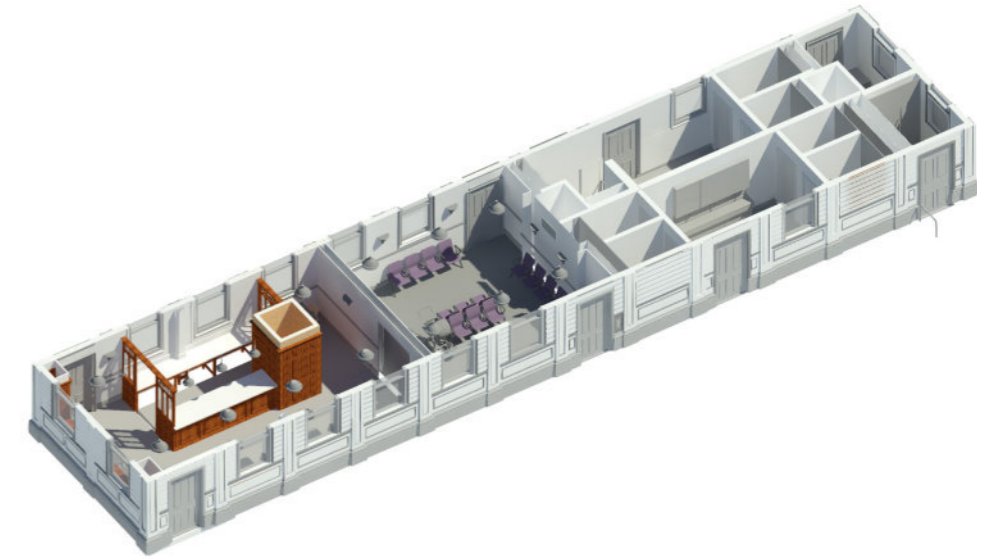


Figure 4.8c: Proposed Tea Rooms 3D model, showing accessibility

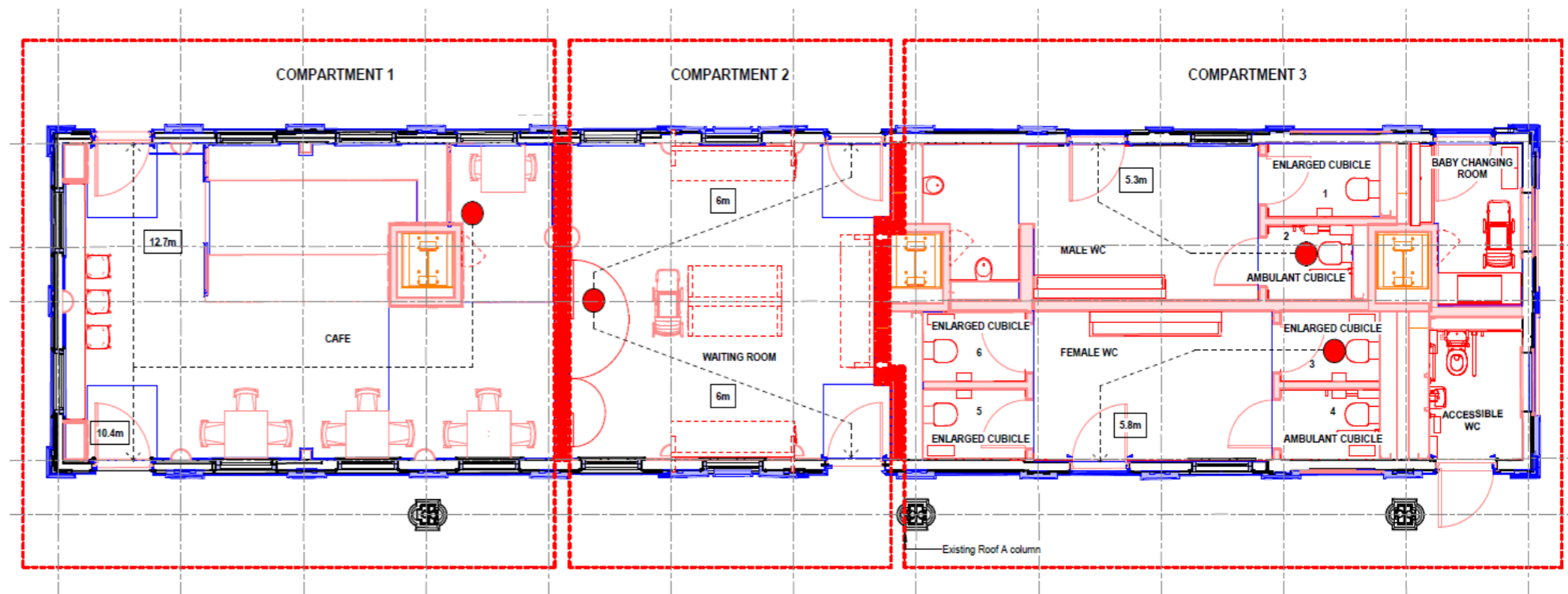


Figure 4.8d: Proposed fire strategy plan

4.8.3.4 Thermal performance

Before dismantling, the building's envelope was un-insulated, heating was limited to radiators in the WC areas, and the single-glazed windows were sealed shut. Opportunities to enhance thermal performance are constrained by the historic timber construction and limited electrical capacity.

Options to introduce insulation have been explored but discounted due to the risk of trapping moisture within the historic timber frame. Although breathable materials such as wood fibre board could reduce this risk, they were also rejected due to the increase in fire load they would introduce. Therefore, the original uninsulated construction is retained.

The proposed scheme introduces improved ventilation through mechanical extract systems in the café and WC areas, alongside reinstated natural ventilation via refurbished operable sash and pivot windows fitted with draught proofing and trickle vents.

Central heating will be provided through radiators, over-door heaters and radiant panels in the WC areas, subject to the electrical capacity of the station supply.

The reconstructed building will remain thermally inefficient and internal temperatures may fall below recommended levels at times. However, overall comfort will improve relative to pre-dismantling conditions.

4.8.3.5 Structural Strategy

The proposed structural strategy adopts a conservation-led approach, minimising intervention and drawing on forensic/empirical understanding of how the building has behaved over time to justify the design rather than adopting standard Eurocode technical design standards.

4.8.3.6 Acoustic Performance

Before dismantling, the building did not incorporate any specific acoustic insulation, resulting in limited separation between areas serving different functions. In the proposed scheme, acoustic separation is improved through the introduction of insulation within the new partition walls that enclose the toilet areas.

4.8.3.7 Glass Safety

In its pre-dismantling condition, the building's glazed elements included external doors with no apparent safety glass certification, windows with annealed glass and a roof lantern with Georgian wired glass.

As part of the reconstruction, targeted improvements are introduced to enhance safety while maintaining the character of the historic fabric. These include the use of annealed laminated glass in locations where safety glass is required, specifically the external doors, windows and roof lantern. This approach improves impact resistance and overall robustness while ensuring minimal visual or material change to the existing components.

No formal Centre for Window and Cladding Technology (CWCT) classification is proposed for the reconstructed lantern glazing due to its historic construction. Safety signage highlighting the fragility of the roof lantern will be positioned adjacent to the structure at roof level.

4.8.3.8 Access and Maintenance

Section to be completed at a later CIMP phase.

4.8.4 Integration with wider Station Upgrade Scheme

4.8.4.1 Relocation

The proposed track and platform layout reduces the overall width of proposed island Platforms 3 and 4. As a result, the clearance between the Tea Rooms and the edge of Platform 4 will be reduced to below the 3.3m required by Network Rail. As this cannot be mitigated by repositioning Track 4, the Tea Rooms will be relocated approximately 2.2 metres nearer to platform 3 as part of the proposed scheme, and approximately 2.5 metres further to the north (Leeds direction).

A clear space around the existing wrought iron columns supporting the retained Euston Roof on Platform 3 is required for future inspection and maintenance. The proposed new position of the Tea Rooms will ensure that there is approximately 400mm clearance to the columns and that the Tea Room door openings do not clash with the column positions.

4.8.4.2 Roof B columns

Three columns supporting the proposed Roof B will directly penetrate the footprint of the Tea Rooms. The columns are supported by piled foundations below.

To minimise the impact of these interventions, the proposed position of the Tea Rooms ensures that the columns do not impede internal circulation routes or visually detract from the interior.

The column in the café will be boxed out in timber panelling to match the adjacent café counter and screens, with plasterboard casings at high level. In the WC areas, the columns coincide with internal wall positions and will be boxed out with plasterboard casings and tiling at low level to match adjacent wall finishes. Inspection hatches concealed within the tiled finishes and timber panelling will allow inspection of the column base plate bolts.

At roof level, zinc flashings and zinc-clad upstands form a collar detail around each of the Roof B columns, allowing for differential movement between the proposed station roof and Tea Rooms structures.

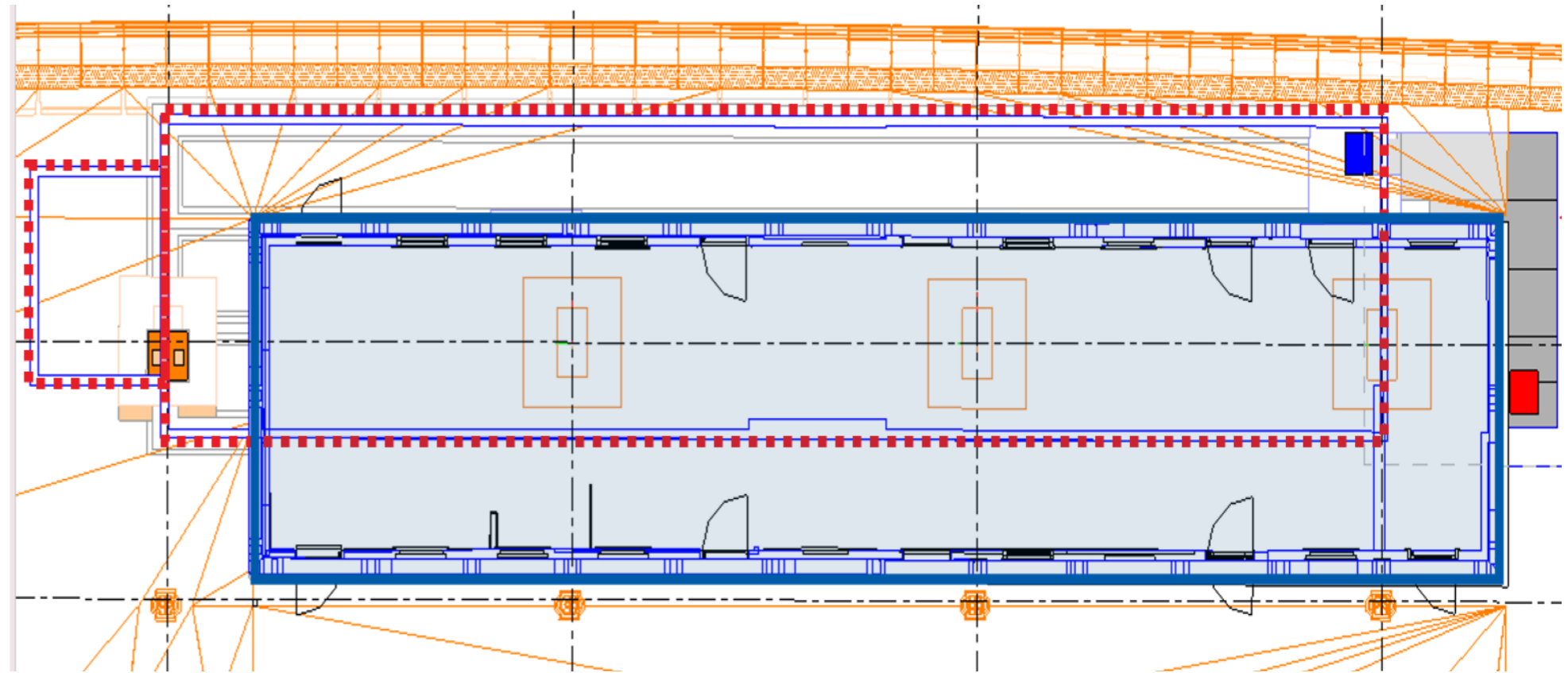


Figure 4.8e: Proposed relocation plan - existing (red-dash) - proposed (blue)

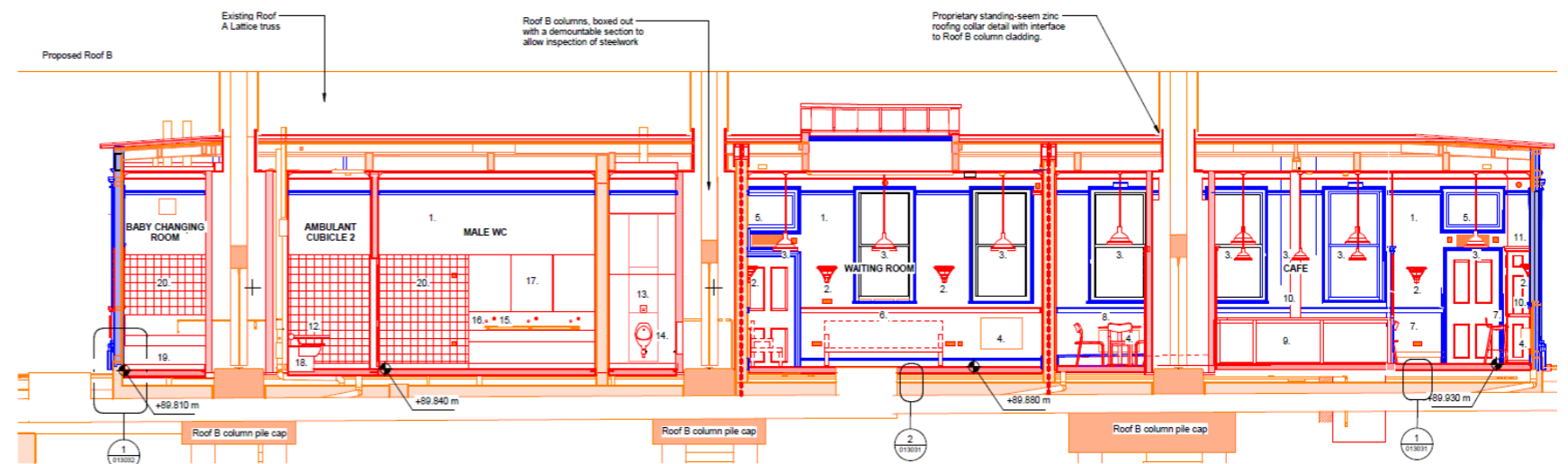


Figure 4.8f: Proposed long section B-B

4.8.4.3 Dismantling and reassembling

Options to relocate the building using rollers were previously explored but dismissed due to the complexity of constructing the new station roof B structural columns and their foundations within the Tea Rooms and the significant temporary support that would have been required for the lightweight structure, both of which risked damaging the historic fabric.

The Tea Rooms will instead be carefully dismantled, stored off-site, repaired and reconstructed. This allows the new station roof structures to be built and the Tea Rooms to then be reconstructed on the new island platform around three of the new roof B columns.

Refer to the Methodology document for further information.

4.8.4.4 Reorientation

The café is currently positioned at the north end of the building, at the furthest point from the passenger subway entrance and exit to the island platform and is out of sight.

Relocating, dismantling and reassembling the Tea Rooms provides an opportunity to enhance its setting, improve its operation and facilitate ease of access. Rotating the building by 180 degrees will enable the café to become a more prominent feature and will position it closer to the subway entrance and exit, as well as the proposed footbridge stairs and lifts.

4.8.4.5 Cafe Kiosk

A modern café kiosk currently abuts the south facade of the Tea Rooms, facing the subway entrance and obscuring views into and out of the building. Due to constraints in the proposed platform layout, the kiosk cannot be retained and will be removed. The south elevation of the Tea Rooms was damaged when the kiosk was installed, including the loss of external cladding boards, dado panels, and the lower sashes of the original windows, which were boarded over. As part of the proposed works, the south elevation (bay 27 and 28) will be restored, with missing window sashes, cladding, and dado panels replicated and reinstated to match the original construction.



Figure 4.8g: Existing cafe kiosk

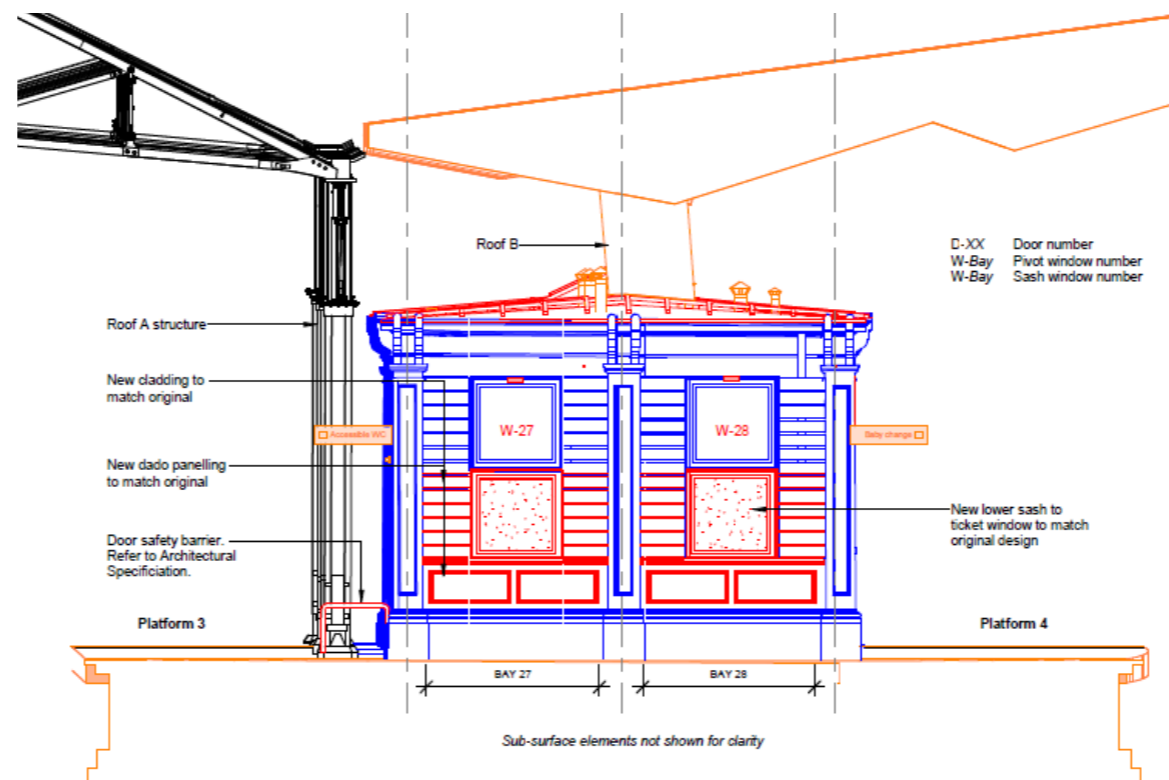


Figure 4.8h: Proposed north elevation (existing south elevation)

4.8.5 Structure

4.8.5.1 Foundations

The original Tea Rooms was founded on masonry dwarf walls with spread footings.

The proposed Tea Room substructure comprises a reinforced concrete raft foundation with a perimeter upstand to support the timber Tea Room superstructure. The raft solution was selected to accommodate the required support conditions, ground constraints, and openings within the slab. These openings allow the Roof B piled foundations and columns to be structurally independent of each other. The raft is designed to span over the roof B pile caps, ensuring both foundation systems operate independently.

4.8.5.2 Beer Cellar and Parcel Subway

The existing underground beer cellar and parcel subway beneath the Tea Rooms will be modified to accommodate the proposed track alignment, roof B column foundations, and the relocated Tea Rooms. Parts of both structures including cast iron beams supporting masonry jack arches will be removed to enable construction of the new foundations.

The parcel subway will be partially in-filled but will remain in use as a service utility route, with additional ducts installed within the retained sections and through the infill to support the island platforms and associated rail infrastructure.

The existing beer cellar will be in-filled and the existing access hatch and pavement light, set into the platform above the beer cellar, will also be removed.

Refer to the CIMP for further details.

