

OLD OAK COMMON

Lineside Road Rail Access Point (RRAP) South West Access Optioneering Options Selection Summary Report

152270-ARC-REP-ECV-000026

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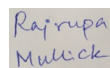
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Old Oak Common RRAP Optioneering

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This report dated 10 July 2020 has been prepared for Network Rail (the “Client”) in accordance with the terms and conditions of appointment dated 02 November 2018(the “Appointment”) between the Client and **Arcadis Consulting (UK) Limited** (“Arcadis”) for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

CONTENTS

1	INTRODUCTION & AIMS	4
1.1	Introduction	4
1.2	Aim	5
1.3	Assumptions	5
1.3.1	RRAP Classification.....	5
1.3.2	Road Rail Vehicle	6
1.3.3	RRAP Vehicle Mounting	8
2	RRAP REQUIREMENTS	8
2.1	General RRAP requirements from NR.....	8
2.2	SW RRAP Requirements from NR.....	9
2.3	Compound Requirements.....	10
3	OPTIONS OVERVIEW	10
3.1	Option A – Jewson’s Yard	11
3.2	Option B – North Pole Depot	11
4	OPTIONEERING	11
4.1	Option A: Jewson’s Yard	12
4.1.1	Option 1:	12
4.1.2	Option 2:	12
4.1.3	Option 3:	12
4.2	Option B:.....	12
4.2.1	North Pole Depot	12
4.3	Land	13
4.4	RRV Access Onto Track	14
4.5	Highway Access	14
4.6	Compound area	14
4.7	Asset Clash	14
4.8	Topography	15
4.9	Safety	15
5	SUMMARY	16
5.1	Preferred Option	16
5.2	Next Steps	17

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Other documents associated with this submission	152270-ARC-REG-EMG-100001-TIDP 152270-ARC-REP-ECV-000024 AR011 Jewson's Yard Feasibility 152270-ARC-REP-ECV-000025 AR011 North Pole Depot Feasibility		

1 Introduction & Aims

1.1 Introduction

Arcadis have been commissioned to complete GRIP Stages 3 and 4 design for the railway systems associated with the introduction of a new Great Western Mainline (GWML) at Old Oak Common. The station will have eight platforms and will act as an interchange between High Speed 2, Crossrail and the GWML. It will be the first mainline station destination for trains leaving Paddington heading west. The existing four track railway will be reconfigured to an eight-track system – four tracks for the mainline and four for the Crossrail services.

The objective of the OOC Railway Systems project is to remodel all railway infrastructures to enable the new OOC station and platforms to be delivered and function effectively. The full scope of the Railway Systems Option Selection design can be found in the Option Selection Report (152270-ARC-REP-EMD000002).

Arcadis is required to produce a feasibility study for the South West RRAP location for Option A : Jewson Yard and Option B : North Pole Depot and a comparison of the options.

Further to the submission of GRIP Stage 4, under Change Alteration AR011, Arcadis have been asked to look into incorporation of a design of the South West Access points as follows:

Option A : Jewson's Yard: Progress an option which includes purchase of part or all of the yard to allow for the requirements regarding space recorded in the NR 'Access Point Strategy v0.2'.

Option B : North Pole Depot Access: To take consideration of GRIP 4 track alignment. To be based on currently available survey information. Not to encroach upon depot lines

and to maintain 2.5m from running edge of depot lines to compound fence line. This is to be located in the vicinity of the Western Access to North Pole depot from OOC.
Note: vehicle moves would likely pass through the depot from the West.

This report compares the options describing the key features along with advantage and disadvantage of one over the other.

1.2 Aim

The aim of this report is to bring together feasibility reports 152270-ARC-REP-ECV-000024 and 000025 to summarise and compare both options, and to provide a recommendation for proceeding.

1.3 Assumptions

This feasibility study has been carried out based on information available in:

- NR Routeview
- OS tiles (where available)
- LiDAR
- Railway Infrastructure Alignment Acquisition System (RILA) data
- Google maps and Google Earth

Topographical survey data was not available for the proposed RRAP location at the time of writing this report.

1.3.1 RRAP Classification

This RRAP is to be a Class 3 and Security Level 2 RRAP as detailed in the Network Rail Infrastructure Access Points – Best Practice Design Guide (CS075481) produced by Capita. This document states that a “Class 3 On Track Plant/On Track Machine (small) RRAP consists of RRV access, 6m vehicle access gate, located in the boundary fence with padlock / slide bar, dedicated parking space for car / van along with limited storage space for materials. Used for RRV access light / maintenance works.”

