Trafford Greenway Feasibility Assessment Report

Mayor's Cycling & Walking Challenge Fund

CO00201536/001 Revision 3

05/07/2023

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Project Name:	Mayor's Cycling & Walking Challenge Fund
Project Number:	CO00201536
Report Title:	Trafford Greenway Feasibility Assessment Report
Report Number:	001

Issue Status/Amendment	Prepared	Reviewed	Approved
Draft	Name: Chu, Joaquim Signature: Date: 21/02/23	Name: David Topley Signature: Date: 21/02/23	Name: Bogdan Tutoveanu Signature: Date: 21/02/23
Rev 1	Name: Chu, Joaquim Signature: Date: 31/03/23	Name: David Topley Signature: Date: 31/03/23	Name: Bogdan Tutoveanu Signature: Date: 31/03/23
Rev 2	Name: Chu, Joaquim Signature: Date: 27/04/23	Name: David Topley Signature: Date: 27/04/23	Name: Bogdan Tutoveanu Signature: Date: 27/04/23
Rev 3	Name: Signature: [redacted] Date: 05/07/2023	Name: Signature: Date: 05/07/2023	Name: Signature: Date: 05/07/2023

Executive Summary

Trafford Metropolitan Borough Council commissioned Amey Consulting to undertake a qualitative assessment of the condition of structures located along the proposed Trafford Greenway (Formerly Cheshire Lines) route and evaluate options for refurbishment. This is a disused section of railway line between Timperley and Irlam, which will be brought back into use as a Greenway.

This document details the findings of the qualitative assessment of the structures along the route, to support the development of the future 8.6km pedestrian & cycle Greenway route.

The approach taken was to obtain the latest available condition records for the structures on the route, undertake a desk top review of them, undertake site visits to confirm the findings, undertake a Structural Review to BD101 with individual recommendations for each bridge.

The structures crossing over the proposed Greenway (overbridges) are in fair condition and very little works are considered necessary to ensure the safety of users of the Greenway passing beneath them. Where there is the danger of loose debris falling onto the Greenway, users can be guided away from the danger areas by suitable guard railing until repairs can be undertaken by the owners of these structures. Consequently, no costs have been allocated to repair these structures.

The condition of underbridges carrying the dis-used railway route vary from poor to fair, and in need of maintenance works, but given that they have been originally designed to carry trains, even with some deterioration they would be able to support their own weight, NMU live loading and small maintenance vehicles. The exceptions are:

- Moss Lane Bridge – which has always been a footbridge and having had some deterioration and lack of maintenance, it is advisable that a capacity assessment be carried out and structural maintenance repairs be undertaken especially to areas of significant section loss
- Cadishead Viaduct – which is the most significant bridge in a poor condition which would be difficult to upgrade, therefore a replacement of the centre span is recommended as the most whole life cost effective options (at a significant cost for both demolition of the existing bridge and replacement NMU bridge)

The maintenance works recommended for the bridges carrying the dis-used railway (referred to as underbridges) have been split in essential works and works that can be deferred. The essential works are generally related to safety aspects such as an even surface safe for NMU usage and adequate parapets. Caution should be taken not to duplicate the surfacing works over bridges if considered separately for the entire route.

Consultation has taken place with NR, and their views were requested regarding the ownership implications of the assets alongside the route and the processes involved in any eventuality. This is discussed in Section 3.

For Cadishead Viaduct, a number of options have been considered within this report. These are discussed in some detail in Section 5 and the breakdown of associated costs is contained in Appendix F.

Although outside the scope of this report, we have commented on the condition of the old railway route between the structures, which is to form the proposed Greenway. The various segments of route are severely overgrown in places, with inaccessible stretches currently being severed by fencing or other similar safety measures at bridge approaches.

Full access should be obtained at later route alignment design stage, which may require advanced vegetation clearance works and/or special access arrangement. Consideration may also be given to undertaking a topographical survey to ensure compliance with geometry requirements set out in relevant standards and guidance, such as route gradients in accordance with Inclusive Mobility[3].

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1 Introduction

1.1 Background

As part of the Greater Manchester (GM) Transport Strategy 2040, which aims to improve the quality of GM's walking and cycling provision, the Trafford Greenway is a project which will bring an unused section of the former Cheshire rail line, between Timperley and Irlam, back into use as a Greenway.

The proposed route is also identified as a key sustainable transport corridor within the New Carrington strategic allocation, as defined by Policy JP 33 of the Places for Everyone Joint Development Plan Document.

The New Carrington vision is to transform Carrington, Sale West and South Partington into a sustainable and attractive, mixed use residential and employment neighbourhood achieved through a holistic revitalisation strategy. On adoption of the plan, the allocation will deliver around 5,000 homes and 350,000 sqm (gross) employment floorspace, delivering a new community that links to the existing settlements of Carrington, Partington and Sale West. The development will be characterised by strategic green infrastructure across the site, enhancing and capitalising on existing assets. The vision will be realised through the transformation of the existing industrial brownfield land in Carrington, the release of some of the Green Belt land and enhancement of the natural environment within the New Carrington allocation. New strategic and local infrastructure, a forward-looking landscape strategy and urban design principles will act as a catalyst for the revitalisation of New Carrington alongside integration with existing settlements of Sale West, Carrington and Partington.

Trafford Greenway would provide a crossing over Manchester Ship Canal for pedestrians and cyclists (currently Cadishead viaduct is closed), bringing significant journey time benefits and delivering an 8.6km length of the Bee Network, providing new safe, high-quality pedestrian and cycle connections to Irlam Train Station and the Timperley Metrolink stop. Along this route are several structures of various forms and a review of their condition is needed to inform a level of potential spend required to open or maintain them opened to the public.

1.2 Scope

The scope of this report is to:

- Assess the structural integrity of the various structures along the route, with a particular focus on the Cadishead viaduct and the section of the route through the proposed New Carrington allocation;
- Liaise with Network Rail (NR) throughout the course of the study;
- Outline any necessary remedial works needed to enable the Greenway to be safely delivered; and,
- Provide high level costings, indicative timescales and potential delivery risks for identified remedial works.

1.3 Methodology for the study

It was identified at the fee proposal stage that the available budget was insufficient to undertake full inspection for assessment and assessments of the bridges on the route in accordance with CD 454. However, it was felt that a full assessment of all structures would not be necessary for most bridges (with the exception of Moss Lane Bridge and Cadishead viaduct) to justify suitability for use by Non-Motorised Users (NMU). A qualitative assessment based on available detailed inspection information is deemed sufficient to determine whether the structural integrity of a bridge is compromised by excessive deterioration, and if not, given that these bridges were designed originally to carry trains, it could be inferred through engineering judgement that they would be suitable for non-motorised traffic, or for use by light maintenance vehicles (up to 7.5t).