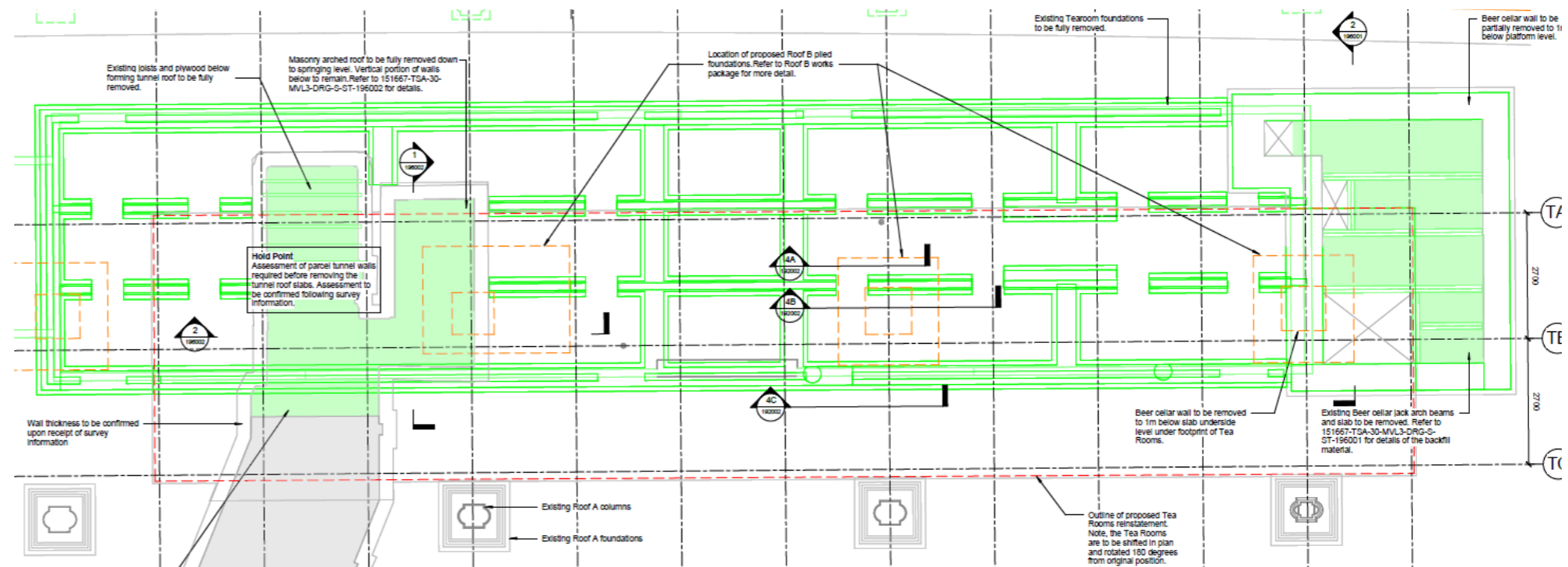


Figure 4.8i: Existing and demolished foundation level plan

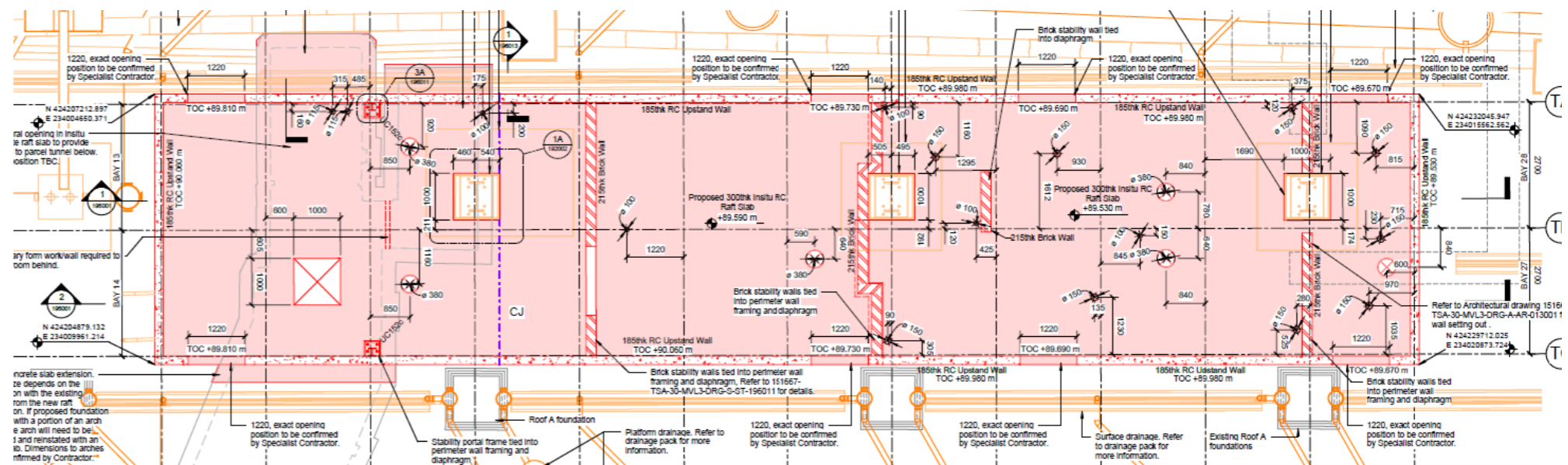


Figure 4.8j: Proposed structural foundation level plan

4.8.5.3 Chimney Stacks

Two existing internal chimney stacks are all that remain from the original fireplaces; the fireplaces and external stacks have been removed at some point in the past. As the fireplaces and full chimney structures no longer survive, the residual heritage value of the remaining stacks without the fireplaces and chimneys is diminished. The stack positions, including one located centrally within the servery, compromise visual connections between spaces, reduce available seating, and constrain circulation for wheelchair users, prams and buggies.

The chimney stacks are removed in the proposed scheme, enhancing the visibility of the historic café counter and creating a more open plan and accessible internal layout.

4.8.5.4 Internal Masonry Walls and Portal Frame

Historically, the building relied on internal walls and chimney structures at regular centres to provide lateral stability.

The proposed scheme provides internal stability via new masonry walls in matching locations, except in the café area, where the open plan arrangement requires a steel portal frame. The changes to the floor plan have been driven by accessibility and commercial requirements of the café.

The horizontal member of the portal frame is positioned within the ceiling zone to avoid a downstand to the café ceiling. The vertical members are positioned inside the timber frame walls to minimise impact on the historic fabric and will be encased in plasterboard.

4.8.5.5 Timber Diaphragm

A timber diaphragm is incorporated within the walls and roof as part of the proposed scheme to add stiffness and ensure effective transfer of stability forces throughout the structure.

4.8.5.6 Timber Structure

Proposed alterations to the retained timber structure will be kept to a minimum to minimise interventions to the historic fabric. The frame will be repaired to match the original construction where significant deterioration or previous poor quality alterations are present. New timber elements will be incorporated to accommodate the revised internal layout and changes to window and door openings.

New structural timber roof members (binder beams) will be installed to frame out openings for the Roof B columns to allow the structures to be independent. New roof members will be provided to support the roof lantern which was originally supported by internal masonry walls.

4.8.5.7 Sole Plate and Plinth

The existing timber sole plate and the lower sections of the vertical timber studs have decayed due to the sole plate being buried in damp conditions below ground and therefore need to be replaced. To extend the service life of the structure, the position of the sole plate will be raised and supported on a new reinforced concrete plinth above the damp platform environment. The original vertical studs will be shortened to suit the new sole plate position, avoiding the need for new timber replacement where rot is present. The new sole plate will match the existing one in terms of material, sizing and support.

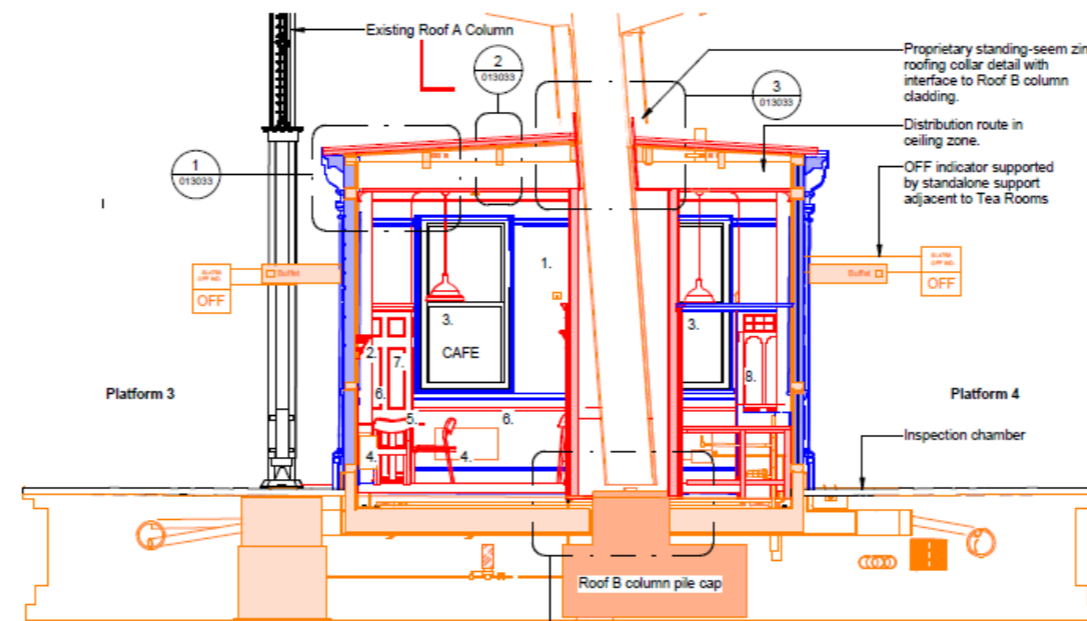


Figure 4.8k: Proposed short section C-C

4.8.6 Exterior

4.8.6.1 East and West Elevation Bay Rearrangement

The external elevations will be altered to align with the revised internal layout by rearranging the existing cladding bays, including associated windows and doors. The proposed arrangement retains all the historic windows and external cladding and ensures the waiting room benefits from views in/out.

On the west elevation, bays 2 & 3, 4 & 8, and 5 & 7 will be swapped. Bay 3 will be altered to remove the surplus door and introduce a new pivot window and matching dado panelling to match the existing. Existing cladding to this bay will be altered to suit. Studwork and framing will be modified or swapped to suit.

Similarly, on the east elevation, bays 19 & 23, 20 & 22, and 24 & 25 will be swapped. Bay 24 will be revised to omit the door opening and incorporate a new pivot window.

4.8.6.2 External Timber Wall Cladding

Original external timber cladding boards including dado panels, pilaster panels, eaves boards and mouldings will be stripped, repaired, painted and reinstated.

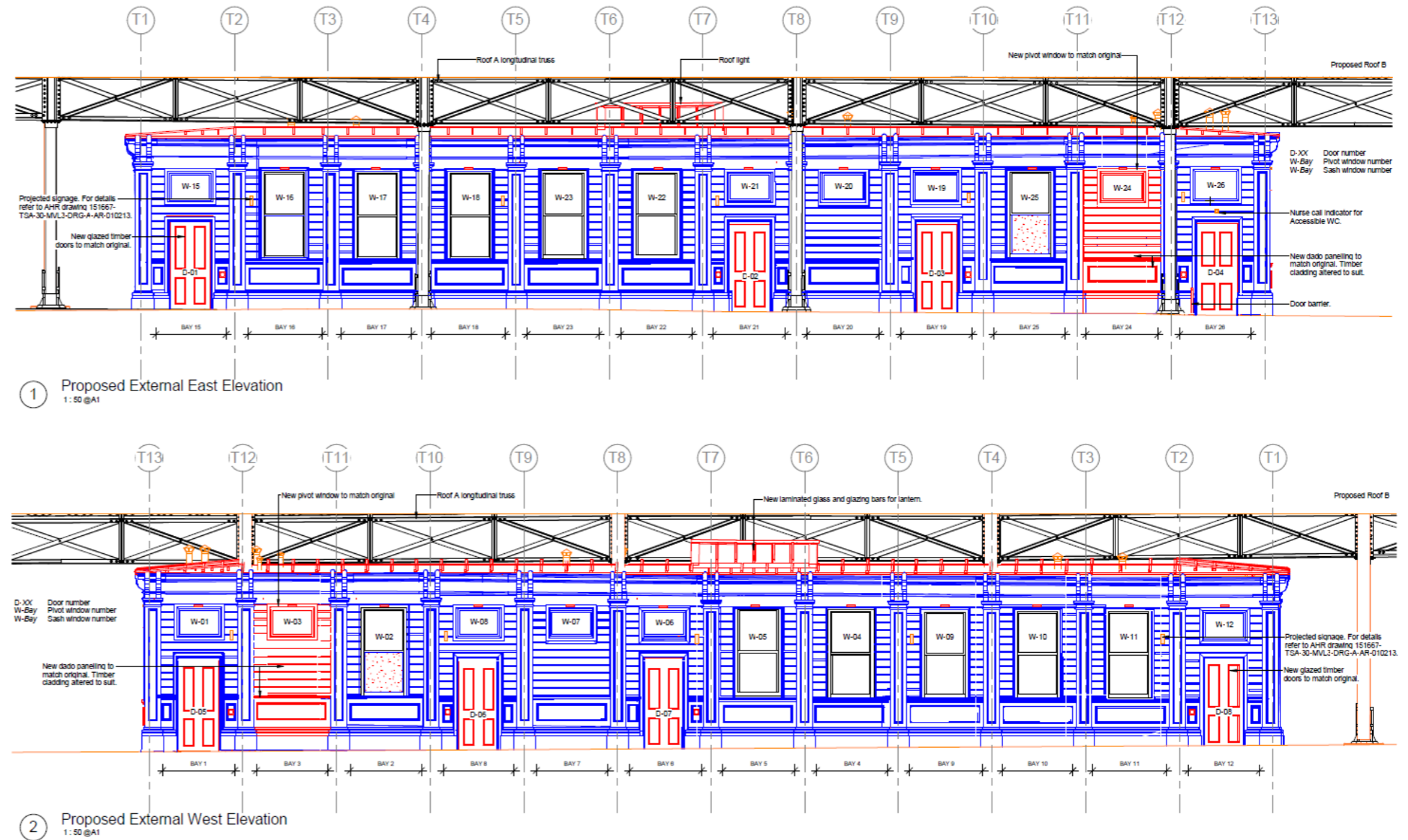


Figure 4.8I: Proposed external east and west bay arrangement

4.8.6.3 Plinth Cladding

The proposed platform will be at a steeper gradient than the existing one. Since the slope of the platform will change relative to the building, the relationship between the platform level and the plinth will also change. The plinth cladding will therefore need to be either trimmed or extended with new timber to fill the gap between the bottom of the dismantled plinth cladding and the platform finish. The proposed re-orientation of the building, involving a 180 degree rotation, exacerbates this issue because the original slope to the bottom of the existing plinth boards will be reversed.

The bottom edges of the existing plinth boards are decayed due to prolonged contact with the damp platform environment and will need replacing. The existing plinth boards will be repaired and adjusted to suit the new platform slope. Lower sections will be replaced where necessary with new matching timber sized to suit the revised platform levels.

New concealed brackets and fixings will be incorporated to secure the plinths to the new concrete upstand behind.

4.8.6.4 External Doors

The existing external doors are modern additions that do not reflect the historic character of the building. Due to the changes platform slope, achieving level thresholds to suit the proposed re-orientation of the building and platform levels would require adding different sized timber sections to the bottom of each door. This, in turn, would increase the height of the existing vision panels from the platform level resulting in vision panels that no longer meet accessibility standards.

As the current doors have limited heritage value, they will be replaced with new timber doorsets based on the original historic designs: four-panel timber doors for the toilet areas and glazed timber doors for the café and waiting areas. Door heights will vary to suit their location along the building.

All external doors will feature flush thresholds to improve accessibility and will be fully automated with push-pad entry and sensor-controlled exit. Stainless-steel safety rails will be installed on the platform outside the accessible WC and within the male and female WC areas.

4.8.6.5 Windows

The existing windows will be repaired, refurbished, and reinstated.

The existing windows have been sealed and painted shut and the upper glass panes of the sash windows have been fitted with in-glass extract fans. The restored windows will be fully operable to allow for natural ventilation, and the fans will be removed.

The existing glass will be replaced by new clear laminated glass to all windows except the lower sliding sashes of windows W02, W25, W27 and W28 to the toilet areas which will feature new obscure laminated glass panels for privacy. The sash glazing recesses will be modified to accommodate the thickness of the proposed laminated glass.

The window frame and sill depths will be increased by approximately 50mm to accommodate the increased external wall build-up by piecing in additional matching timber sections.

Draught seals will be installed to the window sash perimeters, and new parting beads with integral draught seals will be installed to the sliding box sash windows.

Each window will be fitted with a traditional suite of new ironmongery, details to be incorporated in the next phase of the CIMP and/or Design Guide.

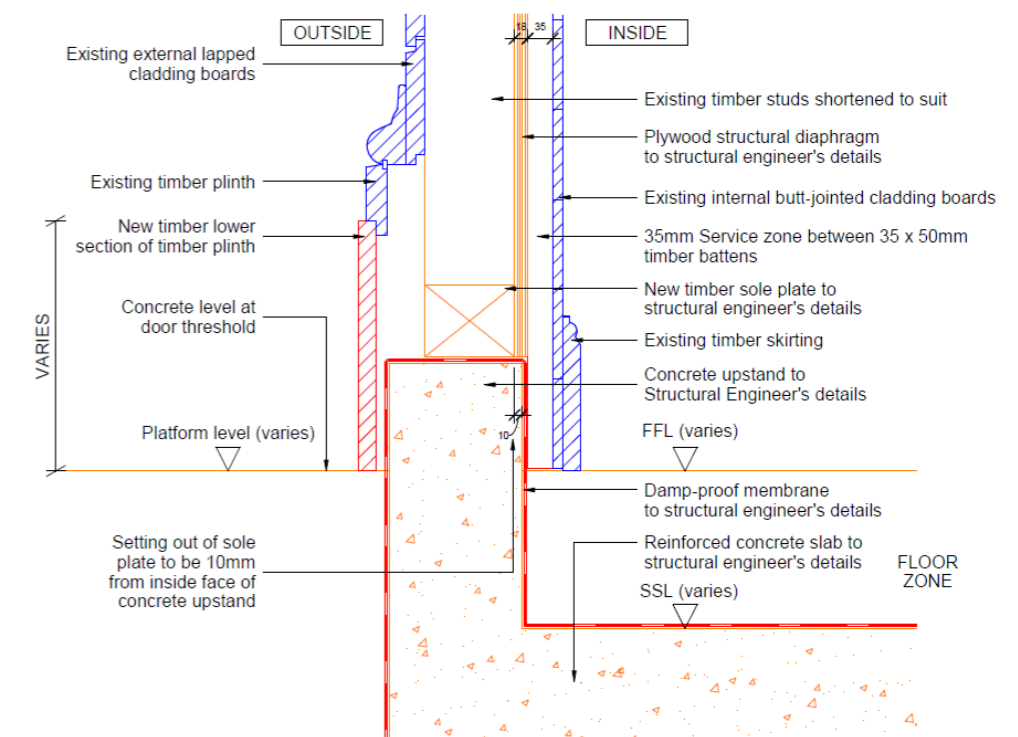


Figure 4.8m: Proposed sole plate and plinth detail



Figure 4.8n: Existing sash windows

4.8.6.3 Plinth Cladding

The proposed platform will be at a steeper gradient than the existing one. Since the slope of the platform will change relative to the building, the relationship between the platform level and the plinth will also change. The plinth cladding will therefore need to be either trimmed or extended with new timber to fill the gap between the bottom of the dismantled plinth cladding and the platform finish. The proposed re-orientation of the building, involving a 180 degree rotation, exacerbates this issue because the original slope to the bottom of the existing plinth boards will be reversed.

The bottom edges of the existing plinth boards are decayed due to prolonged contact with the damp platform environment and will need replacing. The existing plinth boards will be repaired and adjusted to suit the new platform slope. Lower sections will be replaced where necessary with new matching timber sized to suit the revised platform levels.

New concealed brackets and fixings will be incorporated to secure the plinths to the new concrete upstand behind.

4.8.6.4 External Doors

The existing external doors are modern additions that do not reflect the historic character of the building. Due to the changes platform slope, achieving level thresholds to suit the proposed re-orientation of the building and platform levels would require adding different sized timber sections to the bottom of each door. This, in turn, would increase the height of the existing vision panels from the platform level resulting in vision panels that no longer meet accessibility standards.

As the current doors have limited heritage value, they will be replaced with new timber doorsets based on the original historic designs: four-panel timber doors for the toilet areas and glazed timber doors for the café and waiting areas. Door heights will vary to suit their location along the building.

All external doors will feature flush thresholds to improve accessibility and will be fully automated with push-pad entry and sensor-controlled exit. Stainless-steel safety rails will be installed on the platform outside the accessible WC and within the male and female WC areas.

4.8.6.5 Windows

The existing windows will be repaired, refurbished, and reinstated.

