



Croxley Line – Safeguarding for Mass Rapid Transit Technical Report

Watford Borough Council

Reference: 1000006644

Date: 25th September 2020

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| Reason | First draft | Second draft | Final for issue |
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| Date | 24.07.20 | 03.09.20 | 24.09.20 |

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1. **BACKGROUND**

1.1 **Purpose of Study**

1.1.1 This study has been undertaken to identify the extent of safeguarding required to ensure that a corridor is retained for the potential introduction of Mass Rapid Transit (MRT) along with associated cycling and pedestrian infrastructure (an Active Travel route) in west Watford.

1.1.2 The route must be safeguarded to ensure that a future transport infrastructure corridor is retained as new development sites are developed within the Town over coming years.

1.2 **Mass Rapid Transit Scheme**

1.2.1 Mass Rapid Transit (MRT) is a proposed new high-speed, east-to-west public transport system for Hertfordshire based around the A414 corridor.

1.2.2 The system is proposed to provide a fast and reliable public transport link across the south of the county. The MRT strategy also includes priorities for walking, cycling and new public transport investment, along with road improvement schemes.

1.2.3 MRT could form part of a longer link via Watford Junction towards St. Albans and Rickmansworth. It might support lower cost interventions such as facilities for vulnerable users (e.g. protected Active Travel routes).

1.2.4 Most relevant to this study is the proposed extension of MRT to the south and west of Watford Junction Station to link to business parks and residential development zones in the Croxley area.

1.2.5 Details around how the MRT will operate, the exact route that it will take, and the type of vehicles it will use are in development following commissioning of an Outline Business Case (OBC) study by Hertfordshire County Council.

1.2.6 MRT could potentially utilise a section of the disused Croxley Rail line, which was previously safeguarded under an expired Transport Works Act Order as a possible Metropolitan Line Extension route (MLX).

1.2.7 The Hertfordshire County MRT study will involve an option appraisal process, strategic modelling, and subsequent development of an Outline Business Case for a preferred solution.

1.2.8 The outcome of the option appraisal process is not known at this time, but discussions have been held with the County and their consultants to understand the most likely solution, which is confirmed to be bus-based.

- 1.2.9 This assumption does not seek to pre-judge the study outcomes, or to drive the outcomes in a preferred direction, but given the engineering challenges of a non-bus based solution and the strong potential for delivery of an associated active travel route in conjunction with MRT, it is considered to be the most flexible and affordable option for mass transit.

1.3 Outputs

- 1.3.1 This report presents route drawings and technical notes that can be utilised by Watford BC as Planning Authority to hold informed discussions with developers.
- 1.3.2 Section 3.0 provides conceptual scheme drawings with an analysis of the potential route. These concept drawings have been prepared to identify and illustrate development interfaces, future links, and potential engineering constraints. Again, they do not seek to pre-judge or guide the MRT design process, but to assist in understanding the challenges and physical “footprint” that might be required to deliver the infrastructure.
- 1.3.3 Accompanying notes have been provided with each drawing describing route sections, challenges, and opportunities.
- 1.3.4 Recommendations are provided at locations where development sites might need to incorporate “future-proofed” pedestrian and cycle links to the proposed active travel route and MRT corridor, as well as potential opportunities for securing infrastructure funding to enable those connections to be made.
- 1.3.5 Budget cost estimates have been provided for the recommended infrastructure required. These are quantum of cost estimates for specific infrastructure requirements, based on the scale and type of construction required. They are provided for budgeting purposes only and should not be adopted as fixed prices for individual elements. Appendix A provides cost estimate calculations showing the method and rates used for estimation purposes.

2. POLICY BACKGROUND

2.1 Safeguarding Strategic Infrastructure

2.1.1 Watford's Special Policy Areas (SPAs) need good access to public transport. Access to SPAs would be enhanced by a potential MRT corridor, including:

- Town Centre SPA - Watford expects around half of all additional jobs to be provided within the wider town centre (in the order of 3,300 to 4,200 jobs).
- Watford Junction SPA - a mixed-use scheme that when complete, will create 75,000 sqm of commercial space, 6,000 sqm of retail, just under 3,000 dwellings, two primary schools and a range of community uses. The council expects this SPA to provide in the order of 1,350 to 2,350 jobs.
- Health Campus SPA - a mixed-use scheme including a new hospital, at least 500 new homes, employment space, local shops and a primary school, on a site including the current Watford General Hospital – the MRT route would pass very close to this site, which could provide in the order of 1,000 to 1,900 new jobs.
- Western Gateway SPA - an area focused on Watford Business Park, an underperforming employment area in need of upgrading with plans for a wider mix of uses including a supermarket, a primary school and 300 homes.
- Specific development opportunities at Ascot Road, Watford Riverwell, Watford Junction and the Croxley and Watford Business Parks will provide growth both locally and within the wider region that could impact on travel demand in Watford.

2.1.2 Future housing and employment growth on the planned MRT route would therefore be well served and facilitated by the introduction of new public transport with walking and cycling provision. A lack of adequate non-car-based connectivity to these developments might also lead to constraints in their scope and functionality.

2.1.3 Employment predictions across the region report that Watford's employment growth rate (16%) will be double that of the UK overall (8%) between 2016 and 2031. Watford's adopted Local Plan outlines plans for a minimum number of 6,500 new homes to provide for this increasing population. As a minimum 7,000 additional jobs are also planned, to accompany the population growth and to maintain Watford's role as a regional centre.

2.1.4 In summary, significant growth in housing and jobs is proposed for Watford borough, with employment up by 15% in 2031 and population rising by 16% in that time. Growth outside of Watford in areas like Three Rivers will also contribute to a higher number of commutes into Watford, putting additional pressure on the current infrastructure, which is already experiencing high levels of demand.

2.1.5 MRT provision along with associated and/or new cycle and walking links will contribute to the economic success and viability of Watford's growth plans. Safeguarding potential routes for future transport projects is therefore essential.

2.2 Watford's Policy

2.2.1 The following overview plan illustrates the potential impact of an MRT and Active Travel corridor in terms of the connectivity that it could deliver across West Watford, and beyond.

2.2.2 The successful use of strategic transport infrastructure depends on new developments, existing facilities, and public institutions, establishing clear connections to this potential transport route and stops.

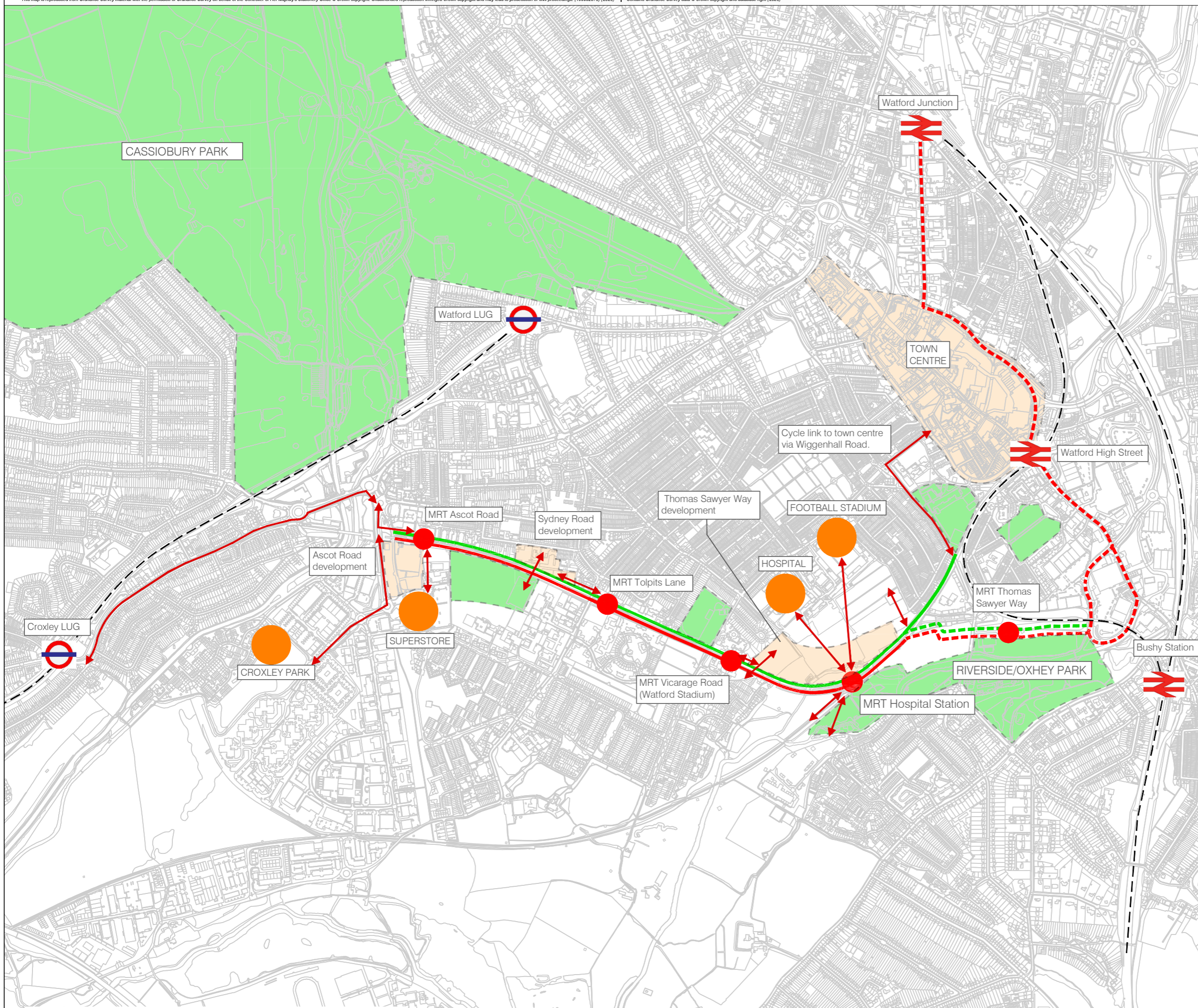
2.2.3 It is important to ensure new proposals recognise key infrastructure in the vicinity of the development site, and that connections are properly integrated into the design process from the outset.

2.2.4 Watford as Planning Authority also wishes to safeguard existing and proposed transport infrastructure from inappropriate development that could compromise future schemes and proposals.

2.2.5 Creation of a mass transit system along the disused railway line to the Lower High Street station has been identified as a key area for safeguarding and Policy SD2.4 Safeguarding and Connecting to Strategic Transport Infrastructure states that:

- Strategic transport infrastructure, as identified on the Policies Map, should be safeguarded.
- This includes the disused railway line, the Abbey Line, Hempstead Road amenity verge and key cycle routes.
- Any proposals that could compromise strategic transport infrastructure will not be supported.
- Proposals should enhance connectivity to public transport and encourage walking and cycling.

