London Borough of Hounslow

LIONEL ROAD STATION

Options Report

70068052 -WSP-REP-EMF-000001
JUNE 2020

CONFIDENTIAL

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REPORT (P01) CONFIDENTIAL

PROJECT NO. 70068052

OUR REF. NO. 70068052 -WSP-REP-EMF-000001

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EXECUTIVE SUMMARY

This feasibility report describes the requirements, site context and three options for the new Lionel Road Station entrance locations. The report analyses the station capacity, constructability and costs. All options are similar in that all horizontal and vertical elements have been checked against Network Rail standards. All options require permanent land rights, easements and wayleaves to enable construction, operation, emergency egress and maintenance of the new station. Key differences between the three options are summarised below:

Options A1 locates the station concourses and entrance at the end of platform 1, and at platform level. Benefits include, i) faster access for passengers travelling between concourse and platforms, ii) a direct and accessible entrance for the eastbound platform, iii) the opportunity to create a new plaza with active frontage on the 27 Great West Road Development, iv) more space for stadium users to queue outside the station if needed. Disadvantages include, i) an indirect access for spectators to/from Brentford Stadium compared to Option A2, ii) a convoluted journey to Platform 2 that requires three turns of direction that risks delaying, confusing and irritating passengers, iii) the entrance is hidden behind existing electrical sub-station buildings, iv) new retaining structures are required to support Lionel Road Bridge to create sufficient space for a concourse, iv) more permanent land take than Option A2 owing to the concourse and wider platform 1 are located within the 27 Great West Road property.

Option A2 locates the station concourses and entrances above the end of platforms at the level of Lionel Road bridge. Benefits include, i) a short and direct access for passengers for spectators leaving or arriving from Brentford Stadium, ii) ease of access to both platforms, iii) the opportunity to enliven an uninviting and generally poorly supervised space along Lionel Road (South), iv) end loaded platform provides faster access for passengers travelling between concourse and platforms, v) greater flexibility and resilience to control multiple station entrances and independent platform entrances than Options 1 and 3, vi) opportunity to create a stepped and ramped plaza to align with Hounslow's vision of the redeveloped 27 Great West Road property, vii) Furthermore, owing to the location of the concourse above the tracks and within the existing Network Rail property land acquisitions is less onerous than Option A1 and A2. Disadvantages are i) lack of space for stadium spectators to queue outside the station if needed, ii) building above the tracks increases construction programme and cost.

Option A3 locates the station concourse and entrance at the middle of Platform 1 (eastbound). Benefits include i) an accessible and direct entrance to the eastbound platform, ii) the opportunity to create a new plaza with active frontage on the redeveloped 27 Great West Road property, iii) more space for stadium users to queue outside the station if needed. Disadvantages include, i) longer boarding and alighting times for both platform users when compared with the end loaded options, ii) the walk distance between stadium and the station is also the longest between all options, iii) passengers boarding and alighting at Platform 2 are required to walk along Platform 1, therefore additional circulation space is required for Platform 1 in order to accommodate the Platform 1

passengers as well as the circulation movements to/from Platform 2, iv) the average journey times for Platform 2 users will be the longest of all options, v) land take for permanent property rights are much higher than Option A2 owing to the concourse is located within the 27 Great West Road Development, and platform 1 is wider than Option A1.

From a constructability viewpoint Option A1 is the simplest of the options to construct and has a programme duration of 12 months. Option A1 is the second least costly, at £12,316,462. Option A2 has more construction elements than Option A1, and consequently has the longest construction programme of 14 months. Consequently, Option A2 is the costliest at £12,500,000. Option A3 has the shortest construction programme of 11 months. Consequently, Option A3 is the least costly at £12,244,769.

This early feasibility stage has shown that there are relatively minor cost and construction differences between the options. And that all options comply with network rail guidance for station capacity. The conclusion is that all options can be considered feasible. It is recommended that all three options are considered and developed with all relevant disciplines, including track, signalling, power and civil works following the requirements for a Network Rail GRIP 2 study.

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1 ABBREVIATIONS

ACRONYM/ ABBREVIATION	DEFINITION
ALO	Any Line Open
CP6	Control Period 6 (2019-2024)
CR-T	Contract Requirements – Technical
CPP	Construction Phase Plan
CWR	Continuously Welded Rail
DIA	Diversity Impact Assessment
ELR	Engineer's Line Reference
Fixed Plant	Signalling power supply & Point heating
FOC	Freight Operating Companies
FTN	Fixed Telecommunications Network
GRIP	Governance of Railway Investment Projects
HGVs	Heavy Goods Vehicles
HV	High Voltage
LOC	Location Box/Cabinet
LV	Low Voltage
M&E	Mechanical and Electrical
NESA	National Electronic Sectional Appendix
NGD	National Gauging Database
NR	Network Rail
OLE	Overhead Line Electrification
ORR	Office of Rail and Road
PETS	Public Emergency Telephone System
PSR	Permanent Speed Restriction

PZT	Point Zone Telephone
RA	Route Availability
REFOS	Running Edge to Face of Structure
RotR	Rules of the Route
RRAP	Road Rail Access Point
RSSB	Rail Safety and Standards Board
S&C	Switches and Crossings
S&T	Signalling and Telecoms
SB	Signal Box
SORAT	Signal Overrun Risk Assessment Tool
SPA	Special Protection Area
SPAD	Signal Passed at Danger
SPT	Signal Post Telephone
SSSI	Site of Specific Scientific Interest
TOC	Train Operating Companies
TTC	Twin Track Cantilever
WPP	Work Package Plan

2

SCOPE AND PURPOSE

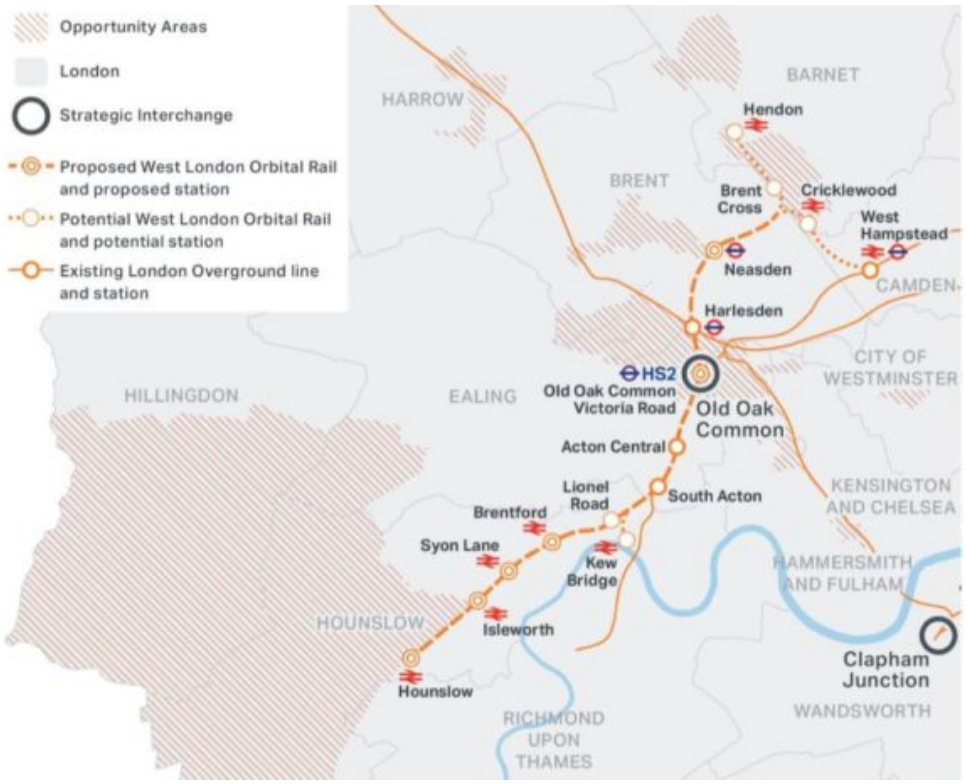
2 SCOPE AND PURPOSE

This feasibility study for Hounslow Council presents and discusses three options for a new Lionel Road station at the on the Kew Curve in the Great West Corridor area of Brentford, Hounslow. The options explore three different station entrance locations for the station and the impact of potential redevelopment of the neighbouring properties, particularly 27 Great West Road that is located north of the proposed station. The proposed station could be served by the proposed West London Orbital rail service (WLO) at an assumed frequency of four trains per hour.

2.1 PURPOSE OF THE STUDY

Given the early stage of design and the need to complete Network Rail's formal GRIP process at a later stage, it is acknowledged that this study will not be recommending a preferred location or station design, but informing the Client of the challenges associated with the options considered and the pros and cons associated with potential layouts based on the assumed space requirements. The study provides an assessment of the space required to safeguard the proposed station. It is envisaged a detailed assessment would be developed later.

Figure 2-1 – Proposed stations on West London Orbital



2.2 STRUCTURE OF THE STUDY

This feasibility report is structured as follows: Section 3 summarises requirements for the new station. Section 4 summarises the strength, constraints, opportunities and risks relating to the proposed station site context. Section 5 outlines the design options for three station entry options and discusses the pros and cons of each option. Appendix A provides an assessment of the three

options from a station capacity perspective. Appendix B provides an assessment of the constructability of each option. Appendix C provides a cost assessment of the three options. Appendix D provides the masterplan drawings for the three options, with both the existing and possible masterplan for the 27 Great West Road developments.

2.3 KEY REFERENCES

The following references were used and incorporated in the feasibility design.

- LB Hounslow Draft Local Plan Review
- LB Hounslow Great West Road masterplan
- WSP Lionel Road Proposed Railway Station Transport Business Case – Technical Report for London Borough of Hounslow, 2014
- WSP Lionel Road Station Masterplan drawing, 2016
- Network Rail Station Capacity Planning Guidance, 2016
- Network Rail Station Design Principles for Network Rail, 2015
- Network Rail Design Standards for Accessible Railway Stations, 2015
- Lionel Road Match Day Demand Forecast

3

REQUIREMENTS

3 REQUIREMENTS

The following key requirements were assembled by the London Borough of Hounslow (the client) to inform the station sizing assessment. These requirements are:

- Two side platforms
- Step-free access from street to train for both platforms
- Platform lengths accommodate a 5-car length Class 378 train (104m).
- Platform lengths can be lengthened to accommodate an 8-car length Class 378 trainset.
- Stair access to Platforms 1 and 2 from the concourse.
- Lifts are designed to NR standards including all associated lift equipment.
- Station areas are sized to accommodate the passenger demand forecast +30% (refer to WSP 2014 study)
- The station shall accommodate the forecast demand from the new Brentford Football Club on match-days (See Appendix 1).
- Drop-off facilities are provided as close as possible to the station.
- Ticket Vending Machines
- Cycle parking
- All station assets including platform, station building, lifts and footbridges require maintenance access
- Staff welfare facilities.
- A staff place of safety adjacent to the ticket gatelines.
- Gatelines can be increased in future to accommodate the forecast demand
- Back of House equipment room is provided (i.e. CER room) within the station.
- Cleaners' facilities and facilities for waste management.
- A safe rendezvous point for use during evacuation.
- The station design complies with all relevant NR Standards.

3.1 KEY ASSUMPTIONS

Key operational and design assumptions as follows:

- The design proposed at this feasibility stage is conceptual
- No ticket office is required
- A single station entrance with a secondary emergency access is satisfactory;
- The station would be operated by London Overground;
- To operate the station three members of staff will be required;
- Current Network Rail standards and guidelines are applicable. In particular, the Station Capacity Planning Guidance and the Design Standards for Accessible Railway Stations.

Rail capacity operational assumptions are:

- The station will be served by four trains per hour in each direction
- A regular 15-minute headway, or interval between train services
- Simultaneous arrival of trains on each platform
- Passenger demand assumptions are 738,000 annual station users +30% (ref. WSP 2014 study
- Match day demand assumptions are 1,130 station users pre and post-match
- To minimise the impact of crowding on the station before, during and after the match, the spectators and stadium visitors will be actively managed and coordinated by station, stadium and Metropolitan Police staff

4

EXISTING SITE CONTEXT

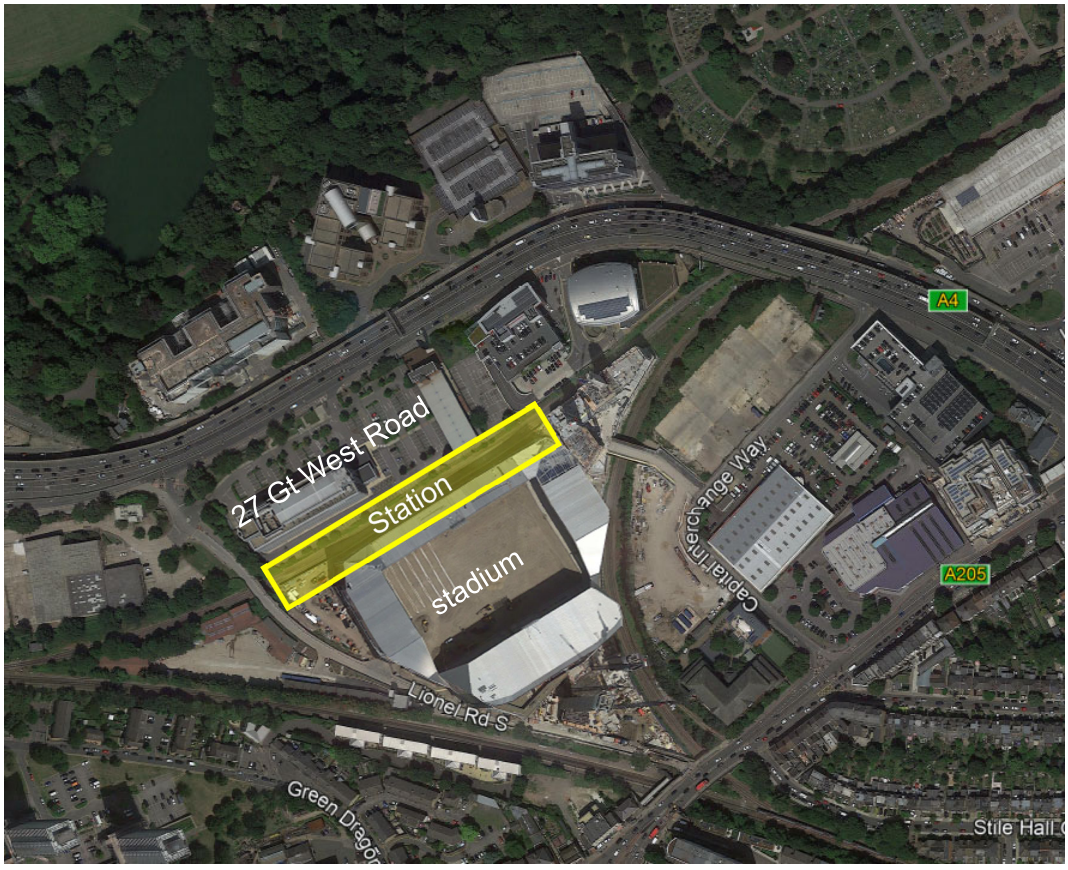
4 EXISTING SITE CONTEXT

The proposed Lionel Road Station will be situated in an area of Brentford East that is identified as a key growth area for employment and housing within the Hounslow Local Plan Review for the Great West Corridor. While the area is well served by the strategic road network which includes the A4 and M4 it suffers from low levels of public transport accessibility. Support for the station is included under Policy GW6 of the review, stating that connectivity will be improved by:

"actively supporting and safeguarding land for the delivery of a potential new Golden Mile Station (Brentford to Southall Crossrail Link) and Lionel Road Station (West London Orbital line);"

The site of the proposed station lies adjacent to 27 Great West Road and is currently occupied by the software development company Sega.

Figure 4-1 - Aerial view of existing station site



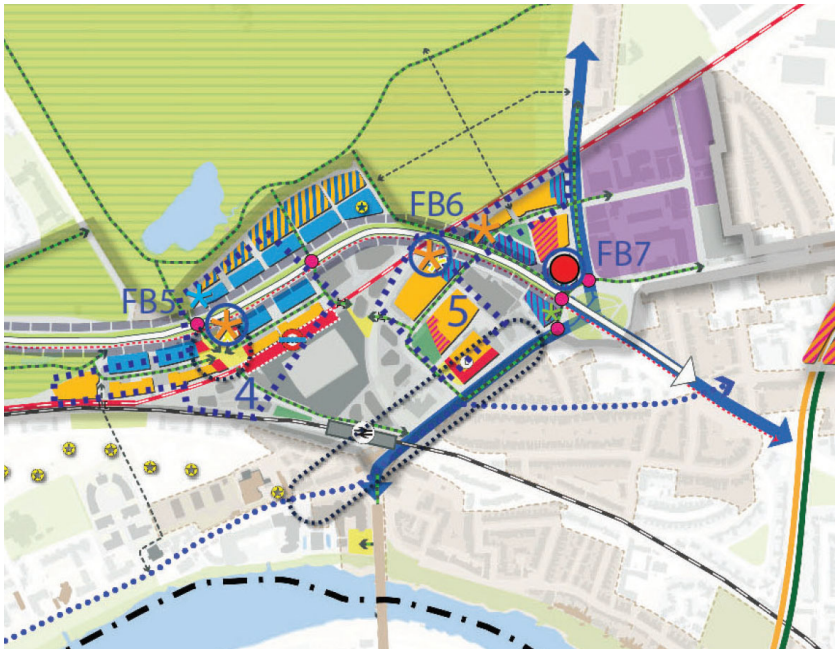
4.1 SITE STRENGTHS

The site provides a satisfactory site for a new station serving the proposed West London Orbital Line. The site allows potential for three main station entrance locations and these options are discussed later in this report. There are good connections to the local road network, and national road network. Stakeholders support continued redevelopment and a new station as part of a wider plan.

4.2 SITE OPPORTUNITIES

To improve connectivity and development, the Great West Corridor vision was developed to focus attention on the following opportunities including: an Overground station at Lionel Road, a new Network Rail Station (Brentford-Golden Mile), the stadium, new residential, retail, B1 uses, office developments, and urban realm, walking and cycling links to local neighbourhoods. A new public space is proposed at the intersection of the station and Lionel Road, and a new pedestrian cycle bridge across the railway at the east end of the station.

Figure 4-2 – Extract of Great West Corridor Overall Spatial Strategy (Hounslow Draft LPR Consultation VOL 4 Great West Corridor, page 34)



Station
Existing taller building/structure
River Brent walk pedestrian/cycle route
Cycle Superhighway 9 (TfL proposed route)
Great West Road Cycleway
Proposed
Office
B1 Uses with residential
Industrial uses with residential
Residential
Residential-led mixed-use

Office/commercial/mixed-use
Industrial uses
Creative industries with ancillary retail uses
Retail frontage
School
Sky campus
Non-residential frontage
Southall to Brentford Rail Link
New Station (Brentford-Golden Mile)
Old Oak Common to Hounslow Overground link
New Station (Lionel Road)
Proposed gateway to Great West Corridor
Potential local landmark
Great West Corridor Improvement
Other Corridor Improvement
Proposed new open space
Enhanced open space
Proposed public space
Pedestrian/cycle route
Desirable future pedestrian/cycle route

Boston Manor Boardwalk
Focal area
Pedestrian/Cycle railway bridge
Leisure centre
Crossing improvement
Proposed Focal Building
30-40m
40-50m
50-60m
60m+
Citadel Site
Focal Building Policy
Tall Building Clusters
1 Golden Mile Station Quarter
2 Brent River
3 London Gateway
4 Brentford Stadium West
5 Brentford Stadium East

Figure 4-3 – Extract of Green Belt and Open Space in the Great West Corridor (Hounslow Draft LPR Consultation VOL 4 Great West Corridor, page 63)

4.3 SITE CONSTRAINTS

The site constraints include: property ownership either side of the railway, existing structures including Lionel Road bridge, buildings and electrical and telecoms buildings. Property constraints include, land ownership, requirements for operation and maintenance of adjacent buildings including the stadium. To develop the station, it will be necessary to transfer, assign temporary or permanent rights from existing land-owners, north and south of the railway for construction and operational purposes. Land is defined for the purposes of this study as:

Permanent land: Permanent transfer of property ownership to construct and operate the station (Station Entrance, footbridge, lift, platforms). Refer to Chapter 5-Options that describes land requirements for each option.