The existing windows have been sealed and painted shut and the upper glass panes of the sash windows have been fitted with in-glass extract fans. The restored windows will be fully operable to allow for natural ventilation, and the fans will be removed.

The existing glass will be replaced by new clear laminated glass to all windows except the lower sliding sashes of windows W02, W25, W27 and W28 to the toilet areas which will feature new obscure laminated glass panels for privacy. The sash glazing recesses will be modified to accommodate the thickness of the proposed laminated glass.

The window frame and sill depths will be increased by approximately 50mm to accommodate the increased external wall build-up by piecing in additional matching timber sections.

Draught seals will be installed to the window sash perimeters, and new parting beads with integral draught seals will be installed to the sliding box sash windows.

Each window will be fitted with a traditional suite of new ironmongery, details to be incorporated in the next phase of the CIMP and/or Design Guide.

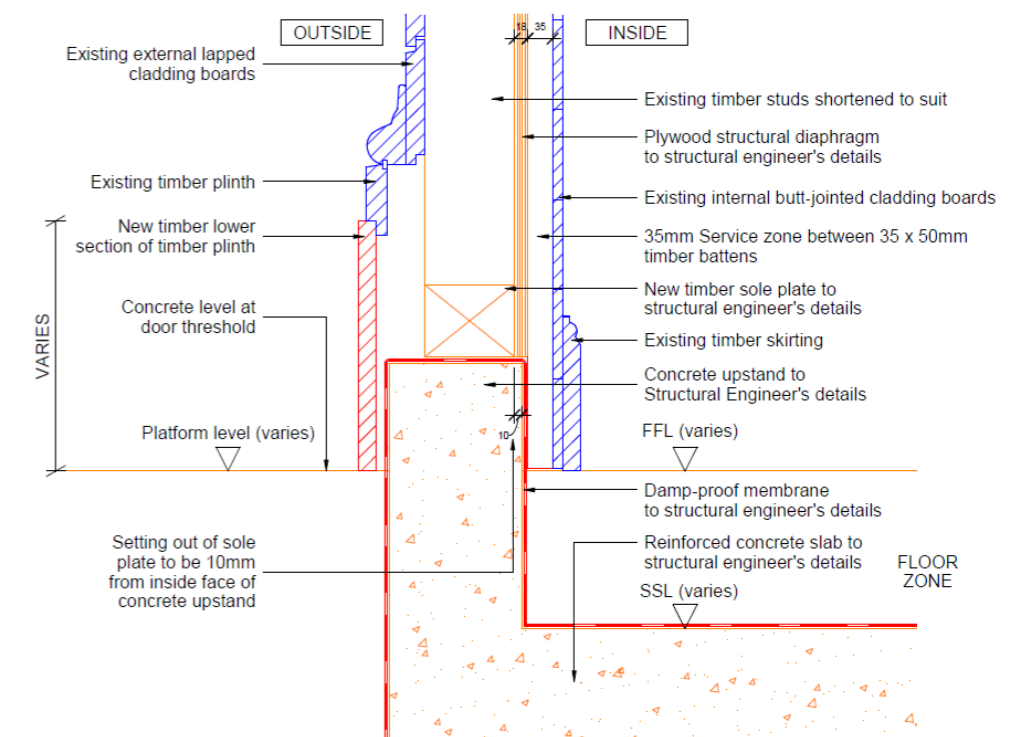


Figure 4.8m: Proposed sole plate and plinth detail



Figure 4.8n: Existing sash windows

4.8.6.6 Trickle Ventilation

10 existing external ventilation grilles are positioned in the cladding above the windows in bays 2, 4, 6, 9, 11, 16, 18, 20, 22 and 25. Internally, 5 of the existing apertures are covered by metal vent covers, which are in poor condition and beyond repair. Trickle ventilation will be incorporated at the head of the pivot or sash windows as part of the reinstated design, either within the window frame assembly or the cladding zone above. Details are being developed with the specialist contractor as part of the repair works and will be incorporated in the next phase of the CIMP and/or Design Guide.

4.8.6.7 Roof Finish

The existing roof finish and substrate comprises lead sheeting on boarding over the original sarking boards. The lead roofing is a modern addition as the historic drawings from 1884 show the building was originally clad with Vieille Montagne zinc. Refer to the Methodology document for further details.

The existing lead roofing and substrate will be replaced with a proprietary ventilated standing seam zinc roof system, installed over new plywood sheathing. This new substrate addresses concerns over the structural condition of the original sarking boards and provides the required support for maintenance access. Timber battens will create a ventilation zone above the structural timber diaphragm.

The new natural unpatinated zinc roof will incorporate proprietary eaves drip details, zinc clad upstands to the lantern, and collars around roof B column penetrations and service penetrations, finished with bespoke zinc cover flashings. The zinc roof will also include bespoke flashings to match the profile of the existing cast iron console brackets to protect the junction with the curved top sections of the brackets protruding above roof level.

4.8.6.8 Eaves

Because the proposed roof finish, substrate and structural diaphragm introduce an additional 80mm of build-up, the binder beams and purlins will be lowered by the same amount to preserve the external eaves relationship. This, in turn, requires the wall studs to be reduced in height accordingly.

Internally, maintaining the existing ceiling level, in particular its relationship to the window heads, architraves and coving, is essential. The existing ceiling is fixed to ceiling joists which are fixed to the underside of the binder beams. In the proposed scheme, the ceiling joists will be repositioned so that their underside aligns with the underside of the binder beams. The existing joists will be reduced in length and installed between the binder beams.

4.8.6.9 Console Brackets

The existing cast iron console brackets will be stripped, repaired and repainted. The original cast iron coach bolts have corroded and will be replaced by new stainless-steel replicas.

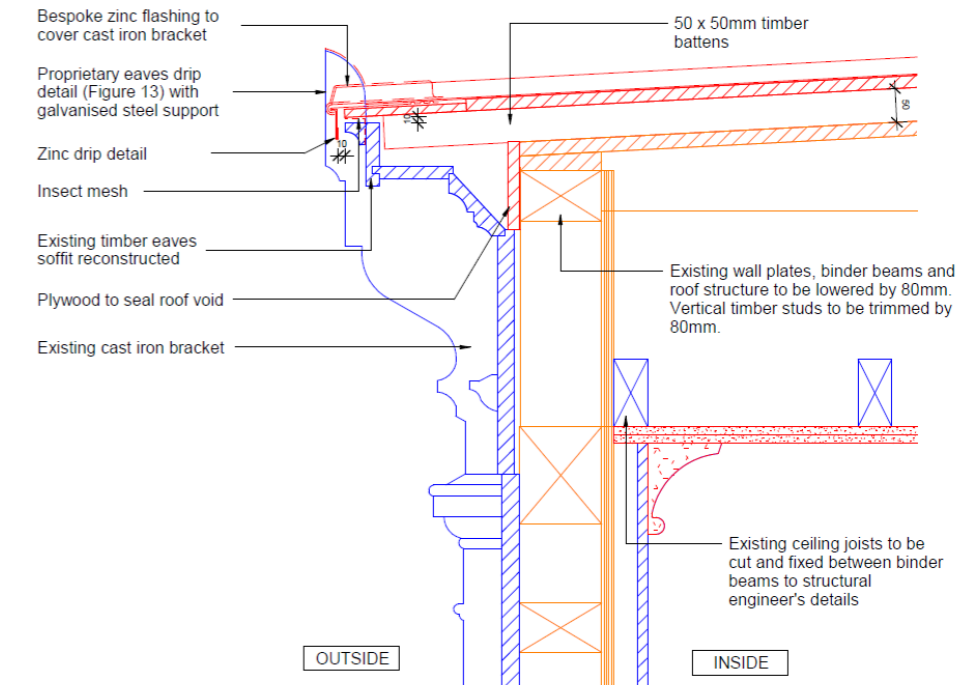


Figure 4.8o: Proposed eaves detail

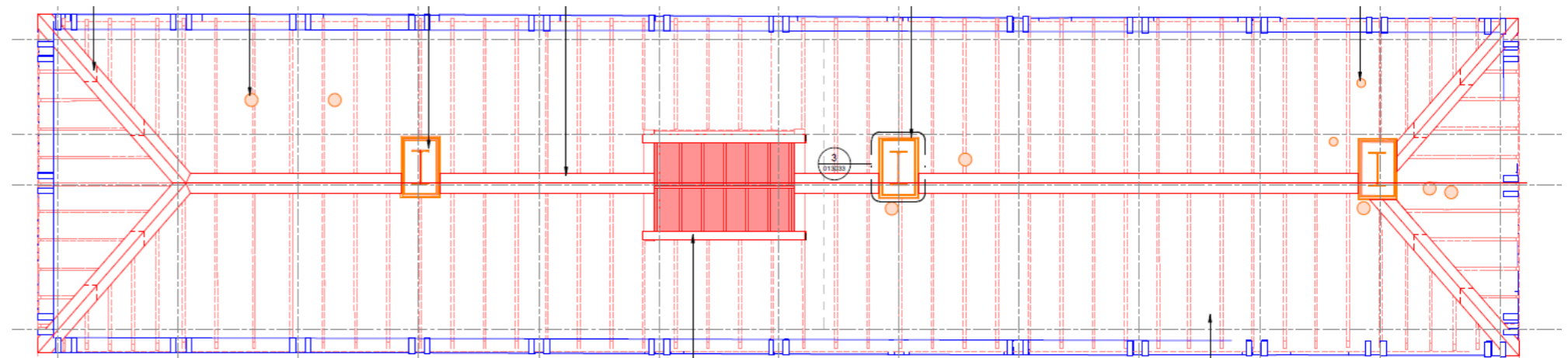


Figure 4.8p: Proposed roof plan

4.8.6.10 Roof Lantern

The lantern will be relocated to a central position in the waiting room and reconstructed as existing. In the existing building, it is supported on masonry cross-walls.

The proposal introduces new binder beams within the roof structure, and the structural studs forming the lantern gables will be trimmed accordingly.

The existing Georgian wired glass, a modern addition, will be replaced with new clear laminated safety glass.

The existing glazing bars are beyond repair and will be replaced with new timber glazing bars that replicate the original profiles, with dimensions adjusted to accommodate the weight and size of the new laminated glass.

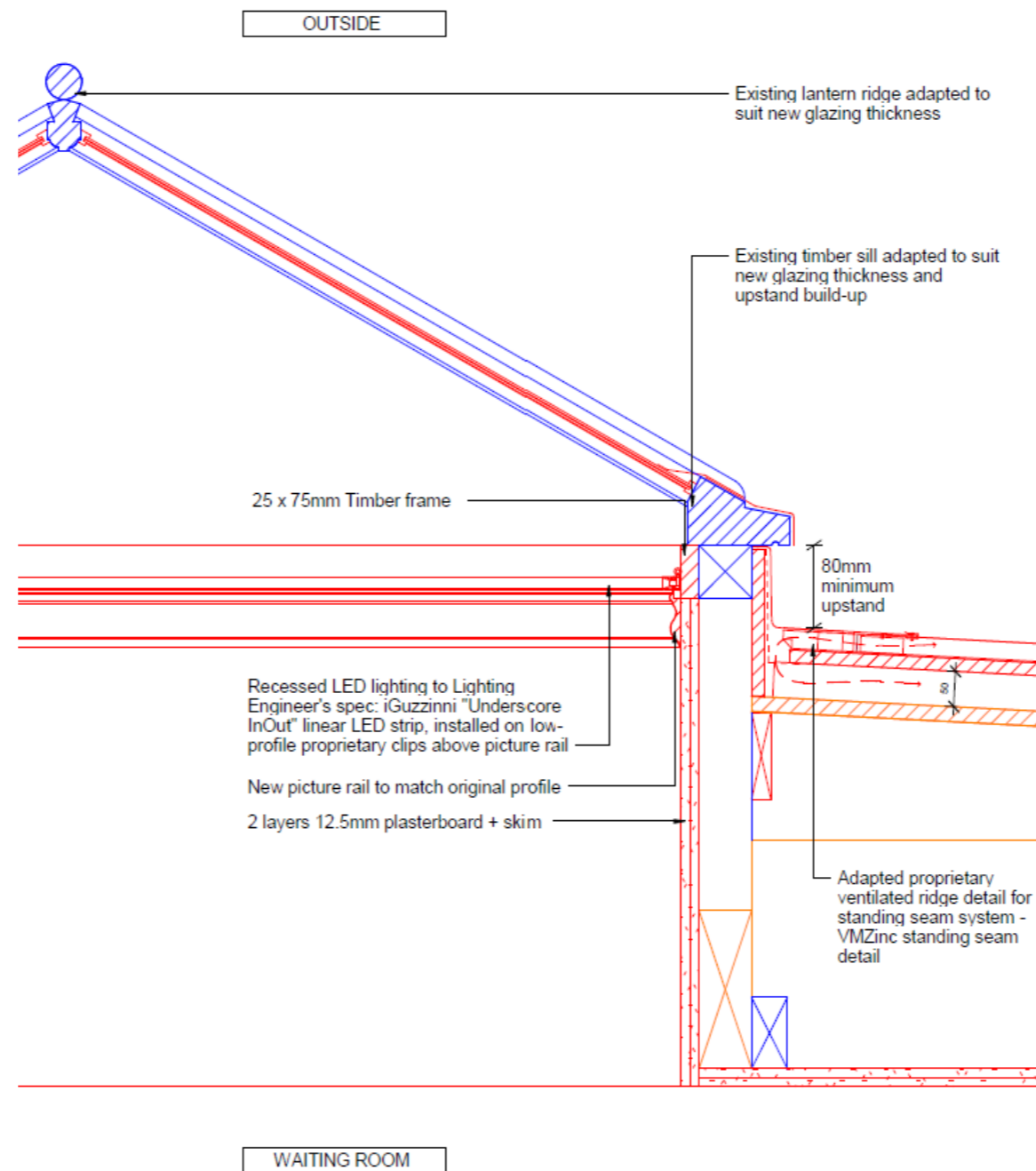


Figure 4.8q: Proposed section detail through reconstructed lantern

4.8.7 Interior

4.8.7.1 Interior Layout

The existing interior layout retains little of the original design. The long rectangular building was originally divided along its length to into two pairs of passenger waiting rooms each separated by a single cross wall with a fireplace and a central toilet block. Over time, many of the internal elements have been altered, and these changes have been pragmatic rather than restorative.

The existing layout comprises a café at the north end, connected to an adjacent waiting room by sliding doors. Internal circulation and view of the interior are restricted by a chimney stack and several short partition walls. The café counter is currently positioned against the end wall between entrance doors on both sides of the room, creating narrow and difficult to navigate circulation spaces that are unsuitable for wheelchair users and pushchairs.

The southern section of the existing building contains toilet facilities, a boiler room, an electrical equipment cupboard and several small lobbies, resulting in an inefficient plan with tight circulation routes.

Past internal interventions have resulted in low quality finishes, although a small number of original components remain, including internal timber wall cladding, the café counter and screens, the ceiling, floorboards and some timber mouldings.

The proposed interior layout has been developed to improve functionality, accessibility and user experience. An open-plan café arrangement with the historic café counter centrally placed improves the counter's setting, internal circulation and internal views.

The waiting room will connect directly to the café through a pair of doors that remain open during operating hours and can be secured at other times. The waiting room will feature the centrally relocated roof lantern, as well as fixed seating and interpretation display boards (details will be incorporated in the next phase of the CIMP and/or Design Guide).

The toilet areas will be reconfigured to provide larger cubicles, wider circulation routes and improved finishes and fittings.

The refurbished interior will be formed from new materials combined with repaired historic elements, including the café counter and screens, timber floorboards and internal cladding in both the café and waiting room.

The revised layout improves accessibility and enhances the functionality of the café, waiting room and toilet areas and delivers better environmental comfort with improved lighting, heating and ventilation.

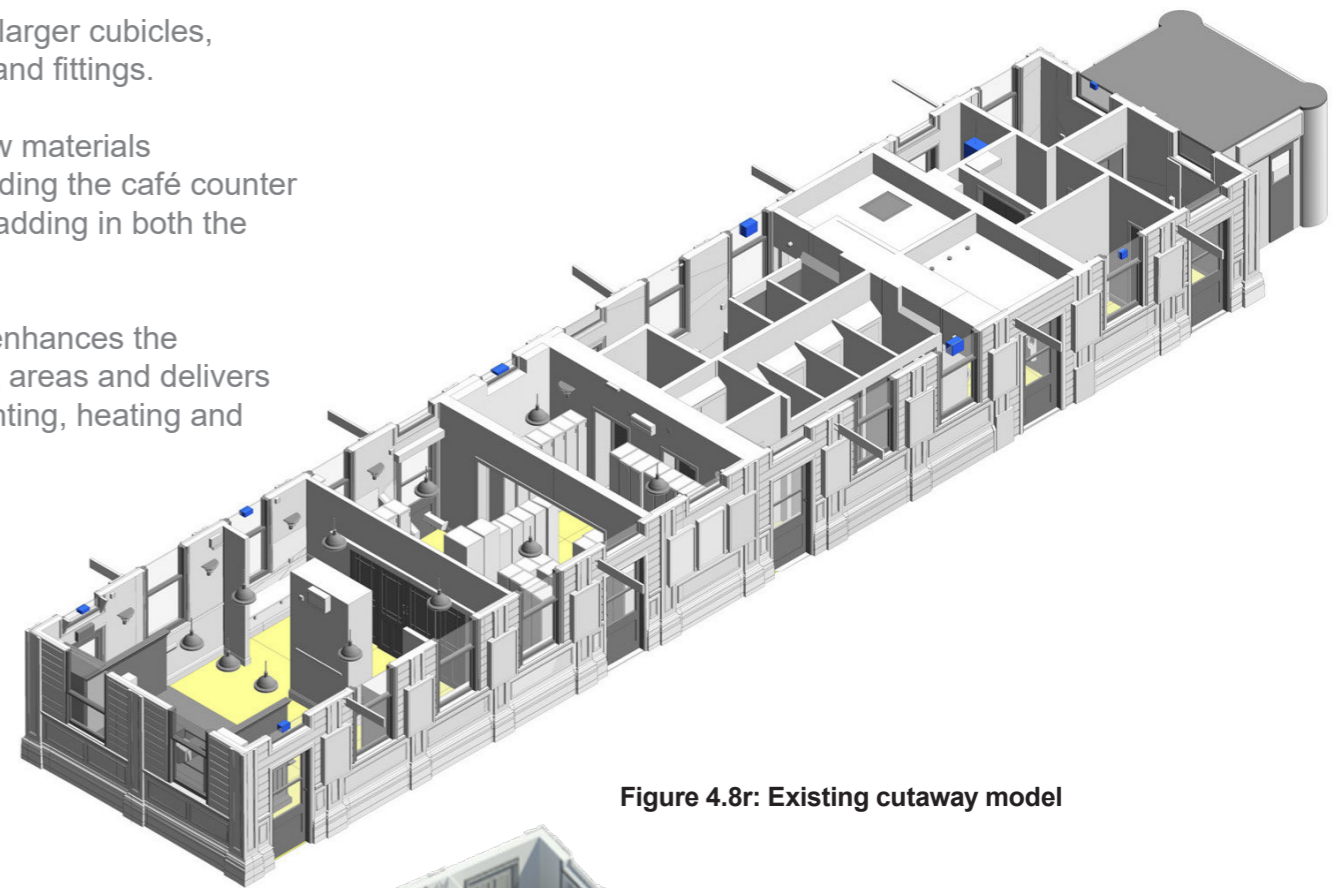


Figure 4.8r: Existing cutaway model

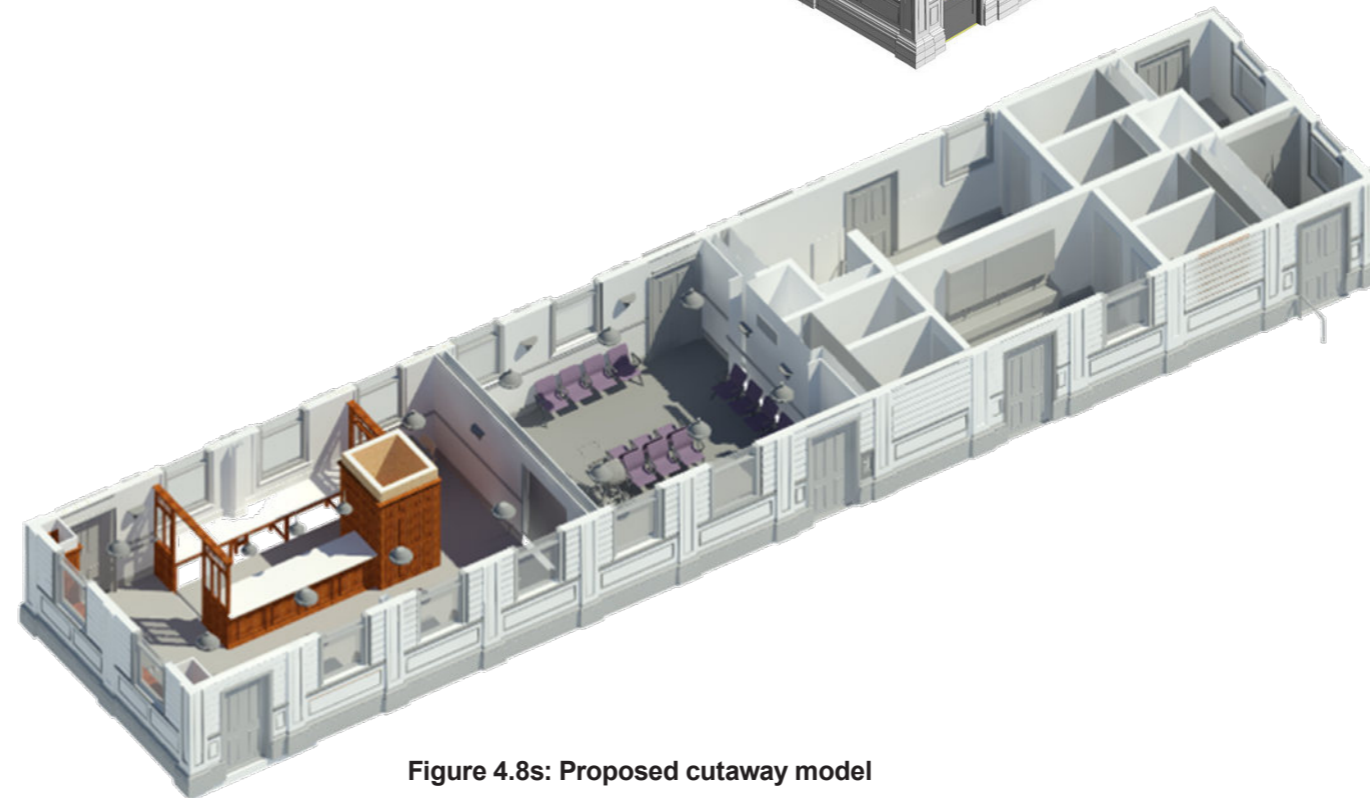


Figure 4.8s: Proposed cutaway model

4.8.7.2 Flooring

Existing floor finishes consist of modern floor tiles and door entry matting on a variety of sub-floors, including chipboard and concrete ground slabs. Little of the original floor construction of timber floorboards on a suspended timber floor remains. Some original floorboards and joists remain within part of the existing waiting room; these elements will be salvaged for reuse as part of the proposed works. The remaining existing floor finishes and sub-floors will be replaced as part of the reconstruction.