Therefore, the approach adopted for the study was as follows:

- Liaise with Network Rail and local authorities (LAs) to obtain existing structure record information;
- Review obtained structure information for all structures along the route;
- Site visits if necessary to supplement the existing inspection reports;
- Qualitatively assess each structure based on existing information including latest Detailed/Visual Examination and Principal/General Inspection reports;
- Identify defects that may affect the structural integrity of bridges on the route;
- Identify defects that may affect the safety of NMUs traveling over or under bridges on the route (such as pedestrian parapet gaps, surfacing defects, spalling materials under overbridges);
- Where appropriate details of discussions/input from Network Rail;
- Where necessary, prepare high-level details of any remedial works needed to enable the creation of a safe and accessible walking and cycling route, or restoring the structural integrity of bridges;
- Provide high level costings, indicative timescales and potential delivery risks for identified remedial works;
- Produce a report with the findings.

1.4 Proposed Route

The proposed route is an 8.6km section of the disused former Cheshire railway line, between Timperley and Irlam. It includes crossing the Manchester Ship Canal via Cadishead Viaduct and would connect the Irlam Train Station in Salford and the Timperley Metrolink stop in Trafford.

The proposed Greenway will follow the line of the former Glazebrook East Junction to Skelton Junction railway line, identified by the Engineer's Line Reference (ELR) WJP1. This section of line connected the current Liverpool to Manchester MAJ line to Stockport. Originally featuring stations at Cadishead, Partington and West Timperley, the stations and line were closed to passengers in 1964, following the recommendations of the Beeching Report. The line continued to carry freight until 1983, when it was completely closed, and the track lifted along much of the route. The former track bed remains and is generally two tracks wide but widens in the Irlam area, where additional lines diverged to service a former steelworks, and in the Partington area where the lines serviced a former gas works.

The section of closed track between Irlam and the Bridgewater Canal features 24 No. structures and some remaining elements of the former stations. Amey bridge engineers have obtained Detailed and Visual Examination reports (which are no older than 6 years) for all bridges on the route and have visited the full length of line between Bridgewater Canal and Irlam station.

The majority of the structures currently remain in the ownership of Network Rail, who continue to carry out biennial visual examinations (VEs) and six-yearly detailed examinations (DEs) to monitor their condition.

The exceptions are structure WJP1/4A (a bridge map is provided in Appendix A), which is owned by Salford City Council and structures WJP1/7A, which are owned by Trafford Metropolitan Borough Council (TMBC). Further confirmation is required of the ownership of structures WJP1/10 and WJP1/18A, whether they are owned by TMBC or Network Rail, as records from both parties appear to be conflicting. The ownership of structure WJP1/9B is unknown but suspected to rest with the owners of the former gasworks site at Partington. Although this structure is located slightly off the route of the former main line, Network Rail are currently visually examining these structures annually, as is usual with third party bridges on the rail network, but the responsibility for both inspection and maintenance lies with the bridge owners.

1.5 Geometry Requirements

The 2019 Initial Feasibility Study Report (titled Cheshire Lines Greenway, prepared by Jacobs, dated March 2019)[1] Section 2.10 outlines the basic principles and best practice for the Greenway design. In addition to the above, Table 1 summarises the notable geometry requirements considered in this study.

Table 1 - Greenway Geometry Requirements

	Desired Minimum	References
Width	4m (for shared pedestrian, cyclist / equestrian use)	LTN 1/20[2] & CD 353[4]
Headroom	3.4m (for equestrian use) 2.4m (for cyclist use)	CD 143[5] LTN 1/20[2]
Parapet height	1.8m (for equestrian use) 1.4m (for cyclist use)	LTN 1/20[2]

Parapet heights depend on whether the route is to cater for only pedestrians (1.15 m high) and cyclists (1.4 m high) or for equestrians too (1.8 m high). It is not yet known if the route should cater for equestrians. It is envisaged that this would be determined through a wider consultation with the neighbouring communities and equestrian organisations in the area. For the purpose of this study, it was assumed that the route may need to cater for equestrian use as well.

Sections of the route are potentially at height (top of embankment), which, depending on risk assessment, may result in fencing being required to prevent falls down the embankment slope. Where the structure was considered to present a potential danger (for example very steep/high embankments or crossing a highway), we have included approach fencing to the 4 corners of the bridge and costed as part of the works associated with each structure.

Figure 1 - Location of structures along the route (See Appendix A for a more detailed map)

2 Route overview

The 2019 Initial Feasibility Study Report [1] discussed in ample detail the connectivity of the potential Greenway to surrounding pedestrian routes in the vicinity of the route. However, it did not appear to discuss the condition of the various sections of disused rail route itself, nor provide an indication of its condition or order of magnitude for work required to convert to a 4 m wide Greenway suitable for NMUs. Whilst outside the scope of this report which focuses on the bridges on the route, since we have walked the route, we will include in this section a brief commentary on the various segments of the route. This is to be read in conjunction with Section 6, and in particular paragraphs 6.3 and 6.9 of the 2019 Initial Feasibility Study Report, which also highlighted that there are numerous unmarked footpaths along and to the side of the dis-used rail corridor.

Some of these routes are used by the public more than the route of the dis-used railway, which varies from a good standard of bridleway to very narrow footpaths and inaccessible segments, completely overgrown by trees and thick vegetation or/and sections where the track and sleepers have not even been removed, and not at all used by walkers (towards the city end of the route). Appendix B includes a description of various segments which is summarised below:

Segment 1 – New Moss Road footpath to Liverpool Road

- Crossing over Moss Lane Bridge then a narrow footpath continuing parallel to the dis-used rail line (not along it). Dis-used railway line is severely overgrown and requires significant vegetation clearing and surfacing works.
- No designated footpath from the estate spur to Liverpool Road, but still a usable narrow footpath, leading to the masonry arch bridge over Liverpool Road, not the old steel bridge at the north of it.

Segment 2 - Liverpool Road – Cadishead Viaduct

- No designated footpath from Liverpool Road towards Partington, but still a usable narrow footpath, less vegetated than the previous segment
- Unknown access to the path, not a through route by walkers due to being severed by Liverpool Road and Cadishead Viaduct, only used by locals

Segment 3 - Cadishead Viaduct – Manchester Road

- Designated footpath at bottom of the dis-used railway embankment. Going under Manchester Road Bridge
- However, a narrow path still exists along the dis-used railway line through dense woodland (going over Manchester Road – fenced off bridge, Lymm Road)

Segment 4 - Manchester Rd – Sinderland Road (over Gasworks A steel bridge)

- Well used footpath, on the old route of the dis-used railway
- Also, a parallel well-trodden path running parallel with the dis-used railway starting from the layby on A6144 Manchester Road, gradually going up the embankment of the dis-used railway and eventually crossing over the concrete bridge at the gas Works. This is the path shown on Google Maps.