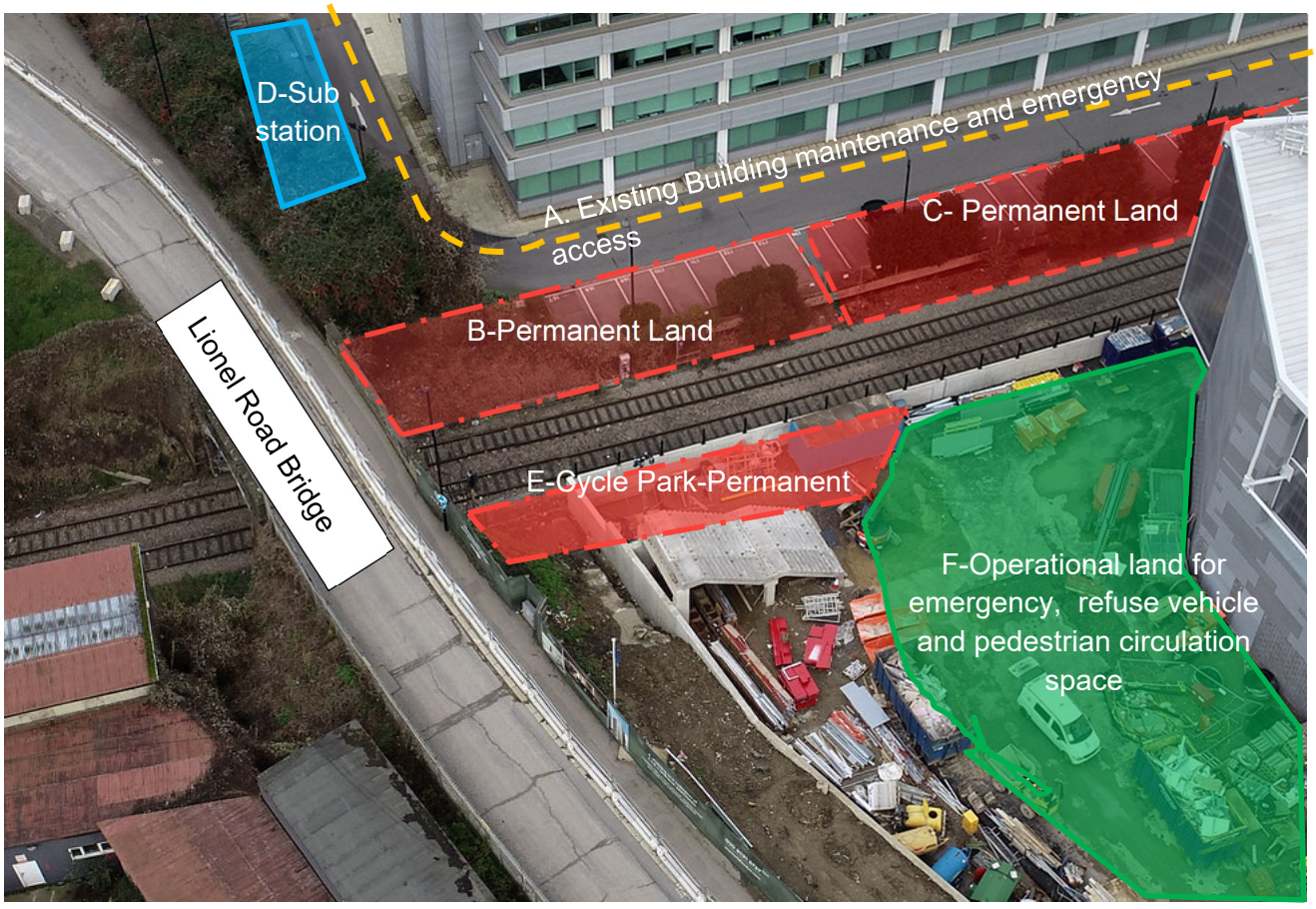
-

Operational land: Wayleave, easements or rights to use other party lands for emergency egress or maintenance. Refer to Chapter 5-Options that describes land requirements for each option.

Construction land: requires temporary agreements to construct the station. This varies for each option. Refer to Appendix B, High level constructability review.

Figure 4.4 illustrates possible land rights may be necessary to develop any option. Consequently, with this level of complexity it is recommended a specialist in land and property rights is employed in the next design stage: A.) Indicates the access required by the property at 27 Great West Road around the building for maintenance and emergency access and egress. B) Indicates permanent transfer of property ownership to construct the footbridge and lifts above tracks and in two options the station entrance. C) Indicates permanent transfer of property ownership to construct and operate the northern platform and a portion of operation land to allow emergency egress and access to the new station platforms. D) Indicates locations of existing electrical/gas/telecom sub-stations may require relocating as part of the masterplan to implement 27 Great West Road that impacts for options A1 and A2. E) indicates a cycle park at the west end of the proposed station where the proposed lift and staircase is required. While the cycle parking could be integrated under the proposed stairs in the future, this would require an agreement with the land owner. And F) indicates the fire engine and maintenance access that constrains the westbound platform width to approximately 3m.

Figure 4-4 – Land safeguarded for construction and operation



Station design constraints include Network Rail requirements and setbacks required from operational railway lines to new and existing structures and railway assets. These include track, signalling, civil engineering, the existing Lionel Road Bridge, and earthworks, utilities and telecoms. and new footbridges. Fire evacuation exits will be required to exit onto neighbouring properties, north and south of the station and will require agreements with landowners. For example, the existing site constraints at the east end of the station, between the stadium and new housing development, have resulted in a lack of space to install a lift and stairs to serve the earlier proposed pedestrian/cycle bridge. Consequently, the proposed cycle route will need to be diverted alongside the public space north of the stadium and to connect to Lionel Road bridge, via the new steps.

Planning constraints include viewing corridors from Kew Gardens, however, owing to the low height of the station this is unlikely to cause concern. An environmental impact assessment will be required that will need to consider a wide range of factors including ecology, contaminated land, hydrology and flooding, air quality, consents.

- Appendix A includes a pedestrian modelling assessment in accordance with Network Rail guidance.
- Appendix B includes a high-level constructability assessment.
- Appendix C includes a high-level cost estimate for the station.
- Appendix D includes the masterplan drawings for all three options

4.4 SITE RISKS/THREATS

Site risks include:

- Timing of new developments north and south of the station may hinder construction of the new station.
- West London Orbital route may be delayed and impact development of the Great West Corridor Vision, that could lead to planning blight in case of delay.
- Lack of station construction sites.

To mitigate these risks regular meetings with stakeholders could discuss future designs and programmes to ensure coordination and develop strategy.

4.5 DISCUSSION

There is a risk of planning blight and overlapping or delayed construction schedule. Those risks could be mitigated by developing a design for the new station that allows development of adjacent sites to take place without hindrance to the future construction of the West London Orbital stations and Lionel Road Station in particular. That would require close coordination and safeguarding or site access for construction.

The relationship and impact between land ownership, implementation of the vision and programming are different with each option. These relationships are described in further detail in the next section

5

OPTIONS

5 OPTIONS

Figure 1 indicates the approximate station outline proposed in 2016 and is shaded blue. The pink area relates to a possible concourse/entrance which could be constructed as part of a new station plaza. The three entrance options considered are:

A1 – Fronting proposed new station plaza.

A2 – Directly onto Lionel Rd (as 2016 WSP outline proposal).

A3 – Central access to platforms, at approximately the mid-point of the development site.

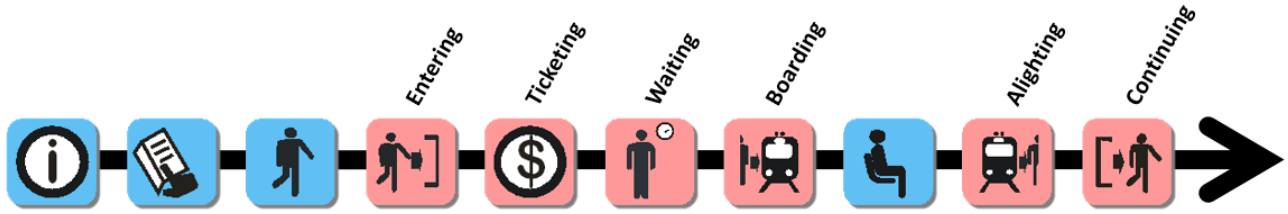
It is assumed for the purposes of this project that the station would have only one public entrance, with a secondary means of escape in emergencies.

Figure 1: Masterplan drawing of the proposed Lionel Road Station showing three alternative entrances A1-A3

5.1 PASSENGER JOURNEY

All options are designed to afford a satisfactory passenger journey as the following figure 5-1 describes. All options are similar in where the waiting, boarding and alighting areas are located. The significant difference between the options is where the Entry, ticketing and continuing functions are located. These differences are summarised below and described in greater detail in the following sections.

Figure 5-1 - Passenger Journey



5.1.1 ENTRY

All three options have accounted for large stadium crowds. It is anticipated that a surge of crowds leaving the stadium will gradually reduce in size owing to the lengthy distance once spectators leave their seats, exit the stadium and walk along Lionel Road.

- Option A1 locates the station entrance within the development at 27 Great West Road at the same level and west end of platform 1. And when the property is redeveloped there is an opportunity to create a plaza to increase visibility of the station entrance.
- Option A2 locates the station entrance at the summit of Lionel road Bridge so that it can serve customers arriving from either the stadium or Great West Road directions, and allow passengers direct access to the west end of platform 1 and 2. A stepped plaza with active frontages can be created when the 27 Great West Road property is redeveloped.
- Option A3 locates the station entrance within the existing development at 27 Great West Road, midway along Platform 1. This requires a new urban realm to be provided in the existing car park area. Upon redevelopment of the property a new plaza with active frontages can be created.

5.1.2 TICKETING / WAITING

All options are similar in size and quantity of:

- Ticket gates and ticket machines
- Unpaid and concourse waiting area

5.1.3 BOARDING ALIGHTING

All options are similar in the way

- Station Name/Branding is provided
- Travel information/direction signage is provided
- Station finishes/fencing are provided
- Fire evacuation and egress at the remote ends of the platforms are provided
- Seating and canopies are provided.

The key differences are:

- Option A1 requires passengers to use a footbridge to board platform 2.
- Option A2 allows passengers to descend the footbridge to access Platform 1 and 2.
- Option A3 requires passengers to move along the platform and ascend the footbridge and then descend it to board platform 2. In this case, the platform 1 is widened to allow that movement.

The report will now develop the 3 main layout options for Lionel Road station.

5.2 ENTRANCE OPTION A1: NEW SIDE PLAZA

5.2.1 SUMMARY

Option A1 locates the entrance at platform level to afford direct access to the Platform 1 that serves eastbound trains. A footbridge with two passengers lift is proposed to provide step-free access to the westbound platform. The station will be partially hidden behind a new retaining wall to support Lionel Road Bridge and existing electrical buildings that partially block the entrance. When the 27 Great Western Road site is redeveloped there is an opportunity to create a new public realm to serve the station. However, there remains a risk that station entrance could remain hidden owing to delay of the future redevelopment or poor integration of the station entrance within the redevelopment.

5.2.2 LAYOUT

The layout derives from key dimensions and areas requirement analysed In Appendix A, Lionel Road Capacity Requirement Study. For the Masterplan and detailed station layout refer to Appendix D, Masterplan drawings.

Figure 5-2 – Option A1 with existing 27 Great West Road Development

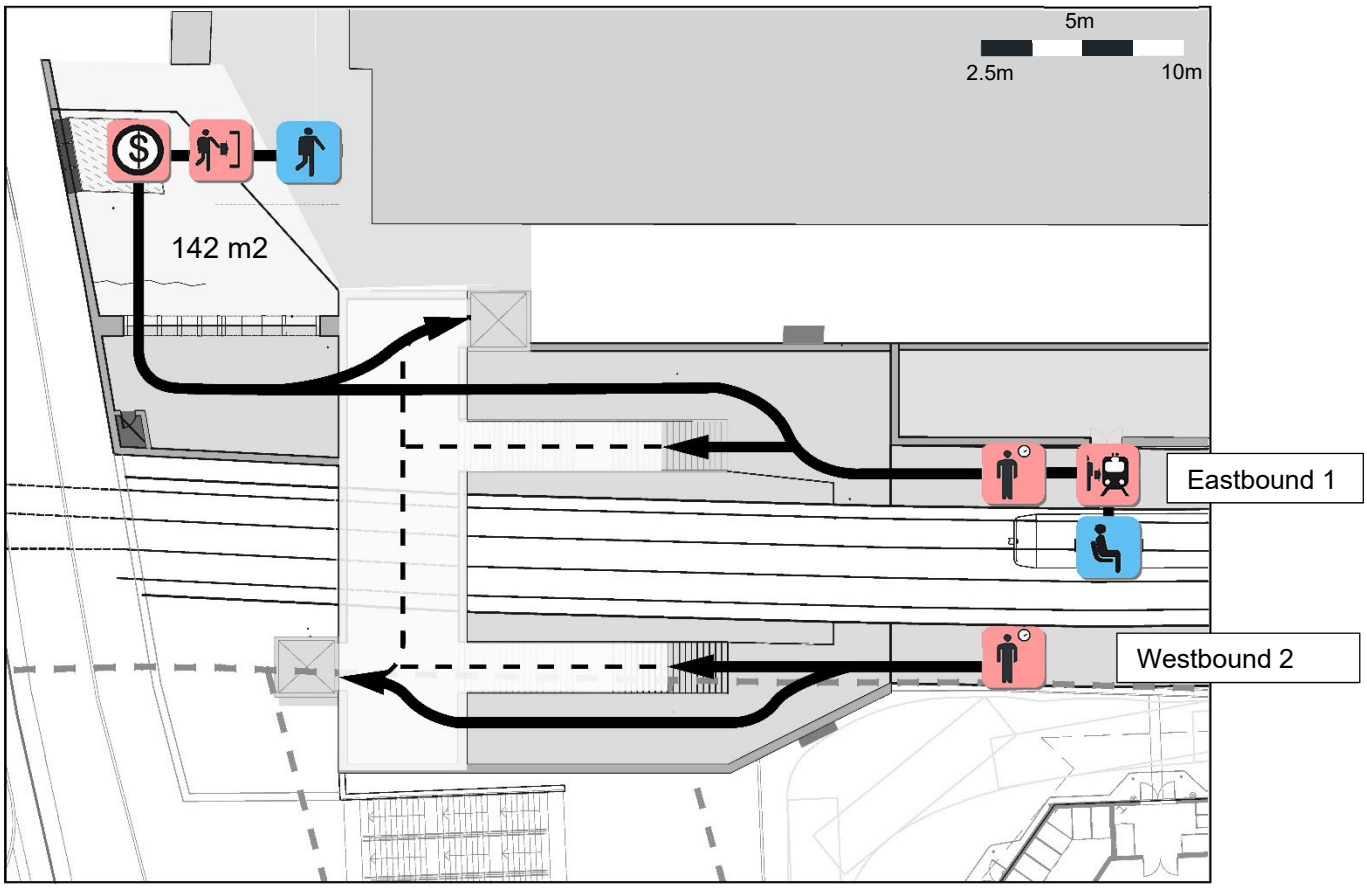
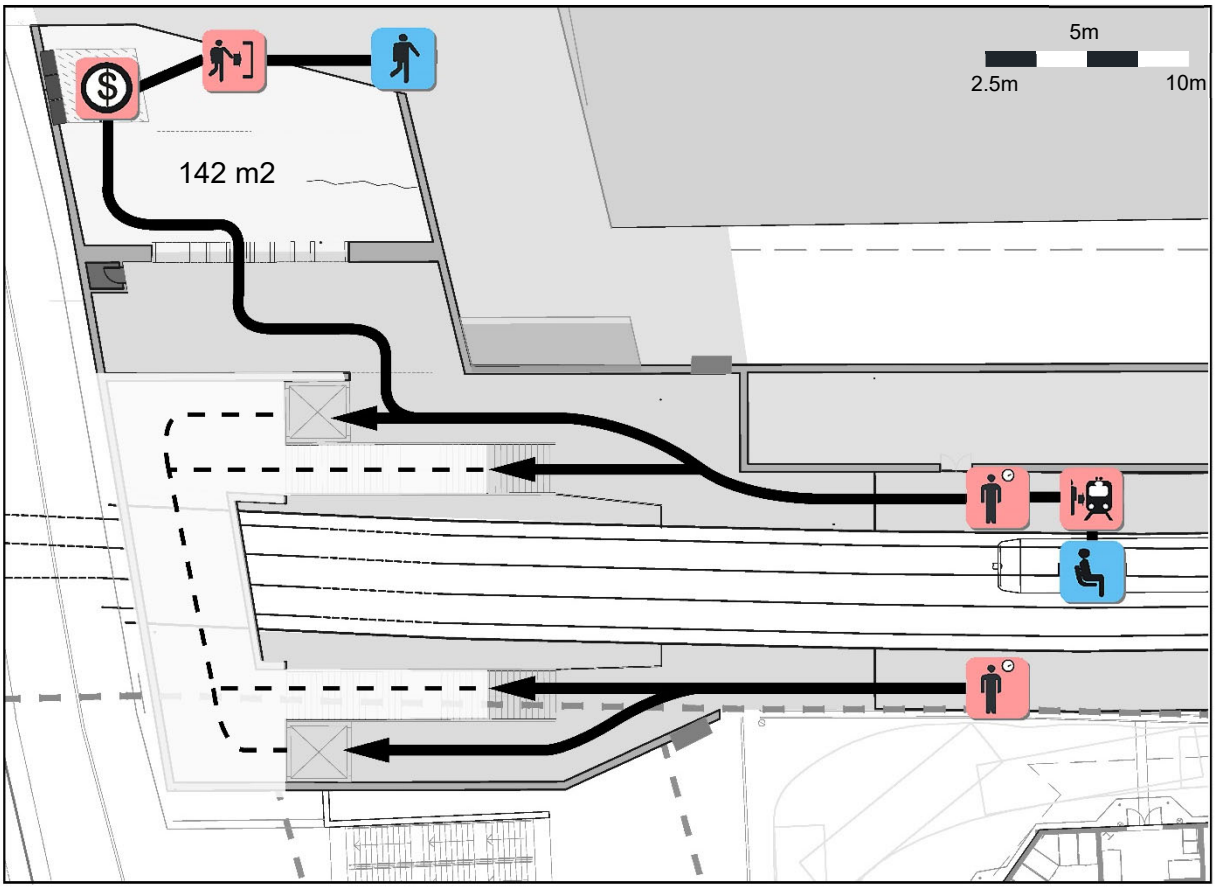


Figure 5-3 – Option A1 with redeveloped 27 Great West Road Development



5.2.3 ENTRY/CONTINUING

Figures 5-2 and 5-3 indicate passengers entering the station from the area located on the east side of the existing 27 Great West Road development. The existing green verge supports Lionel Road Bridge that will be replaced with a new retaining wall structure to achieve the minimum size requirements for the unpaid concourse area. Existing sub-stations that partially block the entrance will be retained. When the development at 27 Great West Road is redeveloped there is a possibility to create an accessible plaza with active frontages and retail and relocate the sub-stations.

Proposed Requirements include:

- The existing car park at 27 Great West Road Development will be dedicated for pick-up and drop-off and car parking and cycle parking for the station.
- The entrance is wheelchair accessible.
- A new pedestrian link connects Great West Road to the station through the 27 Great West Road property.
- H91 is a local bus route that serves Lionel Road and has a stop nearby.
- ‘Bostwick’ gates will be employed to close and control access to the station.
- Entrance ‘branding’, station identity and information will be provided

5.2.4 TICKETING/WAITING

Passengers who require tickets will use the ticket machines located in the unpaid area. All passengers will pass through the ticket gateline and proceed to the eastbound platform or to the footbridge to access the westbound platform. There is a satisfactory 6 metre run-off from the gateline to the end of the paid concourse. The run-off will afford passengers space and time to move from or to a stair, and time to change direction owing to rapid change of direction or sudden change in pace can lead to slips, trips and falls. Consequently, run-offs minimise congestion and improve safety and are necessary for all option. Refer to the Appendix A, chapter 3.9 that indicate run-off spatial requirements. There is a satisfactory space outside the lift for waiting passengers.