In the café area, the existing floorboards will be repaired, lightly sanded, sealed and re-laid, with the original floor joists re-purposed as supporting battens. The surviving boards are square-edged with a rebate to accommodate iron tongues, which are corroded beyond repair. Proposals for supplementing and jointing the boards, fixing methods and finishes are being developed with the specialist contractor as part of the repair works. Proposed samples and finishes will be presented to the Conservation Officer for approval.

The timber floor will ramp down by 1:60 adjacent to the door opening to the waiting room, to suit the difference in floor levels. The door threshold will be constructed in matching timber.

The proposed floor finish within the servery area is vinyl sheet safety flooring on a plywood underlay. Proposed colour samples and finishes will be presented to the Conservation Officer for approval. Refer to the Materials Schedule in the CIMP for further details. A smooth brass threshold strip will protect the edge of the linoleum at the opening in the side-screen.

The flooring in the remaining areas will comprise tiled finishes laid on a proprietary reinforced cement:sand floating screed, installed on rigid insulation acting as a void-former. The tiled floor finishes will be anti-slip porcelain floor tiles from the Westminster Floor Tiles range by H&E Smith. The Waiting room floor will feature a chequerboard pattern within a decorative tile border. The WC areas will be tiled in a Victorian-style polychrome geometric pattern within decorative tile borders. The proposed tiling designs are being

developed and will be incorporated in the next phase of the CIMP and/or Design Guide. Proposed colour samples will be presented to the Conservation Officer for approval. Refer to the Materials Schedule in the CIMP for further details.

Floor tiling within the WC areas will be laid to 1:80 to 1:100 falls towards floor gulleys and will include matching profiled tiled skirtings for ease of cleaning.

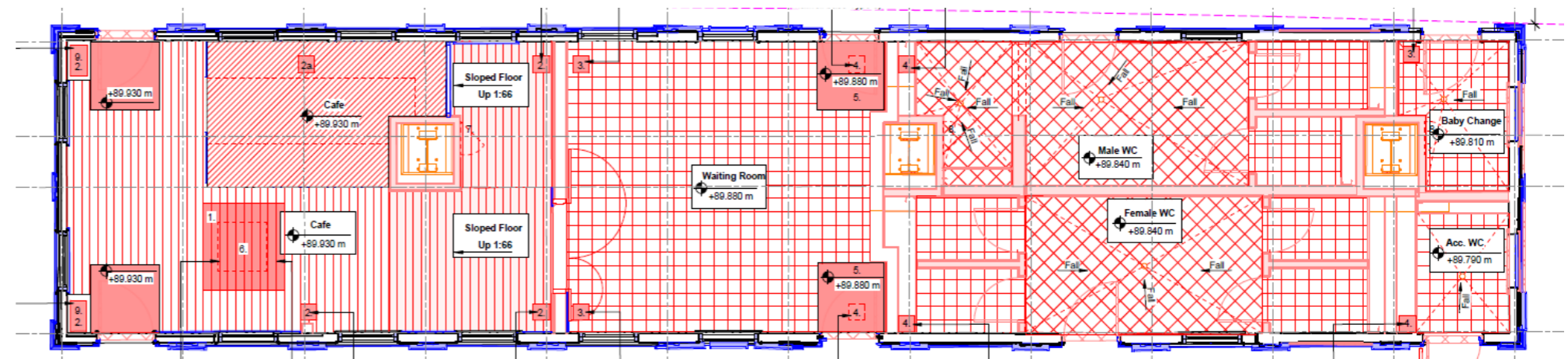









Figure 4.8t: Proposed floor level and finishes plan

KEY

-  Floor Type 1: timber flooring
-  Floor Type 2: ramped timber flooring
-  Floor Type 3: floor tiling
-  Floor Type 4: floor tiling to falls
-  Floor Type 5: sheet flooring
-  Matwell
-  Access hatch

4.8.7.3 Recessed Matwells

The floor finish at the doorways to the café and waiting room will be barrier matting set within bespoke recessed matwells with aluminium edges. The surface of matting will be level with adjacent floor finishes to ensure ease of access. Proposed colours and finishes will be incorporated in the next phase of the CIMP and/or Design Guide.

Proposed colour samples and finishes will be presented to the Conservation Officer for approval. Refer to the Materials Schedule in the CIMP for further details.

4.8.7.4 Floor-level Cable Containment

Cables run in sub-floor containment routes running internally along the length of the building, above the concrete foundation. Recessed cover access hatches, set within the timber and tiled floor finishes, will provide access to these routes for future re-wiring. The recessed covers will be inlaid with the same timber or tiled floor finishes as the surrounding floors to minimise visual impact.

4.8.7.5 Parcel Subway Access

Maintenance access to the former parcel subway below the building will be provided by a concealed floor hatch in the timber floor of the café area.

The hatch will align with an opening in the raft foundation below and fitted with a proprietary 60 minutes fire-rated double sealed cover. Access into the subway will be by tripod, harness and a fixed ladder located in the subway.

The bespoke hinged hatch will incorporate pneumatic actuators for ease of operation. All ironmongery, including a recessed lock and pull handles, will sit flush with the surrounding floor finish. The inlaid timber boarding to the hatch cover will be installed flush with adjacent boards, with joints carefully aligned. The hatch will exceed the size of the manhole cover below to match nearby board widths and joint positions.

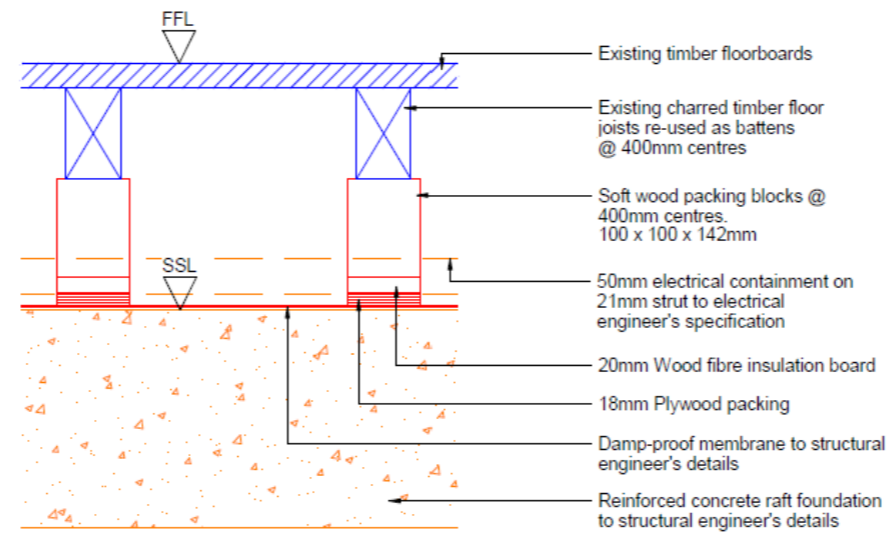


Figure 4.8u: Section through timber floor in cafe

4.8.7.6 Internal Wall Linings

The Tea Rooms were originally lined with timber boards: moulded pencil round tongue and groove boards in the café area, and random-sized plain square edged boards elsewhere.

Existing wall linings retain much of the original boarding, although most of the plain boarding has been covered by later additions such as plasterboard, plywood sheeting, hessian and other coverings. The boards have been damaged by nail and screw fixings associated with these later linings, as well as by modifications, removals for building services installation, and other interior alterations.

As part of the reconstruction, a plywood structural diaphragm will be fitted to the inside face of the external walls. The proposed wall linings will be fixed to the plywood via timber battens to create a 35mm cavity for concealed electrical wiring.

The proposed internal wall linings in the café and waiting room areas will consist of the original internal pencil-round tongue-and-groove cladding boards, which will be stripped and repaired. To accommodate periodic rewiring, the lower section of the internal wall cladding below dado level will be easily removable without causing damage to the individual tongues and board edges. The tongues and rebates of many of the existing cladding boards are heavily damaged. Proposals for repairing, supplementing and jointing the boards along with fixing methods are being developed with the specialist contractor and will be incorporated in the next phase of the CIMP and/or Design Guide

The proposed internal wall linings in the toilet areas, below door-head height, will consist of 1 layer of plywood sheeting behind a layer of fibrous cement tile backer board, to receive wall tiling. At high level, the wall linings will consist of two layers of moisture resistant plaster board and skim. Additional timber noggins and plywood backings will be incorporated as required to support sanitary fittings and fixtures.

4.8.7.7 Tiled Wall Finishes

The existing wall tiling is modern; however, original tiling uncovered behind later partitions in the area of the former ladies' toilet indicates that the original tiling consisted of plain white 6"×6" Minton Hollins & Co. tiles, complemented by a high level feature band of 3"×6" decorative tiles featuring a reddish brown botanical motif.

The proposed wall tiling in the WC areas will be based on the original designs. It will comprise plain 6"×6" Victorian ceramic tiles by H&E Smith, paired with a decorative feature band of tiles fabricated by Craven Dunnill, which closely match the original decorative tiles.

Proposed samples will be presented to the Conservation Officer for approval. Refer to the Materials Schedule in the CIMP for further details.

4.8.7.8 Plaster Finishes

Internal plasterboard linings will be jointed and skim-coated with gypsum plaster.

Internal masonry walls will be finished in lime plaster, with tiled finishes at low level in the WC areas.

4.8.7.9 Partitions

New timber stud partitions will be provided in the WC areas. These will be supported on Dwarf blockwork walls within the floor zones and fixed to the ceiling joists at their head, with additional timber noggins added at ceiling level as required. Wall linings will be as described above.

Proprietary hinged flush wall access panels will allow access to containment routes within plasterboard casings and partitions. The access panels will be finished to match the adjacent wall finishes to remain as visually discreet as possible.

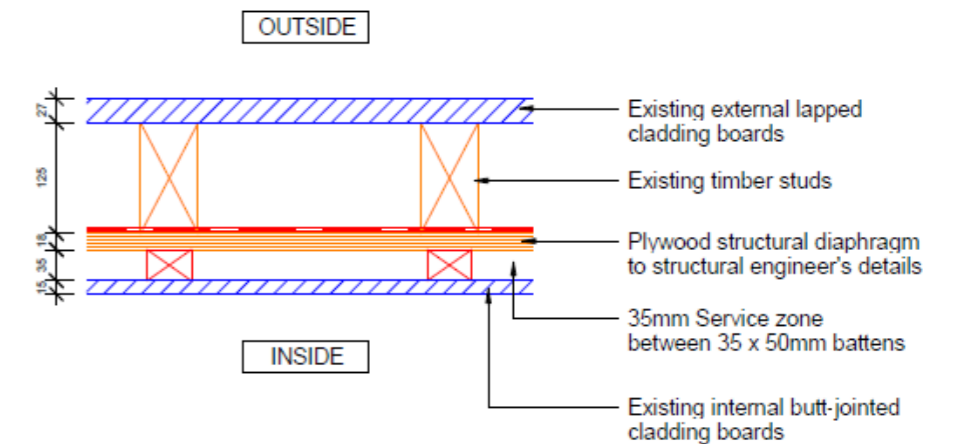


Figure 4.8v: Proposed plan detail through external wall detail

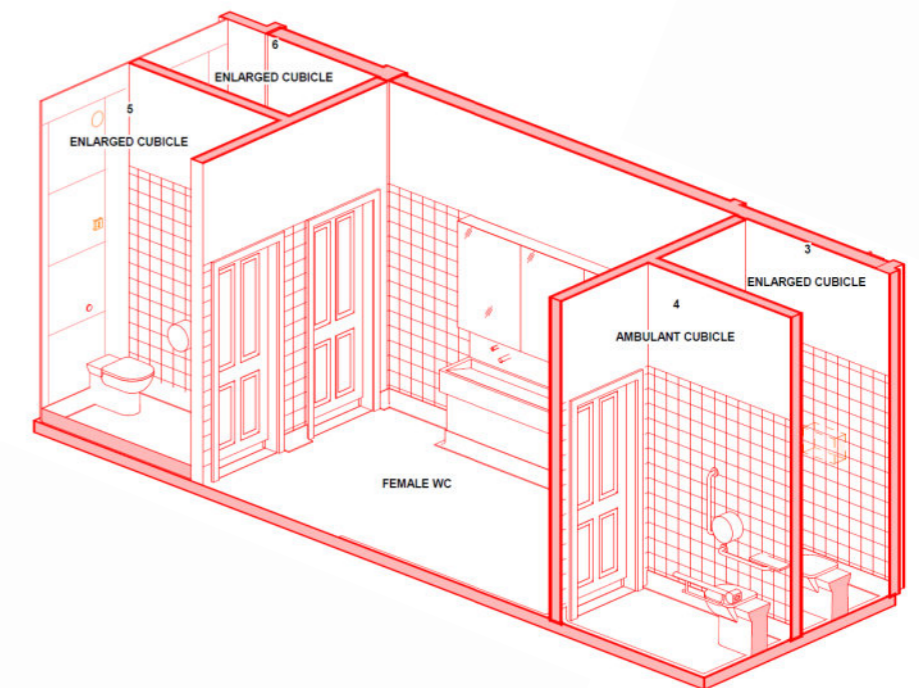


Figure 4.8w: Proposed female WC axonometric 3D view

4.8.7.10 Ceiling Linings

The existing lath and plaster ceilings, including the drawn coving, are original to the building's construction. These will be fully removed as part of the deconstruction works, as they are in-situ applied and cannot be salvaged for re-use.

The proposed ceiling linings will comprise two layers of plasterboard and skim, with new fibrous plaster covings to match the profile of the original coving.

Proprietary hinged flush ceiling access panels will allow access to containment routes within the ceiling void. The access panels will be finished to match the adjacent wall finishes to ensure they remain as visually discreet as possible.

4.8.7.11 Internal Doors

The existing internal doors, which are modern additions that do not reflect the historic character of the building, will be removed as part of the reconstruction.

New internal doors will be four panel timber doorsets based on the original historic door designs, with a lacquered finish to match the café joinery. Door heights will vary and will be coordinated to match the external doors within each room.

A set of 60 minute fire rated leaf and a half doors will connect the café and waiting room, fitted with electro-magnetic hold open devices linked to the fire alarm system.

Toilet cubicle doors will include a 100mm clearance between the underside of the leaf and the finished floor level to comply with Network Rail standards.

Proposed ironmongery samples and finishes will be presented to the Conservation Officer for approval. Refer to the Materials Schedule in the CIMP for further details.

4.8.7.12 Internal Timber Mouldings

The existing decorative mouldings, including skirting boards, dado rails, dado rails, picture rails, window and door architraves, comprise a mixture of original mouldings and modern mouldings with different profiles.

Original mouldings will be carefully stripped, repaired, painted, and reinstated. Missing elements will be replaced with new replica mouldings matching the material properties and dimensions of the historic profiles. This excludes the later modern moulding profiles, which are not to be reinstated.

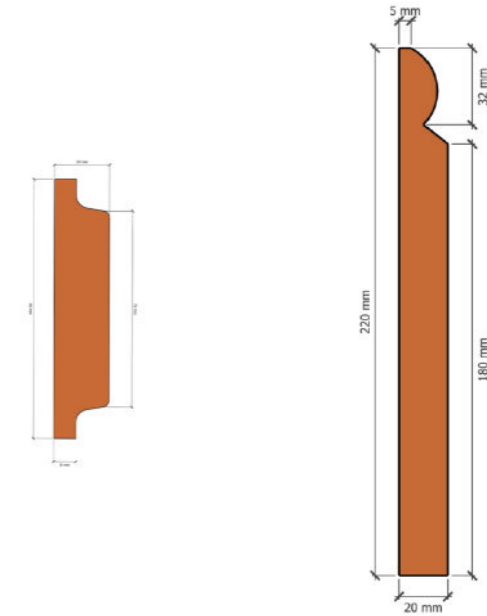


Figure 4.8x: Proposed internal timber mouldings

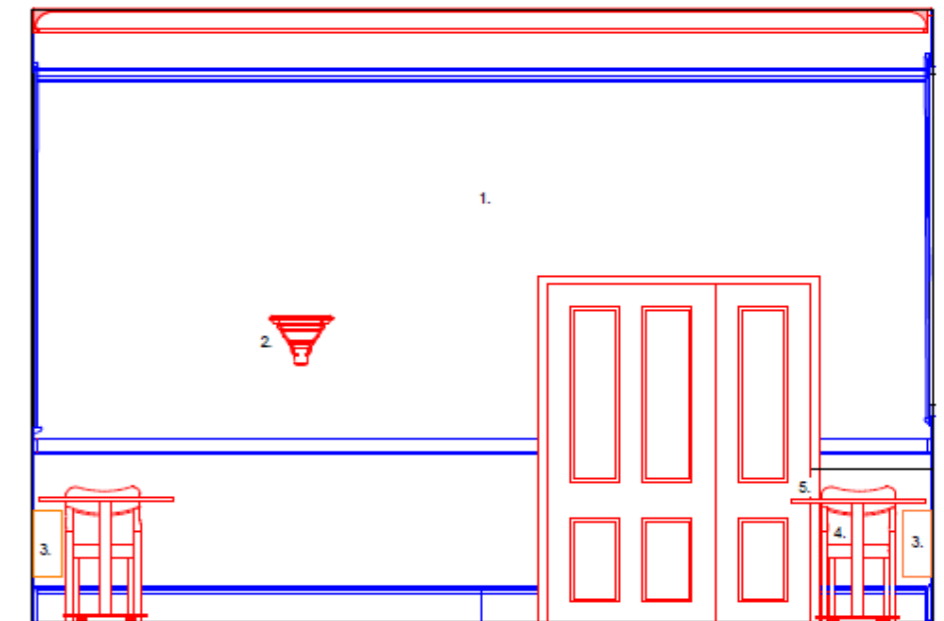


Figure 4.8y: Proposed café internal elevation, showing internal doors

4.8.7.13 Buffet Counter

The existing layout of the buffet counter elements including the raised floor and step, front and rear counters, counter front, glazed side screens with wrought iron rods support rods and storage cupboard, largely reflects the original 1902 design. The fabric itself, however, shows evidence of significant alterations, particularly to the glazed side screens. The original glazed panels, square top lights, white Muranese glass, and associated timber mullions and transoms have been removed and replaced with a single large rectangular glazed opening set below the retained dentilled cornice. The four panel glazed entrance door to the left hand screen is also missing. While the panelled timber counter front survives, the original white Sicilian marble front counter top has been replaced with a laminated board top. Refer to the methodology document for further details.