2.3 Route Overview & Context



- LEGEND**
- MRT Route
 - Active Travel Route
 - Rail lines
 - MRT Station (potential site)
 - Key destinations
 - Development sites
 - Green spaces
 - London Underground
 - London Overground
 - MRT/Active Travel Route Links

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Client

Project
 MRT SAFEGUARDING

Drawing Title
 OVERVIEW

Drawing Status
FOR INFORMATION

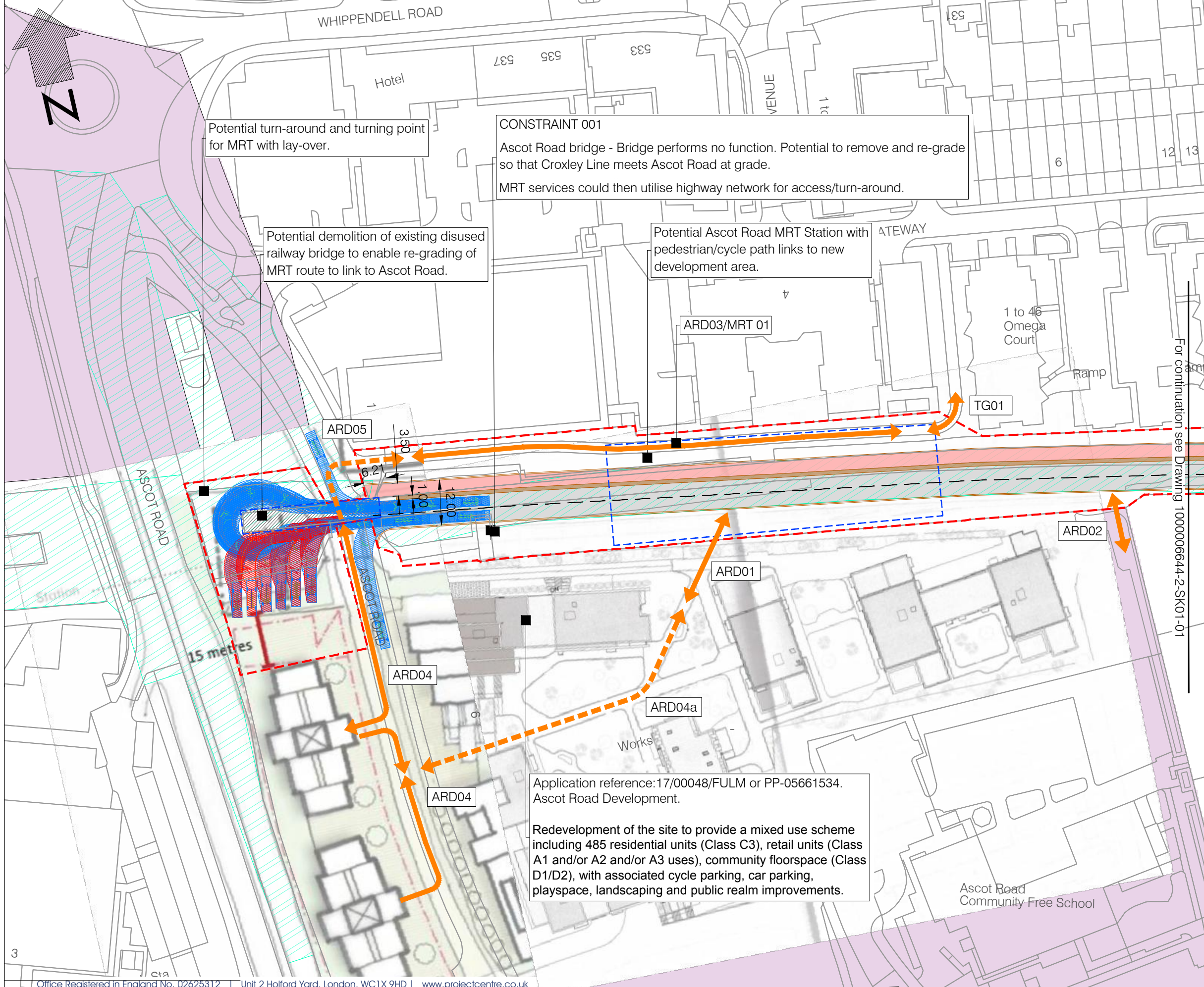
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| Drawing No. 1000006644-2-SK05-01 | | | | Rev - |

3. SAFEGUARDING EXTENT

- 3.1.1 As noted, the core assumption is that the most likely scenario is delivery of a bus-based solution with cycling and walking accommodated in parallel (an Active Travel route).
- 3.1.2 A corridor width of 12m has been assumed for the Croxley Line section, which is based on a 7.5m two-way busway with a 3.5m two-way cycle/pedestrian route and 1m buffer. This required corridor width has been reviewed and agreed in principle with Hertfordshire County Council, Watford BC officers and consultants charged with developing the MRT concept.
- 3.1.3 These assumptions do not pre-judge the MRT study outcomes, but it has been broadly agreed that a bus-based solution with strong cycle and walking elements is the most flexible and affordable option for mass transit.
- 3.1.4 Development plans have been provided by the Planning Authority in outline form, along with a description of the type and extent of development proposed. This information has been copied to route drawings for ease of reference / comparison.
- 3.1.5 Watford BC land ownership records have also been obtained and included on route drawings to illustrate where Council owned land interfaces with the corridor.
- 3.1.6 The following drawings and tables describe route sections and provide details and narrative for Planning and development purposes.
- 3.1.7 Outcomes have been divided between the off-street section of the potential MRT route (sketches numbered SK01-01 to 09) and on-street sections (numbered SK02-01 to 04) and have been reported against the following headings:
1. Drawing Ref.
 2. Alignment description.
 3. Engineering constraints / issues.
 4. Cycle/pedestrian access to MRT
 5. Development interface / future-proofing.
 6. Potential infrastructure investment requirements.
 7. Budget cost estimates.

3.2 Off-Street Section Plans

| Drawing Ref 100006644-2 | Description | Constraints/Issues | Cycle & Pedestrian Access | | Development interface | | Infrastructure Investment Required | Budget Cost Estimates |
|----------------------------|---|--|---------------------------|---|--|-------------|------------------------------------|-----------------------|
| | | | Ref | Description | Ref | Description | | |
| SK01-01 Ascot Road | Croxley Line termination at Ascot Road and "Lozenge Site" <ul style="list-style-type: none"> MRT route termination, layover area and turn-around for services. Interface and links to potential future MRT Station Links to The Gateway and Ascot Road development. | Constraint 001 <ul style="list-style-type: none"> Potential requirement to remove old rail bridge on Ascot Road and re-grade the Croxley Line and land on Lozenge site. At-grade connection to / across Ascot Rd would provide more flexibility for access by MRT services, demand responsive buses and local services, as well as access by bicycle and on foot. Assumed need for layover / standing on Lozenge site where former MLX station was planned. Site safeguarding protects land for this function. Safeguarding includes existing pedestrian path to The Gateway, which would need to be reviewed and re-aligned to complement MRT design. Assumed location of MRT station as indicated – would need to respond to slope of re-graded disused rail line and could have connections from south (Ascot Rd site) and north (The Gateway). | MRT01 | Existing footway linking Ascot Road to The Gateway residential community to form part of MRT design, providing opportunity to enhance connectivity to The Gateway and a future MRT station | Ascot Road Development Ref. 17/00048/FULM or PP-05661534. | | | |
| | | | ARD01 | Future link for pedestrians and cyclists from Ascot Road development to MRT station. Needs to be designed into masterplan. | Small footway link plus gateway to MRT route to allow Ascot Rd residents to access station directly | £4,500 | | |
| | | | ARD02 | Potential link south towards Morrisons store and school would provide useful cycle and pedestrian link for school access and shoppers. | Active Travel link past Ascot Road development site linking direct to superstore | £95,000 | | |
| | | | ARD03 (incTG01) | This link (same as MRT01) would be the route from Ascot Road and the Lozenge site of the Ascot Road development to the future MRT station – see also ARD04 and 04a below. | Costs for upgrading existing path to dual use with enhanced public realm / lighting plus improved access to The Gateway. | £45,000 | | |
| | | | ARD04 ARD04a | Links from Lozenge site to MRT route and Ascot Road MRT station to be designed into scheme to ensure convenient and direct access to active travel link and MRT corridor services. | No costs assumed as routes can be incorporated into development masterplan. | £0 | | |
| | | | ARD05 | Costs for pedestrian / cycle crossing across Ascot Road to enable access to active travel route. | Toucan crossing provision | £50,000 | | |
| | | | CPZ provision | MRT station/s along route could become attractive for park and ride function. Parking restrictions for new development and attractiveness of MRT could lead to excessive on-street parking. | Costs for future delivery of parking controls and potential CPZs along whole corridor. | £155,000 | | |
| | | | TG01 | Existing link to The Gateway to be retained and improved to incorporate access to future MRT station. | | | | |



LEGEND

- Extent of proposed safeguarding
- Proposed cycle path
- MRT running lanes
- Proposed 1m buffer
- Proposed kerb
- Potential location for station
- Cycle way/Pedestrian link
- Future development pedestrian/cycle linkage
- Previous MLX route
- WBC ownership

Standard double decker bus (9.465m) used for swept path analysis.