Segment 5 - Sinderland Road – Dunham Road

- Not a well-trodden path, but a corridor does exist along the line of the dis-used railway, interspersed with areas of poorly drained patches becoming impassable after wet periods and large trees and branches across the path. Marked in Google Maps as a footpath.

Segment 6 - Dunham Road – Birch Road

- The route of the dis-used railway is not maintained or accessible as a footpath due to vegetation overgrowth. Quite a flat area, not on an embankment. There is a narrow footpath to the south of the rail route which is also marked in Google Maps as a footpath.

Segment 7 - Birch Road – Woodcote Road

- There is a narrow footpath through heavily vegetated areas which coincides with the route of the dis-used railway. Flat area, not on an embankment. Shown in Google Maps as a footpath.

Segment 8 - Woodcote Road – Broadheath Community School

- Continuing from the previous segment there is a very narrow footpath through heavily vegetated areas which coincides with the route of the dis-used railway. Flat area, not on an embankment. Shown in Google Maps as a footpath.

Segment 9 - Broadheath Community School – A56 Manchester Road

- The dis-used railway is not usable as a footpath and no alternative footpath was seen during the site visit. No footpath shown in Google Maps either. There are sections of track and sleepers still in place. Significant works would be required to convert this segment of the dis-used rail route into a Greenway.

- Access over the bridge over A56 Manchester Road is prevented by locked gates

Segment 10 - A56 Manchester Road – Bridgewater Canal

- As above, the dis-used railway is not usable as a footpath and no alternative footpath was seen during the site visit. No footpath shown in Google Maps either. There are sections of track and sleepers still in place. Significant works would be required to convert this segment of the dis-used rail route into a Greenway. There are some footpaths around the route.

3 Ownership Implications

3.1 Underbridges

This has been discussed in Section 5.1 of the 2019 Initial Feasibility Study Report[1] and two main options have been considered:

- TfGM/LAs taking ownership of structures, with all that entails (structural liabilities, safety liabilities, capital and maintenance costs) i.e. NR disposing temporarily or permanently of the route and assets on the route
- NR maintaining ownership of these structures with wayleave agreements in place for TfGM/LAs and contributions/commuted sums for capital works required to make the structures safe for NMU use.

Consultation has taken place with NR, and their views were requested regarding the above options and processes involved in any eventuality.

Two departments have been contacted – the Asset Protection Team and the Property Team. A definitive position statement with respect with the above options/preferences could not be obtained. This is because, to make a determination on what the NR preference would be for this location, requires more NR involvement and costs, and there are a number of factors that could influence the decision. However, some useful information was elicited through a number of discussions, as follows:

- The process involved for a temporary disposal of assets is outlined in Appendix G:
- The process would be similar for a permanent disposal of assets or for easements
- NR Property Team would need to undertake an appraisal of property values/land prices, and to take the proposals through Business and Technical Clearance where consultation with various internal NR departments takes place (including the Asset Protection Team and External Stakeholders Team)
- There are surveys and costs associated with this determination that must be paid upfront
- Depending on the decision, agreements need to be drawn up by solicitors (for either transfer of ownership or easements).

3.2 Overbridges

Bridges over the proposed Greenway would not need to be acquired but there may be works required to these structures to protect public safety or which are desirable to create a safe and pleasant Greenway-user experience. The Greenway route is crossed by 4No. overbridges. These structures are of less significance to the functioning of the Greenway but the following factors should be considered.

- Safety at the time of inspection: There was nothing to suggest that any of the overhead structures presents a risk regarding objects falling onto the land below. Each location would need to be assessed to establish whether Greenway users should be separated from any overbridge elements which could form a safety risk. This is considered to be a relatively low risk and, if present, could be solved by appropriate use of fencing.
- Trespass and Vandalism: Improving the accessibility of the area beneath the bridges may increase the likelihood of vandalism.

- Access & Egress: Some of the overbridges present opportunities for connecting with other parts of the transport network and these have been identified in the 2019 Initial Feasibility Study Report [1]. This would require construction of access points at various sites and the provision of waymarking.

4 Structural Reviews

4.1 Structure Records

No assessment/capacity information was available for any of the underbridges. Condition information from the latest inspection reports from Trafford Council, Salford City Council and Network Rail (which do not contain capacity information), in addition to site visits carried out by Amey Consulting in September 2022 as part of this commission, form the basis of the structural reviews.

4.2 Underbridges

The underbridges will carry the proposed load of pedestrians, cyclists and possibly equestrians. Therefore, these structures have been qualitatively assessed in accordance with 'CS 451 Records of Structural Review and Assessment of Highways Structures' and where required, repair works necessary to make the structures safe and to be brought up to a serviceable standard have been noted.

The qualitative assessments for each of these underbridges are set out in this section below. Summary of the latest inspection findings and cost breakdowns of the recommended works can be found in the Condition Summary Sheet for each structure in Appendix D.

4.2.1 New Moss Road Bridge

1	Structure Details			
	Structure Name	New Moss Road Bridge		
	Structure Number	Network Rail: ELR: MAJ, Structure ref: 189 Salford CC Bridge Register Ref: 04/294		
	Structure Key	NR ID: 12015604		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Live railway (CLC Liverpool – Manchester)		
	Bridge Carries	New Moss Road		
	Brief Description of Structure			
	The bridge carries New Moss Road, a single carriageway over the live CLC Liverpool to Manchester line. The bridge has two spans. One span comprises longitudinal cast iron girders with transverse jack arches over the live railway lines. The second span is of reinforced concrete slab over a disused track bed. The bridge deck is strengthened by carbon fibre strips, supported on masonry abutments and central pier. The cast iron span is 7.91m in length. The reinforced concrete span is 4.86m in length.			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A
	Assessment Date	Not known	Report Number	N/A

Figure 2 - New Moss Lane Bridge

	Current Assessed Capacity			
	HA/ALL	Assumed 40t ALL	SV/STGO/SO	Not known
	Critical Elements	Bridge decks, pier and abutments		
	Parapet	The existing vehicle parapet has a height of 1.4m and consists of a masonry lower half with steel extension on top.  Figure 3 - Parapet extension		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: Feb 2021 Visual exam: April 2019		
	Condition / Change in Condition	The structure is in fair condition. The latest inspections reported areas of slight corrosion and defective painting on the cast iron girders, and severe corrosion to the tie bars in between. There were isolated areas of brick spalling and weathering on the jack arches. A service pipe and its support members under one of the jack arches were also corroded. There were damp patches along a construction joint at the reinforced concrete deck soffit, showing sign of possible defective waterproofing. Isolated areas of masonry spalling, weathering and mortar loss and cracking were found at the substructures, wing walls and parapets. These defects are long standing, and considered to have no significant effect on the load carrying capacity of the structure.		