Owing to the site constraints the staircase serving the platform is located outside the platform area and train stopping point. A minimum 6m run-off from the bottom of the stairs to the platform is provided to reduce crowd risks of slips, trips and falls in the area (For the list of run-off requirement please refer to the Appendix A, chapter 3.9). A 1.2m high balustrade separates the landing area from the platform edge. This proposal is intended to meet the requirements of GI/RT7016 clause 6.2.1 to provide satisfactory space for people to move safely along the platform with trains passing at speed, and satisfactory space for people to board and alight trains in peak times.

The staircase serving the platform is located outside the train stopping point. A width of 1.1 m is provided between and the edge of the platform where it is anticipated a train derailment wall is constructed to limit any damage to the bridge and supporting structure. GC/RT5212 sets out requirements for defining and maintaining clearances to trains. Driver Only Operation equipment (DOO) can be in that zone

Proposed Requirements include:

- Arrival and departure information
- Signage
- Information
- ATM machine
- Accessible ticket machines
- Seats in the unpaid area
- Gateline that can be increased in quantity to accommodate the forecast demand
- No Public toilets are currently anticipated.

5.2.5 BOARDING AND ALIGHTING

Passengers enter the platform 1 from the west end of the platform

Proposed Requirements include:

- Platform lengths accommodate a 5-car length Class 378 train (104m).
- Platform lengths can be increased in future to accommodate an 8-car length Class 378 train
- New Station Name/Branding
- Onward travel information/direction signage
- Two new platforms with finishes and fencing
- New fire evacuation and egress signs. The final fire evacuation from the remote ends of the platform exit into the neighbouring properties.
- Seats on the platform are proposed to afford a minimum of 2.5m platform space from the platform edge (GI/RT7016 clause 6.5.2 b).

- A continuous canopy located on each platform is provided to afford waiting passengers shelter and encourage them to move along the platform.

5.2.6 STAFF AREAS

A staff place of safety is located at concourse level to afford clear visibility of the gateline and entrance. Additional staff and plant areas are located on the north side of the eastbound platform.

Propose Requirements include

- Maintenance access is provided for all station assets including platform, station building, lifts etc. It is envisaged access will be required across neighbouring properties and it is assumed agreements will be required.
- Staff welfare facilities are provided at platform level.
- A staff place of safety is provided by the ticket gateline
- Back of House equipment room is provided (i.e. CER room) within the station.
- Cleaners' facilities
- Waste facilities for the station are located at the end of platform 2 and integrated within the Stadium's Waste facility.
- A safe rendezvous point for use during evacuation is provided for the station within the car parking area of 27 Great West Road.

5.2.7 DEVIATIONS FROM NR STANDARDS

At this pre-Grip Study there is a lack of information and reliable detail particularly regarding survey and geometric information that affects almost all disciplines. Nevertheless, from the information provided by the London Borough of Hounslow, at this feasibility stage it appears likely that the station design will comply with all relevant NR Standards.

5.2.8 ASSUMPTIONS

- Land acquisitions and boundaries can be successfully negotiated for both construction, operation and maintenance of the proposed station.
- Land and access will have minor/negligible impact on the operability or commercial viability of the stadium and neighbouring sites.
- It is assumed bicycle bays located on the stadium site will be relocated
- Track curvature and alignment can be satisfactory altered to meet the requirements of GI/RT7016 Part 2.
- Platform height can be satisfactory provided to meet the requirements of GI/RT7016 Part 3.

5.2.9 DISCUSSION

Options A1 locates the station concourses and entrance at the end of platform 1, and at platform level. Benefits include, i) faster access for passengers travelling between concourse and platforms, ii) a direct and accessible entrance for the eastbound platform, iii) the opportunity to create a new plaza with active frontage on the 27 Great West Road Development, iv) more space for stadium users to queue outside the station if needed. Disadvantages include, i) an indirect access for spectators to/from Brentford Stadium compared to Option A2, ii) a convoluted journey to Platform 2 that requires three turns of direction that risks delaying, confusing and irritating passengers, iii) the entrance is hidden behind existing electrical sub-station buildings, iv) new retaining structures are required to support Lionel Road Bridge to create sufficient space for a concourse, iv) more

permanent land take than Option A2 owing to the concourse and wider platform 1 are located within the 27 Great West Road property.

5.3 ENTRANCE OPTION A2: ENTRY VIA LIONEL ROAD

5.3.1 SUMMARY

Option A2 locates the entrance above the platforms to afford direct access to both platforms. A step free entrance level is located at the summit of Lionel Road Bridge. When the property on Great West Road is redeveloped a stepped plaza could be constructed that aligns with Hounslow's vision.

5.3.2 LAYOUT

The layout derives from key dimensions and areas requirement analysed In Appendix A, Lionel Road Capacity Requirement Study. For the Masterplan and detailed station layout refer to Appendix D, Masterplan drawings.

Figure 5-4 – Option A2 with exisiting 27 Great West Road Development

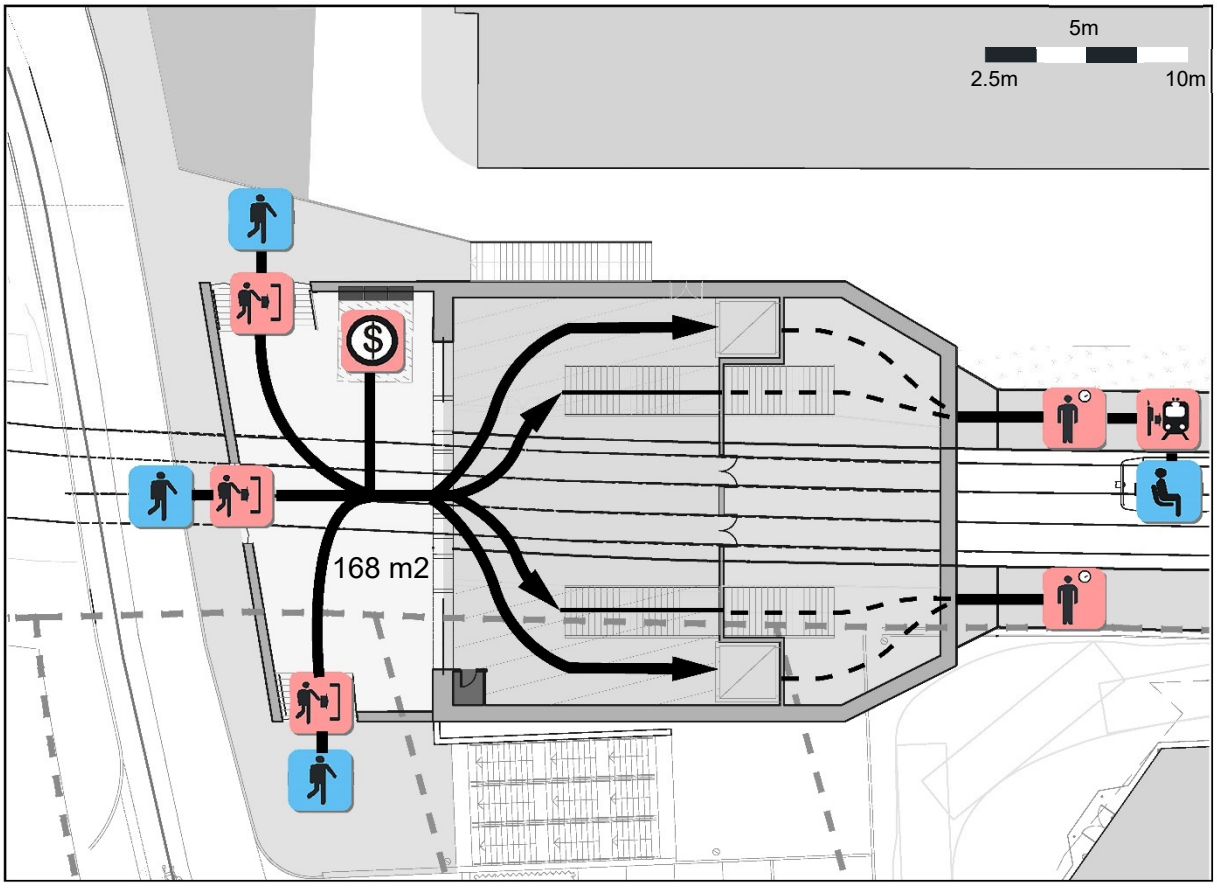
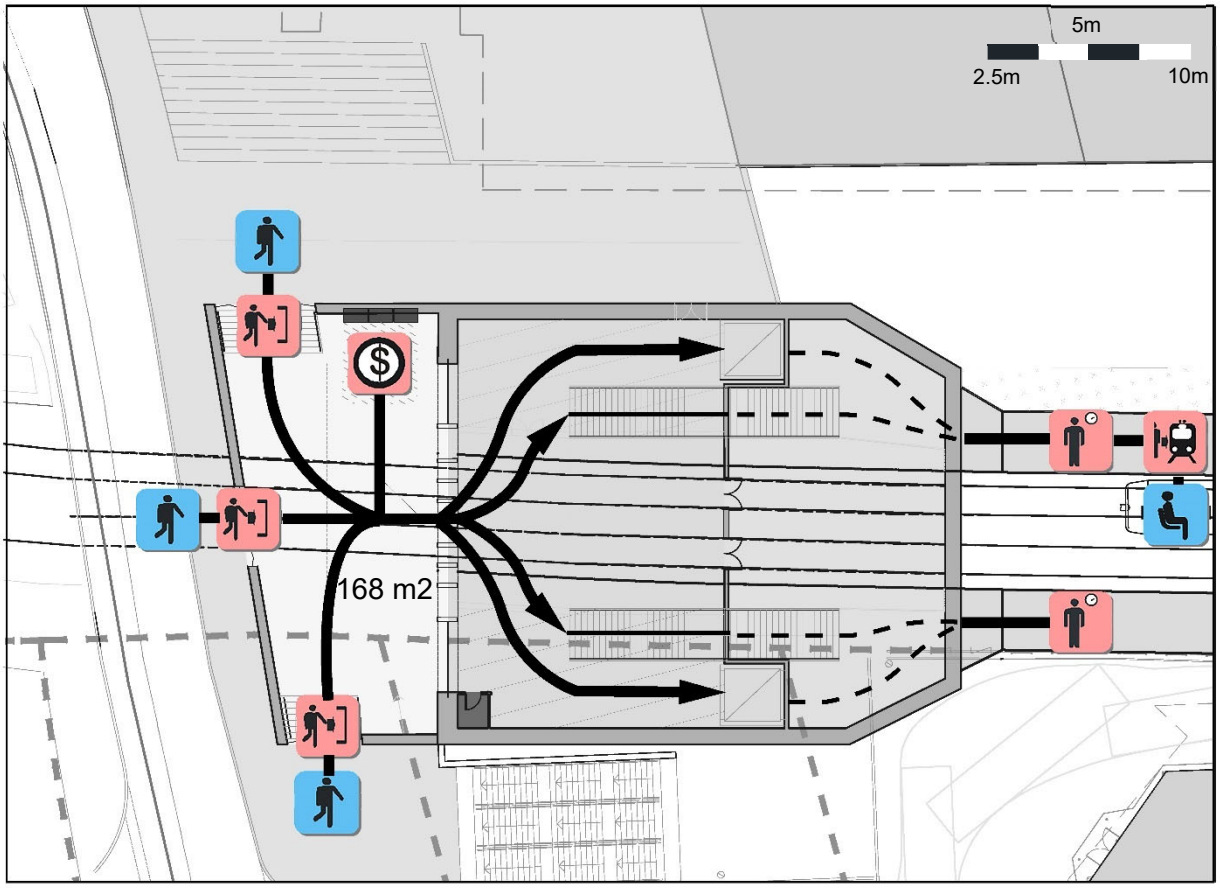


Figure 5-5 – Option A2 with proposed 27 Great West Road Development



5.3.3 ENTRY/CONTINUING

Figure 5-4 and 5-5 indicate passengers entering the station from Lionel Road using either steps or the existing pavement to reach the unpaid concourse of the station. When the development at 25 Great West Road is redeveloped there is a possibility to create a stepped entrance plaza integrated with ramps and seating, active frontages and retail. Refer to image below.

Proposed Requirements include:

- Brentford FC Stadium's dedicated pick up and drop off bays that are located approximately 25m south of the entrance on Lionel Road are also used for the station.
- Brentford FC Stadium's car parking spaces that are located approximately 15m from the station entrance are also used for the station.
- Brentford FC Stadium's cycle parking spaces are also used for the station.
- The existing footpath to Lionel Rad is wheelchair accessible. It is proposed the bridge abutments are modified so that the public footpath can provide a step-free access to the station entrance.
- H91 is a local bus route that serves Lionel Road and has a stop nearby.
- Bostwick' gates will be employed to close and control access to the station.
- Entrance 'branding', station identity and information will be provided

Figure 5-6 – Option A2 with proposed 25 Great West Road Development (image from Gt West Corridor Report)

5.3.4 TICKETING/WAITING

Figure 5-4 and 5-5 indicate passengers who require tickets will use the ticket machines located in the unpaid area. All passengers will pass through the ticket gateline and proceed to the stair or lift. There is a satisfactory 6 metres run-off from the gateline to the top of the stairs, this will help to minimise passengers congestion at this key decision point in all the scenarios (For the list of run-off requirement please refer to the Appendix A, chapter 3.9).There is a satisfactory space outside the lift for waiting passengers.

Owing to the site constraints the staircase serving the platform is located outside the platform area and train stopping point. A minimum 6m run-off from the bottom of the stairs to the platform is provided to reduce crowd risks of slips, trips and falls in the area (For the list of run-off requirement please refer to the Appendix A, chapter 3.9). A 1.2m high balustrade separates the landing area from the platform edge. This proposal is intended to meet the requirements of GI/RT7016 clause 6.2.1 to provide satisfactory space for people to move safely along the platform with trains passing at speed, and satisfactory space for people to board and alight trains in peak times.

The staircase serving the platform is located outside the train stopping point. A width of 1.1 m is provided between and the edge of the platform where it is anticipated a train derailment wall is constructed to limit any damage to the bridge and supporting structure. GC/RT5212 sets out requirements for defining and maintaining clearances to trains. Driver Only Operation equipment (DOO) can be in that zone

Proposed Requirements include:

- Arrival and departure information
- Signage
- Information
- ATM machine
- Accessible ticket machines
- Seats in the unpaid area
- Gateline that can be increased in quantity to accommodate the forecast demand
- No Public toilets are currently anticipated.

5.3.5 BOARDING AND ALIGHTING

Figure 5-4 and 5-5 indicate passengers entering the platform 1 from the west end of the platform

Proposed Requirements include:

- Platform lengths accommodate a 5-car length Class 378 train (104m).
- Platform lengths can be increased in future to accommodate an 8-car length Class 378 train
- New Station Name/Branding
- Onward travel information/direction signage
- Two new platforms with finishes and fencing
- New fire evacuation and egress signs. The final fire evacuation from the remote ends of the platform exit into the neighbouring properties.
- Seats on the platform are proposed to afford a minimum of 2.5m platform space from the platform edge (GI/RT7016 clause 6.5.2 b).
- A continuous canopy is located on each platform to afford waiting passengers shelter and encourage them to move along the platform.

5.3.6 STAFF AREAS

A station supervisors office is located at concourse level to afford clear visibility of the gateline and entrance and easy access to the platforms. Additional staff and plant areas can be located at platform level under the concourse.

Proposed Requirements include

- Maintenance access is provided for all station assets including platform, station building, lifts etc. It is envisaged access will be required across neighbouring properties and it is assumed agreements will be required.
- Staff welfare facilities are provided at the concourse level and at a platform level.
- A staff place of safety is provided by the ticket gateline.
- Back of House equipment room is provided (i.e. CER room) within the station.
- Cleaners' facilities
- Waste facilities for the station are located at the end of platform 2 and integrated within the Stadium's Waste facility
- A safe rendezvous point for use during evacuation is provided for the station within the car parking area of 27 Great West Road.

5.3.7 DEVIATIONS FROM NR STANDARDS

At this pre-Grip Study there is a lack of information and reliable detail particularly regrding survey and geometric information that affects almost all disciplines. Nevertheless, from the information

provided by the London Borough of Hounslow, at this feasibility stage it appears likely that the station design will comply with all relevant NR Standards.

5.3.8 ASSUMPTIONS

- Land acquisitions and boundaries can be successfully negotiated for both construction, operation and maintenance of the proposed station.
- Land and access will have minor/negligible impact on the operability or commercial viability of the stadium and neighbouring sites.
- It is assumed bicycle bays located on the stadium site will be relocated during construction and integrated in a similar location once the station is completed.
- The bridge abutments to Lionel Road can be physically modified to allow access.
- Track curvature and alignment can be satisfactory altered to meet the requirements of GI/RT7016 Part 2.
- Platform height can be satisfactory provided to meet the requirements of GI/RT7016 Part 3.

5.3.9 DISCUSSION

Option A2 locates the station concourses and entrances above the end of platforms at the level of Lionel Road bridge. Benefits include, I) a short and direct access for passengers for spectators leaving or arriving from Brentford Stadium, ii) ease of access to both platforms, iii) the opportunity to enliven an uninviting and generally poorly supervised space along Lionel Road (South), iv) end loaded platform provides faster access for passengers travelling between concourse and platforms, v) greater flexibility and resilience to control multiple station entrances and independent platform entrances than Options 1 and 3, vi) opportunity to create a stepped and ramped plaza to align with Hounslow's vision of the redeveloped 27 Great West Road property, vii) Furthermore, owing to the location of the concourse above the tracks and within the existing Network Rail property land acquisitions is less onerous than Option A1 and A2. Disadvantages include, i) lack of space for stadium spectators to queue outside the station if needed, ii) building above the tracks increases construction programme and cost.

5.4 ENTRANCE OPTION A3: NEW CENTRAL PLAZA

5.4.1 SUMMARY

Option A3 locates the entrance at platform level at the centre of 27 Great Western Road Development. The entrance location provides direct access to the eastbound platform. A footbridge with two passengers lifts is proposed to connect to the westbound platform. Existing buildings located on the 27 Great Western Road site could be retained, and therefore the station entrance will be partially hidden. When the site is redeveloped there is an opportunity to create a new public realm to serve the station. However, there remains a risk that station entrance could remain hidden owing to delay of the future redevelopment or that the station entrance is poorly integrated within the redevelopment.

5.4.2 LAYOUT

The layout derives from key dimensions and areas requirement analysed In Appendix A, Lionel Road Capacity Requirement Study. For the Masterplan and detailed station layout refer to Appendix D, Masterplan drawings.