The document also states that a Level 2 Security is an “enhanced level of security, this would include the same deterrents as basic level, but would also include permanent switchable lighting of compound areas.” Level 1 is classed as basic level of security which includes standard Network Rail 1.8m high palisade fencing and gates to prevent access by members of the public.

Network rail has requested suitable lighting at a high level, e.g. typical streetlight,

A typical Class 3 Access Point from the best practice guide is shown in Figure 1.

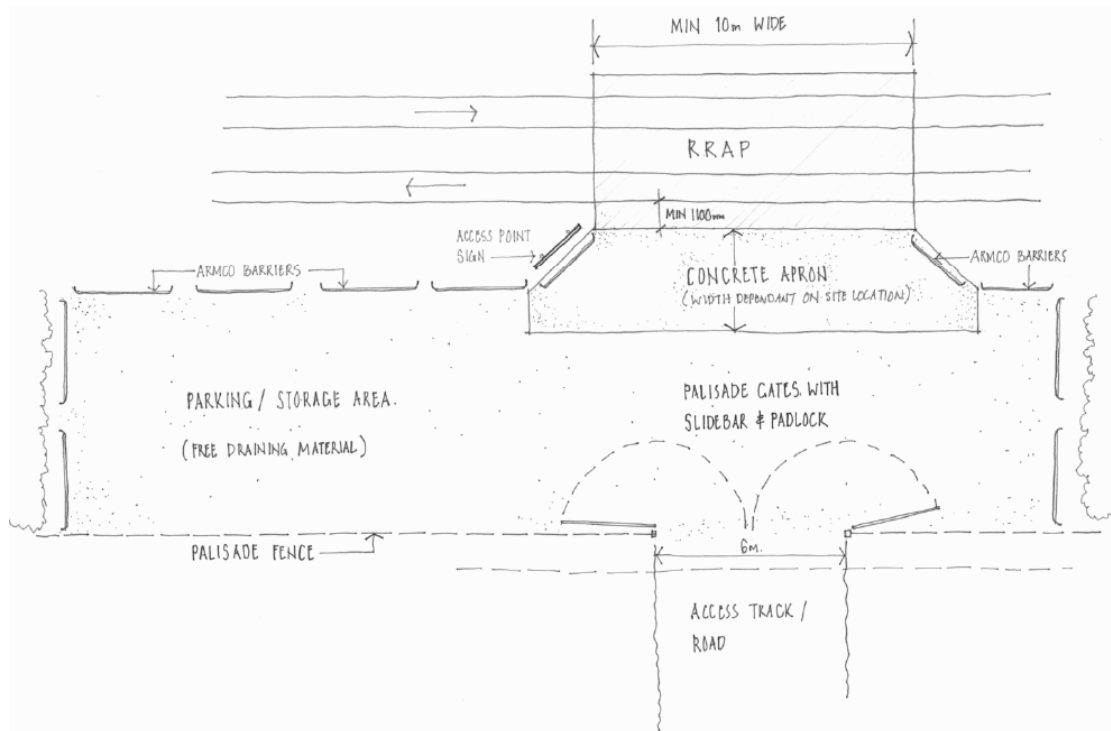
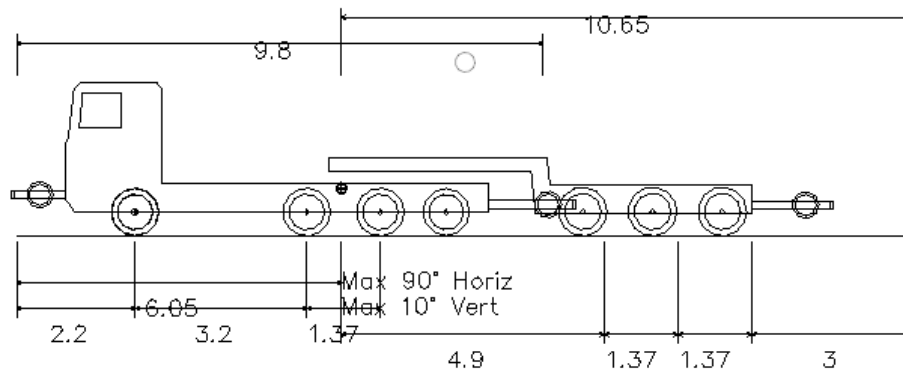


Figure 1 - Typical Class 3 access point from the Best Practice Design Guide

1.3.2 Road Rail Vehicle

The type of vehicle assumed for each option has been stated in the respective report.