	Change in Standards	No design or assessment records are available to confirm the standards previously used for the structure. There were no formal design standards used until 1923, with girder bridges designed on an empirical basis. BS 153 was introduced in 1923, which was the precursor to BS5400 that was first issued in 1978. Cast iron bridges have historically been assessed on a permissible stress basis, and this remains true for current assessment standards. The first design code for concrete structures was introduced in 1934, with the limit state approach being applied since publication of CP 110 in 1972. The latest standard for assessment of highways bridges is CS 454, CS 455 for reinforced concrete and CS 456 for steel structures.
	Change in Loading	No change of use is anticipated for this bridge as part of the proposed Greenway.
	Required capacity	40t ALL
	Vulnerable details	None
	Hidden critical elements	Jack arches, deck slab and beam supports
	Interim measures	N/A
	Conclusion	It is anticipated that NMU users of the proposed Greenway will cross New Moss Road south to the bridge. The proposed route will not run over the bridge deck, which will continue to carry vehicular traffic on New Moss Road. The bridge overall is in fair condition. The bridge is currently being used as a single carriageway and is consequently considered to be suitable for pedestrian loading, including cycle and equestrian. The latest inspections reported tie bars between the cast iron girders under the jack arches were severely corroded, and recommended that their structural necessity should be assessed and renewed if required. The service pipe suspended was founded to be corroded and investigation of its ownership and maintenance liability was recommended. Localised masonry repairs and repointing works are also recommended. However, the defects are long standing, and pose no significant risk to the structural integrity of the bridge or the proposed Greenway.
4	Recommendation	
	No change of use is anticipated for New Moss Road Bridge as part of the potential Greenway, and therefore it would be adequate for use as is. Some minor maintenance works were recommended in the latest inspection reports, but none are considered critical in relation to the proposed Greenway. The existing parapet height is 1.4m and as such not adequate for equestrians use. The existing footway widths on the bridge are not adequate for shared cyclist and pedestrian use, or for wheelchair users. The proposed Greenway is not currently envisaged to run over the bridge, only cross New Moss Road at its south approach. However, if the bridge is to be used as one of the access points to the Greenway, the parapet height may need to be raised.	

4.2.2 Moss Lane Bridge

1	Structure Details			
	Structure Name	Moss Lane Bridge		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 1 Salford CC Bridge Register Ref:		
	Structure Key	NR ID: 12023846		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Disused railway line		
	Bridge Carries	Footpath		
	Brief Description of Structure			
	Moss Lane Bridge is a 4 span simply supported bridge carries a footpath over the redundant railway line. Each deck comprises of 2No. longitudinal steel plate girders, with a steel trough deck spanning transversely. The substructure comprises stonework piers, abutments and wing walls. The bridge deck has an overall length of 64.3m. The minimum parapet height is 1.3m and the minimum distance between the parapets is 3.9m.  Figure 4 – Moss Lane Bridge (Elevation and View over Bridge Deck)			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A
	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			
	HA/ALL	Assumed historical pedestrian loading	SV/STGO/SO	N/A

	Critical Elements	Bridge decks, piers and abutments
	Parapet	The main longitudinal girders of the bridge also form the parapets of the structure. The existing parapet height is measured at 1.32m, which is below the requirement for edge protection for cyclist and pedestrian (1.4m) and equestrian usage (1.8m).
	Pier Impact	N/A
	Certification	Not available
	Calculations	Not available
	As built drawings	Not available
	Comments on Assessment	
	No existing design or assessment records are available.	
3	Evaluation	
	Inspection Date	Detailed exam: Nov 2020 Visual exam: Sep 2019
	Condition / Change in Condition	The latest inspections reported that the structure is in fair to poor condition, with extensive paint failure and moderate to severe corrosion to the steelwork. The steelwork has section loss across all four spans, including a large area of full section loss to the west girder web adjacent to a pier bearing stiffener, which may affect the load carrying capacity of the bridge. Areas of masonry weathering with 5-10mm section losses, and open joints with mortar loss up to 40mm deep were found on the stone substructure, with light vegetation growth. The existing surfacing comprises loose gravel and dirt. There is extensive vegetation adjacent to the parapets along both sides of the footpath. The approach fencing is missing at both ends of the bridge with an approximately 1.5m drop.

Figure 5 – Area of full section loss at longitudinal girder, and missing edge protection at bridge approach

	Change in Standards	No design or assessment records are available to confirm the standards previously used for the structure. There were no formal design standards used until 1923, with girder bridges designed on an empirical basis. BS 153 was introduced in 1923, which was the precursor to BS5400 that was first issued in 1978. For steel girder bridges designed to BS 153, the permissible stress principles would have been used. Current design and assessment standards use the limit state principles. The latest standard for assessment of highways bridges is CS 454, CS 455 for reinforced concrete and CS 456 for steel structures.
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	None
	Hidden critical elements	Girder and trough deck connections
	Interim measures	None.
	Conclusion	The bridge will carry the proposed Greenway, and hence pedestrian, cyclist, equestrian and light maintenance vehicle loading. It is assumed that the structure was originally designed to pedestrian loading to historical standards, which would be less conservative than loading requirements to current standards. The latest inspections reported moderate to severe section losses to the steel girders and trough decking. This would affect the bridge load carrying capacity, in particular the large area of full section loss adjacent to the girder bearing stiffener. Condition of the hidden connection between the longitudinal girders and trough deck cannot be confirmed, which if found to be poor will affect lateral restraint to the longitudinal girder and hence structural integrity of the bridge. Defects identified to the substructure are structurally insignificant, but maintenance works should be undertaken to prevent further deterioration. Distance between parapet is measured at 3.9m, just under LTN 1/20 recommended minimum width (4.0m).
4	Recommendation	
	Considering the areas of section loss identified on the steel girders, and the more onerous loading requirements for the bridge to support the Greenway, it is recommended that a further quantitative assessment of the bridge deck to be undertaken in accordance with CS 454 and CS 456. Due to the lack of as-built records, an inspection for assessment will be required to obtain dimensional and condition information on the structure. Access to within touching distance to the bridge deck will be needed to enable the inspectors to take the necessary measurements. It should be noted that rope access was used in the 2020 Details Examination, and similar arrangement is envisaged for the inspection for assessment.	