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| Client | |
| Project | MRT SAFEGUARDING |
| Drawing Title | ASCOT ROAD |
| Drawing Status | FOR INFORMATION |
| Drawn | AV |
| Designed | PC/AV |
| Date | JULY 2020 |
| Scale | 1:1000 |
| Size | A3 |
| Drawing No. | 1000006644-2-SK01-01 |
| Rev | - |

| Drawing Ref 100006644-2 | Description | Constraints/Issues | Cycle & Pedestrian Access | | Development interface | | Infrastructure Investment Required |
|--|---|---|---------------------------|--|-----------------------|-------------|------------------------------------|
| | | | Ref | Description | Ref | Description | |
| SK01-02 Sydney Road Section | <ul style="list-style-type: none"> Safeguard former rail corridor to enable construction of MRT. | <ul style="list-style-type: none"> Sufficient width for 12m corridor to incorporate busway and cycleway. No notable engineering constraints identified through visual inspection. | N/A | No accesses proposed at this conceptual stage, although at RIBA 2 development stage, consideration should be given to accesses to Sports Facility to south and Sydney Road to north. | None identified | | None identified |



LEGEND

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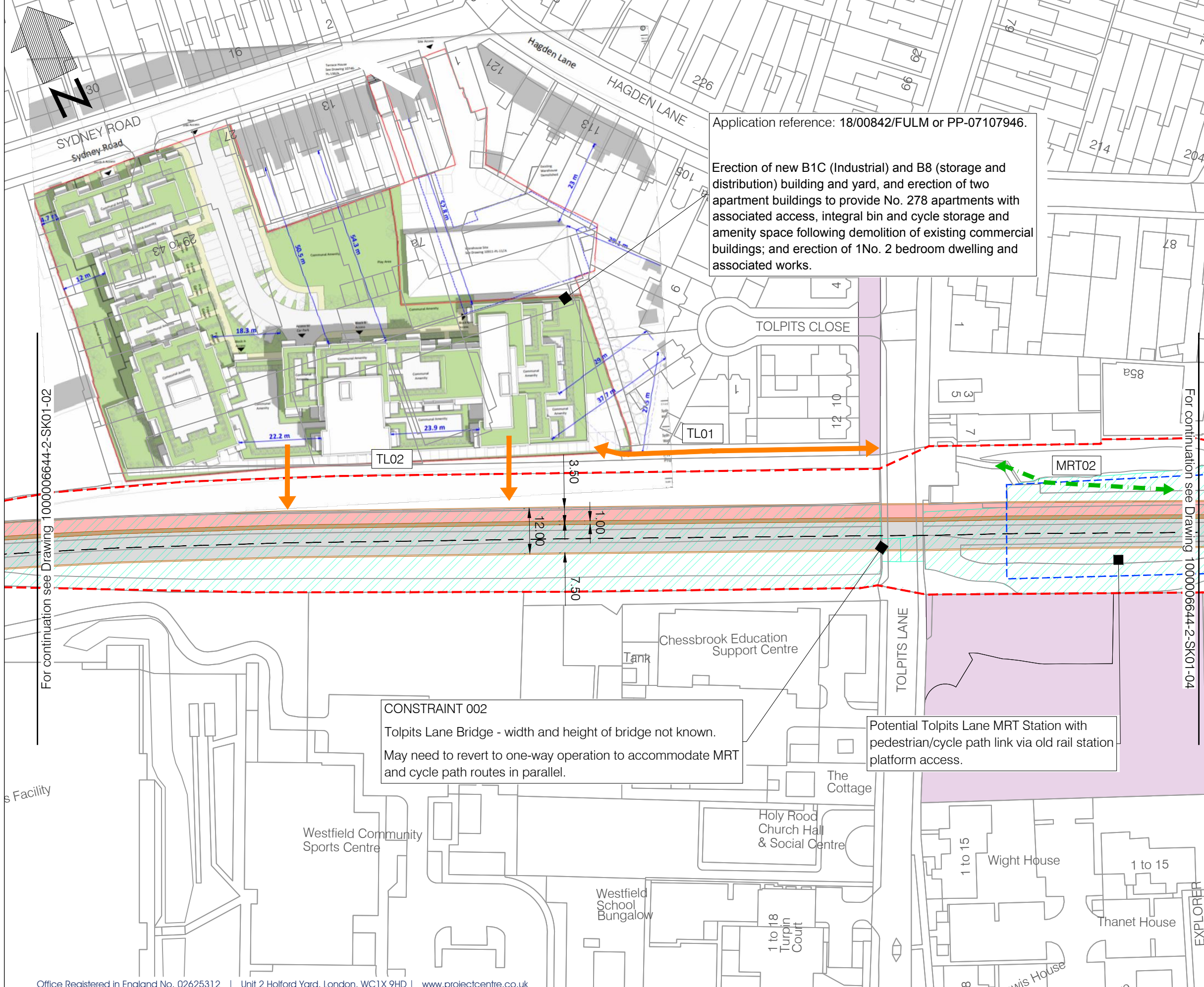
Project
MRT SAFEGUARDING

Drawing Title
SYDNEY ROAD SECTION

Drawing Status
FOR INFORMATION

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| Drawing No. 1000006644-2-SK01-02 | | | | Rev - |

| Drawing Ref 100006644-2 | Description | Constraints/Issues | Cycle & Pedestrian Access | | Development interface | | Infrastructure Investment Required | Budget Cost Estimates | |
|--|--|---|---------------------------|--|--|---|--|-----------------------|------------------------------|
| | | | Ref | Description | Ref | Description | | | |
| SK01-03 Tolpits Lane – Watford West Station | Safeguard former rail corridor – route passes beneath old rail bridge on Tolpits Lane. <ul style="list-style-type: none"> Interface and links to potential future MRT Station at former Watford West station site. Potential links to Sydney Road development site | Constraint 002 <ul style="list-style-type: none"> Width and height of Tolpits Lane Bridge unknown – may be insufficient to maintain 12m corridor. | MRT02 | Utilise old station access route from Tolpits Lane to Watford West station site. Provide for both cyclist and pedestrian access to corridor. Requirement to provide crossing on highway to enable pedestrian cycle access. | Sydney Road Development Ref. 18/00842/FULM or PP-07107946 | | | | |
| | | | | | TL01 | Future link for pedestrians and cyclists from development site to Tolpits Lane, linking to MRT route via new Tolipt Lane access. Development to accommdodate / future-proof potential access route. | Costs to improve existing access track from Sydney Rd site to Toplits Lane and costs for Tolpits Lane uncontrolled crossing. | | £50,000 |
| | | | | | TL02 | Potential links direct from development site to MRT / Active Travel route | Assumed costs for ramp accesses at two potential locations. | | £40,000 |
| | | | | | TL02 / MRT02 | Improve footway at access to potential MRT station and active travel route. | Assumed costs for public realm enhancements, cycle parking, signing etc. | | £15,000 |
| | | | | | General | MRT station could become attractive for park and ride function. Parking restrictions for new development and attractiveness of MRT could lead to excessive on-street parking. | Retain costs for future delivery of parking controls and potential CPZs along corridor. | | Costs captured under SK01-01 |



Application reference: 18/00842/FULM or PP-07107946.

Erection of new B1C (Industrial) and B8 (storage and distribution) building and yard, and erection of two apartment buildings to provide No. 278 apartments with associated access, integral bin and cycle storage and amenity space following demolition of existing commercial buildings; and erection of 1No. 2 bedroom dwelling and associated works.

CONSTRAINT 002
 Tolpits Lane Bridge - width and height of bridge not known.
 May need to revert to one-way operation to accommodate MRT and cycle path routes in parallel.

Potential Tolpits Lane MRT Station with pedestrian/cycle path link via old rail station platform access.

LEGEND

- Extent of proposed safeguarding
- Proposed cycle path
- MRT running lanes
- Proposed 1m buffer
- Proposed kerb
- Potential location for station
- Cycle way/Pedestrian link
- Future development pedestrian/cycle linkage
- Previous MLX route
- WBC ownership

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Project

MRT SAFEGUARDING

Drawing Title

TOLPITS LANE - WATFORD WEST

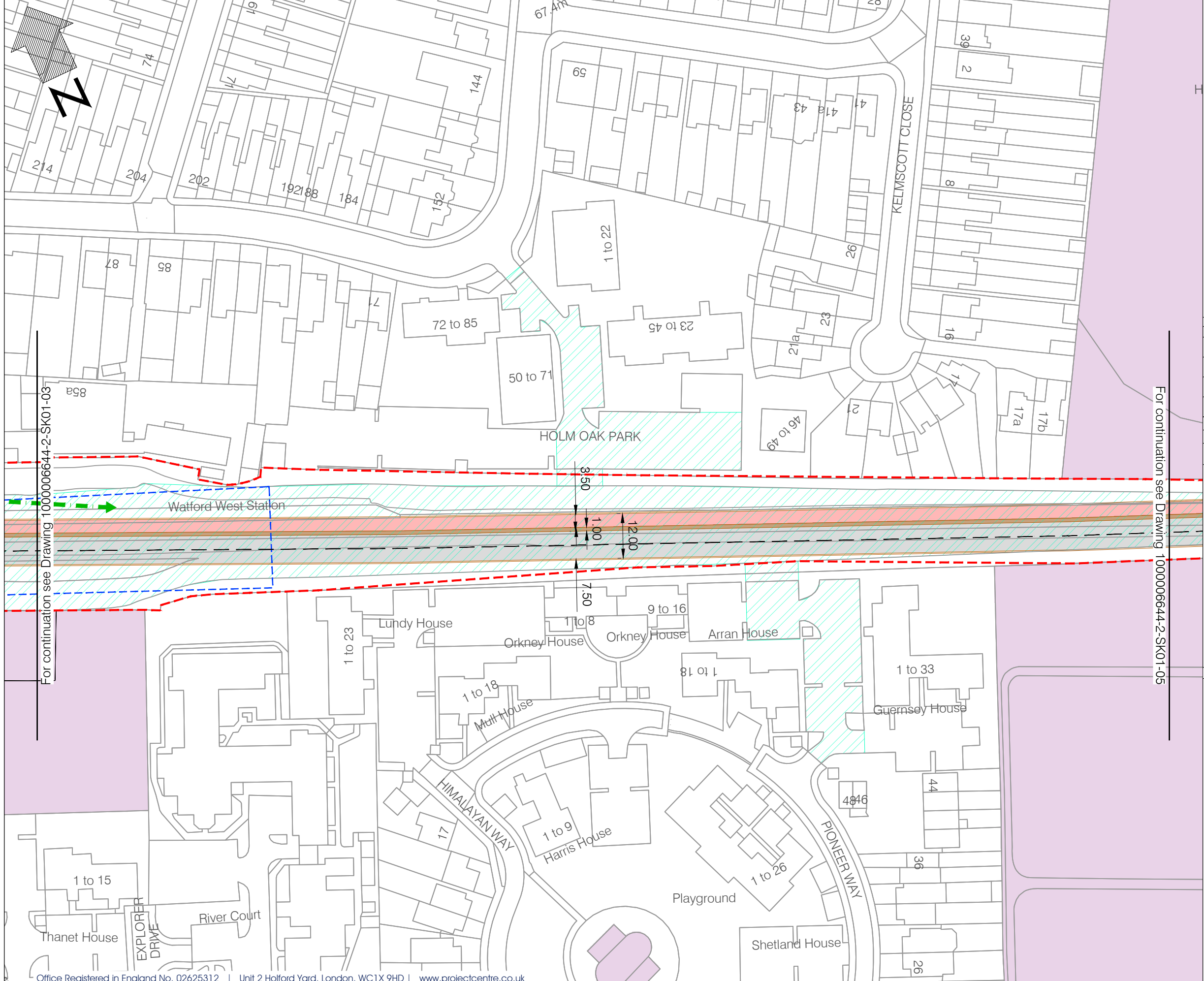
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FOR INFORMATION