It is assumed that the largest vehicle that will be required to access the tracks is the SRS PKR750 or similar (Figure 2 & Figure 3). This vehicle is usually used for installation of gantries and is not usually required during the regular maintenance phase. Therefore, this vehicle being able to join the track in this location will open up options for constructability, and by demonstrating this vehicle can access the track will result in the proving the vast majority of smaller vehicles. However, this vehicle requires a 16.2m RRAP length. Where possible, this vehicle has been tracked.



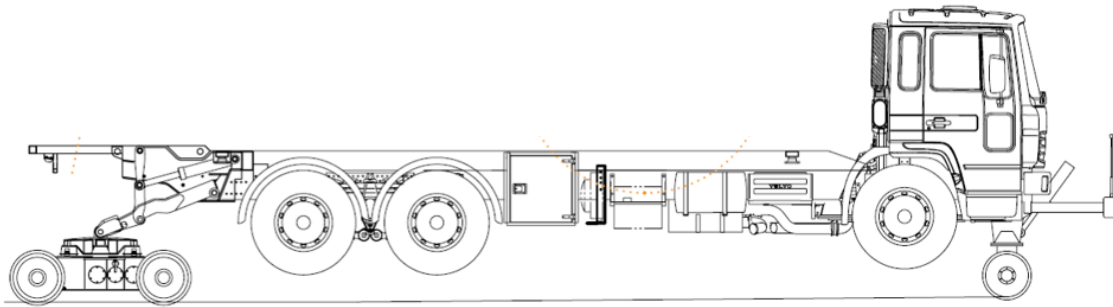
SRS PKR750 Corrected	
Overall Length	16.690m
Overall Width	2.550m
Overall Body Height	2.870m
Min Body Ground Clearance	0.427m
Max Track Width	2.550m
Lock to lock time	4.00s
Wall to Wall Turning Radius	10.850m

Figure 2 - SRS PKR750 Road Rail Vehicle



Figure 3 - SRS PKR750 75 tonne metre crane

Where there isn't sufficient space or capacity for the PKR750, the SRS RB25 has been tracked (Figure 4). The PKR750 (or an equivalent vehicle) is assumed to be the largest vehicle that will need to access the tracks during regular maintenance, and once the tracking of this has been proven, the vast majority of regular maintenance vehicles will also be able to access the RRAP. However, this removes the option of using the RRAP for larger construction vehicles.



RB 25

Technical Data:

Chassis: Volvo or customers choice
Length: ~11,2 m
Width: ~2,5 m
Height: ~2,8 m on road (without module)
Height: 3,1 m from t.o.r (without module)
Total weight: 25000 kg
Weight (RB25): 12540 kg

Rail Drive: SRS Hydrostatic Drive

Speed on track: 70 km/h*
Speed on road: 90 km/h*

Figure 4 - RB 25 Road Rail Vehicle

1.3.3 RRAP Vehicle Mounting

The access point shall provide a level approach of at least five metres of the RRAP. The access shall be a minimum of compacted Type 1 MOT fill with 350 mm construction depth, laid in 75 mm layers. Storage facilities will be positioned so that the RRAP is kept clear for the type of On Track Plant (OTP) that will use it.

NOTE: Requirements for any welfare and storage facilities at any type of access point are detailed in NR/L3/INI/CP0036.

Where demountable machines are to be lifted onto the track, the route should be assessed from the delivery point to the RRAP to determine suitability. The position of outriggers for cranes and other vehicles should be on stable ground. Loads should not be placed onto the track; sleeper ends or cables.

2 RRAP Requirements

2.1 General RRAP requirements from NR

Lineside access points for classic infrastructure, both vehicular and pedestrian (with steps where necessary) shall be retained or replaced with a suitable alternative (matching all existing facilities from the replaced access as a minimum) that is agreed with NR.

New, revised and existing access points shall be reviewed against the Project design, recognising which access points may be used for which maintenance activities, where existing or changed maintenance possession limits are and how protection may be established, or how revised maintenance may impact on the provided Train Service Specification.

All new vehicular access points shall provide Type 1 hard standing parking spaces for vehicles where practicable.