As part of the proposed design, the buffet counter and side screens will be rotated by 90 degrees and relocated to the west wall of the café. This reconfiguration will create more generous circulation space, improve accessibility, and position the counter as the focal point of the remodelled café.

The buffet counter and side screens will be restored and adapted and to suit modern functional requirements in their new position. Due to space constraints, the original storage cupboard will not be retained, but the timber elements will be salvaged for re-use as part of the other joinery items.

4.8.7.14 Counters

The proposed counter positions will be adjusted to create sufficient space for wheelchair users behind the front counter. The raised floor will not be retained, to allow for step-free access.

Counter top depths will be increased to provide space below the counters to accommodate modern appliances. The rear counter top will be extended in length to include a return section, increasing the usable counter area. All original joinery will be fixed to new pine carcassing to match the character of the historic framing.

The existing panelled counter front will be reconstructed and the existing corroded kick-plate replaced with a new brass version. The front counter top will remain at its original height of 1030 mm, while the rear counter will be lowered to a standard height of 900 mm. The existing marble worktop from the rear counter will not be reinstated because it no longer fits the revised layout. The option of cutting the marble into strips for use as a splashback has also been explored, but there is insufficient material for this to be feasible. A new quartz composite worktop, with matching splashbacks, supported on a plywood substrate will be fitted to both the front and rear counters. This will be fabricated to replicate the profile and visual character of the original marble top. Proposed colour samples and finishes will be presented to the Conservation Officer for approval.

An undermounted stainless steel sink will be installed at the end of the counter area, with a counter top-mounted monoblock kitchen mixer tap. Drainage grooves will be incorporated in the countertop.

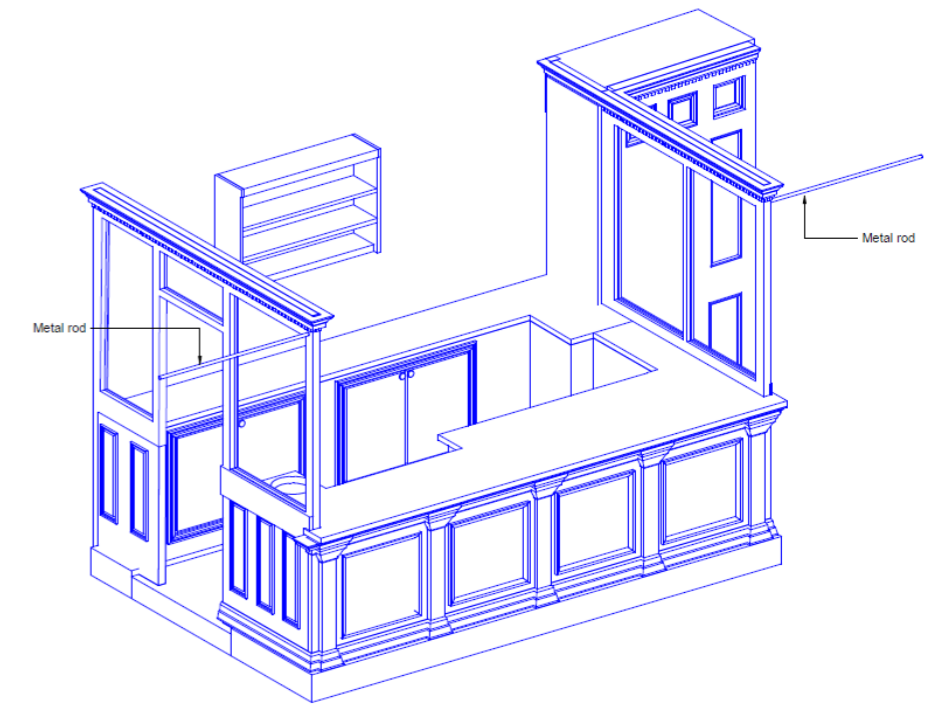


Figure 4.8z: Existing buffet counter axonometric view

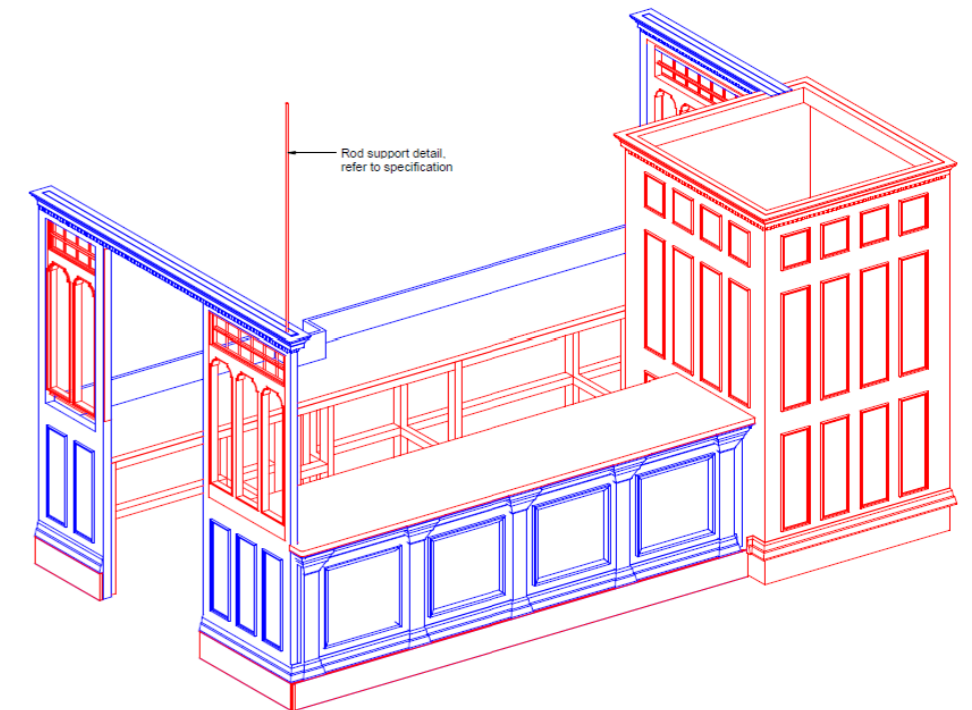


Figure 4.8aa: Proposed buffet counter axonometric view

4.8.7.15 Side Screens

The side screens will be positioned on either side of the counters, with the right-hand side-screen (viewed front the front of the counter) positioned to avoid existing windows and to suit the position of the Roof B column casings.

The dismantled glazed side-screens will be reconstructed with new smaller arched glazed panels, square top lights, and associated timber mullions and transoms, restoring the historic appearance of the original archival drawings as far as possible.

The right-hand side-screen will be adjusted in length to respond to the proximity of the Roof B column casings.

The dentilled cornice of the left-hand side screen will be extended slightly to enlarge the door opening and permit wheelchair access within the servery area. As much as possible of the extension piece will be fabricated from salvaged from the shortened right-hand side screen and storage cupboard. Any additional lengths of cornice will be made from pine to match the appearance and detailing of the original. The missing door will not be recreated for accessibility reasons.

A new steel vertical support rod will connect the top of the left-hand screen to the ceiling structure to provide restraint.

New glass panes will be selected to suit the rebate thicknesses in the joinery and the historic character of the screens. Proposed colour samples and finishes will be presented to the Conservation Officer for approval.

4.8.7.16 Panelling to Roof B Column Casing

New bespoke pine panelling, with details to match the original panelled storage cupboard, including a dentilled cornice, will be applied to cladding around the column casing adjacent to the counter.

A hinged jib door access hatch, allowing inspection of the column base plate will be incorporated into the panelling design. The door will be of solid pine, of a quality and finish to match the historic joinery in the room and fitted with a lock.

4.8.7.17 Cafe Cupboards

Two new bespoke pine panelled cupboards will be fabricated with details to match the original panelled storage cupboard. Each cupboard will include a panelled door of solid pine, finished to match the historic joinery in the room. The panelling design will match the Roof B column cladding, with applied panels of the same proportions and a dentilled cornice at the same height. Both cupboards will be lockable.

Internally, the cupboards will be fitted with adjustable shelving and a removable base to allow access to services in the floor void.

4.8.7.18 Bench Table

A new wall-mounted bench table for customer use will be fabricated from solid pine to match the quality and finish of the historic joinery nearby. It will be supported by hidden brackets within the depth of the shelf, with additional wall-mounted brass brackets below.

4.8.7.19 Waiting Room Seating

Timber bench seating in the waiting room will form part of a later fit-out contract and will be incorporated in the next phase of the CIMP and/or Design Guide.

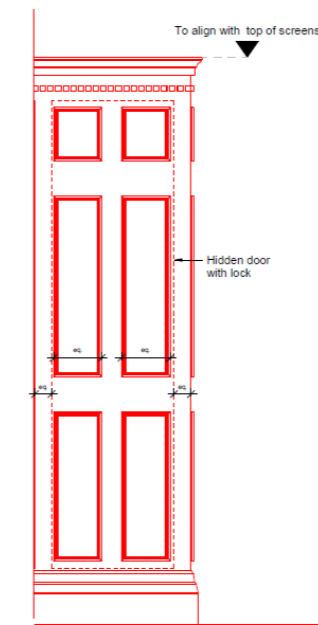


Figure 4.8ab: Proposed cafe cupboard

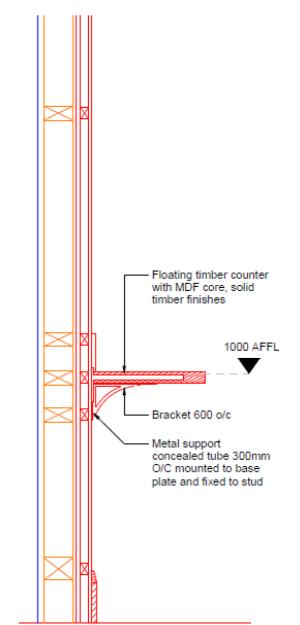


Figure 4.8ac: Proposed bench table

4.8.6.20 Vanity Units

Proposed bespoke vanity units in the toilet areas comprise bespoke mirror units, wash troughs and cover panel systems below.

The mirror units include fully concealed sensor operated hand dryers, recessed LED lighting, hinged mirror panels and hand dryer icons etched into the glass.

The wash troughs will be bespoke precast terrazzo units incorporating integrated wastes, sensor taps and soap dispensers.

The cover panel system below the wash troughs will be formed from high density solid grade laminate with a decorative finish to both sides and polished black radiused edges. The base of the panel system is recessed to accommodate tiled covered skirtings.

Proposed colour samples, materials and finishes will be presented to the Conservation Officer for approval. Refer to the Materials Schedule in the CIMP for further details.

4.8.7.21 Baby Change Unit

The proposed bespoke baby change unit comprises a proprietary baby change top and cover panel system below. The unit is manufactured by Venesta Washroom Systems.

The baby change profile top will be formed of high-pressure laminate with an anti-roll front upstand and splashbacks to backs and sides.

The cover panel system below the baby change top will be formed from high density solid grade laminate with a decorative finish to both sides and polished black radiused edges. The base of the panel system is recessed to accommodate tiled covered skirtings. Proposed colour samples, materials and finishes will be presented to the Conservation Officer for approval. Refer to the Materials Schedule in the CIMP for further details.

4.8.7.22 Integrated Plumbing System (IPS)

The proposed scheme incorporates an accessible pre plumbed panelling system behind all WCs and urinals. The system is manufactured by Venesta Washroom Systems and uses the VEPPS precision engineered click fix assembly within an aluminium frame. Panels are formed from high density solid grade laminate with decorative finishes to both sides and polished black radiused edges. Panels have a nominal thickness of 13 mm, with matching solid grade laminate flash gaps.

Proposed colour samples, materials and finishes will be presented to the Conservation Officer for approval. Refer to the Materials Schedule in the CIMP for further details.

4.8.7.23 Sanitary Fixtures and Fittings

The colours, material and finishes of these fittings will be incorporated in the next phase of the CIMP and/or Design Guide. Refer to the Materials Schedule in the CIMP for further details.

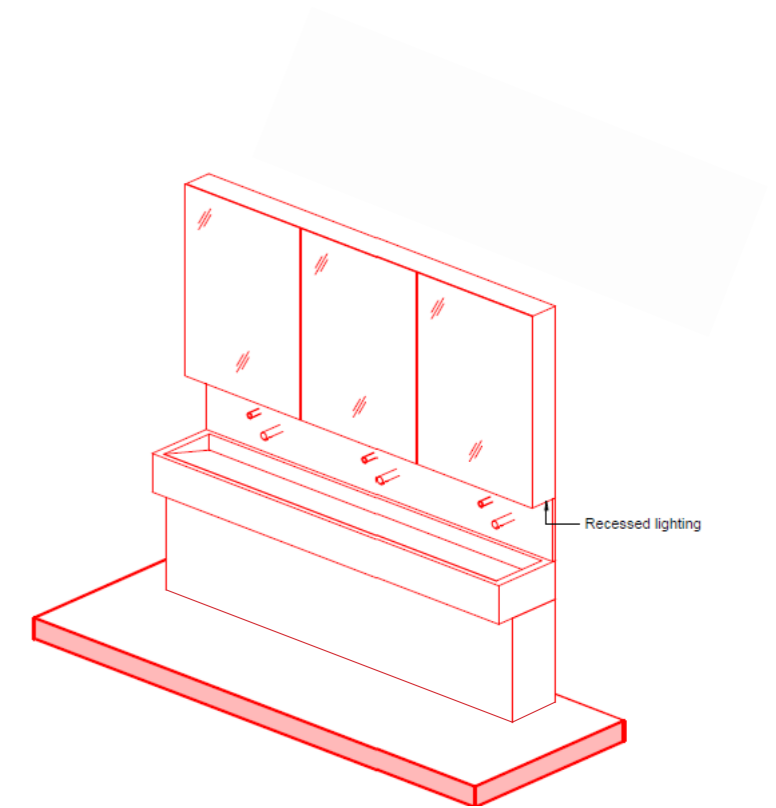


Figure 4.8ad: Proposed vanity unit

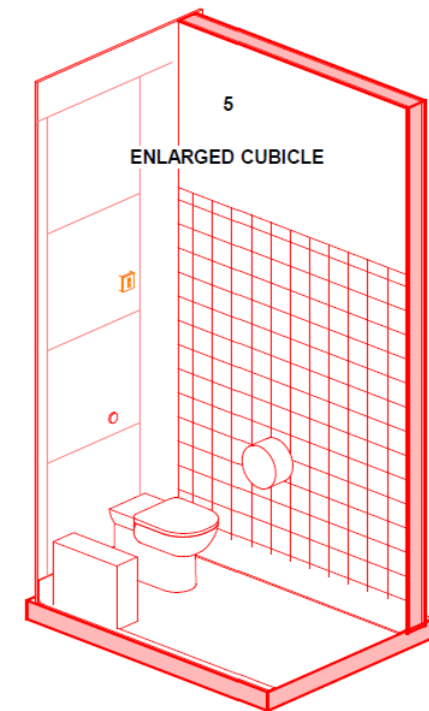


Figure 4.8ae: Proposed IPS system in enlarged cubicle

4.8.8 Materials and Colour Scheme

4.8.8.1 Fixings

Unless specified otherwise in the Structural Engineer's drawings and specifications, existing fixings, including iron nails, screws, bolts and straps, will be replaced with new stainless-steel fixings that match the dimensions of the existing versions.

Existing fixing holes will be reused as often as possible to avoid the creation of new holes in historic timber elements. New fixings will be the minimum number required to suit the application, and to be compatible with existing dimensions and materials.

4.8.8.2 Colour Scheme

The proposed paint specification is in development, with trials underway on samples of dismantled elements in storage. Proposed colour samples will be presented to the Conservation Officer for approval. Refer to the Materials Schedule in the CIMP for further details.

4.8.9 MEP Strategy

4.8.9.1 Station Power Limits

The Station will be provided with a new substation to serve the additional load that has been designed. However, due to cable lengths and impacts on other supplies within the station, volt drop limits the supply to the Tea Rooms to a 90A three-phase supply. The Tea Rooms will therefore be heated using all-electric heaters, and hot water is provided by electric water heaters which make up a large proportion of the electrical supply. The café will be provided with a separately metered 63A single-phase supply to allow for separate billing of electricity to the café tenant.

4.8.9.2 Electrical Distribution Strategy

The Tea Rooms will be supplied via the parcel subway, with incoming cables entering the floor void and transitioning into the electrical cupboard. Cable containment is provided within the floor and ceiling voids and is served from a dedicated distribution board within the electrical cupboard. Services on walls will be cabled from the containment within the floor and ceiling voids and through the service zone within the wall build-up. All electrical fixtures (sockets, fused connection units, data outlets etc.) will be from the MK Edge range.

Samples of the proposed socket face plate finishes will be presented to the Conservation Officer for approval. Refer to the Materials Schedule in the CIMP for further details.

4.8.9.3 Telecoms Assets

Telecoms equipment has been selected to ensure compatibility with the wider station equipment compatibility and spares holdings, and to minimise visual impact on the historic appearance of the Tea Rooms.

Public address speakers will be flush mounted within the ceiling to reduce visual impact, while surface mounted dome cameras

will feature paintable skins that can be painted to match adjacent finishes. Cameras will utilise modular housings so only internal components require replacement, and all units can be configured remotely to minimise operational disruption and reduce the need for working at height.

Cameras and cabling for use by future café tenants will be pre installed to ensure installation quality. A semi rugged customer information display will be surface mounted on the waiting room wall. The low-profile unit has a slim black bezel and will be installed on a tiltable bracket that remains largely concealed from view.

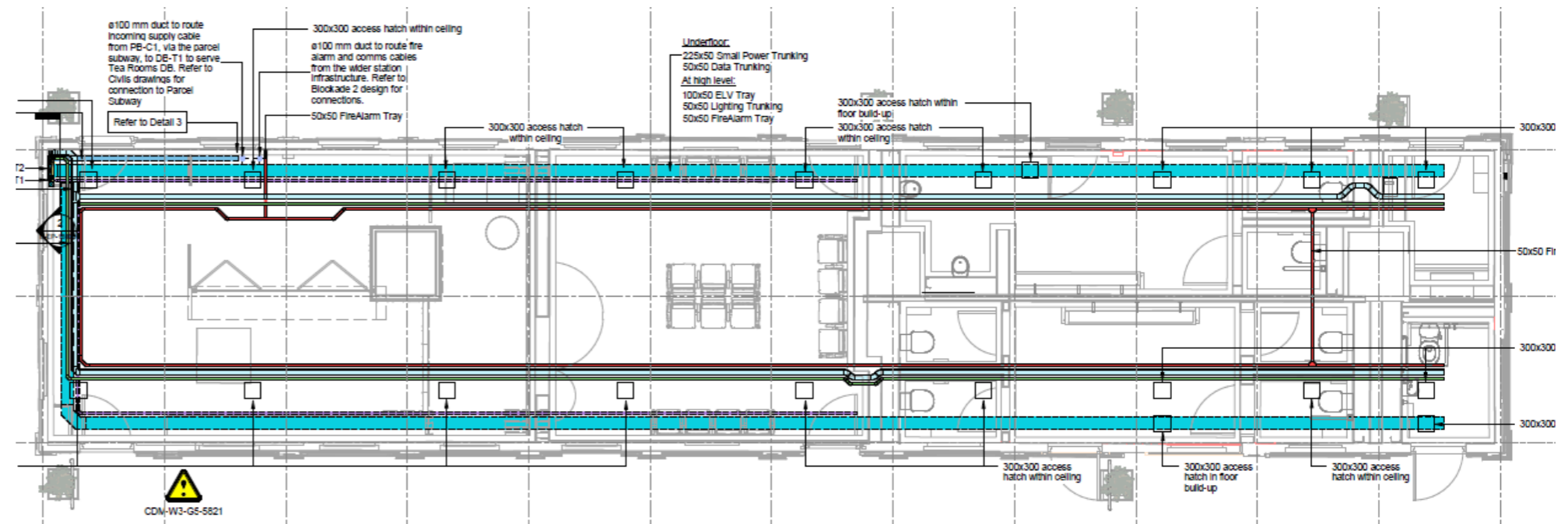


Figure 4.8af: Proposed electrical distribution strategy

4.8.9.4 Lighting

A new lighting scheme is proposed for the Tea Rooms, as the existing modern fittings are not considered heritage-significant and quantities are insufficient for the requirements of the new design. The updated scheme introduces lighting that is either discreetly integrated into the ceiling and joinery, ensuring it remains visually unobtrusive, or presented as visible feature luminaires. In the café and waiting areas, pendants and wall lights have been selected in a Victorian-inspired style to complement and enhance the building's architectural character.