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| Drawing No. 1000006644-2-SK01-03 | Rev - |
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| Drawing Ref 100006644-2 | Description | Constraints/Issues | Cycle & Pedestrian Access | | Development interface | | Infrastructure Investment Required |
|--|---|---|---------------------------|---|-----------------------|-------------|------------------------------------|
| | | | Ref | Description | Ref | Description | |
| SK01-04 Holm Oak Park Section | Safeguard former rail corridor to enable construction of MRT. | <ul style="list-style-type: none"> Sufficient width for 12m corridor to incorporate busway and cycleway. No notable engineering constraints identified through visual inspection. | N/A | No accesses proposed at this conceptual stage, although at RIBA 2 development stage, consideration should be given to access to communities to south and north of corridor. | None identified | | None identified |



LEGEND

- Extent of proposed safeguarding
- Proposed cycle path
- MRT running lanes
- Proposed 1m buffer
- Proposed kerb
- Potential location for station
- Cycle way/Pedestrian link
- Future development pedestrian/cycle linkage
- Previous MLX route
- WBC ownership

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Client

Project
MRT SAFEGUARDING

Drawing Title
HOLM OAK PARK SECTION

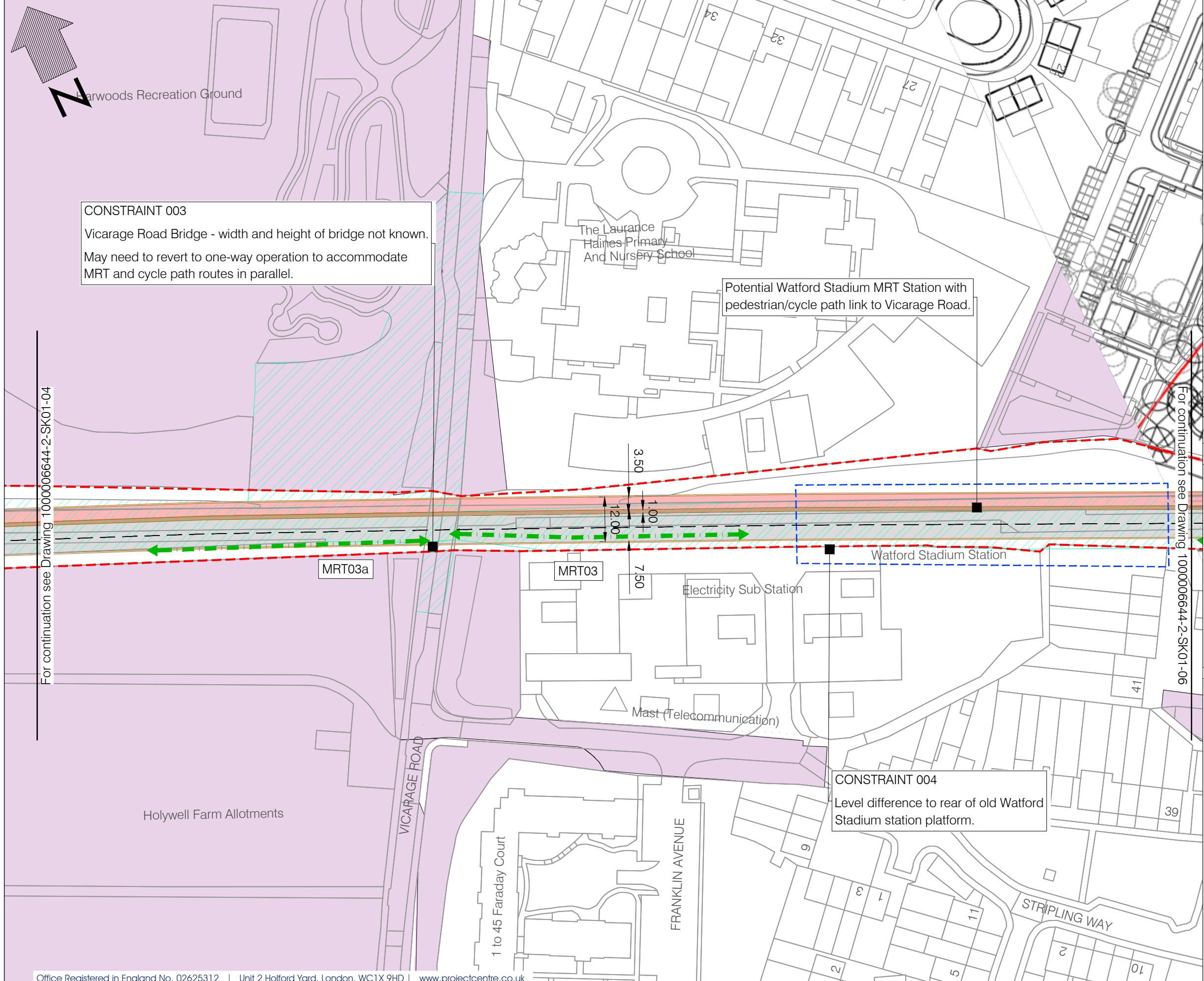
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For continuation see Drawing 1000006644-2-SK01-03

For continuation see Drawing 1000006644-2-SK01-05

| Drawing Ref | Description | Constraints/Issues | Cycle & Pedestrian Access | | Development interface | | Infrastructure Investment Required | Budget Cost Estimates | |
|-------------|---|---|---------------------------|--|-----------------------|--|--|---|---|
| | | | Ref | Description | Ref | Description | | | |
| 100006644-2 | SK01-05 Vicarage Road – Watford Stadium Station Safeguard former rail corridor. <ul style="list-style-type: none"> Route passes under Vicarage Road bridge. Interface and links to potential future MRT Station at former Watford Stadium station site. Potential links to Sydney Road development site | Constraint 003 <ul style="list-style-type: none"> Width and height of Vicarage Road Bridge unknown – may be insufficient to maintain 12m corridor. Constraint 004 <ul style="list-style-type: none"> Visible level difference to rear of Watford Stadium Station – land falls away towards electricity sub-station. | MRT03 | Utilise old station access route from Vicarage Road to Watford Stadium station site. Cycle and pedestrian links to MRT may require safety / operational review. | No direct interface | | | | |
| | | | | | MRT03 | Changes to traffic signals on Vicarage Road to incorporate crossing movements for access to active travel route and MRT station. | Nominal cost for investigation and provision of enhanced crossing facilities / public realm. | | £25,000 |
| | | | | | MRT03a | Potential for further access to west of Vicarage Road to link cycle / pedestrian route | General | MRT station could become attractive for park and ride function. Parking restrictions for new development and attractiveness of MRT could lead to excessive on-street parking. | Retain costs for future delivery of parking controls and potential CPZs along corridor. |



CONSTRAINT 003
 Vicarage Road Bridge - width and height of bridge not known.
 May need to revert to one-way operation to accommodate MRT and cycle path routes in parallel.

Potential Watford Stadium MRT Station with pedestrian/cycle path link to Vicarage Road.

CONSTRAINT 004
 Level difference to rear of old Watford Stadium station platform.

LEGEND

- Extent of proposed safeguarding
- Proposed cycle path
- MRT running lanes
- Proposed 1m buffer
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- Potential location for station
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- Previous MLX route
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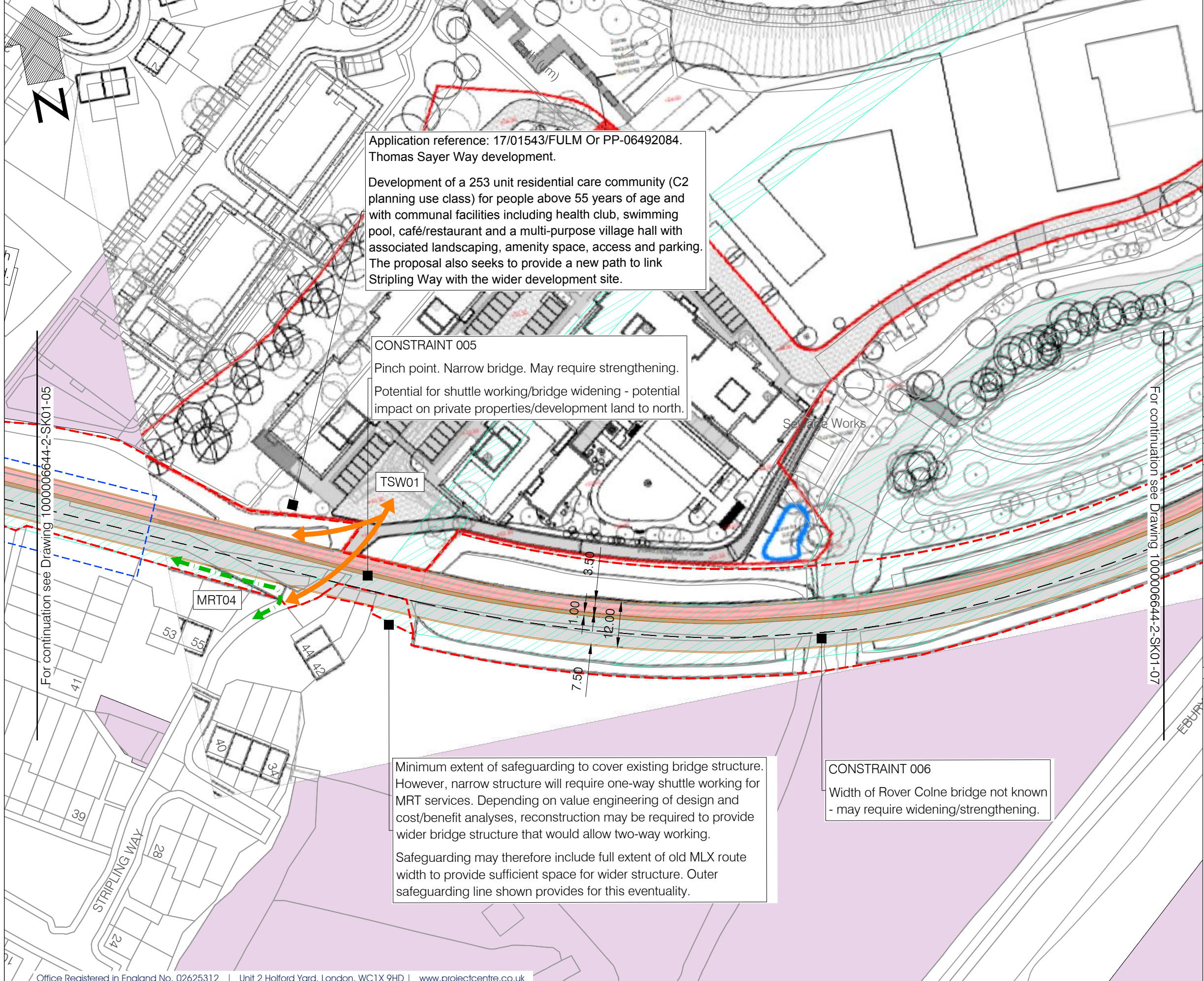
Project
 MRT SAFEGUARDING