All new vehicular access points shall also be evaluated for potential use as Road / Rail on-track points (RRAPs) for RRVs and shall identify the potential for material and equipment access and storage, where practicable.

Wherever possible, the RRAP shall be located on straight and level track.

Table 1 of NR/L2/RMVP/0200/module P301 Issue 2 recommends the following regarding the locations where RRAPs shall not be located:

- On curves of 200m radius or less where continuous check rails are installed.
- On high ballast shoulder areas.
- Over rail adjustments switches, treadles, axle counters
- Over rail welds or rail joints unless the rail joint is in a siding and the access point has been subject to risk assessment and approval
- Where overhead line equipment (OLE) is less than 4165 mm above rail level (ARL) and where non level road surface could place any part of the on-track plant (OTP) within 600mm of the OLE – as stated in the plant manual.
- Within 20 m of a platform ramp.
- Where cross track cables are present.
- Where red or third rail impedance bonding is present.
- Over Hot Axle Bearing Detectors (HABDs); and
- Where guard rails or lateral resistance end plates are present.

Additionally, Clauses 5 to 9 of NR/L2/RMVP/0200/P301 recommend the following requirements for RRAPs:

- The approach to the RRAP when under OLE is level where reasonably practicable.
- Lineside cables shall be installed to be protected, suitably supported and retained to mitigate the risk of crushing, cutting, stretching or any other foreseeable damage.
- Provide rail head protection at any RRAP where the type of OTP being used has the potential to cause damage.
- Provide a level approach of at least five metres either side of the RRAP. The access road shall be a minimum of compacted Type 1 MOT fill with 150 mm construction depth, laid in 75 mm layers.

In addition to the above points, RRAPs cannot be placed within 10m laterally of an OLE mast (Figure 7 of NR/L2/RMVP/0200/P301 Issue 3). A minimum signal clearance of 5m has provisionally been allowed for.

2.2 SW RRAP Requirements from NR

It is generally expected that the mainlines will only be subject to either a complete block from the West to Paddington, or a block from the West to OOC, with the exception of North Pole depot access.

The increase in assets on the mainlines is currently proposed to be 4No. Turnouts and 2No. Crossovers with associated OLE and signalling infrastructure.

The SW RRAP near Jewson's Yard is to provide access onto both the Up and Down Main where possible.

2.3 Compound Requirements

The proposed South West RRAP will be located within the compound near the Jewson's Yard. The compound and RRAP can be accessed from Horn Lane / A4000 public road as shown in Figure 5.

It has been specified that each of the RRAPs/compound areas will require the following:

- A secure compound,
- Level access, for 5m, on the approach to the railway,
- Allow a sept envelope of "HG Rigid Vehicle" from the 1983 Standard British Design Library to access the railway.

The logistics compound will need to provide:

- room for 8 No. Transit vans,
- Laydown area which is 5m wide by 35m. The laydown area should enable a 30m SG switch to be delivered and then lifted and transported to Track,
- Suitable lighting at a high level, e.g. typical streetlight,
- Should ideally be located adjacent to the RRAP as any distance between this and RRAP would interfere with productivity and have a possible impact upon rostering.

Table 1 presents the requirements to carry out maintenance of road-rail access points in addition to the instructions provided by the manufacturers.

Table 1 - Road-rail access points maintenance requirements

Infrastructure element	Maintenance requirements
Signs	Keep all safety instruction signs or labels clean and legible. Replace or touch up the sign or label if any of it is missing.
Road profile between the railway boundary and the RRAP	Maintain the road profile so that underside of the vehicles using it will not touch the ground.
Drainage (associated with the access point)	Keep clear of all debris to allow the water to be free flowing.
Permanent lighting (associated with the access point)	Maintain the permanent lighting in accordance with NR/L2/ELP/27238.

3 Options Overview

Figure 5 shows an overview of the two options in this Options Report.