The lighting strategy also prioritises long-term maintainability. All new luminaires are compatible with a centralised lighting control system to support automated monitoring of luminaires or driver failures, energy use, and emergency lighting testing. This approach reduces maintenance workload and ensures compliance with safety requirements.

Refer to the Materials Schedule in the CIMP for further details about the light fittings.

4.8.9.5 Fire Detection

The Tea Rooms will be provided with automatic smoke and heat detectors that link back to the main stations fire alarm. Manual call points have been omitted apart from a single call point behind the café counter, to prevent public misuse. Fire alarm interfaces will be provided to automatic doors to align with the fire strategy.

4.8.9.6 Ventilation

The building will continue to utilise its existing natural ventilation strategy. Fresh air is introduced via trickle vents installed above all windows within the café and waiting room areas. The windows will be made fully operable to provide additional ventilation as needed. Mechanical extract ventilation is provided by extract fans located in all WC facilities, with additional recessed ceiling extract above the café counter area to ensure adequate exhaust and air movement.

Refer to the Materials Schedule in the CIMP for further details.

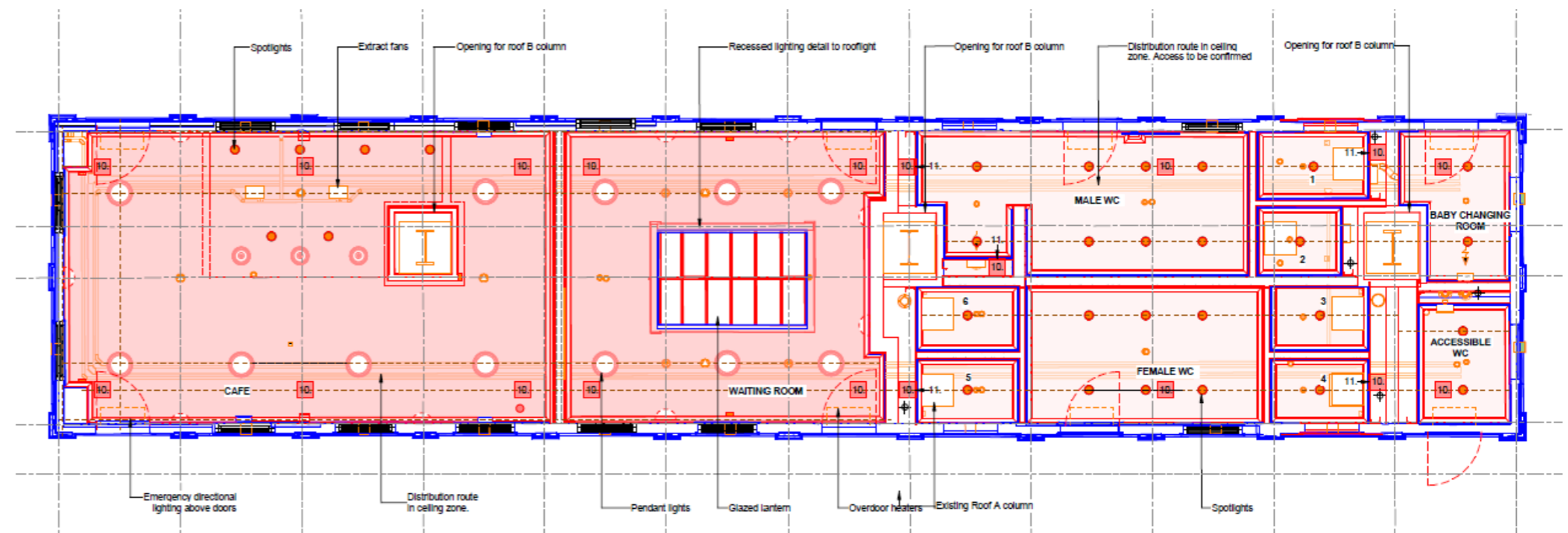


Figure 4.8ag: Proposed reflected ceiling plan

4.8.9.7 Heating

The proposed heating strategy will comprise column radiators positioned beneath fixed seating and behind tables within the café area, as well as beneath windows in the waiting room. Overdoor heaters will be installed above all external exits to act as air curtains and reduce heat loss during periods of door operation. In addition, recessed radiant ceiling panels will be provided within both the male and female WC facilities to maintain suitable internal temperatures.

Proposed colour samples for the radiators will be presented to the Conservation Officer for approval. Refer to the Materials Schedule in the CIMP for further details.

4.8.9.8 Drainage Strategy

A primary ventilated gravity foul drainage system will be utilised to serve the spaces in the Tea Rooms that require domestic sanitary drainage. Soil and waste stacks will rise vertically to ventilate to atmosphere above roof level. All soil and waste stacks will connect to the below-slab drainage system. Floor drains will be provided in the WC areas for general cleaning purposes. Soil stacks will be installed using HDPE material, with PVCu for floats and MuPVC pipework for waste.

Access panels within the floor and ceiling will allow access to the containment at bends and either side of walls to allow future cabling and access to fire stopping. Further access to hot and cold water, drainage and ventilation services is provided via hinged panels within the IPS system and vanity units.

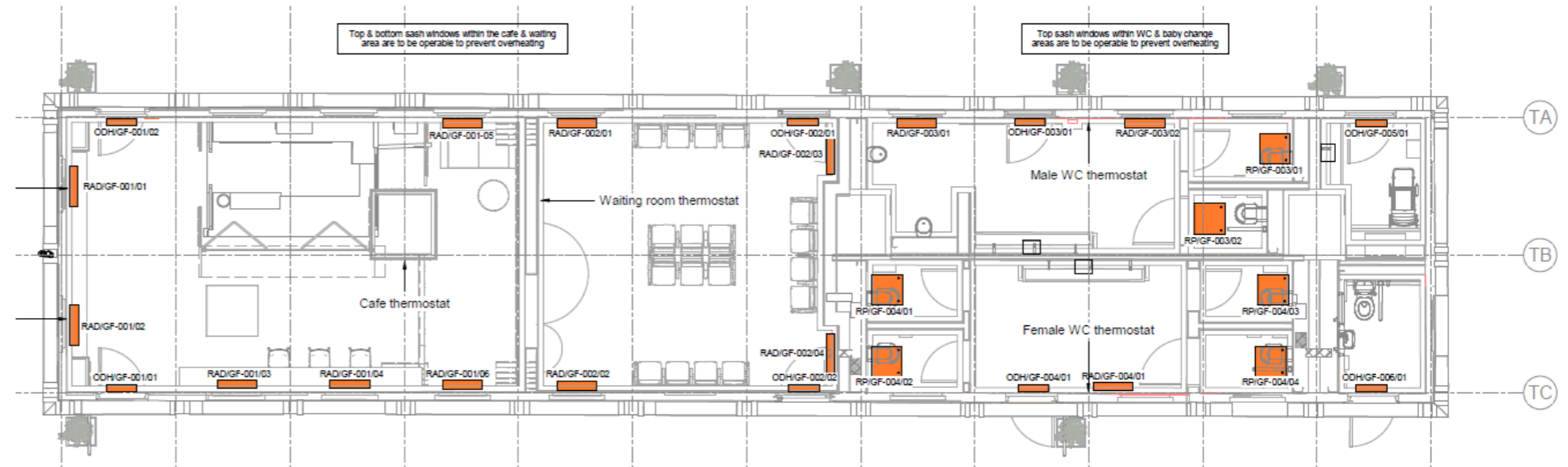


Figure 4.8ah: Proposed heating plan

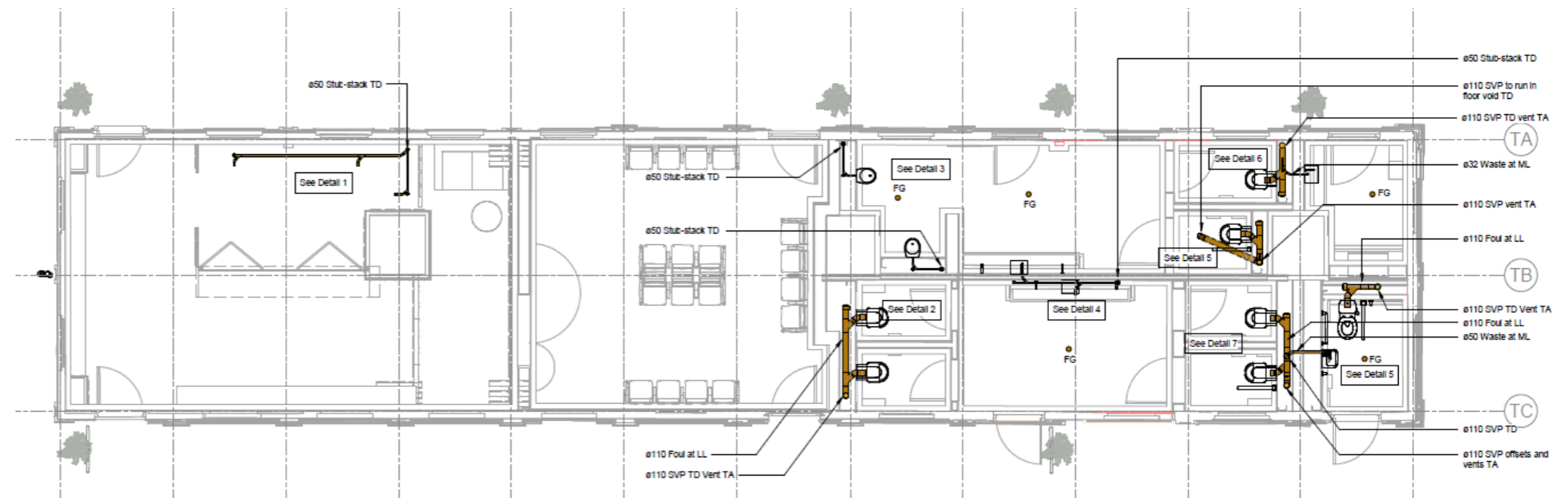


Figure 4.8ai: Proposed drainage plan

4.9 Detail Development Subways

4.9.1 Existing Parcel Subway

The parcel subway is a disused subway that connects Platforms 1 and 4 in Huddersfield Station at a skew angle of approximately 22°. The structure is a simply supported single span underbridge which supports the Up Main and Down Main lines. The structure was constructed in 1899 and comprises two steel trough deck with concrete infill with metal rolled I-section edge beams. Each deck comprises of 12No. Troughs supported on brick abutments with sandstone padstones. Archive information indicates a 19mm thick waterproof asphalt layer sits between the steel troughing and a 50mm thick concrete deck slab. The trough decks are separated by a 900mm covered catch pit located in the six foot. Access to the subway is via series of tunnels and rooms under the station building, which is accessed from a storeroom located at the end of the pedestrian subway beneath Platform 1.

In 2009, strengthening propping works to the trough decks was undertaken. Transverse steel trough support girders were installed to each side of the existing troughs. Support girders were notched into the abutment walls to support secondary girders which in turn support the trough propping girders. The clear square span of the structure is approximately 3.05m (3.28m skew). The minimum headroom is approximately 1.455m to the strengthening works propping arrangement. There is an existing gravity sewer that runs the length of the subway.

4.9.2 Infill works

The proposed works is to partially infill the Parcel Subway with lightweight foamed concrete and utilise it as an under-track crossing (UTX). The subway shall be lined with a separation membrane and filled from the northern end, beneath Platform 4 / Tea Room, to the start of the southern trough deck, allowing the north trough deck to be removed, alleviating future maintenance liabilities with the track carry sections of the subway and addressing the sub-standard ballast depth over the structure.

The separation membrane is to protect / preserve the historical fabric of the structure should this need to be investigated in the future. A brick/blockwork separation wall is proposed to act as permanent shuttering for the concrete infill and close off the subway.



Figure 4.9a: 2009 Strengthening works



Figure 4.9b: 2009 Strengthening works



Figure 4.9c: Existing structure under Tearoom

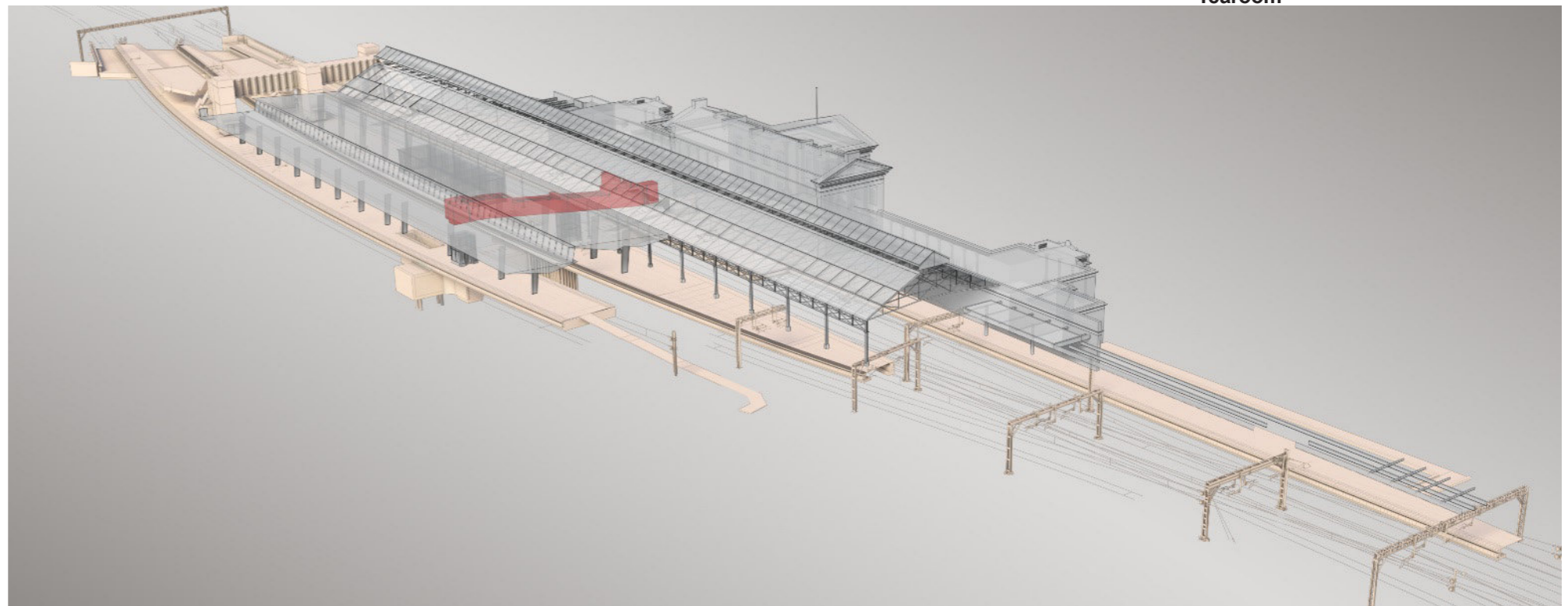


Figure 4.9d: Proposed Parcel Subway highlighted in red on visualisation

The existing sewer and services within the subway will be protected by placing within split ducting and sealed to prevent concrete ingress. Additional proposed services ducts are to be provided within the subway, which pass through the infilling to act as UTX for services between the main building and island platforms. Turning chambers shall be provided to platforms to enable access to the proposed ducts within the subway. The southern trough deck will require a localised section of the trough decking to be removed to allow the ducts to pass through the deck from the platform level into the subway.

4.9.3 Existing Passenger Subway

The existing passenger subway connects the main building entrance on platform 1 to platforms 4, 5, 6 and 8 in Huddersfield Station. It comprises a single span bridge underbridge that carries the ballasted tracks of the Up Main and Down Main lines and part of the platform surface. Access is via either a staircase or lift, located on each platform.

The structure was constructed in circa 1885 and has undergone several alterations to the layout of the stairs with the addition of 2 modern lifts installed in 2010, one lift added to platform 1 and the other to platform 4. The track carrying structure comprises of 16No. longitudinal wrought iron girders with transverse brick jack arches spanning between adjacent girders. Two masonry abutments form the substructure with the floor finished in Yorkshire sandstone pavements, which have historic value. The subway floor ramps down as it passes beneath the rail lines. The structure is square to the tracks with a clear span approximately 4.830m. The headroom clearance through the structure is a minimum of 2.460m.

The platforms over the subway are supported off RSJ's with precast concrete panels spanning between the RSJ's to form the platform surface, additionally, three plate and angles riveted girders span the subway to support a roof column on platform 4. A gravity foul sewer and a surface water sewer traverse the subway at platform 4.

4.9.4 Upgrades to existing subway

The existing staircase on platform 1 (proposed platform 2) shall receive upgraded handrails with integrated lighting. The subway will be lit using linear LED luminaries fixed to the soffit of subway. CCTV will cover the entire subway with help points located adjacent to the lifts at subway level.

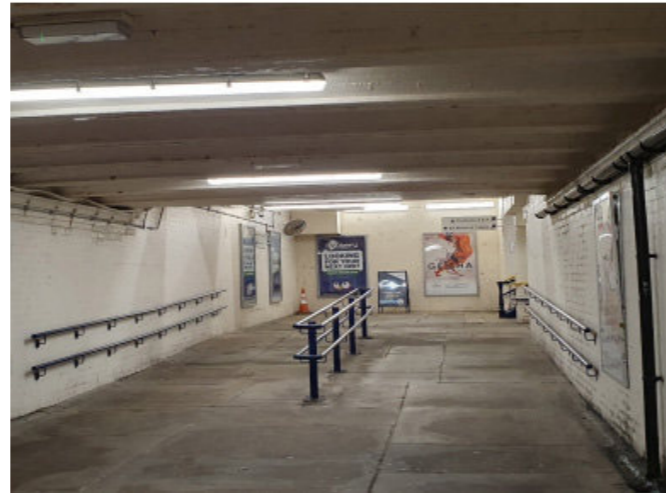


Figure 4.9e: View towards platform 3/4 end



Figure 4.9f: View of platform 2 stairs

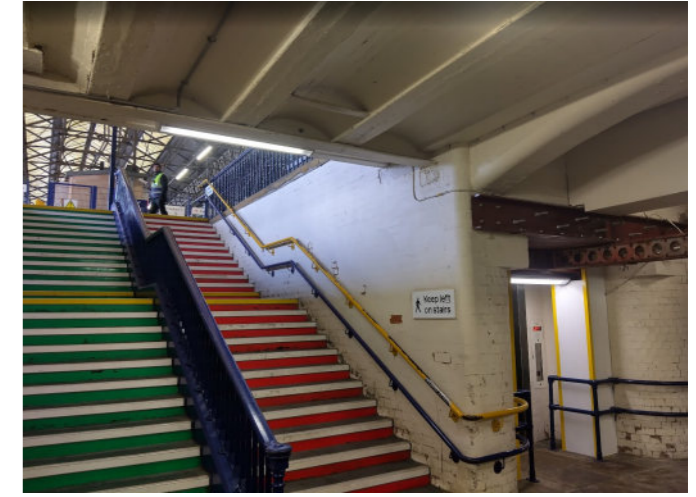


Figure 4.9g: View of platform 3/4 stairs

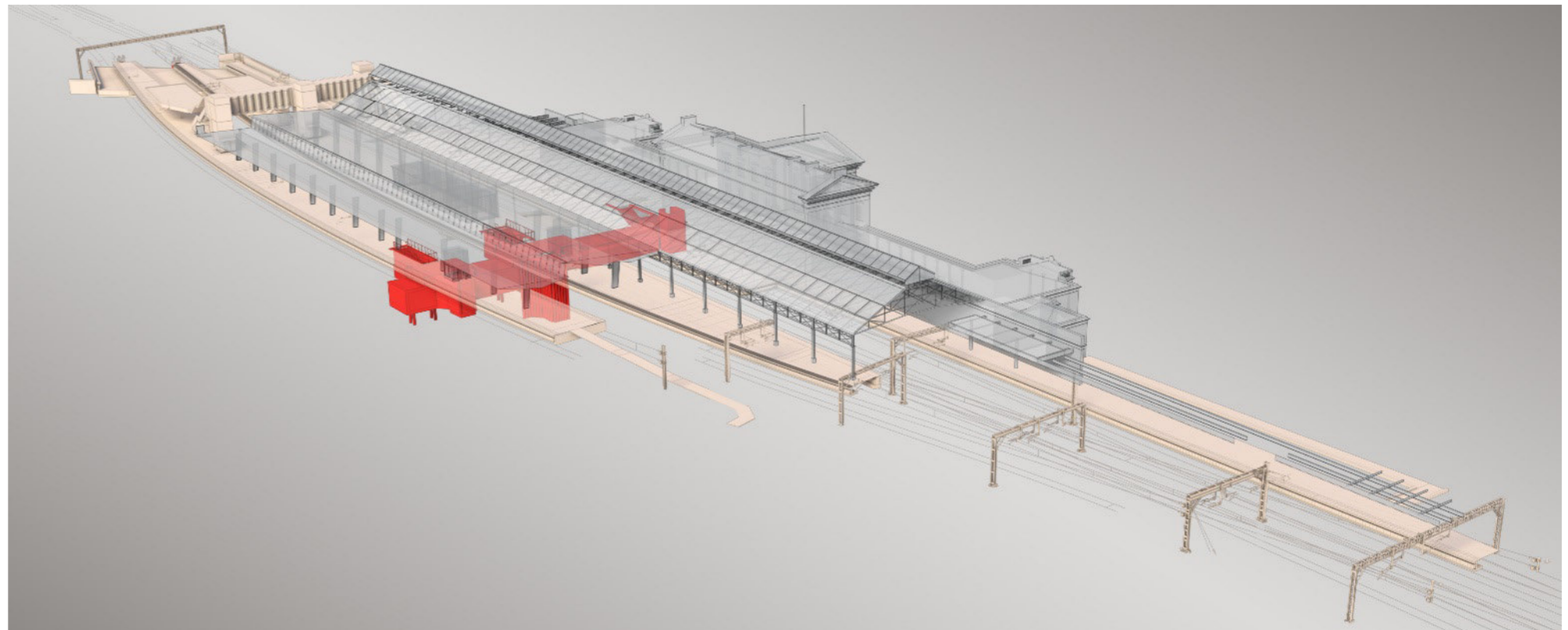


Figure 4.9h: Proposed Passenger Subway highlighted in red on visualisation

The existing subway structure (wrought iron and jack arch arrangement) under the existing track arrangement are to remain. A concrete slab for a direct fix track system may be added above the structure to address substandard ballast depths. The existing deck shall be re-waterproofed prior to the addition of the concrete slab.