Drawing Title
 VICARAGE ROAD - WATFORD STADIUM

Drawing Status
FOR INFORMATION

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| Drawn AV | Designed PC/AV | Date JULY 2020 | Scale 1:1000 | Size A3 |
| Drawing No. 1000006644-2-SK01-05 | | | | Rev - |

| Drawing Ref 100006644-2 | Description | Constraints/Issues | Cycle & Pedestrian Access | | Development interface | | Infrastructure Investment Required | Budget Cost Estimates |
|--|--|---|---------------------------|--|---|--|---|------------------------------|
| | | | Ref | Description | Ref | Description | | |
| SK01-06 River Colne Section | Safeguard former rail corridor. <ul style="list-style-type: none"> Route passes over narrow bridge off Stripling Way. Thomas Sawyer Way development site to north of corridor provides for 253-unit residential care community. Pedestrian / cycle access to this site runs beneath old rail bridge. | Constraint 005 <ul style="list-style-type: none"> Stripling Way bridge is too narrow to accommodate 12m corridor. Bridge may require widening and/or strengthening if two-way MRT service provision is to be maintained. Safeguarding incorporates wider section of land to enable both options to be considered. Widening could require land take from, or acquisition of, private properties. Constraint 006 <ul style="list-style-type: none"> River Colne bridge may require widening / strengthening to accommodate MRT. | MRT04 | Access route needs to be provided from Stripling Way to Watford Stadium station site to allow access for pedestrians and cyclists to corridor. Could potentially be provided from development side. | Thomas Sawyer Way Development site Ref. 17/01543/FULM or PP-06492084 | | | |
| | | | | | TSW01 | Development site design needs to accommodate proposals for potential future access routes to/from MRT corridor to ensure that development benefits when new services and sustainable transport routes are constructed. | Costs to provide future links to MRT route and cycle corridor from development site via Stripling Way. Estimated costs to improve pavement and provide for public realm / lighting beneath existing overbridge to enhance safety and quality of connections. | £30,000 |
| | | | | | MRT04 | Link from Stripling Way to MRT corridor / MRT Station. | Costs assumed to be incorporated within MRT development | £n/a |
| | | | | | General | MRT station could become attractive for park and ride function. Parking restrictions for new development and attractiveness of MRT could lead to excessive on-street parking. | Retain costs for future delivery of parking controls and potential CPZs along corridor | Costs captured under SK01-01 |



Application reference: 17/01543/FULM Or PP-06492084.
 Thomas Sayer Way development.
 Development of a 253 unit residential care community (C2 planning use class) for people above 55 years of age and with communal facilities including health club, swimming pool, café/restaurant and a multi-purpose village hall with associated landscaping, amenity space, access and parking. The proposal also seeks to provide a new path to link Stripling Way with the wider development site.

CONSTRAINT 005
 Pinch point. Narrow bridge. May require strengthening.
 Potential for shuttle working/bridge widening - potential impact on private properties/development land to north.

Minimum extent of safeguarding to cover existing bridge structure. However, narrow structure will require one-way shuttle working for MRT services. Depending on value engineering of design and cost/benefit analyses, reconstruction may be required to provide wider bridge structure that would allow two-way working.
 Safeguarding may therefore include full extent of old MLX route width to provide sufficient space for wider structure. Outer safeguarding line shown provides for this eventuality.

CONSTRAINT 006
 Width of Rover Colne bridge not known - may require widening/strengthening.

LEGEND

- Extent of proposed safeguarding
- Proposed cycle path
- MRT running lanes
- Proposed 1m buffer
- Proposed kerb
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- Future development pedestrian/cycle linkage
- Previous MLX route
- WBC ownership

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Client:

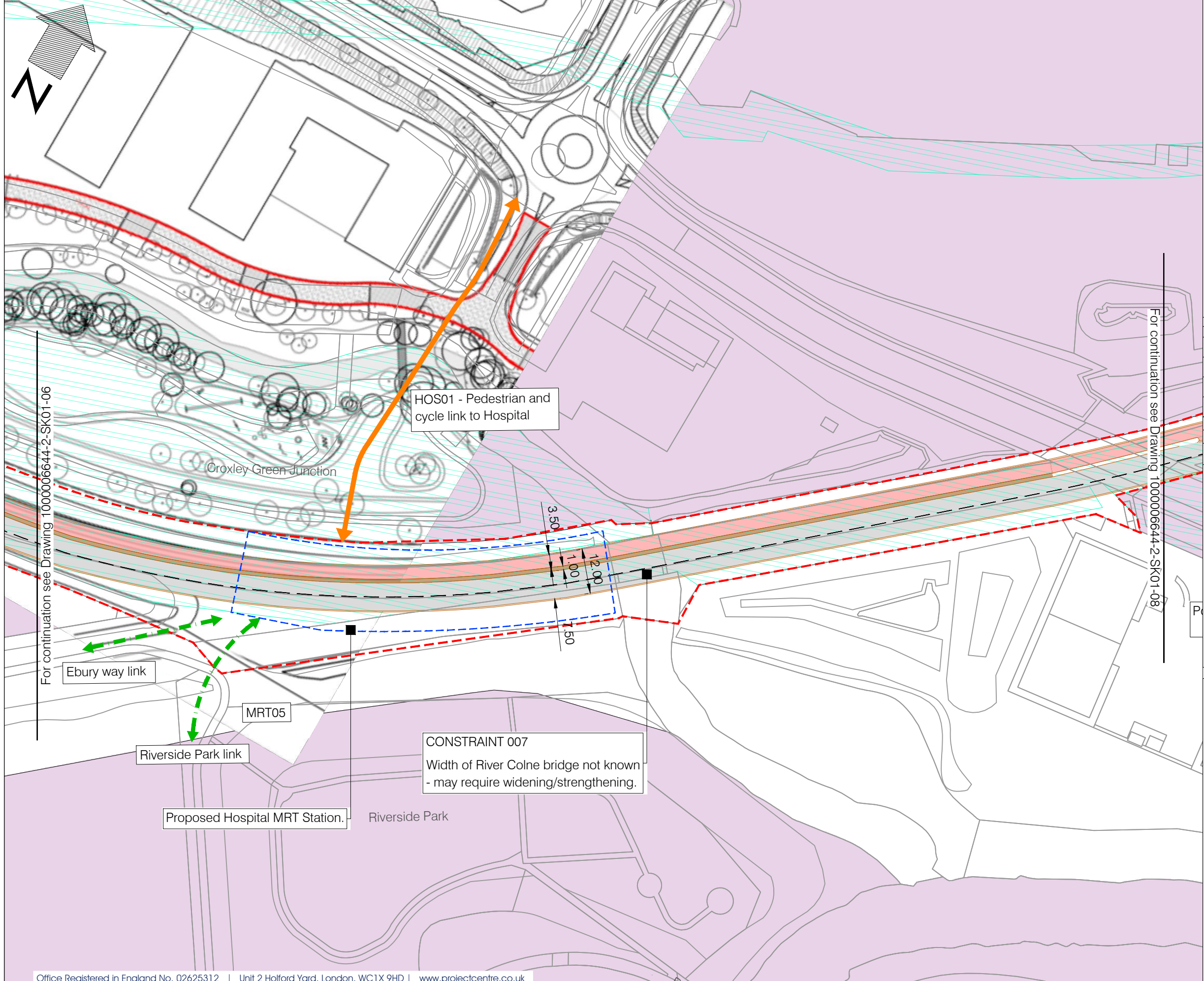
Project: MRT SAFEGUARDING

Drawing Title: RIVER COLNE SECTION

Drawing Status: **FOR INFORMATION**

| | | | | |
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| Drawn AV | Designed PC/AV | Date JULY 2020 | Scale 1:1000 | Size A3 |
| Drawing No. 1000006644-2-SK01-06 | | | | Rev - |

| Drawing Ref 100006644-2 | Description | Constraints/Issues | Cycle & Pedestrian Access | | Development interface | | Infrastructure Investment Required | Budget Cost Estimate |
|--------------------------------------|--|---|---------------------------|---|---|---|---|----------------------|
| | | | Ref | Description | Ref | Description | | |
| SK01-07 Riverside Park Section | Safeguard former rail corridor. <ul style="list-style-type: none"> Route passes River Colne Bridge. Strong potential cycle links to existing leisure routes via Riverside Park / Ebury Way. Cycle and pedestrian link required to north to link MRT to hospital and stadium. | Constraint 007 <ul style="list-style-type: none"> River Colne bridge may require widening / strengthening to accommodate MRT. | MRT05 | Access for cyclists and pedestrians to Riverside Park and Ebury Way would provide strong linkage to existing cycling and leisure route network. | Thomas Sawyer Way Development site Ref. 17/01543/FULM or PP-06492084 & Hospital development site | | | |
| | | | HOS01 | Access to hospital site for cyclists and pedestrians | HOS01 | Proposed layout and geography of site unknown. However, link from MRT and active travel corridor to hospital site and stadium will be critical connector– will require detailed review of destinations and links to confirm requirements. | Estimated cost nominal sum based on creation of 3.5m wide link to road network, and onwards to hospital site. | £65,000 |
| | | | | | MRT05 | Assumes need to amend c210 sqm pavement with new lighting / signing etc to connect existing green space to active travel route | Adjustment of existing layout with new signing and amendments to footpaths / cycleway links. | £15,000 |