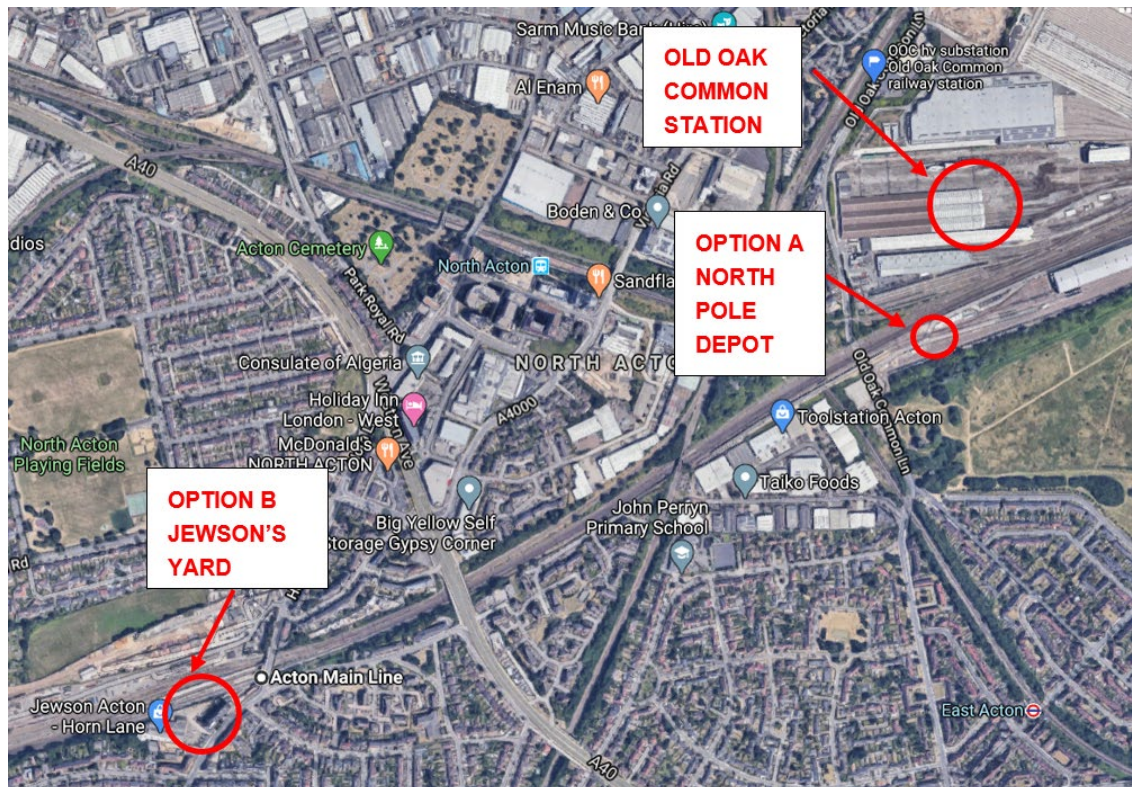


Figure 5 - Site Plan showing North Pole Depot and Jewson's Yard location

3.1 Option A – Jewson's Yard

The Jewson's Yard located approximately 1.5 miles from the Old Oak Common site is identified as a potential location for the SW RRAP. It is in close proximity to the Horn Lane Overbridge and Acton Main Line Station. The site has been studied and 3 possible locations are proposed for placing the RRAP. Access is provided through Horn Lane.

Reference is to be made to the Report 152270-ARC-REP-ECV-000024 for details.

3.2 Option B – North Pole Depot

The site is located off Mitre Way near the Hitachi Depot. Mitre way is accessed via Old Oak Common Lane to the west. All existing tracks within the vicinity are being replaced by a new permanent way layout to accommodate the new station.

Land purchase would be required from Hitachi.

Reference to be made to the Report 152270-ARC-REP-ECV-000025 for details.

4 Optioneering

This section summarises the options research undertaken.

4.1 Option A: Jewson's Yard

The three options proposed for locating RRAP near Jewson's Yard are as follows (Figure 6):

4.1.1 Option 1:

This option proposes positioning the RRAP towards the country end, close to Jewson's Yard boundary fence. The RRAP shall span on to both Up Main and Down Main lines. The length of the RRAP shall be 16.2 m.

4.1.2 Option 2:

This option proposes placing the RRAP near the OLE gantry, in front of Jewson's Yard building. The RRAP shall span only on Down Main line. The length of the RRAP shall be 10.8 m.

4.1.3 Option 3:

This option recommends laying RRAP near the London end of Down Main line in front of Jewson's Yard building, close to the existing access road. The RRAP shall span only on Down Main line. The length of the RRAP shall be 10.8 m.