Figure 5-7 – Option A3 with exisiting 27 Great West Road Development

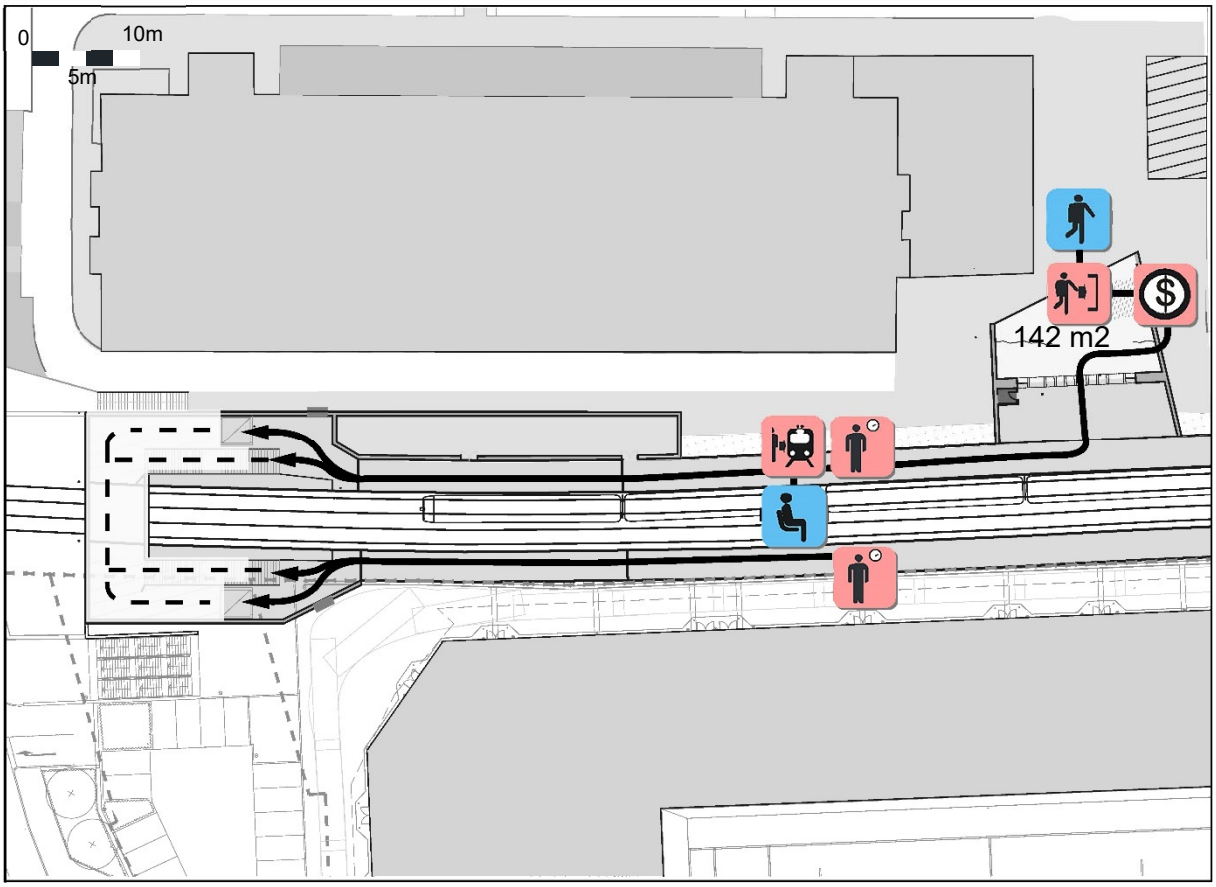
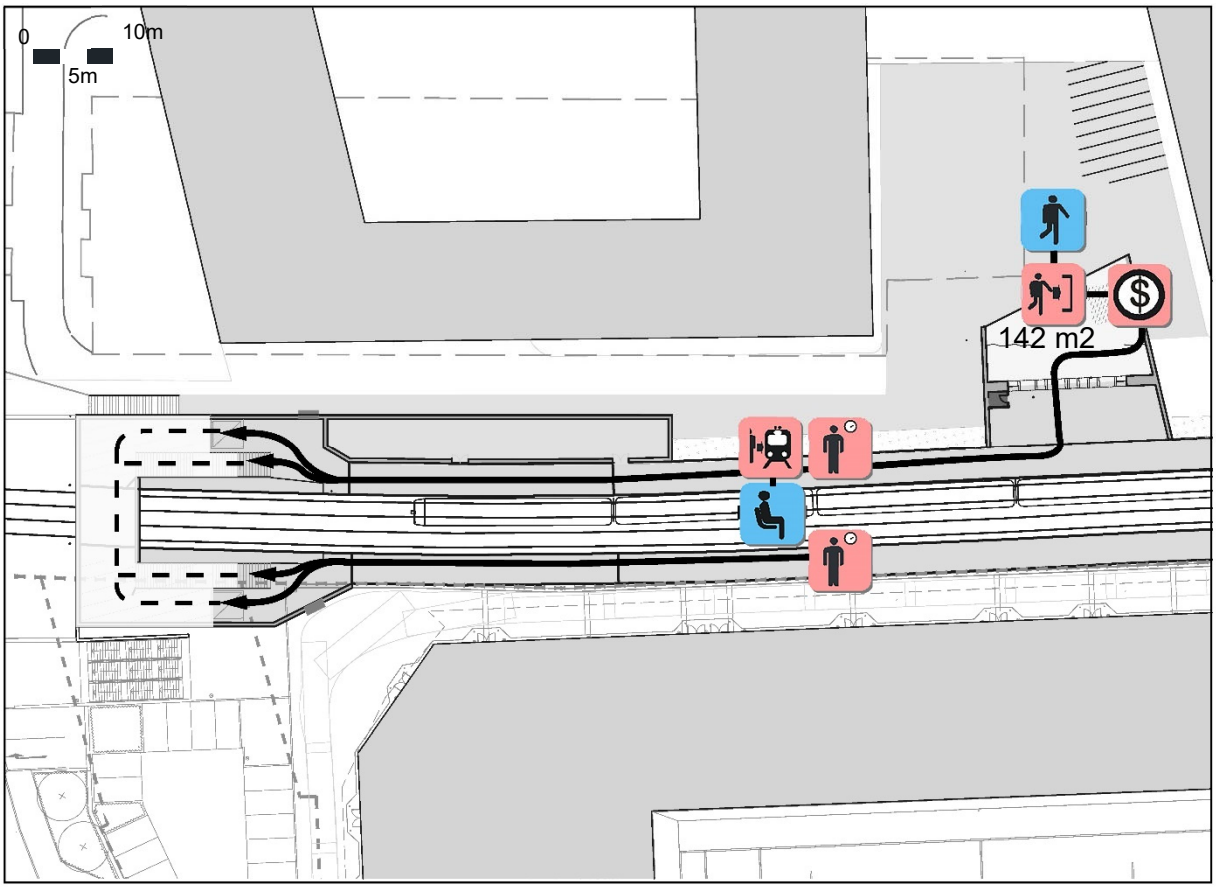


Figure 5-8 – Option A3 with proposed 27 Great West Road Development



5.4.3 ENTRY/CONTINUING

Figures 5-7 and 5-8 indicate passengers entering the station from the area located in the centre of the existing 27 Great West Road development. It will be necessary to modify the existing car parking needs to allow the construction and operation of the station. When the development at 27 Great West Road is redeveloped there is a possibility to create an entrance plaza with active frontages and retail.

Proposed Requirements include:

- The existing car park at 27 Great West Road Development will be dedicated for pick-up and drop-off and car parking and cycle parking for the station.
- The entrance is wheelchair accessible.
- H91 is a local bus route that serves Lionel Road and has a stop nearby.
- Bostwick' gates will be employed to close and control access to the station.
- Entrance 'branding', station identity and information will be provided

5.4.4 TICKETING/WAITING

Figures 5-7 and 5-8 indicate passengers who require tickets will use the ticket machines located in the unpaid area. All passengers will pass through the ticket gateline and proceed along platform 1 to the footbridge to access platform 2 and westbound trains. There is a satisfactory 6 metre run-off from the gateline to the platform, this will help to minimise passengers congestion at this key decision point in all the scenarios (For the list of run-off requirement please refer to the Appendix A, chapter 3.9).There is a satisfactory space outside the lift for waiting passengers.

Owing to the site constraints the staircase serving the platform is located outside the platform area and train stopping point. A minimum 6m run-off from the bottom of the stairs to the platform is provided to reduce crowd risks of slips, trips and falls in the area (For the list of run-off requirement please refer to the Appendix A, chapter 3.9). A 1.2m high balustrade separates the landing area from the platform edge. This proposal is intended to meet the requirements of GI/RT7016 clause 6.2.1 to provide satisfactory space for people to move safely along the platform with trains passing at speed, and satisfactory space for people to board and alight trains in peak times.

The staircase serving the platform is located outside the train stopping point. A width of 1.1 m is provided between and the edge of the platform where it is anticipated a train derailment wall is constructed to limit any damage to the bridge and supporting structure. GC/RT5212 sets out requirements for defining and maintaining clearances to trains. Driver Only Operation equipment (DOO) can be in that zone

Proposed Requirements include:

- Arrival and departure information
- Signage
- Information
- ATM machine
- Accessible ticket machines
- Seats in the unpaid area
- Gateline that can be increased in quantity to accommodate the forecast demand
- No Public toilets are currently anticipated.

5.4.5 BOARDING AND ALIGHTING

Figures 5-7 and 5-8 indicates that passengers entering at the centre of Platform 1, that serves eastbound trains, will move along a wider platform to the footbridge to access Platform 2.

Proposed Requirements include:

- Platform lengths accommodate a 5-car length Class 378 train (104m).
- Platform lengths can be increased in future to accommodate an 8-car length Class 378 train
- New Station Name/Branding
- Onward travel information/direction signage
- Two new platforms with finishes and fencing
- New fire evacuation and egress signs. The final fire evacuation from the remote ends of the platform exit into the neighbouring properties.
- Seats on the platform are proposed to afford a minimum of 2.5m platform space from the platform edge (GI/RT7016 clause 6.5.2 b).
- A continuous canopy located on each platform will afford waiting passengers shelter and encourage them to move along the platform.

5.4.6 STAFF AREAS

A staff place of safety is located at concourse level to afford clear visibility of the gateline and entrance. Additional staff and plant areas are located on the north side of the platform 1.

Proposed Requirements include

- Maintenance access is provided for all station assets including platform, station building, lifts etc. It is envisaged access will be required across neighbouring properties and it is assumed agreements will be required.
- Staff welfare facilities are provided at platform level.
- A staff place of safety is provided by the ticket gateline.
- Back of House equipment room is provided (i.e. CER room) within the station.
- Cleaners' facilities
- Waste facilities for the station are located at the end of platform 2 and integrated within the Stadium's Waste facility.
- A safe rendezvous point for use during evacuation is provided for the station within the car parking area of 27 Great West Road.

5.4.7 DEVIATIONS FROM NR STANDARDS

At this pre-Grip Study there is a lack of information and reliable detail particularly regarding survey and geometric information that affects almost all disciplines. Nevertheless, from the information provided by the London Borough of Hounslow, at this feasibility stage it appears likely that the station design will comply with all relevant NR Standards.

5.4.8 ASSUMPTIONS

- Land acquisitions and boundaries can be successfully negotiated for both construction, operation and maintenance of the proposed station.
- Land and access will have minor/negligible impact on the operability or commercial viability of the stadium and neighbouring sites.
- It is assumed bicycle bays located on the stadium site will be relocated
- Track curvature and alignment can be satisfactory altered to meet the requirements of GI/RT7016 Part 2.
- Platform height can be satisfactory provided to meet the requirements of GI/RT7016 Part 3.

5.4.9 DISCUSSION

Option A3 locates the station concourse and entrance at the middle of Platform 1 (eastbound). Benefits include, i) an accessible and direct entrance to the eastbound platform, ii) the opportunity to create a new plaza with active frontage on the redeveloped 27 Great West Road property, iii) more space for stadium users to queue outside the station if needed. Disadvantages include, i) longer boarding and alighting times for both platform users when compared with the end loaded options, ii) the walk distance between stadium and the station is also the longest between all options, iii) passengers boarding and alighting at Platform 2 are required to walk along Platform 1, therefore additional circulation space is required for Platform 1 in order to accommodate the Platform 1 passengers as well as the circulation movements to/from Platform 2, iv) the average journey times for Platform 2 users will be the longest of all options, v) land take for permanent property rights are

much higher than Option A2 owing to the concourse is located within the 27 Great West Road Development, and platform 1 is wider than Option A1.

5.5 CONCLUSION

For a spatial requirements viewpoint, refer to Appendix A, for a constructability viewpoint, refer to Appendix B, and for cost refer to Appendix C, and for the drawings refer to Appendix D.

Option A1 is the simplest of the options to construct and has a programme duration of 12 months. Option A1 is the second least costly, at £12,316,462. Option A2 has more construction elements than Option A1, and consequently has the longest construction programme of 14 months. Consequently, Option A2 is the costliest at £12,500,000. Option A3 has the shortest construction programme of 11 months. Consequently, Option A3 is the least costly at £12,244,769.

This early feasibility stage has shown that there are relatively minor cost and construction differences between the options. And that all options comply with Network Rail's guidance for station sizing for capacity. In conclusion, all options can be considered feasible. It is recommended that all three options are considered and developed following the requirements for a Network Rail GRIP 2 study. That remit should include all relevant project engineers responsible for disciplines including track, signalling, power and civil works; and stakeholders and landowners responsible for granting consents.

5.5.1 NEXT STEPS

A full Network Rail Grip 2 feasibility study is required

Discussion and coordination with stakeholders and landowners.

Appendix A

LIONEL ROAD STATION CAPACITY REQUIREMENT STUDY

London Borough of Hounslow

LIONEL ROAD STATION CAPACITY REQUIREMENTS STUDY

MARCH 2020

CONFIDENTIAL

London Borough of Hounslow

LIONEL ROAD STATION CAPACITY REQUIREMENTS STUDY

TYPE OF DOCUMENT (VERSION) CONFIDENTIAL

PROJECT NO. 70068052

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London Borough of Hounslow

LIONEL ROAD STATION CAPACITY REQUIREMENTS STUDY

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
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FIGURES

APPENDICES

1

INTRODUCTION

1 INTRODUCTION

1.1.1 WSP has been appointed by London Borough of Hounslow to undertake a feasibility study relating to an initial proposal for a new station at Lionel Road South on the Kew Curve in the Great West Corridor area of Brentford, Hounslow.

1.1.2 The proposed Lionel Road Station will be located at the north of the Brentford Stadium. The new station has two through platforms and a single station entrance serving rail passengers and spectators. Station capacity assessment has been undertaken using static analysis to assess the capacity requirements of the three design options.

1.1.3 A set of assessment results were developed based on the annual forecast of 738,000 passengers plus an additional 30% uplift. The static analysis results include the capacity requirements of the gateline, run-on/off distances, all circulation and waiting areas within the station during normal operation, perturbation and special events. The sizing requirements and Levels of Service were identified according to Network Rail Station Capacity Planning Guidance.

2 OVERVIEW OF ASSESSMENT

2.1.1 This chapter of the report details the methodology, key assumptions and design options undertaken in the study.

2.2 DETAILED METHODOLOGY

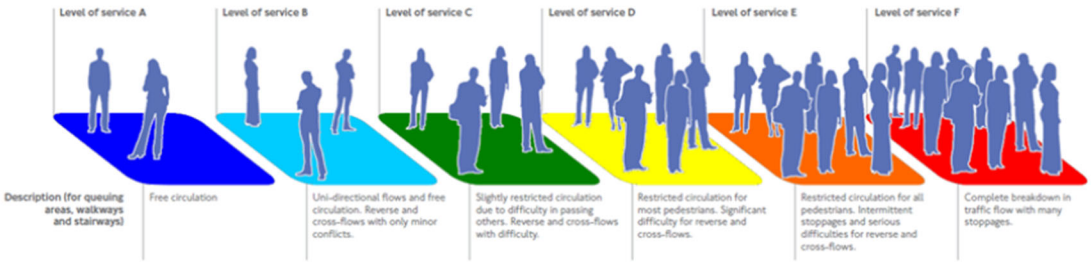
2.2.1 In order to assess the passenger flow experience within different parts of the proposed station, static analysis methods were employed to quantify the density of passengers within these areas. This analysis enables the impact of changes to the physical layout of the station to be quantified among the different layout options.

2.2.2 Station capacity has been assessed in accordance with Network Rail's Station Capacity Planning Guidance (NR's SCPG), November 2016. The capacity requirements outline in NR SCPG have been adopted to assess three design options under three operation scenarios.

2.2.3 Fruin's LoS (measured as the available area per pedestrian) serves as an international standard measure of crowd density and has been used to identify the LoS at the proposed railway station. The NR SCPG planning criteria for various operating situations and the LoS categories range on a scale from A to F, as illustrated and described in **Figure 2-1**.

Figure 2-1 - Illustration of Fruin's Level of Service (LoS) and Planning Criteria from NR SCPG

Figure 1.1 Fruin levels of service and the planning criteria for stations



Planning criteria for various operating conditions

Station Area	Normal Ops		Perturbation		Evacuation		Construction		Special Events	
	LoS	Quantitative measure	LoS	Quantitative measure	LoS	Quantitative measure	LoS	Quantitative measure	LoS	Quantitative measure
Passageways – one-way	D	50ppmm	D/E	65ppmm	E/F	80ppmm	D/E	65ppmm	D/E	65ppmm
Passageways – two-way	C	40ppmm	D	50ppmm			D	50ppmm	D	50ppmm
Stairways – one-way	D	35ppmm	E	43ppmm	F	56ppmm	E	43ppmm	E	43ppmm
Stairways – two-way	C	28ppmm	D	35ppmm			D	35ppmm	D	35ppmm
Concourse dwell areas	B	1.0m² per pax	D	0.45m² per pax			C	0.8m² per pax	C	0.8m² per pax
Platforms	B/C	0.93m² per pax	E	0.28m² per pax			D	0.45m² per pax	D	0.45m² per pax
Ticket gates		25ppm/gate		25ppm/gate		50ppm/gate		25ppm/gate		25ppm/gate
Escalators		100ppm		110ppm		120ppm		110ppm		110ppm

Nb: The unit of measurement for passenger flow-rate is ppmm (passengers per minute per metre width) and is applicable to passageways and staircases. The unit of measurement for passenger flow that is used for escalators and ticket gates is ppm (passenger per minute per unit).

In case of ramps with a gradient less than 1 in 20, the passageway planning criteria should be applied. For gradients steeper than 1 in 20, a 10% reduction in flow capacity should be assumed.

2.3 KEY ASSUMPTIONS

2.3.1 The design development at present is conceptual in nature and accordingly there are a number of key assumptions required to inform the design work. These assumptions are outlined below:

- In 2014, WSP carried out a study to investigate the viability of the construction of a new station on the Kew Curve at Lionel Road South. The study concluded that the proposed station would be used by 738,000 passengers per annum. For this assessment an additional scenario of +30% was also assessed, bringing the total of 959,400 annual users.
- The initial estimated station users (pre and post-match) was 1,130. Detailed figures are provided in **Appendix A.**
- Assumes an even 15-minute interval between train services.
- No ticket office will be provided.
- The station would be operated by London Overground.

2.4 DESIGN OPTIONS

2.4.1 Three alternative locations for a station entrance were assessed, see **Figure 2-2** below:

Figure 2-2 - Masterplan drawing of the porposed Lionel Road Station shows three alternative entrances A1, A2 and A3

2.4.2 In **Figure 2-2**, the approximate station outline proposed is shaded blue, whilst the pink areas relate to a possible concourse/entrance which could be constructed as part of a new station plaza. The three entrance options considered in this study are therefore:

- A1 – Fronting proposed new station plaza.
- A2 – Directly onto Lionel Rd (as 2016 WSP outline proposal)
- A3 – Central access to platforms, at approximately the mid-point of the development site.

The study assesses the capacity requirements of a single station entrance. The secondary access will be provided for emergency situations only and can be assessed if required.

3 LIONEL ROAD STATION CAPACITY ASSESSMENT

3.1.1 This chapter of the report details the proposed station capacity and requirements under various scenarios, as well as the pedestrian flow analysis carried out to assess the capacity requirements and LoS to be experienced by passengers.

3.2 ASSESSMENT SCENARIOS

3.2.1 The capacity requirements of three design options outlined in Section 2.4 have been assessed under three operational scenarios as below:

- **Normal operations**: assessment carried out to the spatial aspects of station planning for public areas during normal operations conditions.
- **Perturbation**: assessment carried out to the spatial aspects of station planning for public areas during simultaneous arrival of trains on each platform.
- **Special Event (match day)**: assessment carried out to the spatial aspects of station planning for public areas during a departure peak of a special event at Brentford Community Stadium.

3.3 DEMAND ASSUMPTIONS

3.3.1 The station forecast annual demand of 959,400 was contained within the 2014 WSP study as outlined in the key assumptions in Chapter 2. It was based on an annual forecast rail passenger of 738,000 +30% uplift.