LEGEND

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- Previous MLX route
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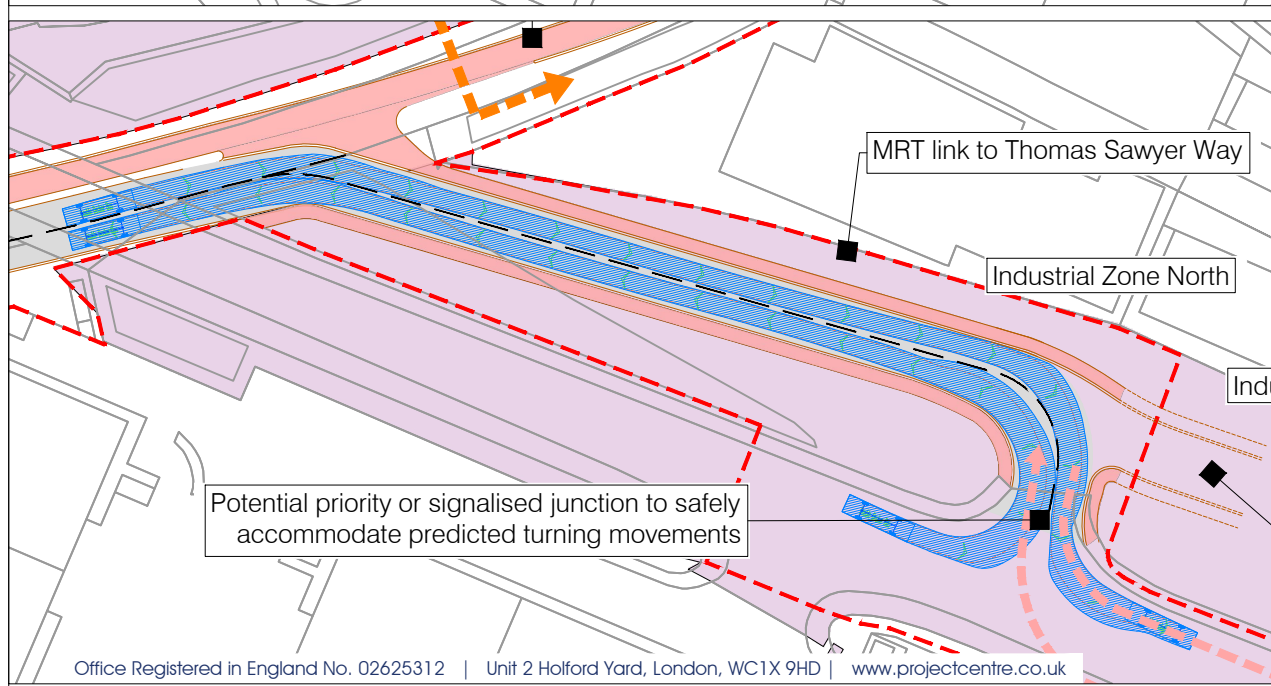
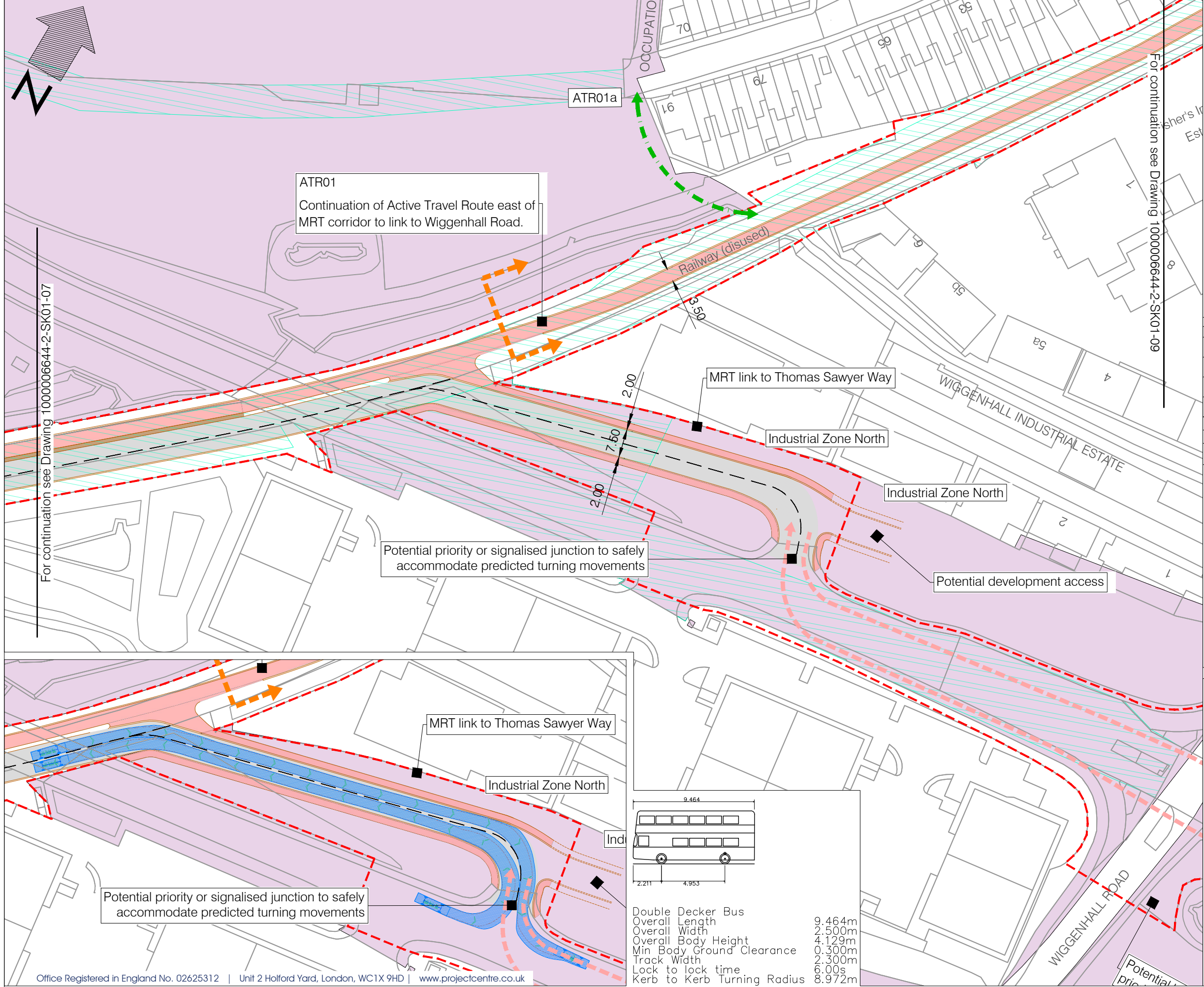
Drawing Title
RIVERSIDE PARK SECTION

Drawing Status
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| | | | | |
|-------------|-------------------|-------------------|-----------------|------------|
| Drawn AV | Designed PC/AV | Date JULY 2020 | Scale 1:1000 | Size A3 |
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| Drawing No. 100006644-2-SK01-07 | Rev - |
|------------------------------------|----------|

| Drawing Ref 100006644-2 | Description | Constraints/Issues | Cycle & Pedestrian Access | | Development interface | | Infrastructure Investment Required | Budget Cost Estimate |
|---|---|---|---------------------------|---|--|-----------------|------------------------------------|----------------------|
| | | | Ref | Description | Ref | Description | | |
| SK01-08 Thomas Sawyer Way Section and SK01-09 Wiggenhall Road Link | <p>Safeguard former rail corridor and continue safeguarding north to Wiggenhall Road to maintain cycle route.</p> <ul style="list-style-type: none"> Route turns east to land parcel south of Wiggenhall Road Industrial Estate. Links to existing highway access to Thomas Sawyer Way. Traffic signal installation likely to be required at Thomas Sawyer Way access. | <p>Access for MRT from the highway network will be required at this location as there are no other at-grade links that can be utilised to allow MRT to move between the highway and off-street route.</p> <p>The Active Travel route can continue east from this location to link to Wiggenhall Road via new ramped connections (referenced as ATR).</p> <p>Extension of the active travel route past the MRT corridor may not be funded through MRT delivery; therefore, a separate cost estimate has been provided for its continuation past Thomas Sawyer Way.</p> | ATR01 | <p>Continuation of active travel route to east of MRT to link to Wiggenhall Road (currently used as part of active travel social distancing network in Watford).</p> <p>The active travel route will benefit all proposed developments along the MRT corridor.</p> <p>Potential for landscaping improvements could also be considered – pocket parks / leisure routes would benefit new residents and workers by creating green gyms and leisure-focused areas.</p> | Industrial Zone North - no current application reference | | | |
| | | | MRT Access | Land required for safeguarding could accommodate MRT and be used for development purposes for remaining land parcel. Combined use design may be plausible over MRT section (e.g. parking uses). | Costs for delivering signalised access to Thomas Sawyer Way and accommodating future access routes to MRT corridor and land parcel covered under MRT development | £n/a | | |
| | | | ATR01 | Contributions from all corridor development sites to enable delivery of cycle and pedestrian route to Wiggenhall Road, including associated highway interfaces. | Clearance and pavement construction for active travel route – 450m long | £195,000 | | |
| | | | ATR01a | Link to Cardiff Road and communities to north of corridor. | Clearance and pavement construction | £17,500 | | |
| | | | ATR01b | Ramped access options for cyclists and pedestrians to join cycle/pedestrian route from Wiggenhall Road – potential to introduce both for enhanced route access. | Ramp to west side of Wiggenhall Road plus crossing on Wiggenhall Road | £90,000 | | |
| | | | ATR01c | Requirement for new crossing on Wiggenhall Road to allow safe links to route. | Via old rail bridge and ramp to east side of Wiggenhall Rd | £85,000 | | |
| | | | | Provision of ramp connections to Wiggenhall Road | | | | |
| | | | | | Total estimated cost of active travel route extension to Wiggenhall Road | £387,500 | | |



| | |
|-----------------------------|--------|
| Double Decker Bus | 9.464m |
| Overall Length | 2.500m |
| Overall Width | 4.129m |
| Overall Body Height | 2.300m |
| Min Body Ground Clearance | 0.300m |
| Track Width | 2.300m |
| Lock to lock time | 6.00s |
| Kerb to Kerb Turning Radius | 8.972m |

LEGEND

- Extent of proposed safeguarding
- Proposed cycle path
- MRT running lanes
- Proposed 1m buffer
- Proposed kerb
- Potential location for station
- Cycle way/Pedestrian link
- Future development pedestrian/cycle linkage
- Previous MLX route
- WBC ownership