4.9.5 Extension works

The proposal is to extend the existing passenger subway to provide access to the new island platform (proposed platform 5 and 6). An in-situ reinforced concrete box will form the structure of the subway extension, which will support the 2No. realigned tracks plus part of the new island platform. The extension retains the existing clear span (4.830m) and achieves minimum headroom clearance of 2.5m. The extension will connect to the existing subway with a short ramp to address the floor level differences.

4.9.6 Materials and colour

Wall finishes are to be white paint on a smooth concrete surface. Stainless steel handrails are to be provided within the subway to account for level drops. York Stone pavements are to be used within the extension section to match the existing subway. All colours to follow the Project's colour specification for the station, as reflected in the Materials Schedule submitted to discharge Condition 2 attached to the granted LBC

4.9.7 Staircases and lifts

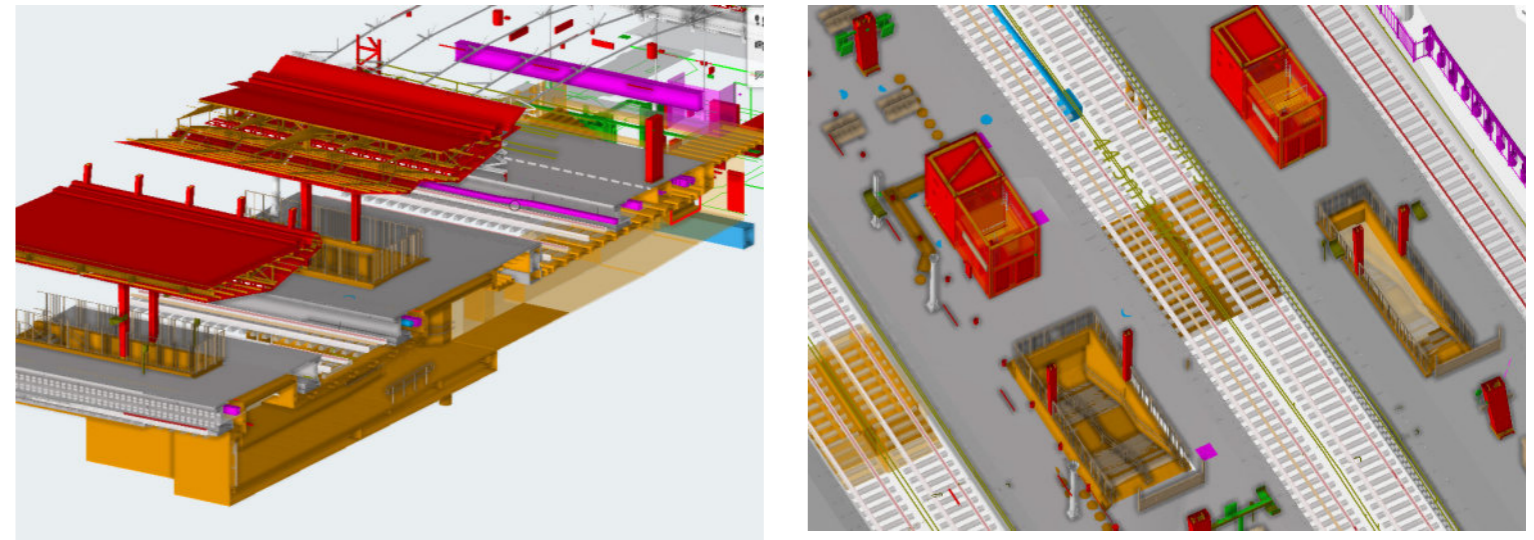
The existing staircase and lift shaft serving platforms 4, 5, 6 and 8 and parts of the subway roof are to be removed as part of the works. A new staircase and a 16 persons through lift shall be provided on the re-aligned platforms (proposed platform 3 and 4). The proposed staircase width is approximately 4m wide (wall to wall) with handrails to the side wall and a central handrail. The staircase is to have two flights of steps with 12 risers per flight and an intermediate landing.

The staircase and lift shaft walls adjacent to platform 4b (proposed platform 3) shall be constructed using contiguous pile walls arrangement with the remaining structure constructed in-situ as per the subway extension to platform 5 and 6. The existing sandstone pavements shall be protected, with the disturbed pavements re-laid as part of subway extension. The staircases shall be provided with 800mm wide corduroy warning tactile to top and bottom of the stairs. Each step nosing will incorporate a permanently contrasting continuous material for the full width of the stair on both the tread and riser.

Platform 5 and 6 are to be provided with a staircase and 16 persons through lift to provide step free access. The staircase width is approximately 2.2m wide (wall to wall) with handrails to the side walls. The staircase is to have two flights of steps with 13 risers per flight and an intermediate landing. The proposed stairs and lifts shall maintain a minimum 3.3m distance from the platform copper edge. Balustrades around stairwells are to be designed to resist crowd loads.

4.9.8 Interface with Roof B

The roof columns over the staircase shall be split over the staircase side walls with a column supported off each side wall of the staircases. The lift shaft below platform level and staircases are to be in reinforced concrete. The staircase walls and lift shafts are to locally support the roof canopy. A roof column is to be integrated into the lift shaft steel frame on both island platforms.



Figures 4.9i-j: Subway relation with roofs B & C.* Colours from federated model do not reflect realistic proposed colours in the Colour Specification Brochure

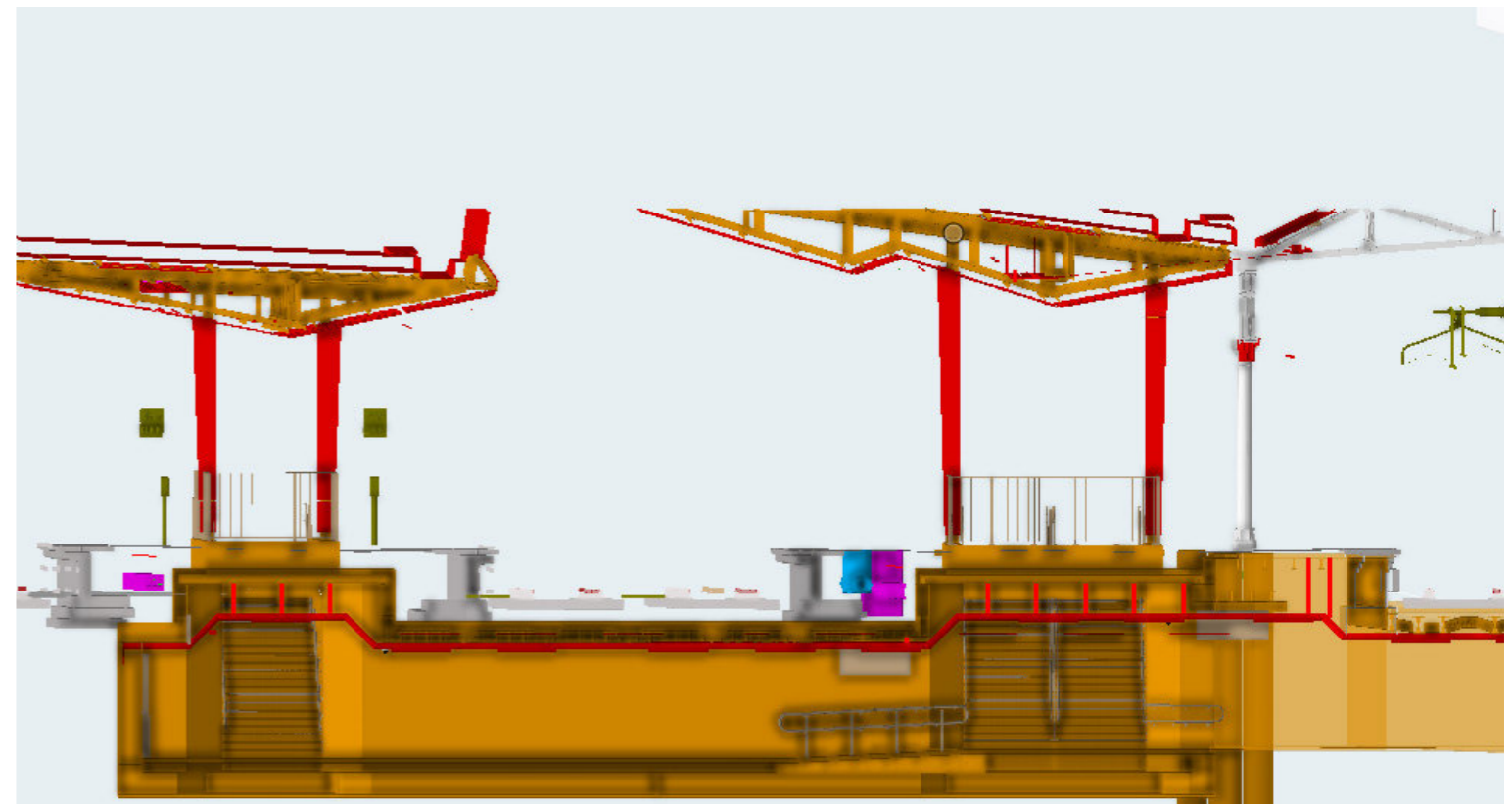


Figure 4.9k: Proposed Passenger Subway section cross track.

4.9.9 Passive Provision

The subway end wall under platform 6 shall be designed for removal without damaging the remaining structure to facilitate a future extension to the north of the station beyond Network Rail land boundary to provide a northern entrance to the station.

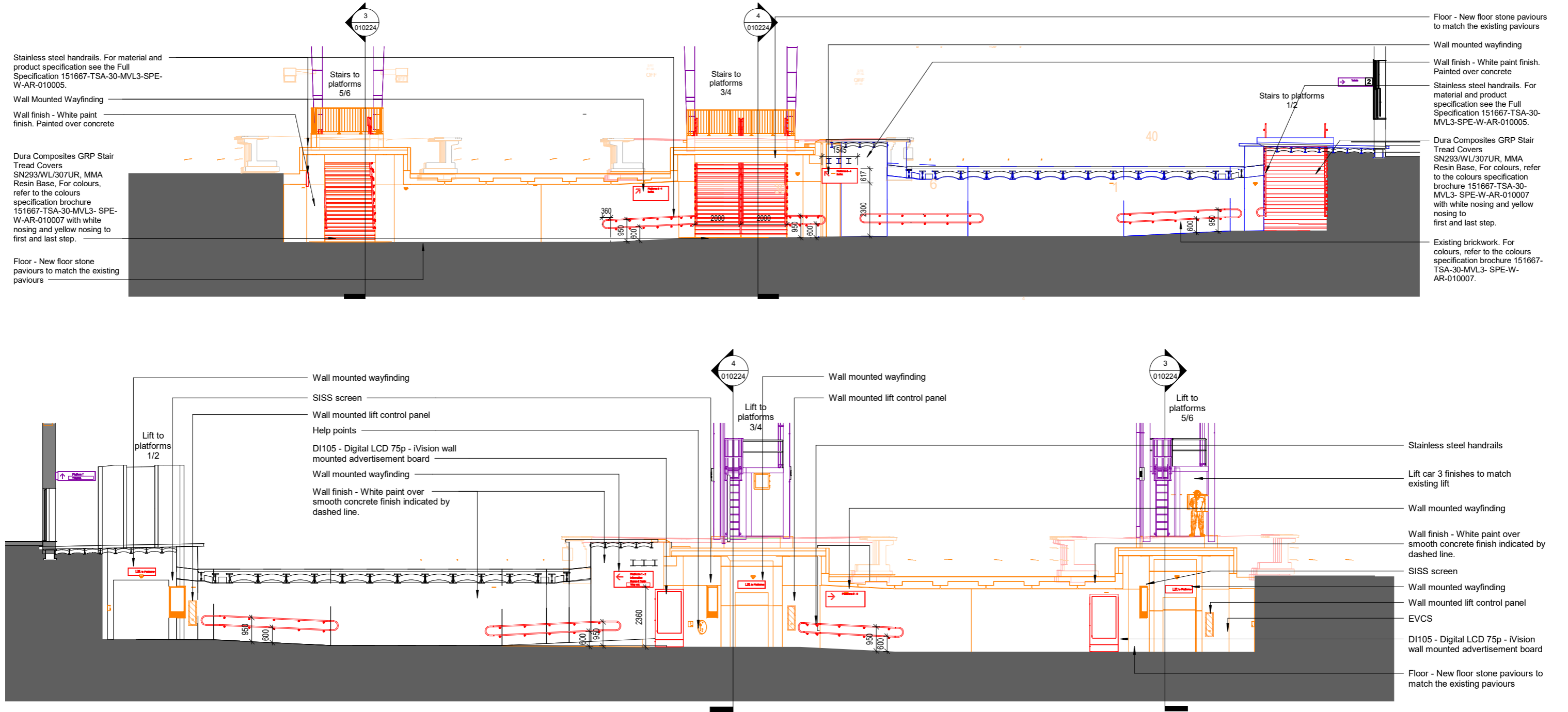


Figure 4.9I: Proposed Passenger Subway Cross track section

4.10 Signage

During this stage, the wayfinding strategy of the station is set out through multiple projected, wall mounted, ceiling hung and free-standing wayfinding signs. The principle is to upgrade the existing signage to the latest NR-GN-CIV-300-01 Wayfinding standard and reducing the amount of clutter to unify the signage throughout the station.

All sign font sizes satisfy the NR wayfinding standards and are visible between the ranges of 2m-20 meters. This would satisfy the inclusive mobility standards (DfT) for signage to be legible from distance.

Projected signs and ceiling mounted signs could pose a potential perch location for birds, and it is recommended by the wayfinding standards to provide an off the shelf solution such as a mounted wire system (figure 4.10b). These systems can be mechanically fixed into the removable cap component of the signage which can be removed for the purpose of cleaning or replacement.

Braille and direction of travel will be included on top and bottom of handrails leading to the passenger subway as well as braille on room identification signs. It is important to note that it is recommended that the overall wayfinding strategy should be displayed in the station forecourt with braille.

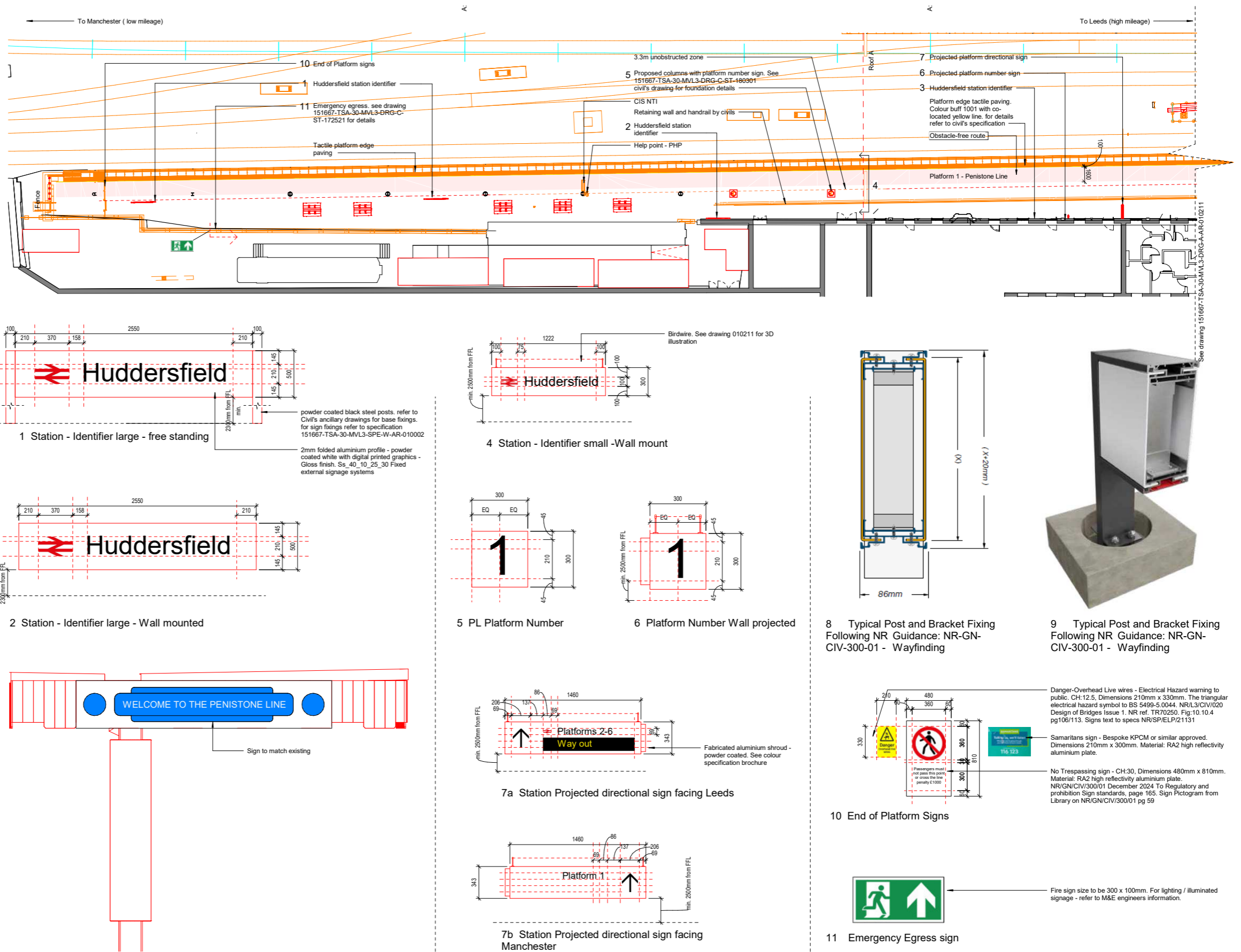


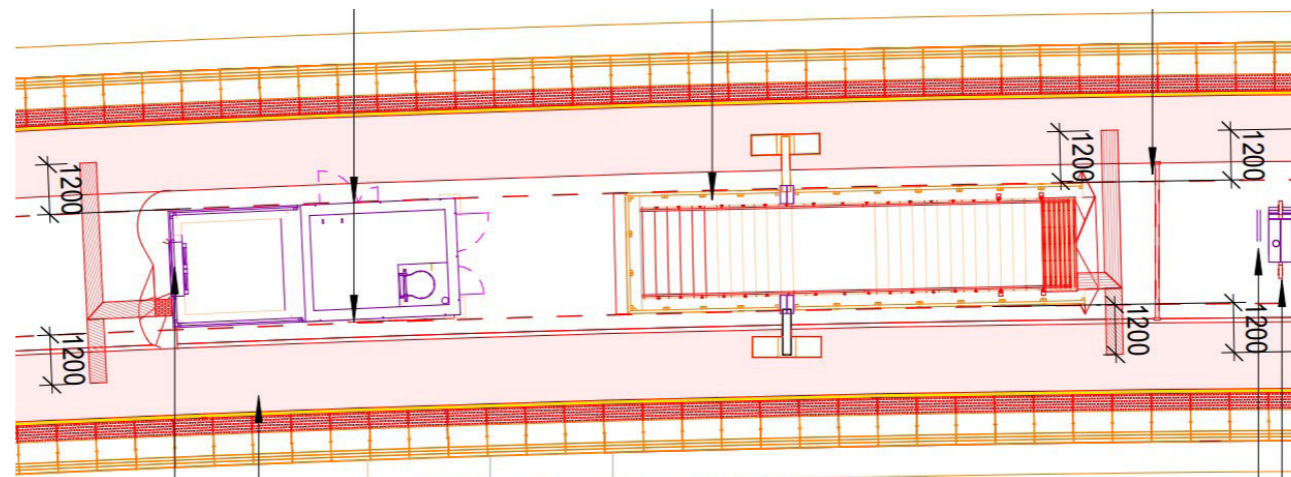
Figure 4.10a: Signage layout 3 Proposed Penistone Line Signage

With regards to the tactile guidance pathway, the Requirements set out in PRM NTSN (Persons with Reduced Mobility National Technical Specification Note) and the RIS-7016-INS (Rail Industry Standard Issue 2 Interface between Station Platforms, Track, Trains and Buffer Stops) offer a solution to plan the pathway through the platforms. However, these two standards do not align in their approach to marking the Danger Area and tactile wayfinding. As stations differ, there are no useful guidance documents within the DfT, RSSB or NR standards for larger stations.