3.3.2 The daily station demand has been calculated based on an annualisation factor of 285. The peak arrivals of 55% of the daily arrivals during the AM 3-hour peak period has been used for this study, which was a typical autumn weekday arrival factors for a London rail station summarised in Department for Transport Statistical Release report 2018. An additional 50% of peak arrivals was assumed for departures. The Station Planning Standards and Guidelines 3 hour to 1 hour factor has been applied to produce a set of peak hour demand.

3.3.3 The train frequency information has been provided based on 4 arrivals and 4 departures per hour for eastbound and 4 arrivals and 4 departures per hour for westbound platforms.

3.3.4 For the purpose of the analysis, peak times were derived based on train headways of both platforms within the station. The peak hour arrival and departure flows have been evenly distributed to 8 arrivals and 8 departures between the two platforms.

3.3.5 The total number of arrivals and departures between AM and PM are identical between the 2 peak periods, however, it is assumed that the departure peak is in the AM and arrival peak is in the PM.

3.3.6 The perturbation demand was developed based on simultaneous arrivals at both platforms. Hence, doubling the peak alighting flows in a short space of time within the station.

3.3.7 The special event scenario consists of a total of 1,130 movements entering the station from Brentford Stadium according to the match day rail demand assumptions. The capacity requirements have been assessed based on the peak 15 minute egress movements from Brentford Stadium to Lionel Road Station during the PM peak period.

3.3.9 The forecast peak hour demand totals are summarised in the table below:

Table 3-1 – Derived Peak Demand Summary

Scenario	Peak Hour Demand					
	AM Peak Hour			PM Peak Hour		
	Entry to the Station	Exit from the Station	Total	Entry to the Station	Exit from the Station	Total
Normal Operations	417	208	625	208	417	625
Perturbation	833	417	1250	417	833	1250
Special Events	-	-	-	1130	0	1130

3.3.10 As can be observed from the table above, it was assumed that the peak hour exit totals for each period would be equal to half of its peak hour entry totals. Also, the PM Peak hour exit totals would be equal to the AM Peak hour entry totals.

3.3.11 The peak hour demand for a special event scenario was based on match day rail demand assumptions of 1130 passengers over an hour and it is also assumed that there are no exit movements from the Lionel Road Station during the special event peak periods.

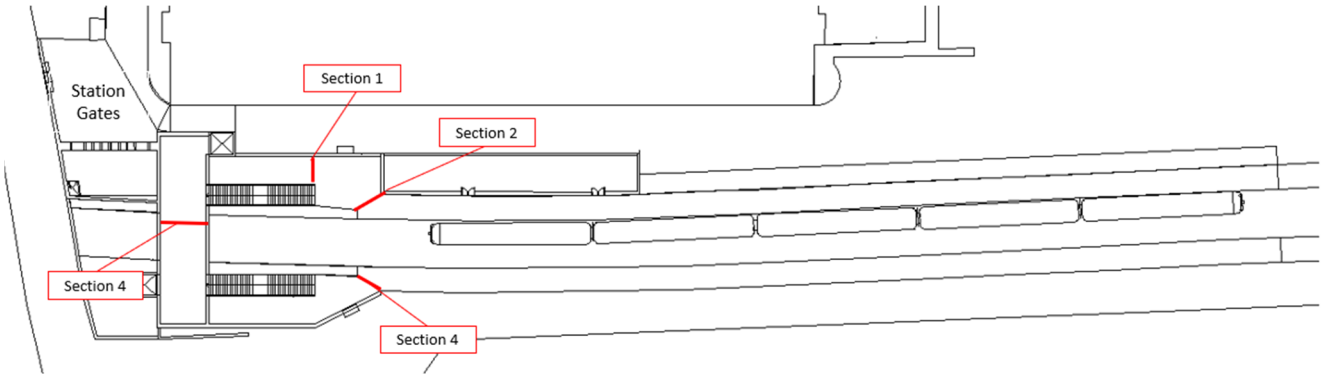
3.4 PASSAGEWAYS

3.4.1 The likely circulation movements within the station have been identified and the capacity of each passageway has been assessed according to the criteria set out within the NR's SCPG, and the results are shown below for all design options and scenarios. Further comments are explained in the conclusion section.

Passageways Option A1

3.4.2 **Figure 3-1** shows the key passageways within the proposed A1 layout (referenced as sections which are numbered between 1 and 6).

Figure 3-1 - Lionel Road Station's Passageways (Option A1)



3.4.3

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	3.40	450	562	C	D	2.9
Section 2	3.40	225	281	A	B	2.2
Section 3	5.50	225	281	A	A	2.2
Section 4	3.40	225	281	A	B	2.2

Table 3-4 below summarise the LoS for each section assessed for option A1 under all scenarios.

3.4.5 Table 3-2 to

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	3.40	450	562	C	D	2.9
Section 2	3.40	225	281	A	B	2.2
Section 3	5.50	225	281	A	A	2.2
Section 4	3.40	225	281	A	B	2.2

Table 3-4 below summarise the LoS for each section assessed for option A1 under all scenarios.

Table 3-2 – Normal Operations Passageways LoS Summary (Option A1)

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	3.40	337	337	C	C	2.3
Section 2	3.40	169	169	A	A	2.2
Section 3	5.50	169	169	A	A	2.2
Section 4	3.40	169	169	A	A	2.2

Table 3-3 – Perturbed Scenario Passageways LoS Summary (Option A1)

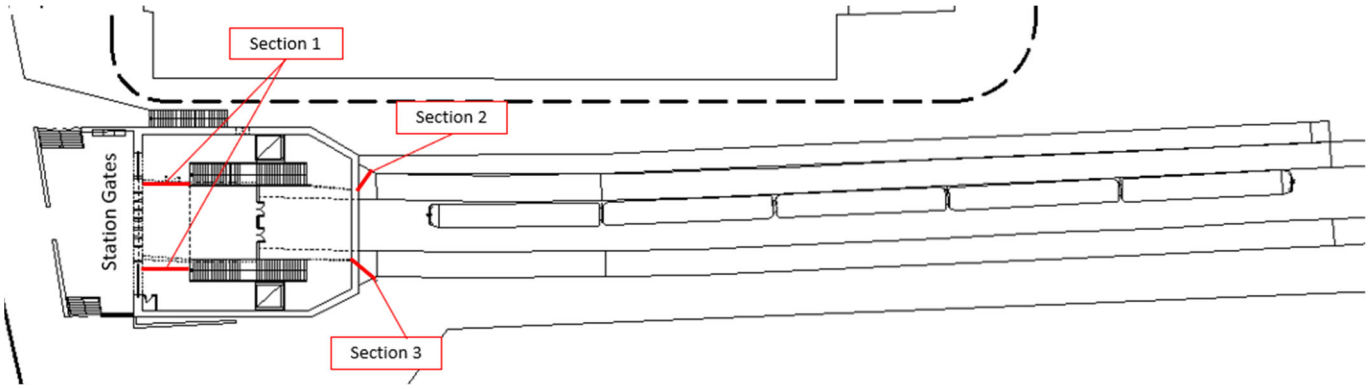
Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	3.40	450	562	C	D	2.9
Section 2	3.40	225	281	A	B	2.2
Section 3	5.50	225	281	A	A	2.2
Section 4	3.40	225	281	A	B	2.2

Table 3-4 – Special Events Scenario Passageways LoS Summary (Option A1) Passageways Option A2

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	3.40	-	898	-	D/E	3.4
Section 2	3.40	-	449	-	C	2.2
Section 3	5.50	-	449	-	A	2.2
Section 4	5.00	-	449	-	B	2.2

3.4.7 **Figure 3-2** shows the key passageways within the proposed A2 layout (referenced as sections which are numbered between 1 and 4).

Figure 3-2 - Lionel Road Station's Passageways (Option A2)



3.4.8

3.4.9 **Table** 3-5 to

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	5.50	337	337	A	A	2.2
Section 2	3.40	337	337	B	B	2.2
Section 3	3.40	337	337	B	B	2.2

3.4.11 Table 3-7 below summarises the LoS for each section assessed for option A2 under all scenarios.

Table 3-5 – Normal Operations Passageways LoS Summary (Option A2)

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	5.50	169	169	A	A	2.2
Section 2	3.40	169	169	A	A	2.2
Section 3	3.40	169	169	A	A	2.2

Table 3-6 – Perturbed Scenario Passageways LoS Summary (Option A2)

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	5.50	337	337	A	A	2.2
Section 2	3.40	337	337	B	B	2.2
Section 3	3.40	337	337	B	B	2.2

Table 3-7 – Special Events Scenario Passageways LoS Summary (Option A2) Passageways Option A3

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	5.50	-	449	-	A	2.2
Section 2	3.40	-	449	-	B	2.2
Section 3	3.40	-	449	-	B	2.2

3.4.12

3.4.13 **Figure** 3-3 shows the key passageways within the proposed A3 layout (referenced as sections which are numbered between 1 and 7).

Figure 3-3 - Lionel Road Station's Passageways (Option A3)

Table 3-8 to

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	3.40	225	281	A	A	2.2
Section 2	5.55	225	337	A	A	2.2
Section 3	3.40	225	281	B	B	2.2

Table 3-10 below summarises the LoS for each section assessed for option A3 under all scenarios.

Table 3-8 – Normal Operations Passageways LoS Summary (Option A3)

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	3.40	169	169	A	A	2.2
Section 2	5.55	169	169	A	A	2.2
Section 3	3.40	169	169	A	A	2.2

Table 3-9 – Perturbated Scenario Passageways LoS Summary (Option A3)

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	3.40	225	281	A	A	2.2
Section 2	5.55	225	337	A	A	2.2
Section 3	3.40	225	281	B	B	2.2

Table 3-10 – Special Events Scenario Passageways LoS Summary (Option A3)

Station Area	Provided Passageway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Section 1	3.40	-	449	-	C	2.2
Section 2	5.55	-	449	-	A	2.2
Section 3	3.40	-	449	-	B	2.2

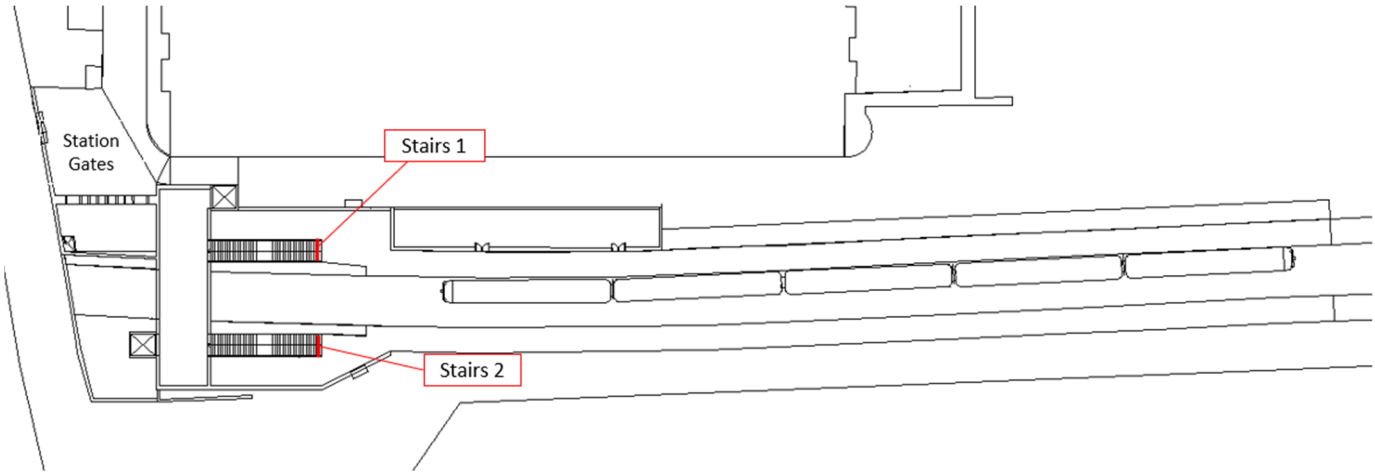
3.5 STAIRWAYS

3.5.1 The capacity of each stairway has been assessed using the criteria set out within NR's SCPG, and the results are shown for all design options and scenarios.

Stairways Option A1

3.5.2 **Figure 3-4** shows the key stairways within the proposed A1 layout (referenced as Stairs 1 and 2).

Figure 3-4 - Lionel Road Station's Stairways (Option A1)



3.5.3 **Table 3-11** to

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Stairs 1	2.40	225	281	B	C	1.7
Stairs 2	2.40	225	281	B	C	1.7

3.5.5 Table 3-13 below summarise the LoS for each section assessed for option A1 under all scenarios.

Table 3-11 – Normal Operations Stairways LoS Summary (Option A1)

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	

Stairs 1	2.40	169	169	A	A	1.6
Stairs 2	2.40	169	169	A	A	1.6

Table 3-12 – Perturbated Stairways LoS Summary (Option A1)

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Stairs 1	2.40	225	281	B	C	1.7
Stairs 2	2.40	225	281	B	C	1.7

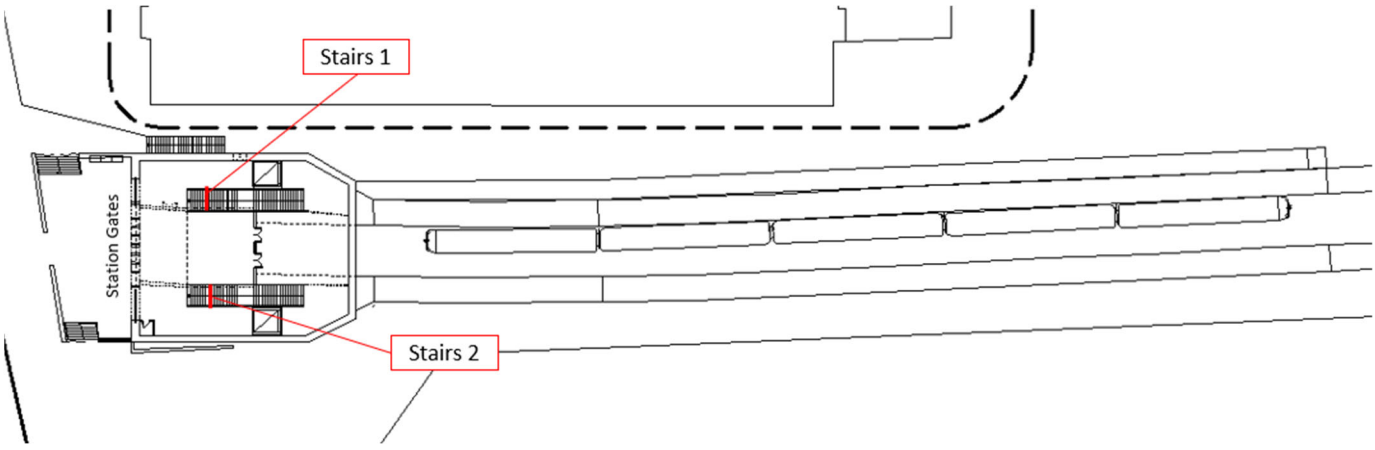
Table 3-13 – Special Events Stairways LoS Summary (Option A1)

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Stairs 1	2.40	-	449	-	D	2.1
Stairs 2	2.40	-	449	-	D	2.1

Stairways Option A2

3.5.6 **Figure 3-5** shows the key stairways within the proposed A2 layout (referenced as Stairs 1 and 2).

Figure 3-5 - Lionel Road Station's Stairways (Option A2)



3.5.7 **Table 3-14** to

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Stairs 1	2.40	225	281	B	C	1.7
Stairs 2	2.40	225	281	B	C	1.7

3.5.9 Table 3-16 below summarise the LoS for each section assessed for option A2 under all scenarios.

Table 3-14 – Normal Operations Stairways LoS Summary (Option A2)

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Stairs 1	2.40	169	169	A	A	1.6
Stairs 2	2.40	169	169	A	A	1.6

Table 3-15 – Perturbated Stairways LoS Summary (Option A2)

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Stairs 1	2.40	225	281	B	C	1.7
Stairs 2	2.40	225	281	B	C	1.7

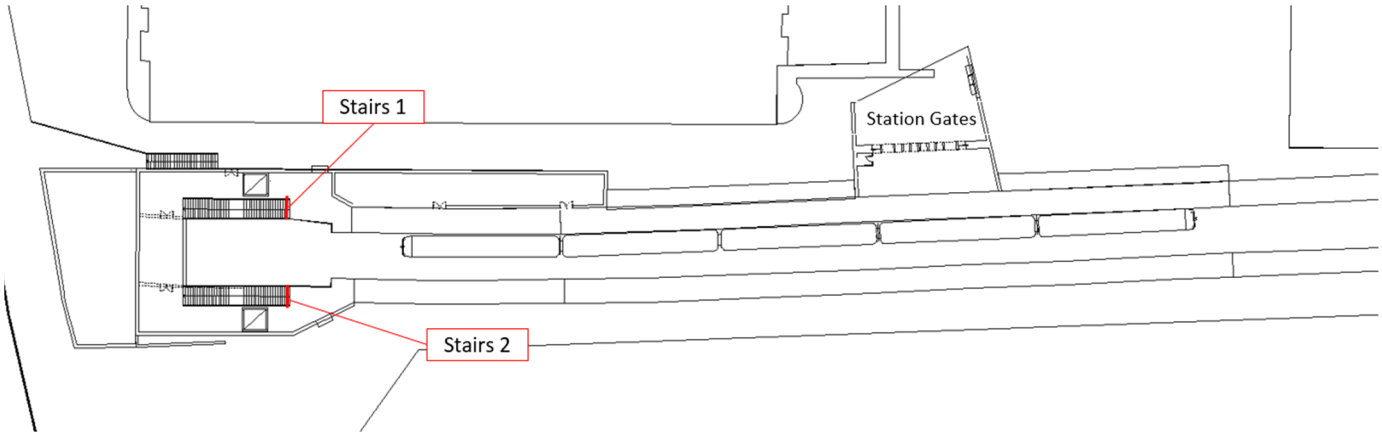
Table 3-16 – Special Events Stairways LoS Summary (Option A2)

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Stairs 1	2.40	-	449	-	D	2.1
Stairs 2	2.40	-	449	-	D	2.1

Stairways Option A3

3.5.10 Figure 3-6 shows the key stairways within the proposed A3 layout (referenced as Stairs 1 to 3).

Figure 3-6 - Lionel Road Station's Stairways (Option A3)



3.5.11

3.5.12 **Table** 3-17 to

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Stairs 1	2.40	225	281	B	C	1.7
Stairs 2	2.40	225	281	B	C	1.7

3.5.14 Table 3-19 below summarise the LoS for each section assessed for option A3 under all scenarios.

Table 3-17 – Normal Operations Stairways LoS Summary (Option A3)

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Stairs 1	2.40	169	169	A	A	1.6
Stairs 2	2.40	169	169	A	A	1.6

Table 3-18 – Perturbated Stairways LoS Summary (Option A3)

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Stairs 1	2.40	225	281	B	C	1.7
Stairs 2	2.40	225	281	B	C	1.7

Table 3-19 – Special Events Stairways LoS Summary (Option A3)

Station Area	Provided Stairway width (m)	Peak 5 min demand (number of passengers going through each section)		Level of Service		Required Width (m)
		AM	PM	AM	PM	
Stairs 1	2.40	-	449	-	D	2.1
Stairs 2	2.40	-	449	-	D	2.1

3.6 PLATFORMS

3.6.1 Two single face platforms of 110 metres long and 3 metres wide are proposed at Lionel Road station. Platform 1 (Eastbound) and Platform 2 (Westbound).

3.6.2 The platforms are long enough to accommodate a 5-car length Class 378 train (104m) and provide a 5 metre allowance to cater for variances in train stopping as specified in the NR's SCPG. There is also space to add a further 65 metres in length to the east side of each platform in order to provide a second station exit in case of emergency.

3.6.3 It is assumed passengers have sufficient time to distribute evenly between 15-minute train headways during the peak periods. The busiest carriages for all options are shown below:

- Options 1 and 2: the busiest carriage of 25%

- Option 3: the busiest carriage of 20%

3.6.4 **Figure 3-7** to **Figure 3-9** below outline the total demand per carriage. It was assumed that both platforms would have the same demand distribution with 15-minute interval between train services. Further comments are explained in conclusion section.