	Condition of the hidden connection between the longitudinal steel girders and trough decking should also be confirmed by trial holes over the bridge deck, and considered by the assessment. Recommended maintenance works are as listed below to bring the structure up to a safe and serviceable standard as a Greenway: Essential works, estimated cost: £67,500 ▪ Bridge assessment ▪ Steelwork repairs and localised patch painting with necessary strengthening works as identified by the structural assessment ▪ Vegetation clearance on the footpath over the bridge deck, along both girders / parapets ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage ▪ Safety fencing reinstatement at approaches to the structure Works that can be deferred, estimated cost: £203,000 ▪ Re-painting ▪ Masonry repairs and repointing to substructures and wing walls ▪ Parapet extension – the existing parapet height is just under the 1.4m requirement for cyclist use, but could be deem acceptable with approval by the Technical Approval Authority. If equestrian use is required on the Greenway, the parapets should be extended to a minimum height of 1.8m (see Section 6).

4.2.3 Cadishead Station Subway

Cadishead Station Subway has been infilled and is no longer able to be inspected.

4.2.4 Liverpool Road Bridge

1	Structure Details			
	Structure Name	Liverpool Road Bridge		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 3 Salford CC Bridge Register Ref: 04/036		
	Structure Key	NR ID: 1207351264		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Liverpool Road		
	Bridge Carries	Disused Railway		
	Brief Description of Structure			
	Liverpool Road Bridge carries the disused railway over B5320 Liverpool Road. The structure is a single span brick arch bridge, with a 10.8m span length and 11.3m width. The minimum parapet height is 1.85m.  Figure 6 - Liverpool Road Bridge			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A

	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			
	HA/ALL	Assumed historical railway loading	SV/STGO/SO	N/A
	Critical Elements	Bridge deck and abutments		
	Parapet	The existing parapet consists of a masonry wall with Key Clamp barrier extension on top. It has a total height of 1.85m which is suitable for all pedestrian traffic including equestrians.		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: Mar 2020 Visual exam: Nov 2018		
	Condition / Change in Condition	The structure overall is in fair condition. The latest inspections identified a number of longitudinal fractures to the arch barrel, and vertical fractures at spandrel, abutment and parapet walls, typically ranging from hairline to 1mm wide, with minor areas of open mortar joints, brick losses and weathering. There are areas of water seepage throughout the arch barrel, indicating there is no existing waterproofing or possible failure of the waterproofing or drainage system.		

Figure 7 - Open joints and cracks to intrados and spandrel wall

The parapet Key Clamp extension rails exhibit areas of moderate corrosion with lengths of missing and loose rails.
The existing footpath surfacing over the bridge comprises loose gravel, with extensive vegetation growth throughout including mature trees.

		There are no existing safety fences over the wing walls or top of embankments at approaches to the bridge, which have a drop of over 9m to Liverpool Road. There are existing palisade fencing and locked gates preventing access to the top of the structure.  Figure 8 - View over the Structure
	Change in Standards	No design or assessment records are available to confirm the standards previously used for the structure. Arch bridges were historically designed and assessed by empirical method, with the modified MEXE method being introduced in 1963 for highway, and which remains one of the four acceptable analysis methods recommended by the current standard CS 454.
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	None
	Hidden critical elements	None
	Interim measures	Existing palisade fencing and locked gates to prevent unauthorised access over the bridge
	Conclusion	The bridge overall is in fair condition. There are a number of longitudinal and vertical cracks to the arch barrel intrados and spandrel walls, with areas of minor brick loss and weathering These defects appear to be localised and long standing, and are therefore considered to have no significant impact on the load carrying capacity of the bridge. Given that the bridge was originally designed to carry trains, and since no significant deterioration is evident that would compromise the structural integrity, it is considered to be suitable for the loading requirements of the proposed Greenway. The existing bridge parapets with the Key Clamp guardrail extensions have a height of over 1.8m, which is adequate for NMU. However, there are no

		adequate restraint system in place over the >9m high embankment, which would deem unsafe for Greenway usage. The existing footpath over the bridge comprises loose gravel, which is not adequate for wheelchair users. Extensive vegetation and trees along the footpath should be removed.
4	Recommendation	
	The bridge is considered to be suitable for the loading requirements of the Greenway. Recommended maintenance works are as listed below to bring the structure up to a safe and serviceable standard as a Greenway: Essential works, estimated cost: £30,000 ▪ Replace the parapet extensions to the masonry parapets ▪ Vegetation clearance – remove vegetation and trees and treat roots on the footpath over the bridge deck ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage ▪ Remove existing palisade fences and locked gates. Suitability of retaining existing palisade fences as restraint system for NMU over the embankments should be assessed ▪ Install approach fencing at the 4 corners of the structure Works that can be deferred, estimated cost: £27,500 ▪ Masonry repairs and repointing throughout– replace missing and weathered bricks, and repoint open mortared joints and cracks. Cracks should be monitored during future inspections following repointing works, and crack stitching repair should be considered if they reoccur and are widened.	

4.2.5 3ft Brick Arch Culvert

The culvert between Liverpool Road Bridge and A57 Cadishead Way Bridge was not found during the site visit in September due to dense vegetation. This was echoed in previous visual examination report in October 2014.

Figure 9 - 3ft Bridge Arch Culvert

4.2.6 A57 Cadishead Way

1	Structure Details	
	Structure Name	A57 Cadishead Way (North Bank Bridge)
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 4A Salford CC Bridge Register Ref: 0494
	Structure Key	NR ID: 1207351461
	Date Commissioned	Circa 2003
	Obstacles Crossed	A57 Cadishead Way
	Bridge Carries	Disused railway
	Brief Description of Structure	
	A57 Cadishead Way / North Bank Bridge is a single span reinforced concrete box structure, with reinforced concrete wing walls flanked from each corner. Both bridge elevations, abutments and wing walls are cladded by brickwork facing. The bridge was construction in circa 2003, after the decommissioning of the railway. It carries the disused railway over A57 Cadishead Way. The structure has a clear span of 16.7m and a width of 39.5m. There is no parapet along the disused railway, which has a 10m width formed with granular fill material (see bridge longitudinal section below extracted from as-built drawing no. SD5044/1).	