The DfT issued a letter with guidance to Network Rail Assurance Panel which concluded that each project needs to determine how they proceed to secure authorization and comply with the requirements in the PRM NTSN.

After consultation with the accessibility group, it is agreed that the principle of guidance is, as per the PRM NTSN 4.2.4.2, that all obstacle-free routes of the platforms and vertical circulation elements are connected to the tactile guidance pathway along with waiting areas, WCs, Help points, and ticket machines and information desks (entrance zone within station building) Figure 4.10c. The consultation also concluded that a parallel tactile guidance pathway along the platform edge is not recommended, as this will conflict with the edge hazard tactiles.

Figure 4.10c shows the obstacle-free route highlighted in red and the tactile pathways connecting to the former zone with the lift, stairs, help points and waiting shelters.



- Tactile paving: Path guidance.
 - Tactile paving: Corduroy hazard warning surface. Colour buff 1001
 - Tactile paving: Platform edge warning surface.
 - Tactile Paving Decision Junction or Attention Indicator.
 - Obstacle-free route
- Signage colours**
For colour references refer to the Colour Specification Brochure 151667-TSA-30-MVL3-SPE-W-AR-010007

Figure 4.10c: signage and wayfinding

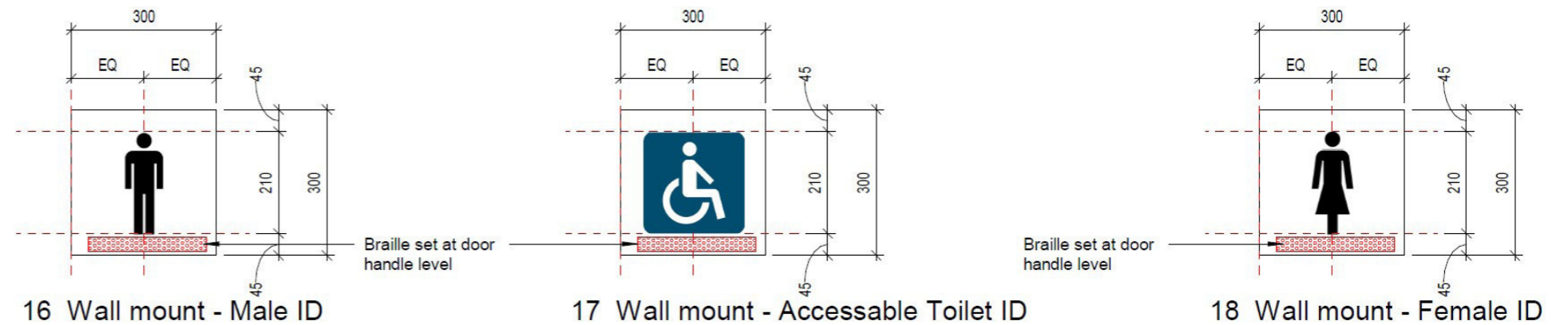


Figure 4.10d: wall mounted signage and braille



Figure 4.10b: Birdwire extract from NR/GN/CIV/300/01



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4.11 Overhead Line Equipment (OLE)

Section to be completed at a later CIMP Phase

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Section 5 Access and Maintenance

05



5.0 Access and Maintenance

The overall philosophy for the access and maintenance of the scheme, as mentioned in previous sections, is to minimise the visibility of walkways, ladders, steps over the roof, etc. This is reflected in different methods around the station such as positioning ladders accessing roofs B & C inside access rooms on the island platforms. Utilising subtle fall restraint systems and walkways, away from main views and edges of the roofs, hidden step overs and guardrails behind the main principle building, and centralising access ladders behind main columns reduce their visual impact on the station.

Models

Measurements	
Working height max. ⁽¹⁾	
Platform height	
A Height - stowed (standard)	
B Height Tilted back ⁽²⁾ (standard)	
C Length - stowed (standard)	
D Length - tilted back ⁽²⁾	
E Width	

Productivity

Lift capacity	
F Outrigger footprint (l/w) (standard)	
G Corner access ⁽³⁾ (standard)	
H Wall access front/side (standard)	
Standard platform dimensions (l/w/h)	
Gated standard platform dimensions (l/w/h)	
Gated narrow platform dimensions (l/w/h)	

Weight and Floor Loading⁽⁴⁾

AC models	
DC models	
Occupied floor pressure	

Power

Power source - AC models	110V/50-60 Hz
	220V/50-60 Hz
Power source - DC models	12V DC

Sound and Vibration Levels

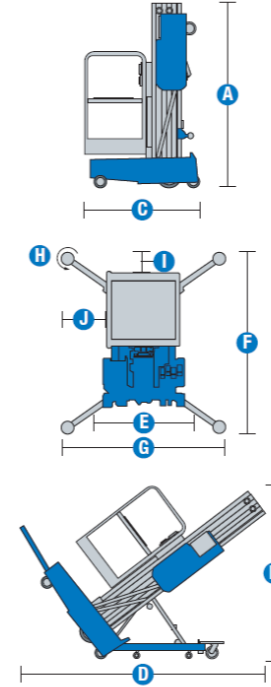
Sound Pressure level (ground workstation)	< 70 dBA
Sound Pressure level (platform workstation)	< 70 dBA
Vibrations	< 2.5 m/s ²

AWP-40S

US	METRIC
46 ft 4 in	14.10 m
40 ft 4 in	12.30 m
9 ft 1.5 in	2.78 m
6 ft 6 in	1.98 m
4 ft 8 in	1.42 m
9 ft 9 in	2.97 m
2 ft 5 in	0.74 m

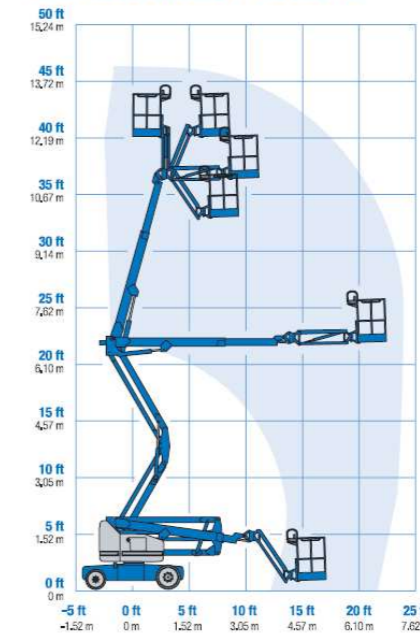
300 lb	136 kg
7 ft 5 in/6 ft 9 in	2.26/2.06 m
2 ft 7 in	0.79 m
1 ft 3 in/2 ft 4 in	0.38/0.71 m
27/26/44.75 in	0.69/0.66/1.14 m
27/26/44.75 in	0.69/0.66/1.14 m
26/20/44.75 in	0.66/0.51/1.14 m

1,040 lb	472 kg
1,130 lb	513 kg
0.20 psi	1.37 kPa



AW-40S Specification

Range of motion Z-40/23 N RJ



Z-40/23N RJ

US	Metric
46 ft 5 in	14.32 m
40 ft 5 in	12.32 m
22 ft 8 in	6.91 m
21 ft 3 in	6.48 m
2 ft 6 in	0.76 m
6 ft 6 in	1.98 m
21 ft 5 in	6.53 m
4 ft 11 in	1.50 m
6 ft 5 in	1.96 m
9.5 in	0.24 m

Models

Measurements	
Working height max. ⁽¹⁾	
Platform height max.	
Horizontal reach max.	
Up and over clearance max.	
A Platform length	
B Platform width	
C Height - stowed	
D Length - stowed	
E Width	
F Wheelbase	
G Ground clearance - center	

Z-40/23RJ Specification

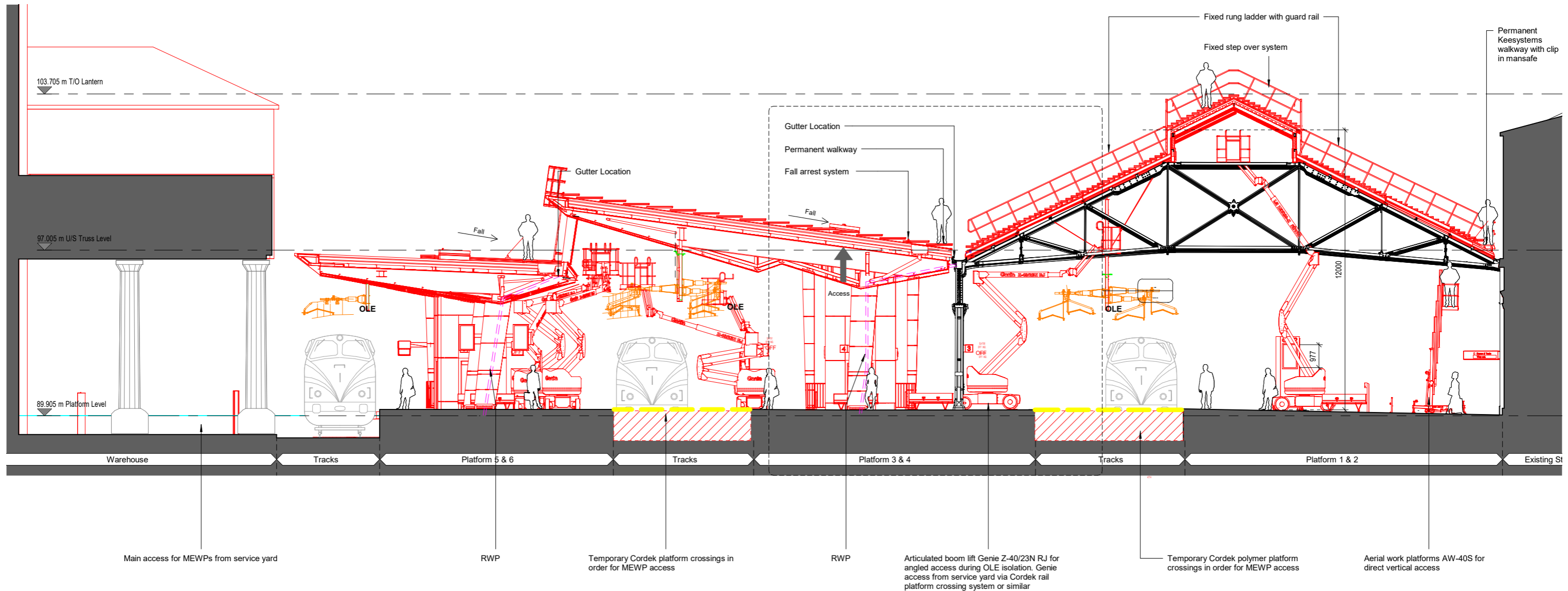


Figure 5.0a: Access and Maintenance Section

5.0 Access and Maintenance

Access and maintenance to be carried out during OLE isolation due to proximity to OLE. Access to areas over the canopies or under the main roofs would require either temporary elevated platforms, or Genie lifts to access. Areas under 12m can be cleaned via water pole from platform level.

Cordex platforms can be laid out temporarily for heavier machinery/ Genie lifts over tracks to give access between the island platforms in instances of repair or high level inspections during OLE isolation and outside hours of operation.

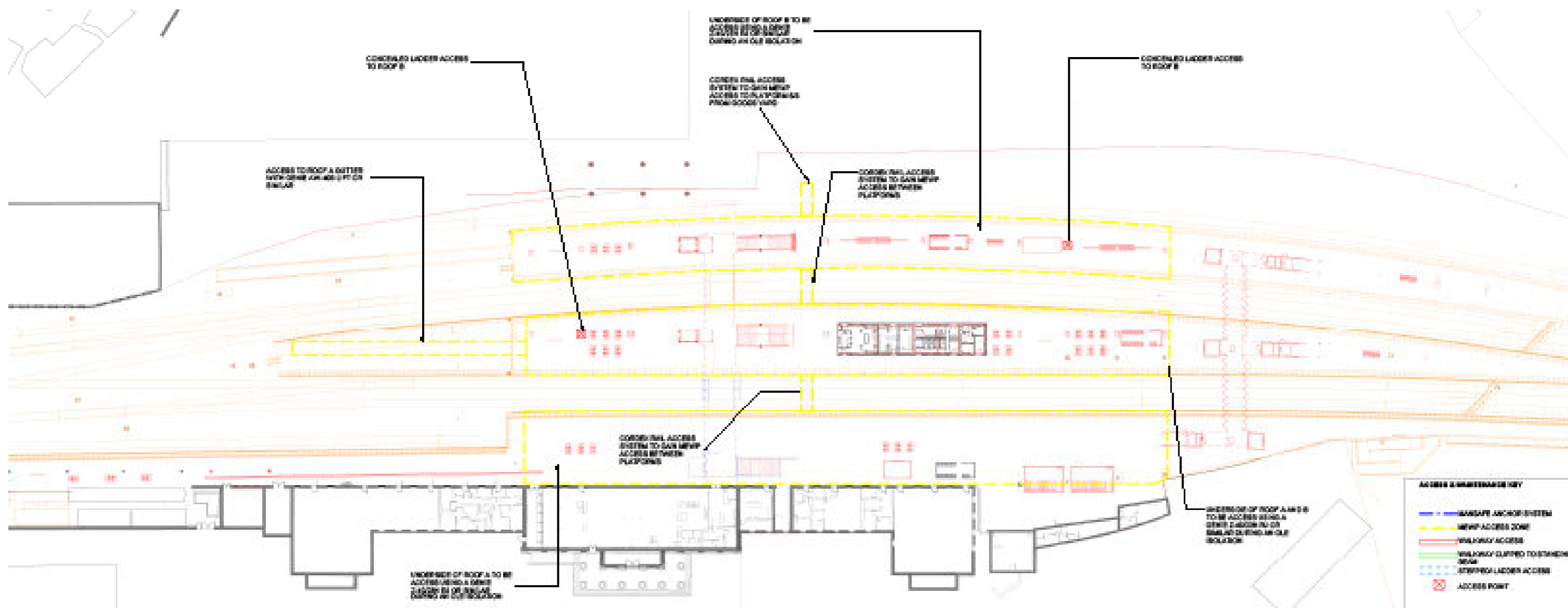


Figure 5.0b: Proposed Platform Access and Maintenance Plan

5.0 Access and Maintenance

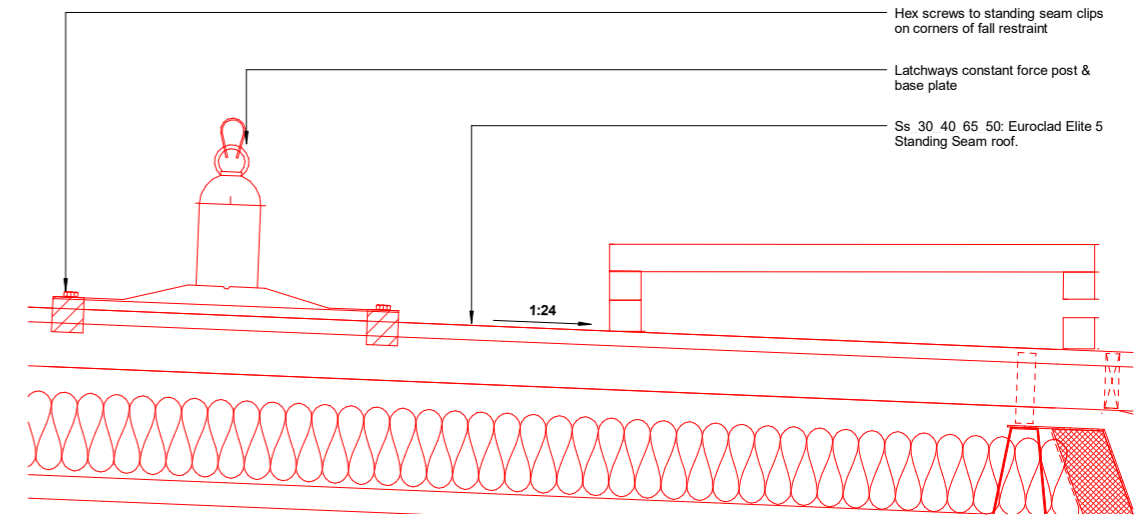


Figure 5.0c: Proposed Roof Access Walkway and Fall Restraint System

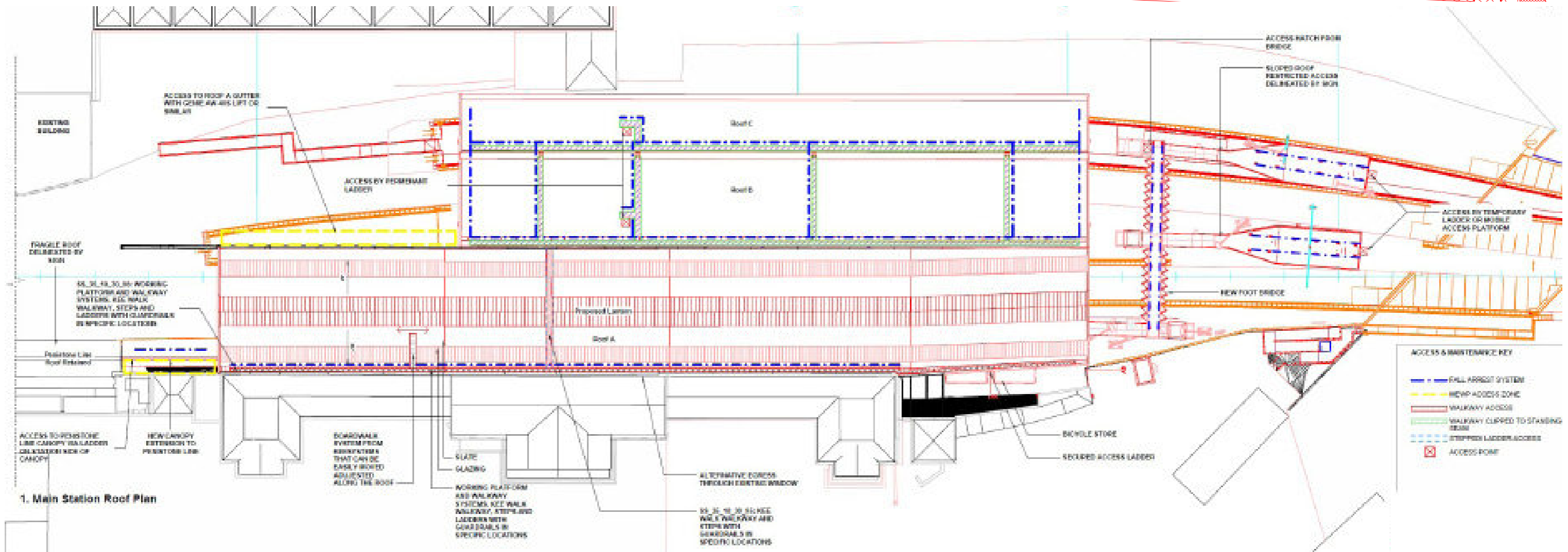


Figure 5.0d: Proposed Roof Access and Maintenance Plan

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Section 6 Huddersfield Viaduct

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6.0 Huddersfield Viaduct

Huddersfield Viaduct will be presented at a later CIMP phase.