Figure 3-7 - Percentage of Total Demand per Carriage (Option A1)

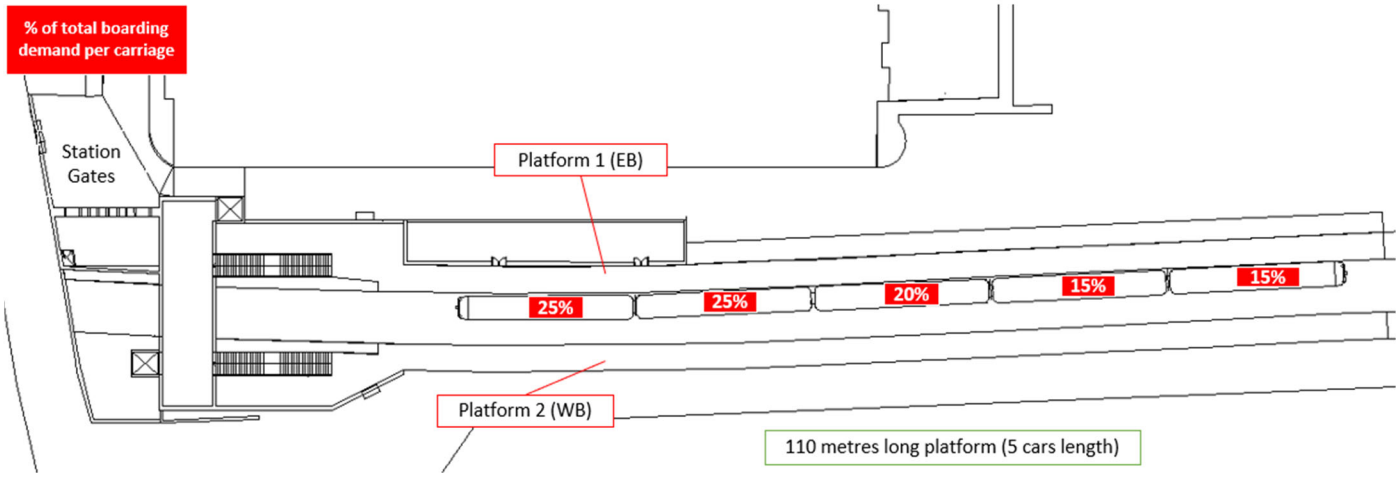


Figure 3-8 - Percentage of Total Demand per Carriage (Option A2)

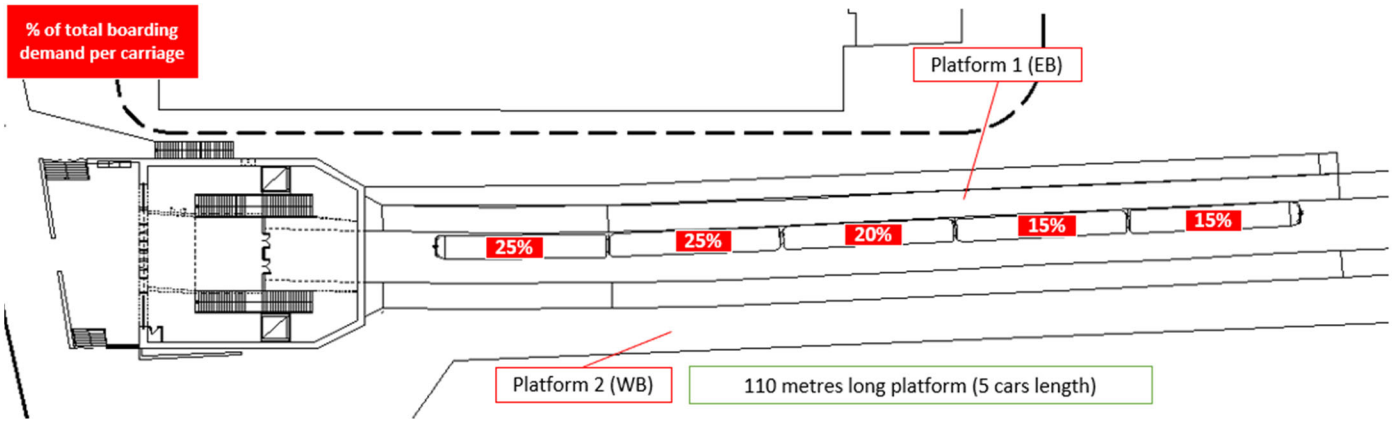


Figure 3-9 - Percentage of Total Demand per Carriage (Option A3)

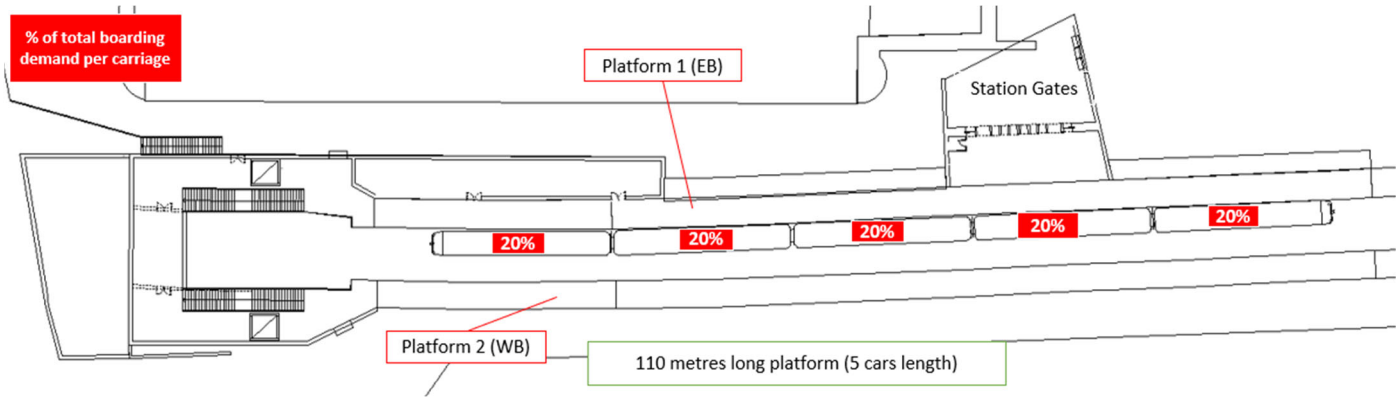


Table 3-20 – Platform Summary Results for All Design Options

Description	Option A1			Option A2			Option A3		
	Normal Operations	Perturbation	Special Events	Normal Operations	Perturbation	Special Events	Normal Operations	Perturbation	Special Events
Two-way peak hour demand	625	1,250	565	625	1,250	565	625	1,250	565
Demand per train	156	312	141	156	312	141	156	312	141
% of busiest train load	25%	25%	25%	25%	25%	25%	20%	20%	20%
Results									
Required single platform width (m)	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**3.2**	**3.0**
Design single platform width (m)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Enough capacity?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

3.7 GATELINES

3.7.1 Table 3-21 to Table 3-22 outline the total number of Automatic Ticket Gates (ATG) and Wide Aisle Gates (WAG) needed in order to accommodate the forecast passenger demand under all three scenarios assessed.

Table 3-21 - Gateline Requirements under Normal Operations

Time Period	Entry Flows	Exit Flow	ATG In	ATG Out	Additional ATG	Total ATG	WAG
AM Peak	112	56	2	3	1	6	2
PM Peak	56	112	1	3	1	5	2

Table 3-22 - Gateline Requirements under Special Events (Match Day)

Time Period	Entry Flows	Exit Flow	ATG In	ATG Out	Additional ATG	Total ATG	WAG
PM Peak	449	0	5	0	1	6	2

3.8 CONCOURSE

3.8.1 All proposed design concourse areas were assessed. As specified in the NR's SCPG, concourses shall be large enough for passengers to move through without experiencing excessive congestion or obstruction.

3.8.2 Lionel Road station has dedicated platforms for each direction, passengers are likely to wait on the platforms rather than the concourse. However, an allowance still needs to be made for those passengers who stop to view Costumer Information Systems (CIS) screens in the concourse area. The NR's SCPG specifies that in this case, the area shall be large enough to accommodate 10% of the 15-minute station entry and exit demand at a density of 1 sqm per person.

3.8.3 **Figure 3-10** and **Figure 3-12** outline the location and size of the unpaid concourse area for all proposed station design options.

Figure 3-10 - Unpaid Concourse Area (Option A1)

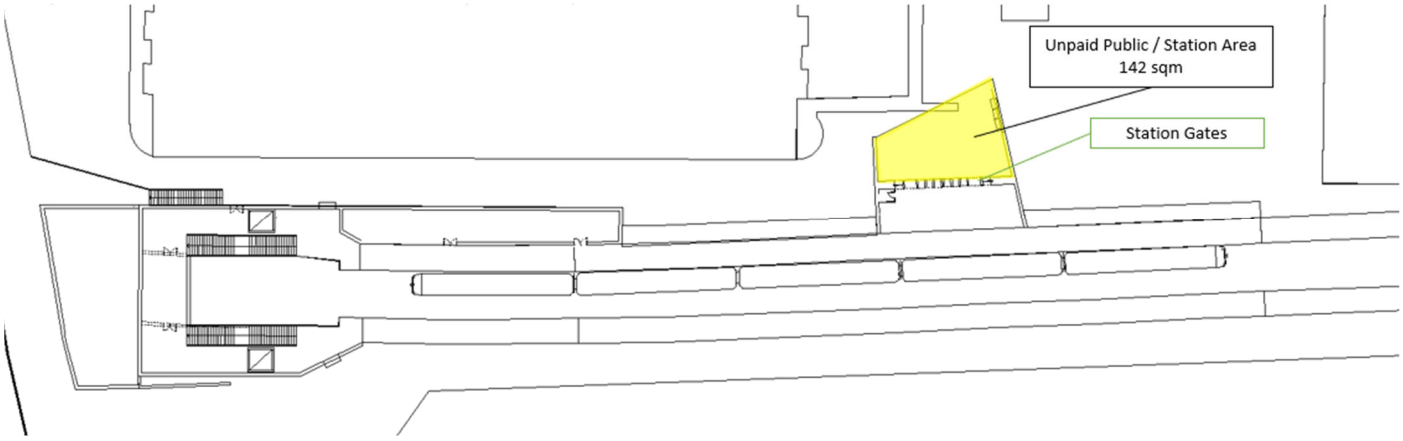


Figure 3-11 - Unpaid Concourse Area (Option A2)

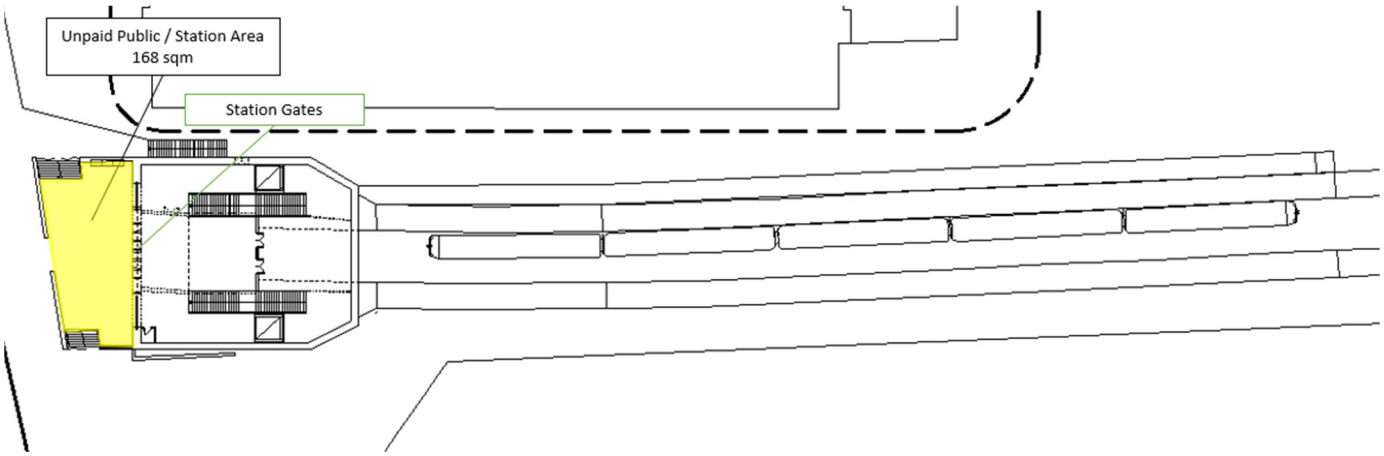
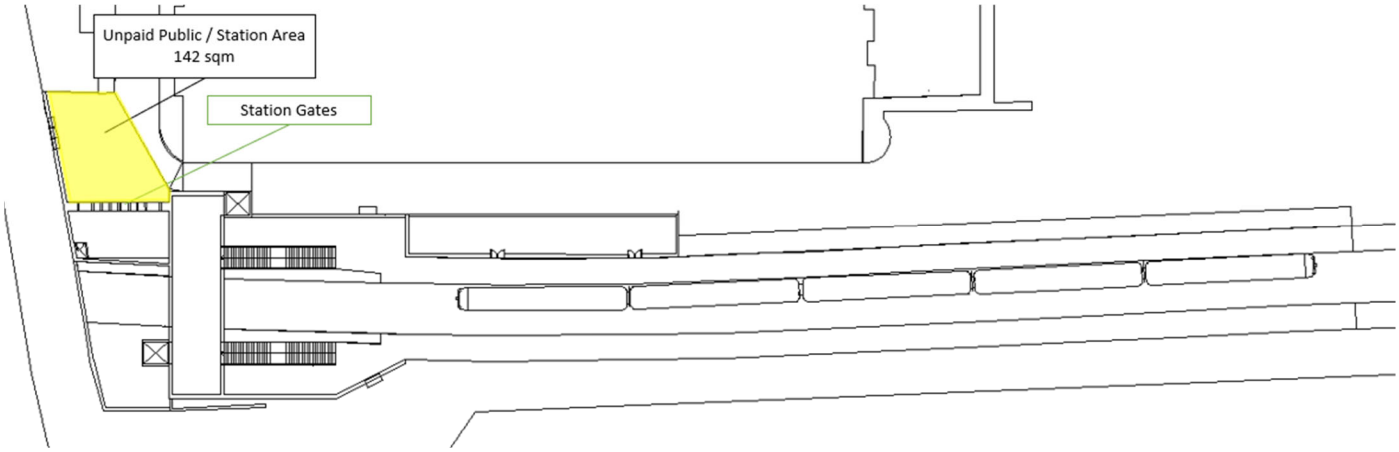


Figure 3-12 - Unpaid Concourse Area (Option A3)



3.8.4 **Table 3-23** below summarises the concourse assessment carried out for all design options.

Table 3-23 – Concourse Size Requirements Assessment for All Options

Scenario	Required Unpaid Concourse Space (sqm)	Option A1 Provided Concourse Space (142 sqm)	Option A2 Provided Concourse Space (168 sqm)	Option A3 Provided Concourse Space (142 sqm)
		Satisfies NR's SCPG requirements:		
Normal Operation	75	Yes	Yes	Yes
Perturbed Scenario	83	Yes	Yes	Yes
Special Events (Match day)	142	Yes	Yes	Yes

3.9 RUN-ONS / RUN OFFS

The run-on or run-off distances have been identified according NR SCPG standard to provide sufficient spaces between critical decision points. The proposed design options have been measured and the provided run-ons/offs for Options 1, 2 and 3 are all met NR SCPG requirements and are shown in Figure 3-13, Figure 3-14 and Figure 3-15. A set of run-on and run-off distances were extracted from NR SCPG and are shown below:

- Street to Gateline / Gateline to Street – **6m**
- Gateline to Passageway / Passageway to Gateline – **6m**
- Stairway to Gateline / Gateline to Stairway – **6m – 10m** (additional distances included for Option 2, Run offs 2 and 4)

Figure 3-13 - Option 1 – Provided Run-On/Off Distances

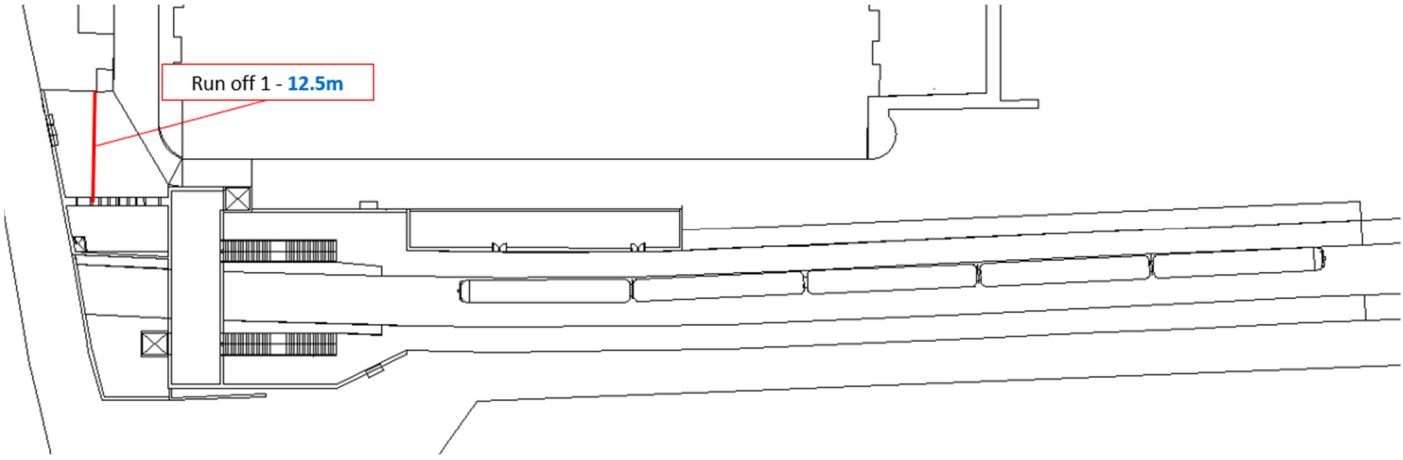


Figure 3-14 - Option 2 – Provided Run-On/Off Distances

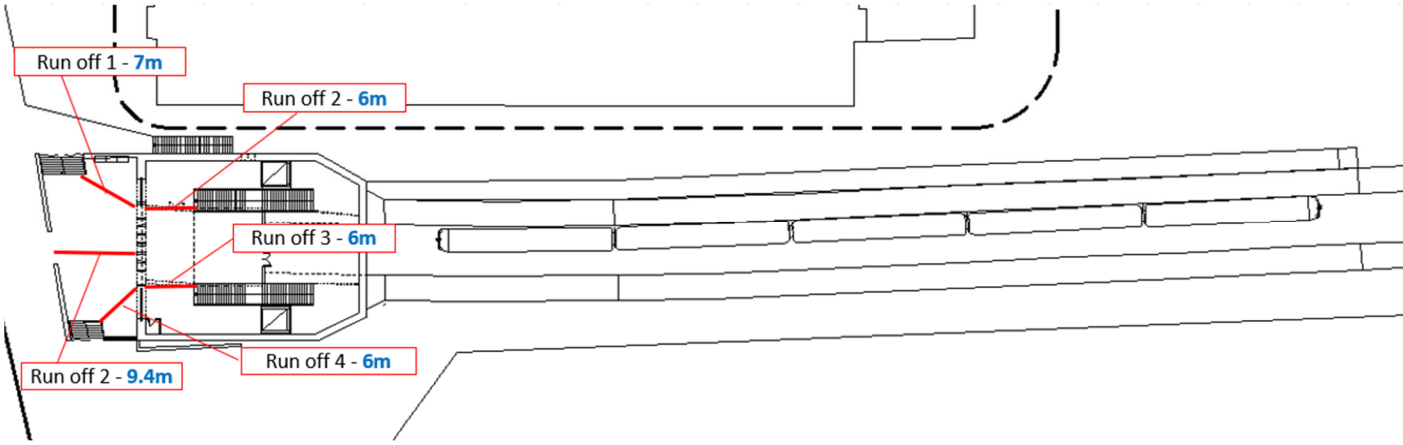
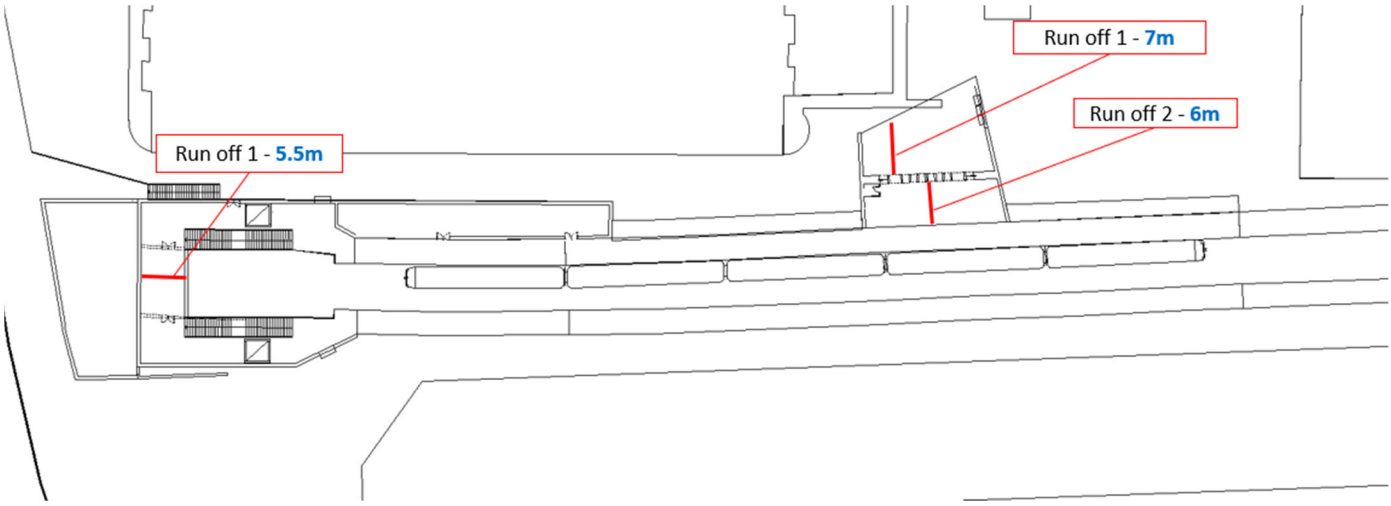


Figure 3-15 - Option 3 – Provided Run-On/Off Distances



4 CONCLUSIONS

The forecast annual demand of 959,400 rail passengers has been used for the capacity assessment of three design options during normal operation, perturbation and the departure peak of a special event scenarios.