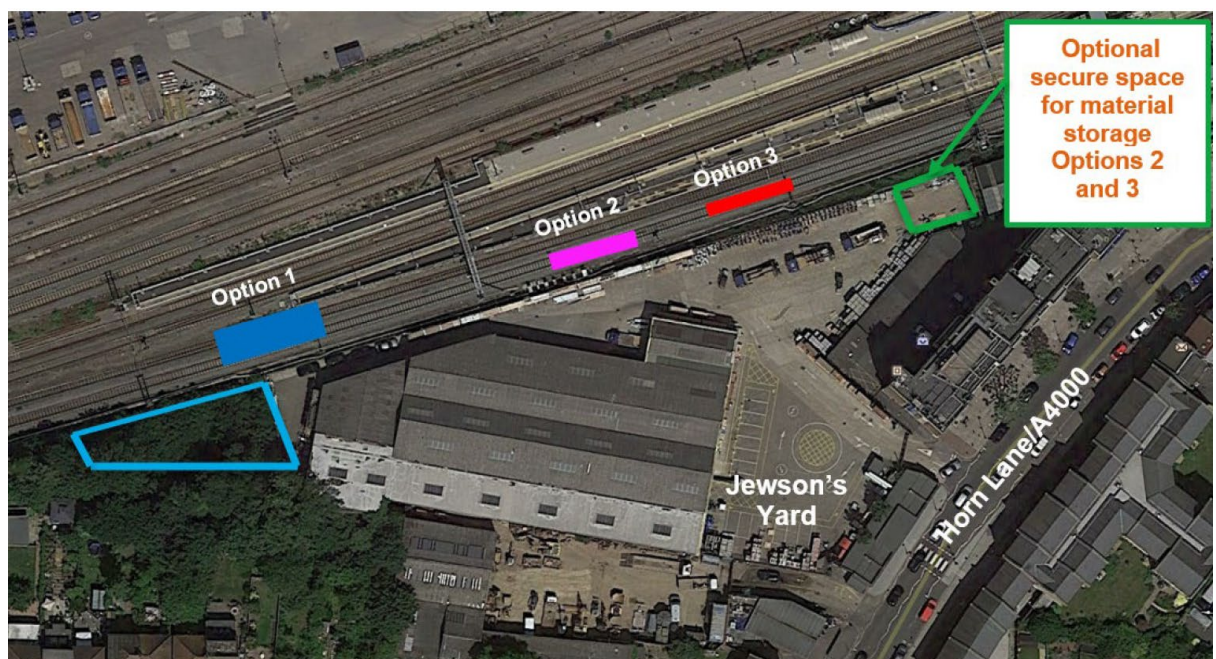


Figure 6 - Site plan showing 3 possible options for Jewson's Yard

4.2 Option B:

4.2.1 North Pole Depot

The RRAP will be located within a new compound to the west of the North Pole Depot site (Figure 7). The compound and RRAP will be accessed from Scrubs Lane, Mitre Way and along the Hitachi internal road system. The length of the RRAP shall be 16.2 m.