Figure 10 - A57 Cadishead Way / North Bank Bridge

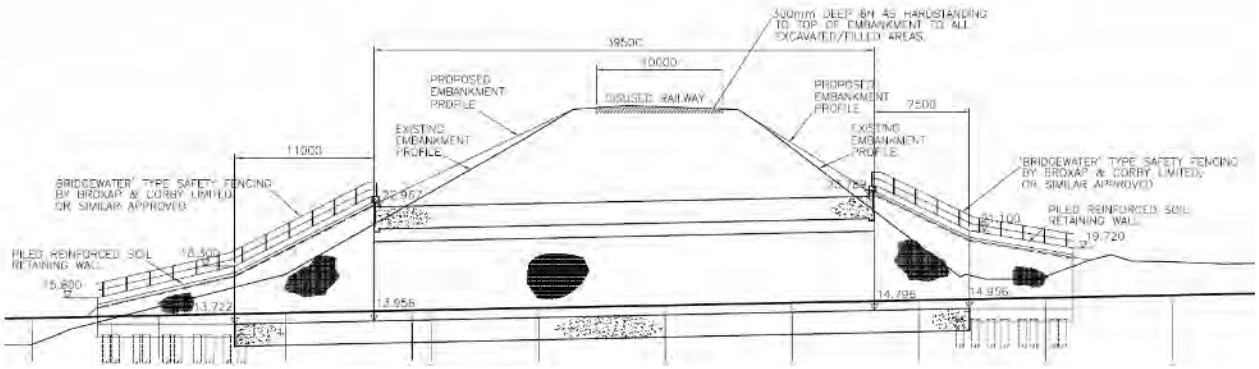


Figure 11 - Bridge longitudinal section (extracted from drawing SD 5044/1)

	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A
	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			
	HA/ALL	Assumed footway loading to BD 37/01	SV/STGO/SO	Not known
	Critical Elements	Reinforced concrete box		
	Parapet	There are existing safety fences over the headwalls and wing walls, but no parapets along the disused railway		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	The following drawings are made available at the time of this study: ▪ SD 5044/1 North Bank Bridge General Arrangement ▪ SD 5044/4 North Bank Bridge Concrete Box Underpass Concrete Details ▪ SD 5044/10 Earthworks ▪ SD 5044/16 Wing Walls General Arrangement		
	Comments on Assessment			
	No existing design or assessment records are available.			

3	Evaluation	
	Inspection Date	Salford Council PI: Feb 2017 NR Visual exam: Sept 2019
	Condition / Change in Condition	The structure overall is in good condition. There was no significant deterioration has been highlighted during the latest inspections. Only overgrown vegetation and minor area of spalling were recorded on the wing walls and brickwork facings.
	Change in Standards	Based on the available as-built drawings, the structure was constructed in circa 2003. Between 1984 and 2004, reinforced concrete structures would be designed to BS 5400 part 4, which is in line with current assessment standard CS 454.
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	None
	Hidden critical elements	Reinforced concrete box and wing walls behind brick facings
	Interim measures	Palisade fencings have been installed at all four corners of the bridge to prevent unauthorised access to the embankments. The segment of disused railway over the bridge is not accessible, due to being severed by Liverpool Road Bridge (see Section 4.2.4) and Cadishead Viaduct (see Section 4.2.7).
	Conclusion	The bridge overall is in good condition. Although there is no existing record available to confirm the load carrying capacity of the structure, the high deck slab thickness of 1.75m and the span/depth ratio of approx. 10 would suggest it was designed to a level of HA loading, likely to allow for future development.

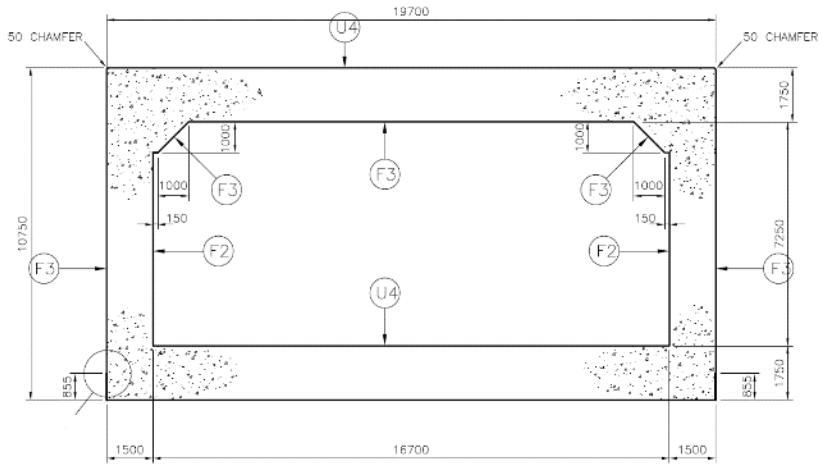


Figure 12 - Typical concrete box section (extracted from drawing no. SD 5044-4)

Conservatively for the purposes of this study, it is assumed that the bridge was designed to footway loading in accordance with BD 37/01 and associated maintenance vehicles as a minimum, which would be similar to loading requirements of the proposed Greenway. Since no significant deterioration is evident that would compromise the structural integrity of the bridge, it is considered to be suitable for the intended loading requirements.

There are no existing parapets or safety fence along the disused railway track, adjacent to high embankments leading to A57 Cadishead Way.

The existing path of the disused railway comprises granular fill material, which is not suitable for wheelchair users.

4 Recommendation

The bridge is considered to be suitable for the loading requirements of the Greenway.

Recommended maintenance works are as listed below to bring the structure up to a safe and serviceable standard as a Greenway:

Essential works, estimated cost: £35,000

- Footpath surfacing improvement to an acceptable standard for Greenway usage
- Install appropriate pedestrian parapets or guardrails along the proposed Greenway over the bridge and its approaches over the high embankments

4.2.7 Cadishead Viaduct

1	Structure Details	
	Structure Name	Cadishead Viaduct
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 5
	Structure Key	NR ID: 1207351266
	Date Commissioned	Understood to be 1889.
	Obstacles Crossed	Manchester Ship Canal
	Bridge Carries	Disused railway, but currently blocked off
	Brief Description of Structure	
	The bridge carries the proposed Trafford Greenway over the Manchester Ship Canal. It is a five span structure comprising a central span of twin wrought-iron trough-decks on lattice girders and masonry arch side spans. The central span is 42.6m long and the side spans range between 13.3m and 14.3m long. The masonry parapets to the side spans are approximately 1m high and in disrepair. The structure is skewed at approximately 25 degrees.	
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.

Figure 13 - Cadishead Viaduct, view looking south

2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A
	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			
	HA/ALL	Assumed historical railway loading	SV/STGO/SO	N/A
	Critical Elements	Central metal span, masonry side spans, piers and parapets		
	Parapet	The existing masonry parapets are in disrepair and have a height of approximately 1m. The outer lattices form the parapets of the central span		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	No as-built records are available for Cadishead Viaduct, but we have referred to the as-built records of Railtrack Underbridge 194 which is a similar form of construction and is still in service carrying the Manchester to Liverpool Line over the ship canal, just to the north-east of Cadishead Viaduct.		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: April 2020 Visual exam: September 2019		
	Condition / Change in Condition	No significant deterioration has been highlighted during the latest visual inspections, although access has been limited owing to the positioning of containers to prevent access.		
	Change in Standards	No design or assessment records are available to confirm the standards previously used for the structure. There were no formal design standards used until 1923, with girder bridges designed on an empirical basis. BS 153 was introduced in 1923, which was the precursor to BS5400, first issued in 1978. For girder bridges designed to BS 153, permissible stress principles would have been used. Current design and assessment standards use limit state principles. The latest standard for assessment of highways bridges is CS 454 and CS 456 for steel structures. Arch bridges were historically designed and assessed by empirical methods, with the modified MEXE method being introduced in 1963 for highways,		