The sizing requirements have been identified for passageways, stairways, platforms and concourse as well as run-off distances. All design options were assessed according to NR SCPG and the results identified in the report will be used to inform the design team from the feasibility study stage and beyond.

It is assumed passengers have sufficient times to spread more evenly along platforms due to 15-minute train headways. The busiest carriage for Options 1 and 2 end loaded platforms is 25% and Option 3 is 20% based on 5 carriage trains.

Options 1 and 2

The station concourses and entrances are located at the end of platforms for Options 1 and 2 which provide a more direct access for passengers in particularly for spectators to/from Brentford Stadium. End loaded platform provides faster access for passengers travelling between concourse and platforms.

Option 2 benefits from providing multiple station entrances and separated platform entrances via stairways to/from each platform when compared with Options 1 and 3. It has also provided the most direct access for Brentford Stadium.

Option 3

The station concourse and entrance are located at the middle of Platform 1. It may result in longer boarding and alighting times for both platform users when compared with the end loaded options. The walk distance between stadium and the station is also the longest between all options.

Passengers boarding and alighting at Platform 2 are required to walk along Platform 1, therefore additional circulation space is required for Platform 1 in order to accommodate the Platform 1 passengers as well as the circulation movements to/from Platform 2. The average journey times for Platform 2 users will be the longest between all options.

Option 3 benefits from being able to bring the stadium movements off Lionel Road South and provides more spaces for stadium users to queue outside the station if needed.

Appendix A

MATCH DAY RAIL DEMAND ASSUMPTIONS

Match Day Rail Demand Assumptions

To estimate match day demand, data has been taken from the 2013 Brentford Community Stadium Transport Assessment[1] as a starting point. A set of assumptions was then applied to estimate what proportion of those expected to travel to/from the stadium by rail would be likely to use Lionel Road based on its convenience compared to other arrival points. The rationale for each of these is described in the table below.

2013 Transport Assessment Data			
Station	**Total supporters**	**Estimated Lionel Road Displacement**	**Rationale**
Kew Bridge West	1443	722	Stations equally convenient so assume 50% of Kew Bridge West demand. i.e. passengers on Hounslow loop will get on first train. Assumes Kew Bridge and Lionel Rd services alternate.
Kew Bridge East	1323	0	Supporters will continue to use Kew Bridge.
Gunnersbury South	648	0	No displacement assumed
Gunnersbury North	1792*	379	75% of Gunnersbury LO North demand.
Ealing Broadway Two-way	470	0	No displacement
Acton Town Two-way	784**	29	Small (10%) displacement of away supporters due to unfamiliarity with area.
South Ealing Two-way	328	0	No displacement
TOTAL		**1130**	

*London Overground only affected – 505 passengers **Of which 292 away supporters

[1] WSP Revised Transport Assessment http://planning2.hounslow.gov.uk/NPSPublicDocs/00379603.pdf

WSP House
70 Chancery Lane
London
WC2A 1AF

wsp.com

Appendix B

HIGH LEVEL CONSTRUCTABILITY REVIEW

1 CONSTRUCTABILITY

1.1 GENERAL ASSUMPTIONS

The design options are currently being developed, and the following key construction and logistics assumptions have been made:

- Engineering Access possessions will be made available as required for the scheme.
- Strategic plant is available for the work where required.
- Site compounds, craneage locations and suitable road access will be available to deliver the works.
- Signal sighting solutions can be found during the construction process.
- Agreements on working practices, timings and locations can be reached with relevant authorities in order that the works can be undertaken as planned (e.g. Section 61).
- Offline construction as far as reasonably practicable. In other words, construction that does not impact railway operations.

1.1.1 HEALTH AND SAFETY

All works will comply with the Health and Safety provisions as defined within the Network Rail Rule Book and Group Standards.

Health and safety issues will be investigated in further detail at future design stages, but it is likely that the following key risks/hazards will be applicable to the works being planned:

- Personnel and machinery encountering live operational assets (trains/equipment).
- Personnel encountering machinery, road/rail and rail vehicles within congested worksites.
- Public and highway interface conflicts at site access locations.
- Personnel and machinery encountering live services (railway, highway or utility).

1.1.2 ENABLING WORKS

Several items of work will need to be carried out in advance of the main works for all options. They include scope such as design validation surveys, ground investigations, site clearance / de-vegetation, scrap clearance, site compound/hoardings/security/lighting set up, long lead item procurement, cable route moves/upgrades, possession applications, section 61 noise and working hours consents applications, traffic management applications, Construction Phase Plans, Work Package Plans, land take and so on. Some of this work may require short term possessions of operational Network Rail lines.

1.1.3 SITE ACCESS REQUIREMENTS

A construction compound will be required to house site welfare buildings, construction staff parking, material laydown areas and so on. For options A1 and A2, the compound will be adjacent to Lionel Road, for Option A3 the main compound will be by the new Northern Ticket Office, with a small compound adjacent to Lionel Road.

Unless access is available from the north, which it is in Option A3, the platforms will be constructed with plant and material delivery by rail during possessions, and a personnel access created from Lionel

Road bridge. Work will then be carried out behind hoardings or a safety fence during operational hours. Installation will work back toward the Lionel Road access.

The platform support (piles or expanded polystyrene) can be carried out in operational hours. The platforms will be designed for construction with prefabricated components on piles, to minimise work effecting the railway, lifted either within the platform footprint during operational hours., or with road rail plant during possessions.

All structures will be designed to maximise off site preassembly and minimise site works. The bridges and station building will be lifted in with cranes located to the north of the station or on Lionel Road. This will require possessions, and to be co-ordinated with the use of the new stadium, as Lionel Road is a key access route for this.

1.1.4 PUBLIC INTERFACES

Given the location of the proposed works, positive engagement with the local population is extremely important. Regular interfaces and communications will be required whilst working with the relevant local authorities to minimise the risk of disruption to the construction programme as a result of disputes.

1.2 OPTION A1 CONSIDERATIONS

Option A1 is the simplest of the options from a construction perspective.

Access is from Lionel Road, the track and from the property on 27 Great West Road. The platforms will be constructed with plant and material delivery by rail during possessions, and a personnel access created from Lionel Road bridge. Work will then be carried out behind hoardings or a safety fence during operational hours. Installation will work back toward the Lionel Road access.

The platform support (piles or expanded polystyrene) can be carried out in operational hours. The platforms will be designed for construction with prefabricated components on piles, to minimise work effecting the railway, lifted either within the platform footprint during operational hours., or with road rail plant during possessions.

All structures will be designed to maximise off site preassembly and minimise site works. The bridge will be lifted in with cranes located to the north of the station or on Lionel Road. This will require possessions, and to be co-ordinated with the use of the new stadium, as Lionel Road is a key access route for this.

1.3 OPTION A2 CONSIDERATIONS

Option A2 has more construction elements than Option A1.

Access is from Lionel Road, from the property on 27 Great West Road and the track. The platforms will be constructed with plant and material delivery by rail during possessions, and a personnel access created from Lionel Road bridge. Work will then be carried out behind hoardings or a safety fence during operational hours. Installation will work back toward the Lionel Road access.

The platform support (piles or expanded polystyrene) can be carried out in operational hours. The platforms will be designed for construction with prefabricated components on piles, to minimise work effecting the railway, lifted either within the platform footprint during operational hours., or with road rail plant during possessions.

Option A2 includes a new ticket hall over the railway. The method will be like Option A1, but there is a larger quantum of work, thus delivery of A2 will have a longer programme than option A1. Either several weeks of engineering hours, a series of weekends or a Christmas blockade could be used to deliver the station building ad bridge.

All structures will be designed to maximise off site preassembly and minimise site works. The bridges and station building will be lifted in with cranes located to the north of the station or on Lionel Road. This will require possessions, and to be co-ordinated with the use of the new stadium, as Lionel Road is a key access route for this.

1.4 OPTION A3 CONSIDERATIONS

Option A3 has more construction elements than Options 1 and 2, with the over track element being comparable to option A1

Access is from Lionel Road, from the property on 27 Great West Road, and the track.

The new northern station building will be constructed in the Great West Road development, in a high street environment, This area will be used to access the new northern construction area as well.

The platforms will be constructed with plant and material delivery by rail during possessions, and a personnel access created from Lionel Road bridge. Work will then be carried out behind hoardings or a safety fence during operational hours. Installation will work back toward the Lionel Road access.

The platform support (piles or expanded polystyrene) can be carried out in operational hours. The platforms will be designed for construction with prefabricated components on piles, to minimise work effecting the railway, lifted either within the platform footprint during operational hours., or with road rail plant during possessions.

All structures will be designed to maximise off site preassembly and minimise site works. The bridge will be lifted in with cranes located to the north of the station or on Lionel Road. This will require possessions, and to be co-ordinated with the use of the new stadium, as Lionel Road is a key access route for this.

1.5 ASSUMPTIONS

NR possessions will be available to meet the construction programme.

A ground investigation will be needed; however, an initial assessment could be made from the new Stadium GI.

The existing Lionel Road bridge can be adapted / extended to form part of the new station. An assessment of the existing bridge will be required

Temporary access, and land can be purchased for Option 3A, from the property on 27 Great West Way is agreed.

Suitable compound areas can be agreed in the property on 27 Great West Way, on the Lionel Road verge to be retained or in the new Brentford stadium car park.

Suitable craneage locations can be agreed for over track structure installation in the property on 27 Great West Way, on Lionel Road verge and in the new Brentford stadium car park.

The DNO cabinet on Lionel Road can be relocated or the entrance designed around this.

Signal location and sighting design is carried out as part of the detailed design

Access from Lionel Road can be agreed with the highway authority.

1.6 RISKS AND OPPORTUNITIES

Utilities and services in NR and highway authority land to be identified and diverted or moved to suit the works. There are visible railway services in the Up cess, split ducts in the south cess, catch pits and drainage in the six foot and no visible power cables. There is extensive vegetation along both fence lines, and there could be more services under these.

The existing railway could include contaminated ground, from the adjacent works and sidings. This will need to be assessed.

The programme and access will need to avoid disrupting Lionel Road on days the stadium has events.

Access from Lionel Road or the property at 27 Great West Way is not agreed

The existing Lionel Road Bridge requires a full reconstruction

Highway and Railway services cannot be diverted or relocated, or do not meet the construction programme.

1.7 HIGH LEVEL PROGRAMME

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Option 1A														
Mobilise and compounds														
Platforms														
New footbridge														
New North Entrance														
Services and systems														
Commissioning														
Demobilise														
Option 2A														
Mobilise and compounds														
Platforms														
New West Entrance														
New station building over tracks														
Services and systems														
Commissioning														
Demobilise														
Option 3A														
Mobilise and compounds														
Platforms														
New West Entrance -														
New bridge over tracks														
Services and systems														
Commissioning														
Demobilise														

Appendix C

COST ESTIMATE

COSTS

We have reviewed the cost estimate included in the Lionel Road Business Case V1.6 and have updated this to the current masterplan options and 2019 values.

1.1 ASSUMPTIONS

- The GRIP 1-5 design would be completed by a designer employed by Network Rail
- Contractor would be involved in early stages of Design
- One stop shop for Design, i.e. all disciplines
- Design costs for track re alignment to improve the radius is included within design fees
- Lift specialist to design and construct lift.
- Space for construction of station would be made available within Stadium and would be suitable for site construction of station
- Main construction site would be to within the car parking areas to the north of the station.
- Possessions all arranged and organised by Network Rail
- There would be no environmental issues
- No major ground issues, assume simple foundations
- Exclusions:
  - Electrification, either Overhead or third rail of the line.
  - Timetabling and rail planning
  - WebTAG appraisal
  - Costs of land purchase, highways works, and pedestrian access paths are dependent on detailed design work and are excluded.
  - Any associated legal costs.

1.2 COST COMPARISON

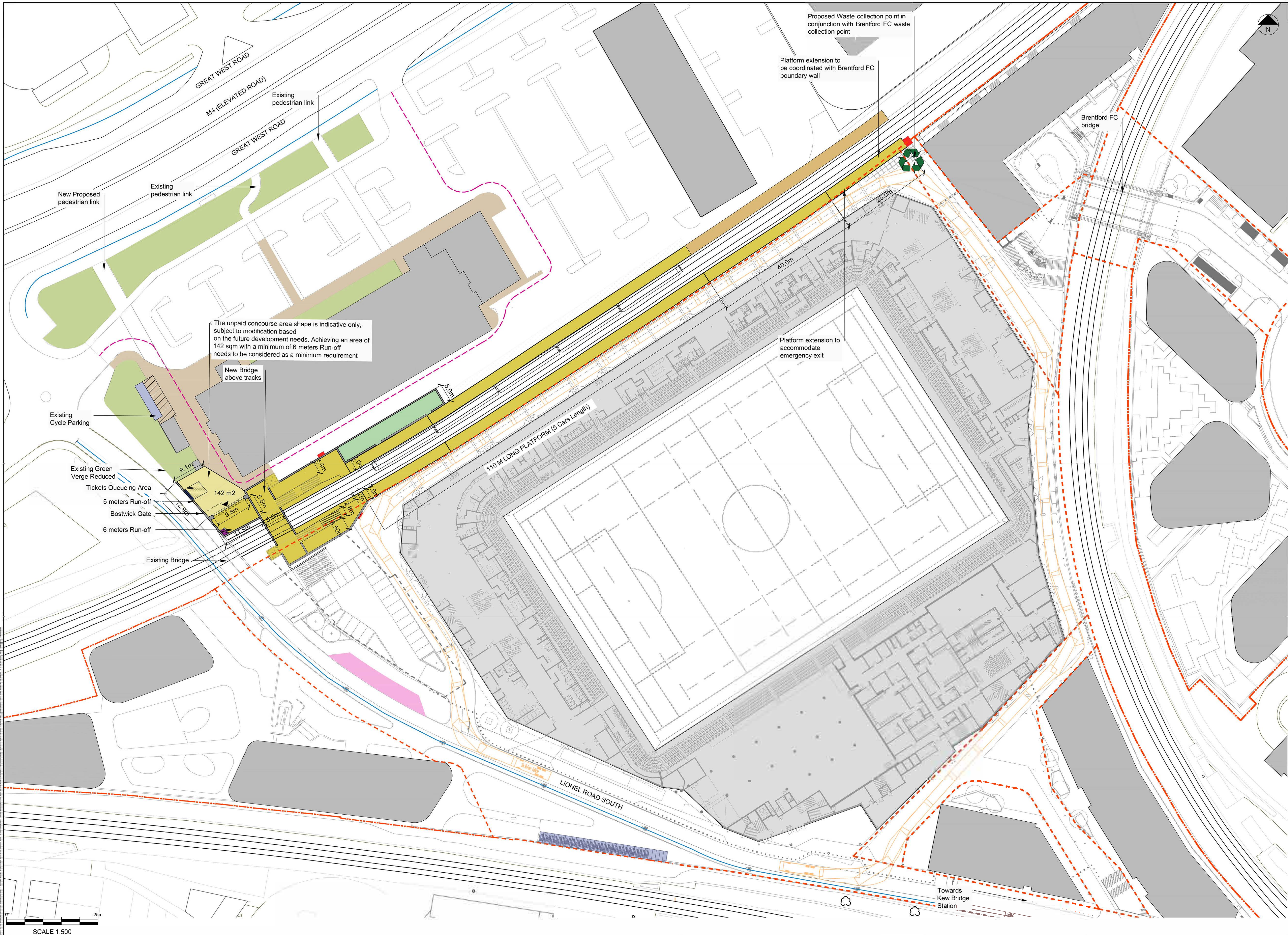
	2011/12	Option A1	Option A2	Option A3
BCIS All in TIP Index	**221**		**340**	
Preliminaries %	**34%**	**29%**	**34%**	**27%**
Preliminaries	795,000	1,039,538	1,223,077	967,846
Design to GRIP 5 with construction support	165,000	253,846	253,846	253,846
Signal design and sighting	45,000	69,231	69,231	69,231
Civil and structural works	1,200,000	1,846,154	1,846,154	1,846,154
Associated works	15,000	23,077	23,077	23,077
Mechanical and electrical works	65,000	100,000	100,000	100,000
DNO Supply	100,000	153,846	153,846	153,846
Track alignment	180,000	276,923	276,923	276,923
Telecoms works	75,000	115,385	115,385	115,385
Lifts	110,000	169,231	169,231	169,231
Platform construction (2 platforms)	110,000	169,231	169,231	169,231
Contingency on construction items (10%)	265,000	407,692	407,692	407,692
SUBTOTAL	**3,125,000**	**4,624,154**	**4,807,692**	**4,552,462**
Highway Improvements	2,000,000	3,076,923	3,076,923	3,076,923
Bespoke Station	3,000,000	4,615,385	4,615,385	4,615,385
TOTAL (excluding OB)	**8,125,000**	**12,316,462**	**12,500,000**	**12,244,769**

Excluding public access
Excluding public realm

Appendix D

MASTERPLAN DRAWINGS

DO NOT SCALE



LEGEND

- Brentford FC Site Area Boundary
- Existing Buildings
- Bicycle Parkings
- Cycle Route
- Brentford FC drop-off
- Urban Realm
- Unpaid Public / Station Area
- Paid Public / Station Area
- Tickets Queueing Area
- 6 meters Run-off
- Potential platform extension
- Station Control / Supervision Services/ Welfare Facilities
- Staff Place of Safety
- Ticket Vending Machines
- Fire Egress
- Rendezvous Point
- Station Entrance A2 option
- Maintenance Access
- Waste collection point
- Brentford FC waste collection / delivery path
- Potential location for green area implementation