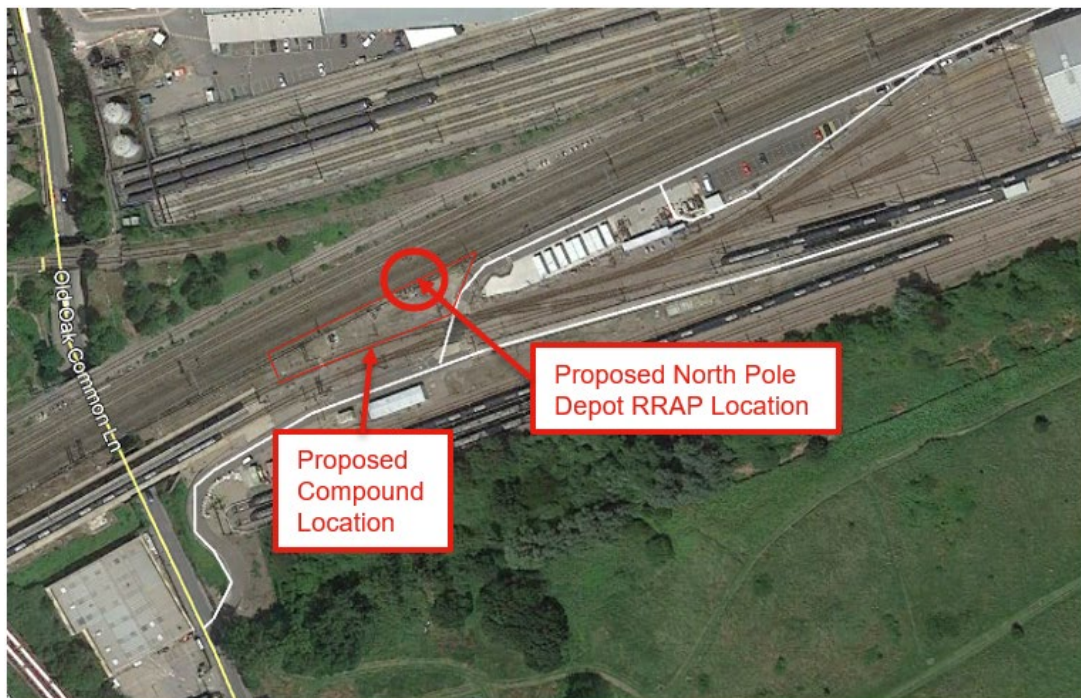


Figure 7 - Site Plan showing North Pole Depot

4.3 Land

The land acquisition / leasing requirements of the proposed options are listed in Table 2:

Table 2 – Land Acquisition/purchase requirements

Option	Purpose	Property Detail & Land Measurement (approx.)
A1: Jewson's Yard (Country end)	Access road from the Horn lane Parking Area (RRV and other vehicles) RRV mounting on the RRAP	Jewson's Yard (approx. 850 m2) Private area (covered in vegetation) (approx. 100 m2) for RRV movement ease (if necessary)
A2: Jewson's Yard (Signal cabinet location)	Access road from the Horn lane Parking Area (RRV and other vehicles) RRV mounting on the RRAP	Jewson's Yard (approx. 750 m2)
A3: Jewson's Yard (London end)	Access road from the Horn lane Parking Area (RRV and other vehicles) RRV mounting on the RRAP	Jewson's Yard (approx. 500 m2)
B: North Pole Depot	Access road Parking Area (RRV and other vehicles) RRV mounting on the RRAP	Hitachi (approx. 1400 m2)

4.4 RRV Access Onto Track

The RRV access details are summarised in Table 3.

Table 3 - RRV capability

Option	RRAP Length	Access to Track	RRV
A1: Jewson's Yard (Country end)	16.2m	Up and Down Main	PKR 750 (Overall length 16.7m)
A2: Jewson's Yard (Signal cabinet location)	10.8m	Down Main	RB 25 (Overall length 11.2m) or similar
A3: Jewson's Yard (London end)	10.8m	Down Main	RB 25 (Overall length 11.2m) or similar
B: North Pole Depot	16.2m	Up and Down Main	PKR 750 (Overall length 16.7m)

The clashes mentioned in Section 4.7 of this report are anticipated to be relocated.

4.5 Highway Access

Jewson's Yard: Access road from Horn Lane (A4000) through Jewson's Yard. Acton Station footbridge and Horn Lane Overbridge in close proximity of the site. The available headroom to be checked.

North Pole Depot: Access via Old Oak Common Lane. Headroom available is 3.8m for the Old Oak Common Lane Underbridge. The proposed WSP bridge to be studied.

4.6 Compound area

A dedicated parking space for car / van along with limited storage area shall be necessary. The compound shall be fenced with Armco Barriers (track side) and Palisade fence (other sides). 6.0m wide Palisade Gate shall be provided with locking system. An approx. area of 270 m² is available for storage and an approx. area of 300 m² is available in front of the building for parking.

This is a multidisciplinary project which will require the Civils design team to maintain close liaison with the OLE, Signals, Track, Drainage, and other relevant disciplines, including the constructability of OOC.

4.7 Asset Clash

Table 4 presents the existing asset clashes, and the proposed solutions.

Table 4 - Asset Clash Summary

Option	Asset Clash	Solution
A1: Jewson's Yard (Country end)	OLE Structure (2Nos) Cable trough Platform and stairs fence	Moving the OLE posts 10m from the end of RRAP URX Proposed below the RRAP New fence to be installed (without any projection from the platform edge)
A2: Jewson's Yard (Signal cabinet location)	Signal Cabinet (7Nos) Cable trough	Preferred option: Moving the cabinets towards the London end (less than 10m) Or Moving the cabinets towards Country end (approx. 10m) and placing on the other side of OLE gantry URX Proposed below the RRAP
A3: Jewson's Yard (London end)	Cable trough	URX Proposed below the RRAP
B: North Pole Depot	Junction lighting Cabinet	Moving the cabinets and Junction lighting URX Proposed below the RRAP

4.8 Topography

The track gradient and super elevation for the options is mentioned in Table 5:

Table 5 - Topography

Option	Gradient between tracks	Super elevation
A1: Jewson's Yard (Country end)	1 in 44 to 1 in 63	Down Main: 80mm Up Main: 70mm
A2: Jewson's Yard (Signal cabinet location)	1 in 15 to 1 in 20 (RRAP cannot be extended to both track)	Down Main: 80mm Up Main: 70mm
A3: Jewson's Yard (London end)	N/A	Down Main: 80mm Up Main: 70mm
B: North Pole Depot	0	Down Main: No cant Up Main: 5mm – 25mm

4.9 Safety

The safety concerns for the Jewson's Yard are listed below:

- The edge of the platform is within 2.0m from the edge of RRAP.

- Station Footbridge and Horn's Lane overbridge are in proximity to the site. The available headroom to be investigated.
- Buried service and drainage information is required for RRAP detail design.
- Signals, OLE structures, sign board and other structures in proximity to the RRAP to be protected by 1.8m high Palisade fence to avoid any operational hazard.
- The access road to the RRAP is shared with Jewson's Yard, hence proper fencing to ensure security of the compound.
- Potential blocking of Emergency Exits for the Jewson Building.

The safety concerns for the North Pole Depot are listed below:

- North Pole Depot has to cross a rail crossing (although used infrequently) to get to the compound
- Old Oak Common Lane underbridge has a headroom clearance of 3.8m. The Proposed WSP bridge towards Country end to be studied.
- Signals, OLE structures, sign board and other structures in proximity to the RRAP to be protected by 1.8m high Palisade fence to avoid any operational hazard.

Large vehicles accessing the RRAP will need to ensure there is a safe interface with the public. At the next GRIP stage consideration should be given to:

- a) access routes through minor roads.
- b) seasonal or periodic road availability.
- c) access rights and suitability of private roads.
- d) traffic management requirements.
- e) access through the boundary gate from public highways.
- f) height, width and weight restrictions on public highways.
- g) delivery vehicle size and manoeuvrability.
- h) condition of existing highway surface and verges.
- i) third party overhead services.

5 Summary

5.1 Preferred Option

The advantages and disadvantages of each option are summarised in Table 6:

Table 6 – Summary Table

Option	Advantage	Disadvantage
A1: Jewson's Yard (Country end)	NR can access both tracks PKR 750 can access the track	Replacing the OLE post (feasible yet difficult) Using Jewson Yard area (significant disturbance) Might need acquiring the neighbouring private land (approx. 100m ²) for RRV movement ease, as difficult access at present
A2: Jewson's Yard (Signal cabinet location)	Provision for longer RRAP of 16.2m by replacing OLE / Signal	NR cannot access the Up Main due to the gradient between tracks Replacing signal cabinets (considered feasible) Using Jewson Yard area (significant disturbance) PKR 750 cannot access the track
A3: Jewson's Yard (London end)	No removal of service Provision for longer RRAP of 16.2m by replacing OLE / Signal	NR cannot access the Up Main due to platform proximity Using Jewson Yard area (significant disturbance) PKR 750 cannot access the track
B: North Pole Depot	NR can access both tracks	The tracks are not parallel Hitachi land acquisition necessary

Both options (Jewson's Yard and North Pole Depot) are feasible, with sufficient highway access, and space for RRAP and storage. Aside from the physical space and asset clash practicalities investigated in these reports, it is likely to come down to the land purchasing/leasing which is to be determined by Network Rail. Disturbance to Jewson would be greater than the disturbance to Hitachi (in terms of proportion of space acquired and disruption to business).

From the research undertaken in these reports, on balance it is suggested by Arcadis that the North Pole Depot RRAP is pursued. This location allows easy access onto the Up and Down main, which is not affected by the track cant (like Jewson's Yard) and is closer to the station, meaning less time spent travelling during shifts. The GRIP 4 design has accounted for the RRAP to be here, therefore there are no clashes with assets. The Jewson's recommended RRAP location would require relocation of an OLE mast.

5.2 Next Steps

For future work, the following tasks to be undertaken:

- Site survey for Jewson's Yard
- Topographical data for Jewson's Yard
- Land acquisition from Jewson's Yard and Adjoining private owner (if necessary)
- Discussion on use of the Jewson's Yard premises for storage, parking and fencing
- A detail study of the OLE post relocation (if necessary)
- A detail study of the Signal cabinet relocation (if necessary)

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