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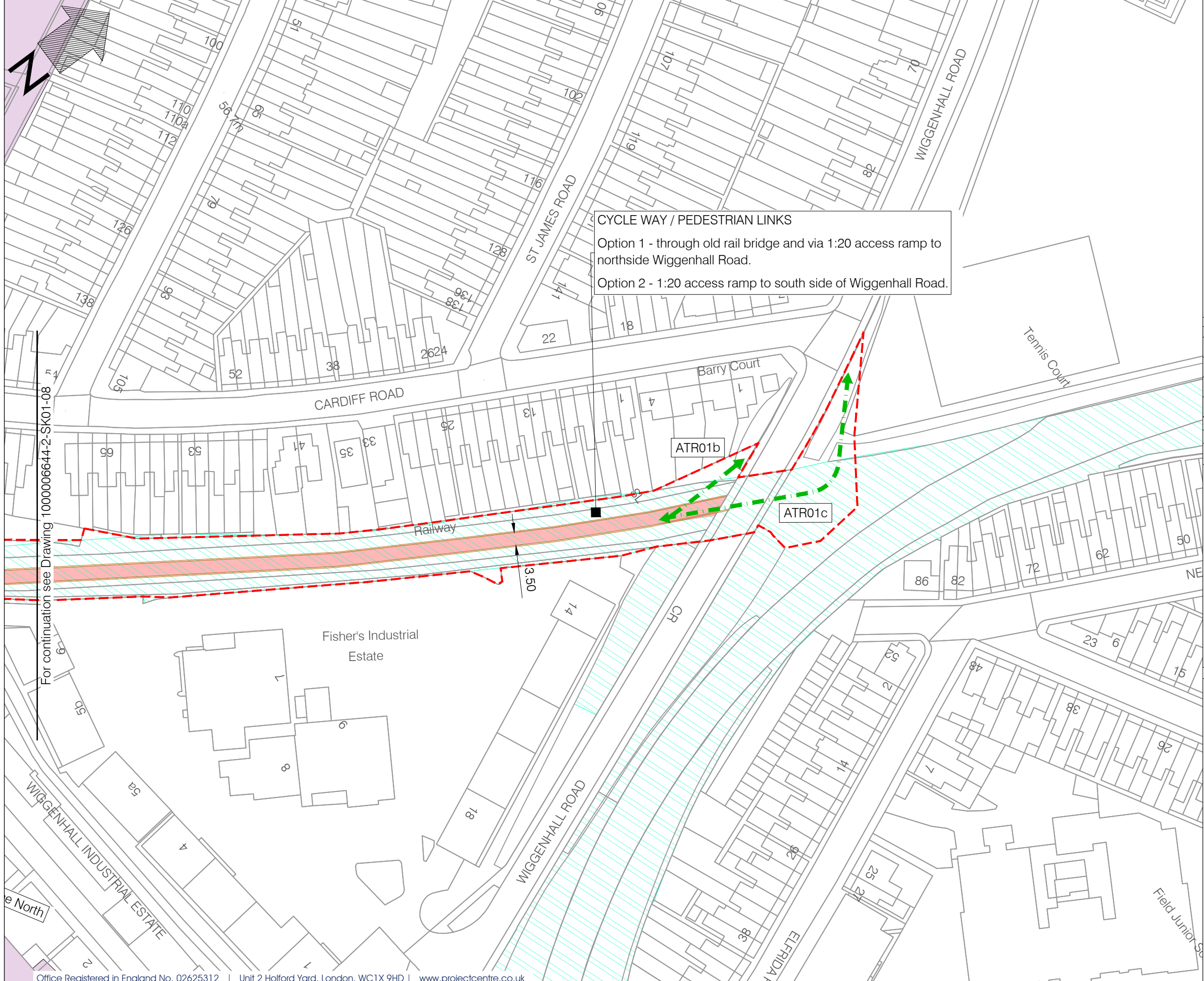
Client

Project
 MRT SAFEGUARDING

Drawing Title
 THOMAS SAWYER WAY SECTION

Drawing Status
FOR INFORMATION

| | | | | |
|------------------------------------|-------------------|-------------------|-----------------|------------|
| Drawn AV | Designed PC/AV | Date JULY 2020 | Scale 1:1000 | Size A3 |
| Drawing No. 100006644-2-SK01-08 | | | | Rev - |



LEGEND

- Extent of proposed safeguarding
- Proposed cycle path
- MRT running lanes
- Proposed 1m buffer
- Proposed kerb
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- Future development pedestrian/cycle linkage
- Previous MLX route
- WBC ownership

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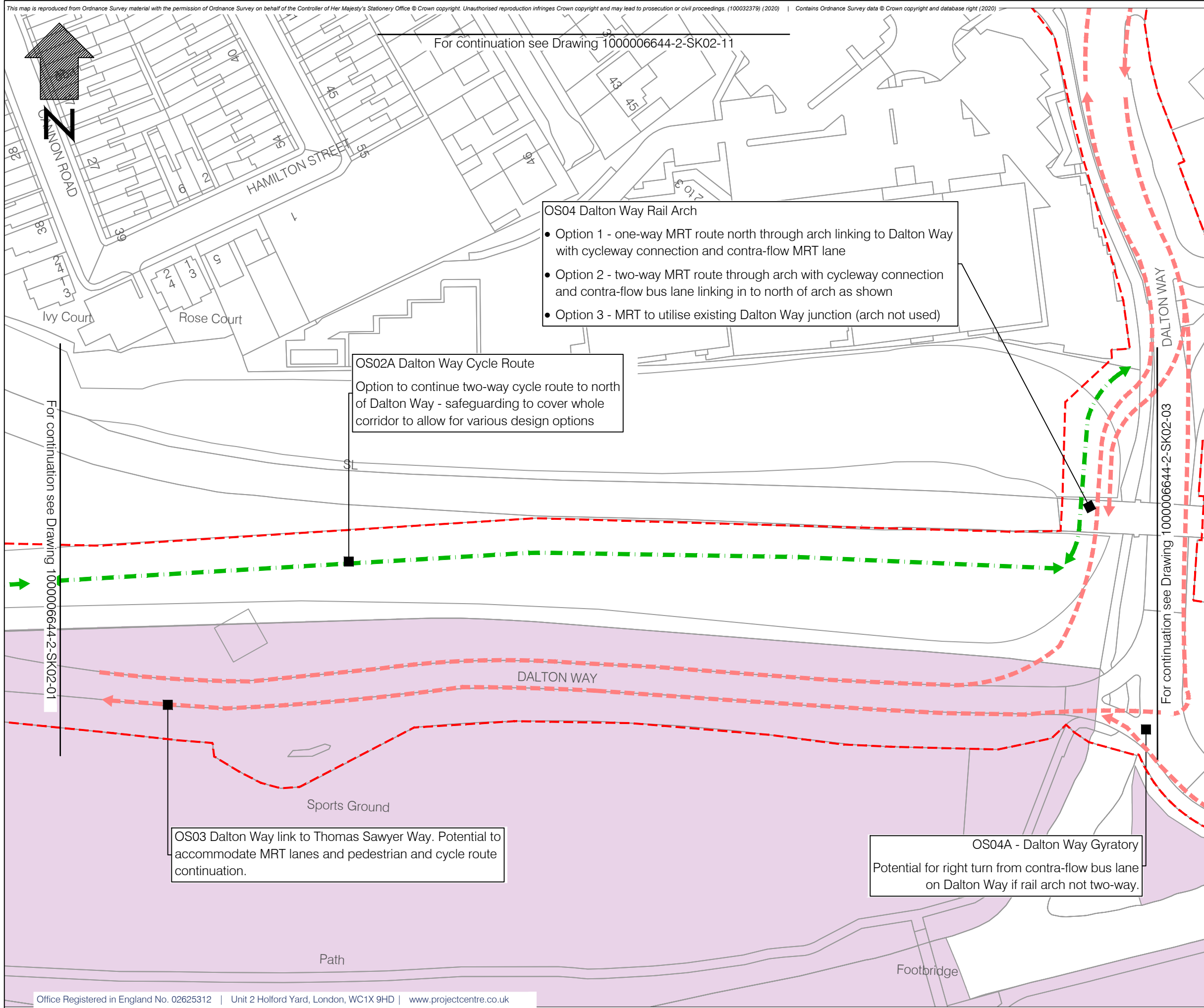
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|----------------|----------------------|-----------|--------|------|
| Client | | | | |
| Project | MRT SAFEGUARDING | | | |
| Drawing Title | WIGENHALL ROAD LINK | | | |
| Drawing Status | FOR INFORMATION | | | |
| Drawn | Designed | Date | Scale | Size |
| AV | PC/AV | JULY 2020 | 1:1000 | A3 |
| Drawing No. | 1000006644-2-SK01-09 | | | Rev |
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3.3 On-Street Section Plans

3.3.1 The following table describes the potential on-street section of the MRT route from Thomas Sawyer Way and Dalton Way to Lower High Street. The following sketch plans indicate the potential route and options identified to determine whether safeguarding might be required. Land requirements will mainly be within the highway boundary. There is no requirement to safeguard the public highway. However, an assessment has been undertaken to determine sections of the route that may provide options for MRT routing, and hence that should ideally be safeguarded until option assessment work is complete and a preferred option identified.

| Drawing Ref | Plan Ref | Description |
|--|-------------|---|
| 1000006644-2 | | |
| SK02-01 Thomas Sawyer Way | OS01 | Land to north of Thomas Sawyer Way associated with petrol station could potentially be utilised to provide an MRT Station, or to enable re-design of the traffic signal junction to provide bus priority. Safeguarding line incorporates this area to provide design flexibility. |
| | OS02 & 2A | Land to north of Dalton Way could be used to continue two-way cycle route link from MRT route to Town Centre via existing NCR on Dalton Way gyratory. |
| | OS03 | Assume use of kerbside MRT lanes, with associated need for local widening and improvements at signals to accommodate bus priority measures. |
| SK02-02 Dalton Way | OS4 | Existing railway arch is unused and could potentially be re-opened and incorporated within MRT design. However, there are traffic management and engineering challenges to this proposal and the cost of re-opening the arch might not be offset by the journey time benefits gained. Recommendation is to safeguard area until option assessment work has been undertaken. |
| | OS4A & OS05 | Potential contra-flow lane on Dalton Way would provide consistency in MRT routing, i.e. avoiding dividing the route around the gyratory system. Again, may not be feasible and benefits may not outweigh costs, but option should be safeguarded until design work is completed. Various options possible for contra-flow lane to access Dalton Way, as shown on sketch. |
| SK02-03 Dalton Way Gyratory | OS06 | If contra-flow MRT lane is not feasible, services may have to utilise gyratory system as shown. Safeguarding would be needed to rear of public highway. |
| SK02-04 Dalton Way Gyratory | OS07 | MRT service would access Watford High Street rail station via existing bus and taxi only Lower High Street. No requirement for safeguarding identified. |

For continuation see Drawing 1000006644-2-SK02-11



OS04 Dalton Way Rail Arch

- Option 1 - one-way MRT route north through arch linking to Dalton Way with cycleway connection and contra-flow MRT lane
- Option 2 - two-way MRT route through arch with cycleway connection and contra-flow bus lane linking in to north of arch as shown
- Option 3 - MRT to utilise existing Dalton Way junction (arch not used)

OS02A Dalton Way Cycle Route

Option to continue two-way cycle route to north of Dalton Way - safeguarding to cover whole corridor to allow for various design options

OS03 Dalton Way link to Thomas Sawyer Way. Potential to accommodate MRT lanes and pedestrian and cycle route continuation.

OS04A - Dalton Way Gyratory
Potential for right turn from contra-flow bus lane on Dalton Way if rail arch not two-way.