		and which remains one of the four acceptable analysis methods recommended by the current standard CS 454.
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and potentially equestrian) using proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	Metal trough decking
	Hidden critical elements	Bearings
	Interim measures	N/A
	Conclusion	The metal central span is in poor condition, the masonry side spans are in fair condition. The bridge is currently closed to all traffic owing to the very poor condition of the trough decking of the central span. The barrels of the masonry side spans show longitudinal cracking which should eventually be repaired. The central span must either be renovated or replaced. There are no known services located on the bridge. The substructure elements are in fair condition. Minor repair works are required to the masonry, including repointing and replacing spalled and damaged bricks.
4	Recommendation	
	Change of use from train to pedestrian and occasional maintenance vehicles (max 7.5t) is proposed for this bridge as part of the potential Greenway scheme. The central span must either be renovated or replaced, which are considered essential works. Some maintenance work is required to the piers and side-spans in order to bring the remainder of the structure up to a serviceable condition, including masonry repairs and repointing, installation of new downpipes and de-vegetation. This is considered works that can be deferred. The following options have been considered for this structure, and discussed in more detail in Section 5. A breakdown of costs (capital and whole life) is contained in Appendix F. Essential works: Span 3 (central span) Option 1 – replacement span (pratt truss or similar) (£2,083,200) Option 2 – remove half deck and refurbish remaining deck (£2,629,200) Option 3 – retain both decks and refurbish one (£2,569,200) Parapets Option X – Raise existing parapets as required to 1.8m height for equestrian use (or 1.4m for cycling only – some cost reduction) (£40,000) Option Y – Repair existing parapets and construct new parapet 1.8m high inboard (or 1.4m for cycling only – some cost reduction (£148,000) Works that can be deferred: Maintenance works including masonry repairs and repointing, drainage repairs and de-vegetation (£89,900)	

4.2.8 Mersey Viaduct

The structure has been demolished.

Figure 14 - Mersey Viaduct

4.2.9 Footpath Subway

1	Structure Details			
	Structure Name	Footpath Subway (Lynn's Subway)		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 7A Trafford Council Bridge Register Ref: 057		
	Structure Key	NR ID: 1207351269		
	Date Commissioned	1969.		
	Obstacles Crossed	Footpath		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	Footpath Subway (Lynn's Subway) is constructed of 23 no. units of 1m long precast reinforced concrete box sections between precast concrete headwalls and wing walls. The structure has a 2.3m span and 2.2m headroom. It carries the disused railway track over a footpath. The parapets have a height of approximately 1.0m, constructed over the headwalls.			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A

Figure 15 – Footpath Subway (Lynn's Subway)

	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			
	HA/ALL	Assumed historical railway loading	SV/STGO/SO	Not known
	Critical Elements	Reinforced concrete box		
	Parapet	The existing parapet is approximately 1.0m high, constructed over the headwalls. They are some distance away from the top of the embankments where the disused railway path located, and would not offer the necessary edge protection for the potential Greenway NMU users.		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Drawings available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	NR Detailed exam: Jan 2014 Trafford Council GI: 2018		
	Condition / Change in Condition	The latest inspections reported the structure was found to be in a fair condition with only minor defects identified. There were drop in soffit levels between the concrete box units. However, this appeared to be long standing with no cracks in surfacing to suggest differential settlement. A number of joint sealants between the box units were found to be deteriorated or failed. There were minor areas of localised concrete spalling to the box units and wingwalls. Some of the lighting units within the subway are non-functional. There are large trees and vegetation growth throughout the disused railway track and brambles growing over the wingwalls. There were areas of paint failure and surface corrosion on the existing parapets.		

		 Figure 16 - View inside of the structure  Figure 17 - View over the structure
	Change in Standards	No design or assessment records are available to confirm the standards previously used for the structure. The structure was likely designed to CO 116 (The structural use of precast concrete), which was introduced in 1965. The latest standard for assessment of highways bridges is CS 454 and CS 455 for reinforced concrete structures.
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	None
	Hidden critical elements	None
	Interim measures	N/A
	Conclusion	The structure is in fair condition. There were maintenance defects identified during the latest inspections, including deteriorated joints between the concrete box units, minor areas

		of concrete spalling and parapet painting failure with localised surface corrosion. These defects are not considered to have structural significance. Given that the bridge was originally designed to carry trains, and since no significant deterioration is evident that would compromise the structural integrity, it is considered to be suitable for the loading requirements of the proposed Greenway. There are no existing parapets or safety fences along the disused railway track, adjacent to the top of the embankments. The disused railway track comprises loose gravels, which is not suitable for wheelchair users. In addition, there are heavily overgrown vegetation including trees throughout the track.
4	Recommendation	
	The bridge is considered to be suitable for the loading requirements of the Greenway. Recommended maintenance works are as listed below to bring the structure up to a safe and serviceable standard as a Greenway: Essential works, estimated cost: £2,000 ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage Works that can be deferred, estimated cost: £14,000. ▪ Clear overgrown vegetation and trees, and treat roots as appropriate, over the disused railway track and the embankments ▪ Replacement and repair of joints sealant between the reinforced concrete units ▪ Maintenance painting to existing parapets over the headwalls	

4.2.10 Lymm Road

1	Structure Details			
	Structure Name	Lymm Road		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 7		
	Structure Key	NR ID: 1207351268		
	Date Commissioned	Substructure assumed early 1900's, superstructure replaced 1980		
	Obstacles Crossed	Manchester Road		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	The bridge carries the disused railway over Manchester Road. The structure is a single span concrete deck on pre-cast concrete beams on masonry abutments and masonry wingwalls. It is believed that the precast beams, which are of semi-portal form, were installed as replacement for an original arch ring. The new beams appear to be set on the original springings of the old arch The Structure has a span of 7.7m and a width of 9.5m. The parapets have a total height of 2.0m.			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A

Figure 18 - Lymm Road Bridge (with adjacent WJP1/7A Footpath Subway to the east)

	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			
	HA/ALL	Assumed historic railway loading	SV/STGO/SO	N/A
	Critical Elements	Bearings		
	Parapet	The existing parapet consists of a concrete wall with Key Clamp barrier extension on top. It has a total height of 2m which is suitable for all pedestrian traffic including equestrians.		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: May 2021 Visual exam: Nov 2018		
	Condition / Change in Condition	The structure overall is in fair condition. There is a long-sanding issue that the beams have been displaced and so not equally spaced. However, no deterioration is recorded. Some evidence of leaking between beams. The latest detailed and visual examination identified minor spalls with exposed reinforcement to the concrete surfaces. There is also minor mortar loss throughout the brickwork sections of the structure. There are large trees and vegetation growth throughout the former track bed and small trees growing behind the wingwalls. The existing surfacing is a gravel path. It is suitable for pedestrians, cyclists and horses but unsuitable for wheelchair users and child buggies. Downpipes are missing to the abutments causing water staining.		