NOTES

1. Next steps, include and are not limited to:

- Consider the vision for the station and its integration within the neighbouring existing and proposed development
- Consider stakeholder requirements who may include existing neighbours, property owners, authorities,operators and sponsors
- Consider public safety risks (e.g. crowding, crime prevention, vehicle, train, anti-social, terrorism)
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REV	DATE	BY	DESCRIPTION	CHK	APP
P01	23/03/2020	NB	FIRST ISSUE	JH	CW

DRAWING STATUS: S2 - FOR INFORMATION

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CLIENT: London Borough of Hounslow

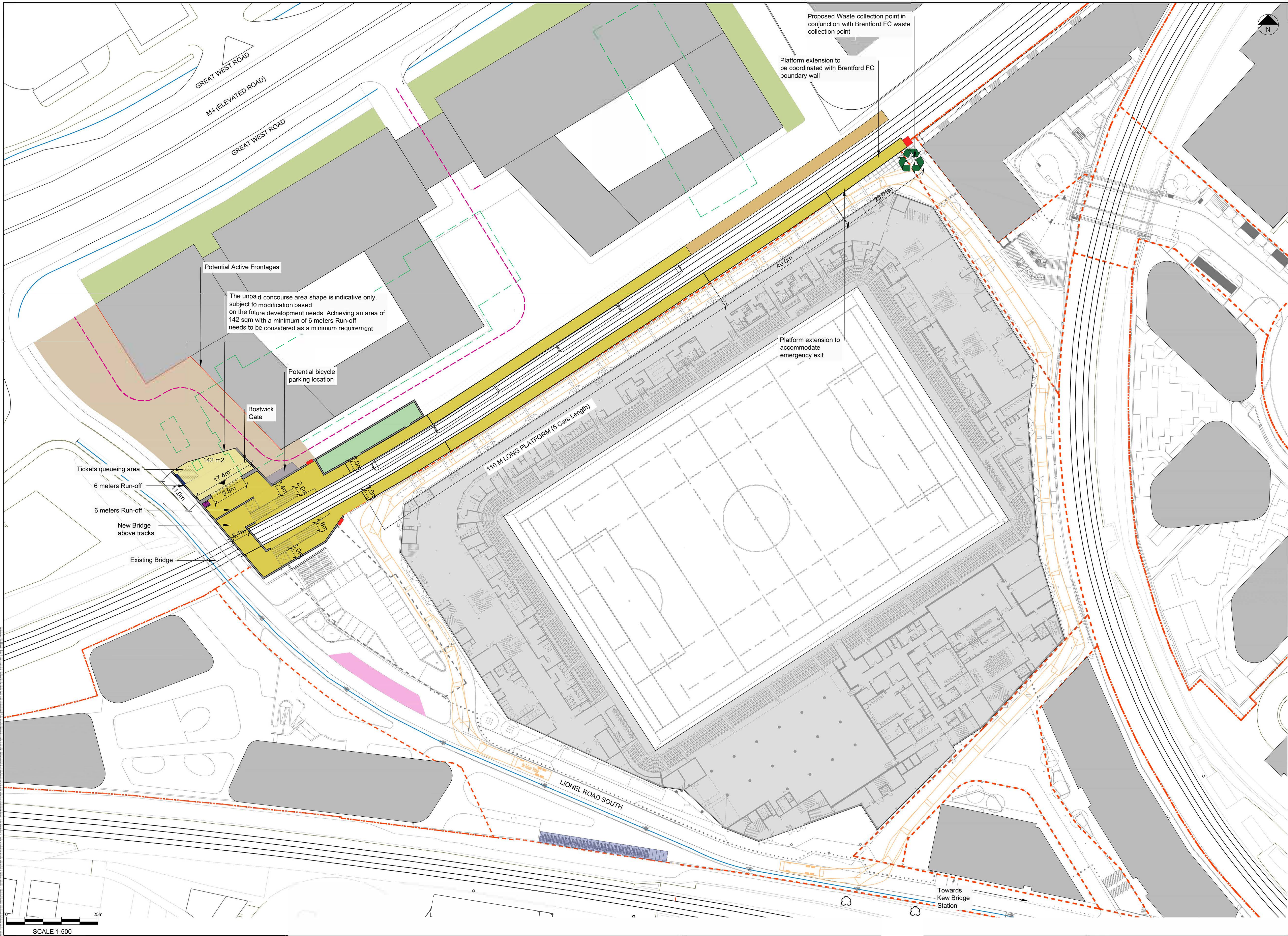
ARCHITECT:

PROJECT: LIONEL ROAD STATION OPTIONS

TITLE: OPTION A1 - MASTERPLAN
EXISTING 27 GREAT WEST ROAD DEVELOPMENT

SCALE @ A1	CHECKED	APPROVED	
1:500	J.Harding	C. Wood	
PROJECT No	DESIGNED	DRAWN	DATE
70068052	N.Beço	N.Bego	June 20

DRAWING No: 70068052-EAR-GA-0001
REV: P01



DO NOT SCALE

LEGEND

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- Building to be demolished
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- Cycle Route
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- Urban Realm
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NOTES

Reference:
"Great West Corridor, Masterplan and Capacity Study. London Borough of Hounslow, July 2019"

1. Drop-off facilities to be coordinated with 27 Great West Road Masterplan.

2. Maintenance access to be coordinated with 27 Great West Road Masterplan.

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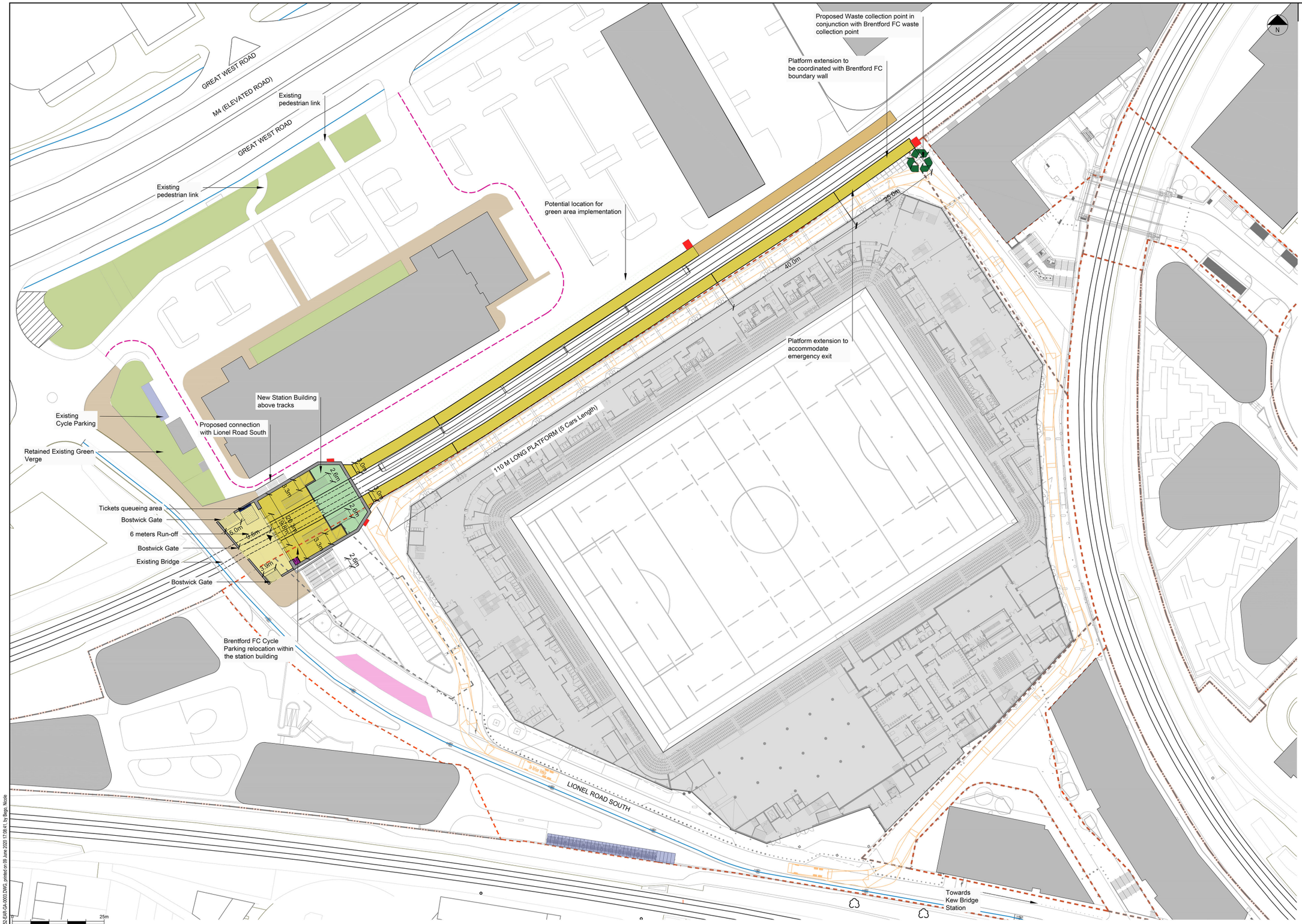
ARCHITECT:

PROJECT: LIONEL ROAD STATION OPTIONS

TITLE: OPTION A1 - MASTERPLAN
REDEVELOPED 27 GREAT WEST ROAD DEVELOPMENT

SCALE @ A1: 1:500	CHECKED: J.Harding	APPROVED: C. Wood
PROJECT No: 70068052	DESIGNED: N.Bego / DRAWN: N.Bego	DATE: June 20
DRAWING No: 70068052-EAR-GA-0002		REV: P01



DO NOT SCALE

LEGEND

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- Brentford FC Bicycle Parkings incorporated in the station
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ARCHITECT:

PROJECT: LIONEL ROAD STATION OPTIONS

TITLE: OPTION A2 - MASTERPLAN
EXISTING 27 GREAT WEST ROAD DEVELOPMENT

SCALE @ A1:	CHECKED:		APPROVED:
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PROJECT No:	DESIGNED:	DRAWN:	DATE:
70068052	N.Bego	N.Bego	June 20

DRAWING No: 70068052-EAR-GA-0003 REV: P01

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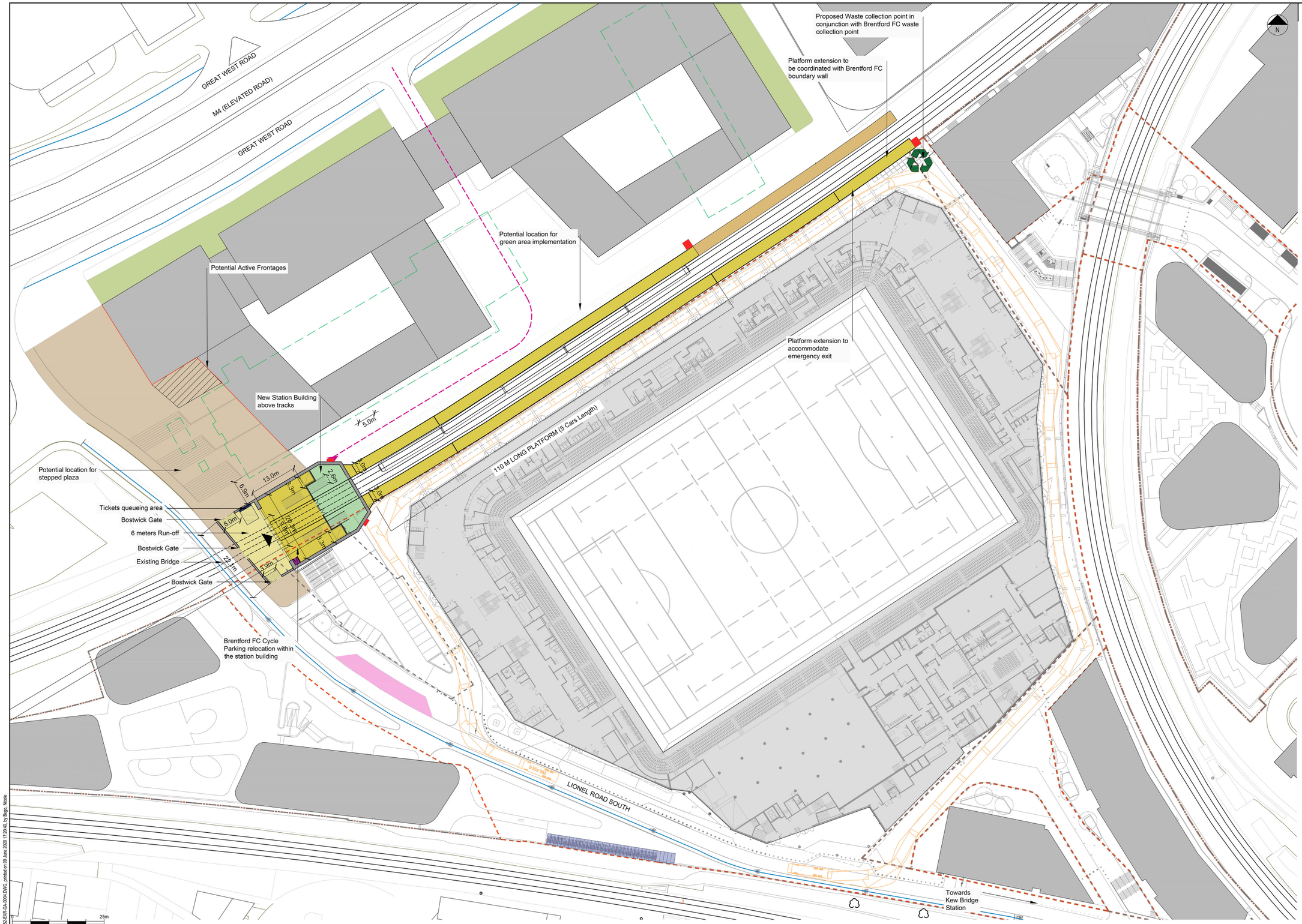

SCALE 1:500

DO NOT SCALE

LEGEND

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NOTES

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ARCHITECT:

PROJECT: LIONEL ROAD STATION OPTIONS

TITLE: OPTION A2 - MASTERPLAN
REDEVELOPED 27 GREAT WEST ROAD DEVELOPMENT

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70068052	N.Bego	N.Bego	June 20

DRAWING No: 70068052-EAR-GA-0004 REV: P01

DO NOT SCALE

N

GREAT WEST ROAD

M4 (ELEVATED ROAD)

GREAT WEST ROAD

Existing pedestrian link

Existing pedestrian link

New Proposed pedestrian link

The unpaid concourse area shape is indicative only, subject to modification based on the future development needs. Achieving an area of 142 sqm with a minimum of 6 meters Run-off needs to be considered as a minimum requirement

Proposed Waste collection point in conjunction with Brentford FC waste collection point

Platform extension to be coordinated with Brentford FC boundary wall

65.0m

Ticket queueing area

18.9m

6 meters run-off

142 m2

Bostwick Gate

9.8m

16.7m

6 meters run-off

40.0m

Platform extension to accommodate emergency exit

13.0m

Existing cycle parking

New Bridge above tracks

4.9m

110 M LONG PLATFORM (5 Cars Length)

3.0m

2.6m

3.3m

3.0m

Potential location for Lionel Road -27 West Road connection

2.6m

2.4m

3.3m

Existing Bridge

Brentford FC Cycle Parking relocation within the station building

LIONEL ROAD SOUTH

Towards Kew Bridge Station

0 25m

SCALE 1:500

LEGEND

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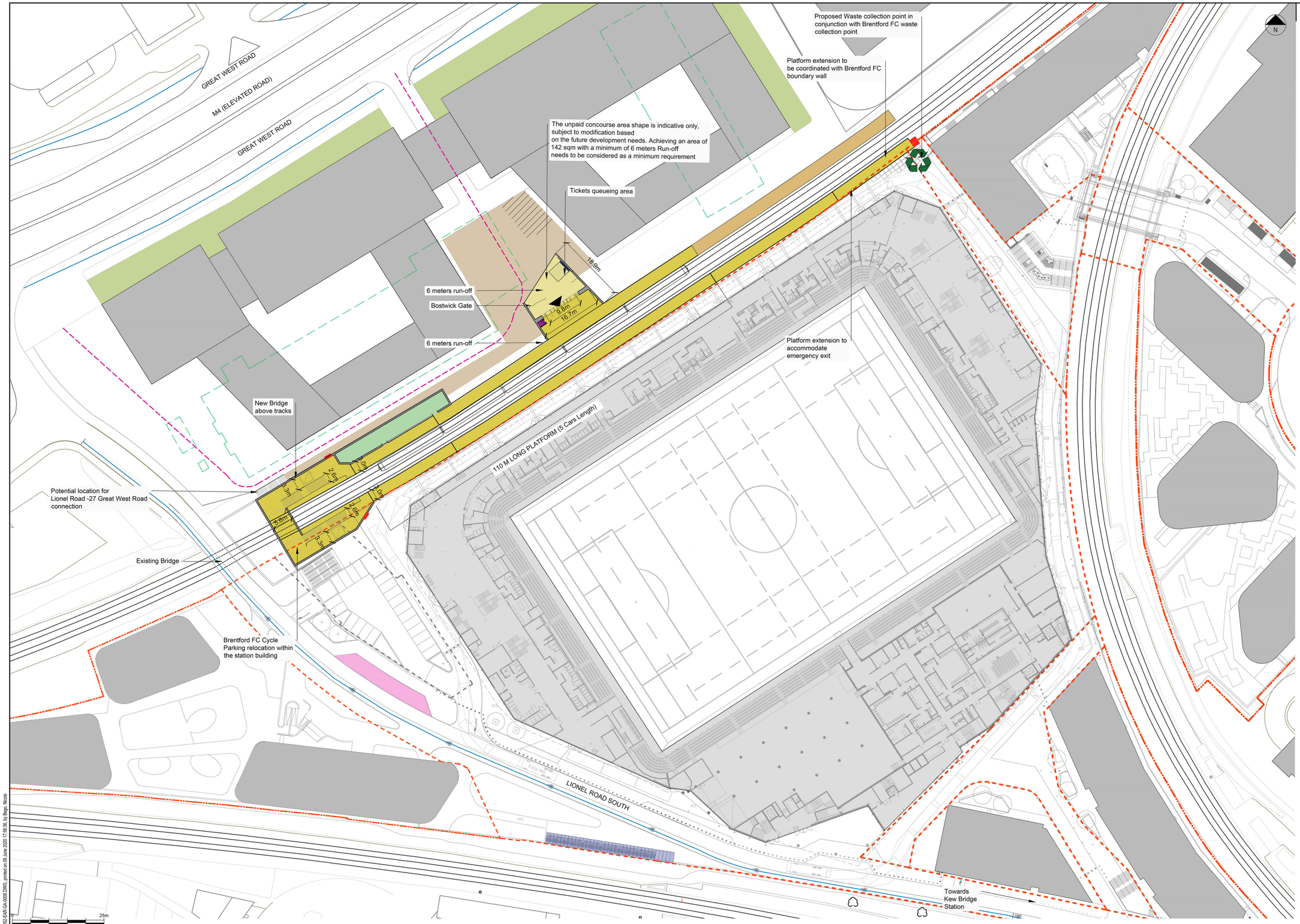
ARCHITECT:

PROJECT: LIONEL ROAD STATION OPTIONS

TITLE: OPTION A3 - MASTERPLAN
EXISTING 27 GREAT WEST ROAD DEVELOPMENT

SCALE @ A1:	CHECKED:		APPROVED:
1:500	J.Harding		C. Wood
PROJECT No:	DESIGNED:	DRAWN:	DATE:
70068052	N.Bego	N.Bego	June 20

DRAWING No: 70068052-EAR-GA-0005 REV: P01



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CLIENT: London Borough of Hounslow

ARCHITECT:

PROJECT: LIONEL ROAD STATION OPTIONS

TITLE: OPTION A3 - MASTERPLAN
REDEVELOPED 27 GREAT WEST ROAD CORRIDOR

SCALE @ A1:	CHECKED:		APPROVED:
1:500	J.Harding		C. Wood
PROJECT No:	DESIGNED:	DRAWN:	DATE:
70068052	N.Bego	N.Bego	June 20

DRAWING No: 70068052-EAR-GA-0006 REV: P01

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