LEGEND

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- Proposed cycle path
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- Proposed kerb
- Cycle way/Pedestrian link
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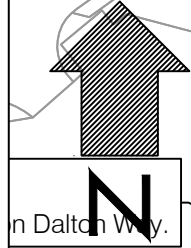
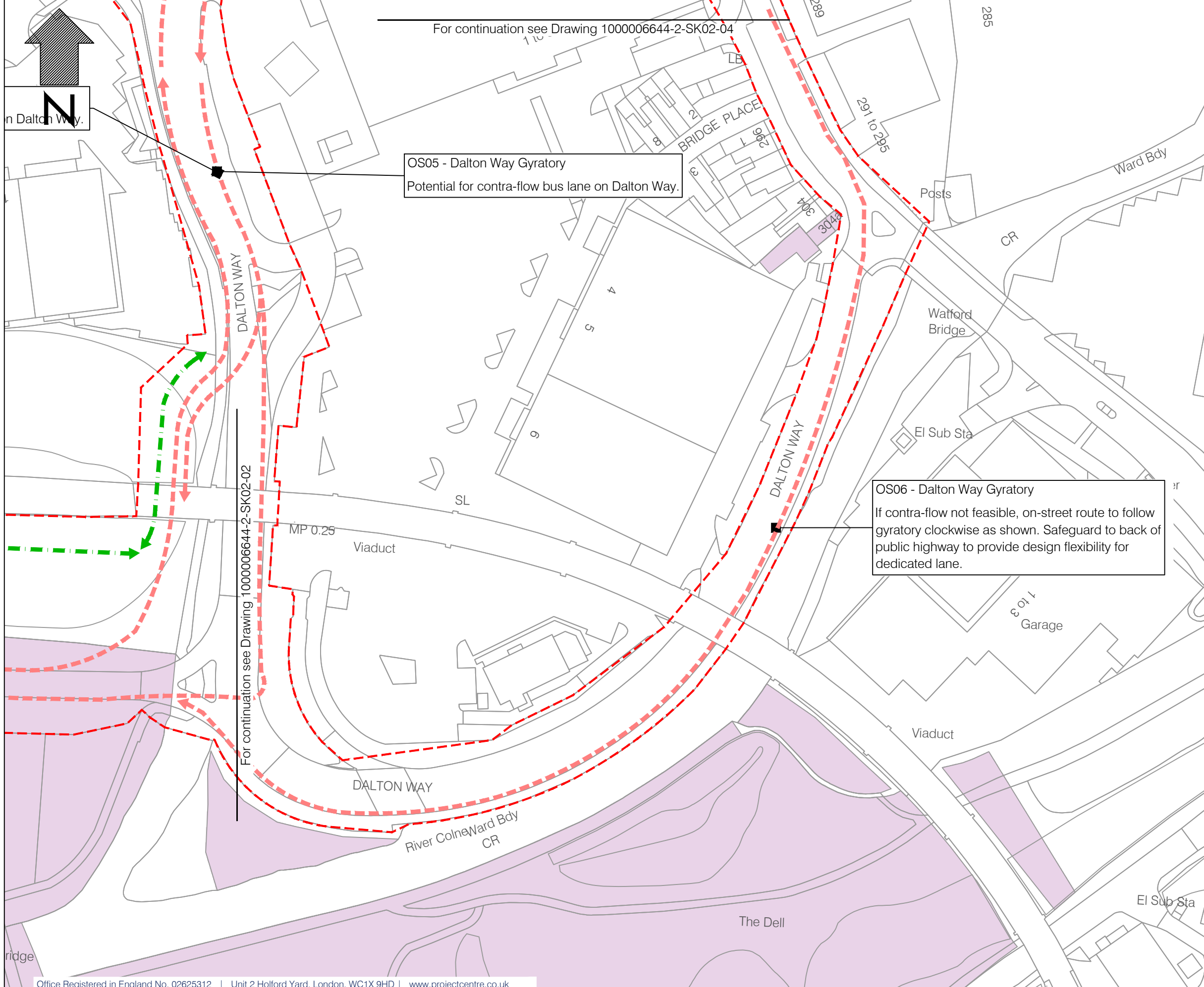
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Project
MRT SAFEGUARDING

Drawing Title
THOMAS SAWYER WAY OFF STREET SECTION 2

Drawing Status
FOR INFORMATION

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| Drawing No. 1000006644-2-SK02-02 | Rev - | | | |



LEGEND

- Extent of proposed safeguarding
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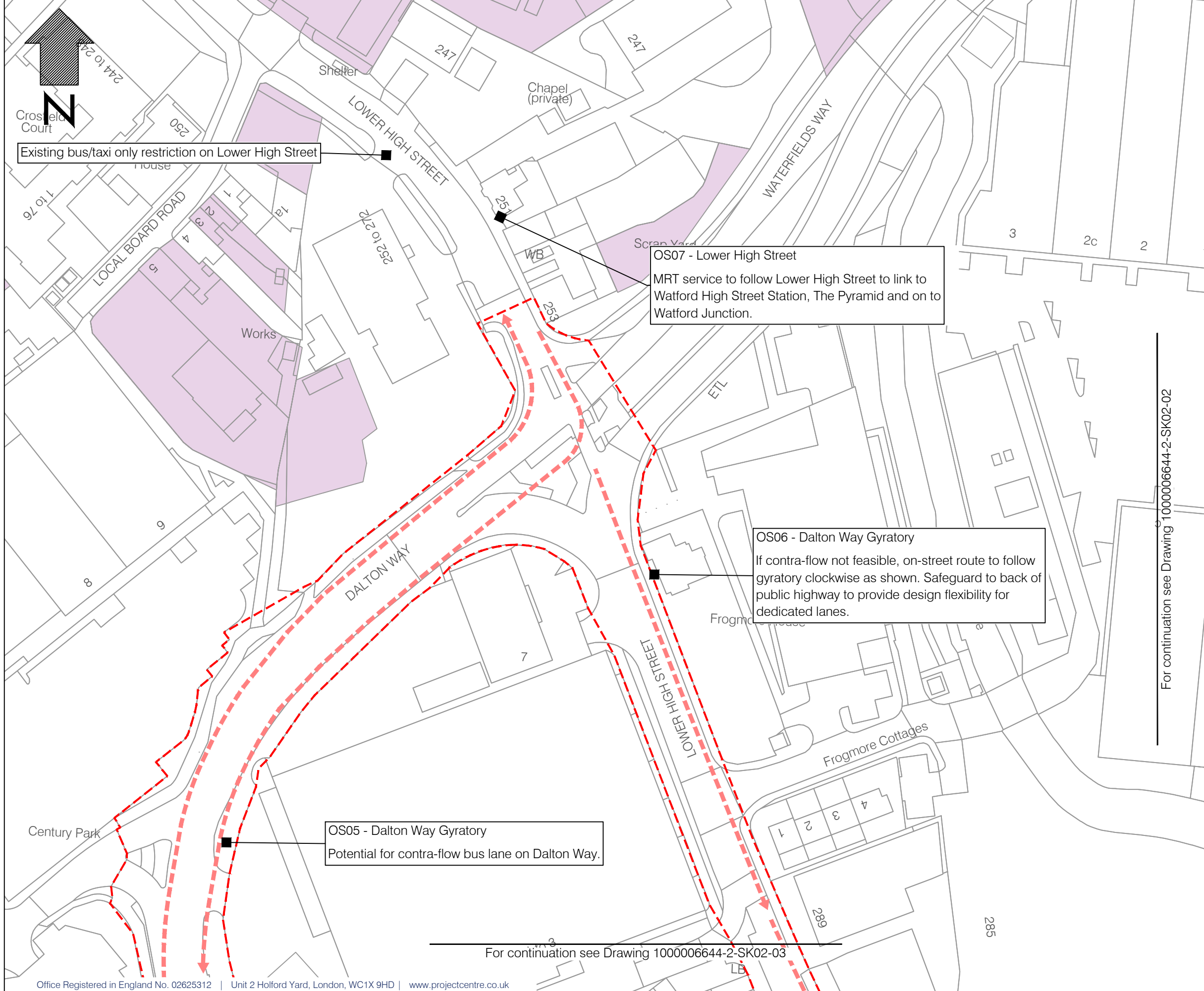
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| Client | |
| Project | MRT SAFEGUARDING |
| Drawing Title | THOMAS SAWYER WAY OFF STREET SECTION 2 DALTON WAY NORTH |
| Drawing Status | FOR INFORMATION |
| Drawn | AV |
| Designed | PC/AV |
| Date | JULY 2020 |
| Scale | 1:1000 |
| Size | A3 |
| Drawing No. | 1000006644-2-SK02-03 |
| Rev | - |



Existing bus/taxi only restriction on Lower High Street

OS07 - Lower High Street
MRT service to follow Lower High Street to link to Watford High Street Station, The Pyramid and on to Watford Junction.

OS06 - Dalton Way Gyratory
If contra-flow not feasible, on-street route to follow gyratory clockwise as shown. Safeguard to back of public highway to provide design flexibility for dedicated lanes.

OS05 - Dalton Way Gyratory
Potential for contra-flow bus lane on Dalton Way.

For continuation see Drawing 1000006644-2-SK02-03

LEGEND

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For continuation see Drawing 1000006644-2-SK02-02



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Drawing Title
THOMAS SAWYER WAY OFF STREET SECTION 2
DALTON WAY NORTH

Drawing Status
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| Drawn AV | Designed PC/AV | Date JULY 2020 | Scale 1:1000 | Size A3 |
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APPENDIX A- BUDGET COST ESTIMATES FOR INFRASTRUCTURE

QUALITY

It is the policy of Project Centre to supply Services that meet or exceed our clients' expectations of Quality and Service. To this end, the Company's Quality Management System (QMS) has been structured to encompass all aspects of the Company's activities including such areas as Sales, Design and Client Service.

By adopting our QMS on all aspects of the Company, Project Centre aims to achieve the following objectives:

1. Ensure a clear understanding of customer requirements.
2. Ensure projects are completed to programme and within budget.
3. Improve productivity by having consistent procedures.
4. Increase flexibility of staff and systems through the adoption of a common approach to staff appraisal and training.
5. Continually improve the standard of service we provide internally and externally.
6. Achieve continuous and appropriate improvement in all aspects of the company.

Our Quality Management Manual is supported by detailed operational documentation. These relate to codes of practice, technical specifications, work instructions, Key Performance Indicators, and other relevant documentation to form a working set of documents governing the required work practices throughout the Company.

All employees are trained to understand and discharge their individual responsibilities to ensure the effective operation of the Quality Management System.



Award Winning



Certifications



FS 77166

Accreditations



Memberships



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