Figure 19 - View under the bridge deck

Figure 20 - View over the structure

Change in Standards	No design or assessment records are available to confirm the standards previously used for this structure. It is likely that the semi-portal pre-cast beams of the deck are a replacement for an original arch barrel, and are set on the springings of the original arch. Date of replacement construction is understood to be 1980. In which case the design will have been to CP110 using ultimate limit state principles. The latest standards for assessment of concrete highway bridges are CS 454 and CS 455 (reinforced concrete)
Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles

	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	None
	Hidden critical elements	None
	Interim measures	There are existing palisade fences at both ends to prevent access over the bridge
	Conclusion	Overall, the structure is considered to be in fair condition. Owing to the significant reduction in loading from trains to NMU and small maintenance vehicles, the structure is considered adequate for carrying the proposed Greenway, provided the maintenance interventions listed below are undertaken.
4	Recommendation	
	It is recommended that the following works are undertaken to render the structure suitable for carrying the proposed Greenway: Essential works, estimated costs: £7,300 ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage ▪ Remove existing palisade fences at bridge ends ▪ Install appropriate pedestrian parapets or guardrails along the proposed Greenway over the bridge and its approaches over the high embankments Works that can be deferred, estimated costs: £63,000 ▪ Repair areas of minor spalling to concrete beams ▪ Clear significant vegetation from behind wing walls ▪ Repair open joints and stepped fractures in wing walls ▪ Waterproofing may require replacing within the next 10 years ▪ Clear overgrown vegetation and trees, and treat roots as appropriate, over the disused railway track and the embankments	

4.2.11 Partington Station Subway

1	Structure Details			
	Structure Name	Partington Station Subway		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 8		
	Structure Key	NR ID: 1207351462		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Unused footway		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	The subway carries the disused railway over an unused footway/platform access. The structure is a single span brick arch on brick sidewalls. Dimensions are unknown due to partial infilling of structure. There are no parapets on this structure.  Figure 21 - Partington Station Subway			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A
	Assessment Date	Not known	Report Number	N/A

	Current Assessed Capacity			
	HA/ALL	Assumed historic railway loading	SV/STGO/SO	N/A
	Critical Elements	None		
	Parapet	There are currently no parapets on this structure.		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: Jan 2012 Visual exam: Aug 2019		
	Condition / Change in Condition	The structure overall is in fair to poor condition The latest detailed and visual examination identified that the structure has been partially infilled at both ends to prevent access to the structure.  Figure 22 - View inside the partially infilled structure There are missing and loose bricks to the headwalls at both ends of the structure. During the last detailed examination, isolated areas of staining and calcites were identified to the sidewalls and soffit. This may have progressed since this inspection.		

		There are small trees and vegetation growing within the north infilled staircase area. The existing surfacing is a gravel path. It is suitable for pedestrians, cyclists and horses, but unsuitable for wheelchair users and child buggies.
	Change in Standards	No design or assessment records are available to confirm the standards previously used for this structure. Arch bridges were historically designed and assessed by empirical methods, with the modified MEXE method being introduced in 1963 for highway bridges, and which remains one of the four acceptable analysis methods recommended by the current standards CS 454 and CD 375.
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	N/A
	Hidden critical elements	N/A
	Interim measures	N/A
	Conclusion	The structure is in fair condition. Some works would be required to ensure future structural integrity. It is noted that the subway is currently disused and almost totally buried at each end.
4	Recommendation	
	Given that the subway is disused, and taking into account the current condition of structure, the most cost-effective solution is considered to be to demolish the arch barrel and backfill with granular or suitable site won material, and so eliminate any future maintenance lability. Alternatively, options to fully infill the structure can be considered e.g. foamed concrete infilling, to avoid arch barrel demolition. It is recommended that areas in front of the bridge head walls and wing walls are also backfilled to formed sloped embankment, and if vegetation can be planted over the structure at the sides of the proposed Greenway, the need for equestrian parapets might also be avoided. General vegetation clearance and footpath surfacing improvement over the structure are recommended. Essential works, estimate cost: £3,000 ▪ Footpath surfacing improvement Works that can be deferred, estimate cost: £42,000 ▪ Cut back vegetation and treat roots ▪ Infilling of structure	

4.2.12 Footway Subway

1	Structure Details			
	Structure Name	Footway Subway		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 9		
	Structure Key	NR ID: 1207351270		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Unused footway		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	Footway Subway carries the disused railway over an unused footway. The structure is a single span subway consisting of two brick arch sections and a cast iron rib arch section, with brickwork headwalls and wingwalls. The structure has a span of 1.99m, 1.88m headroom and a width of approximately 29.79m. The structure is blocked off by a brick wall at the south end and an access gate at the north end. There are 1.2m high timber fences behind the head walls and wing walls at both ends of the structures.			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A
	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			

Figure 23 - Footway Subway

	HA/ALL	Assumed historic railway loading	SV/STGO/SO	N/A
	Critical Elements	None		
	Parapet	There are existing timber fences behind the head walls and wing walls, but no parapet along the disused railway track over the embankment		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: Jan 2020 Visual exam: Nov 2018		
	Condition / Change in Condition	The structure overall is in fair condition. The latest detailed and visual examination identified that the cast iron barrel units are severely corroded and laminated to a maximum depth of 8mm. There are old standing fractures to the brickwork barrel sections. There is minor mortar loss to the exterior brickwork sections.  Figure 24 - View inside the structure There are trees and vegetation growing behind the wingwalls. There is also an exposed gas pipe to the north side adjacent the wingwalls. It was identified during the most recent site visit that the lock is missing to the access gate. Sections of the existing timber fencing are damaged or missing.		

		 Figure 25 - View over the structure
	Change in Standards	No design or assessment records are available to confirm the standards previously used for this structure. There were no formal design standards used until 1923, with girder bridges designed on an empirical basis. BS 153 was introduced in 1923, which was the precursor to BS5400 that was first issued in 1978. Cast iron bridges have historically been assessed on a permissible stress basis, and this remains true for current assessment standards. The latest standards for assessment of highway bridges are CS 454 and CS 456 (steel structures). Arch bridges were historically designed and assessed by empirical method, with the modified MEXE method being introduced in 1963 for highway, and which remains one of the four acceptable analysis methods recommended by the current standard CS 454.
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	Presence of gas pipe passing under the structure, partially exposed. Ownership and status unknown.
	Hidden critical elements	N/A
	Interim measures	N/A
	Conclusion	The structure is in fair condition, although some works would be required to ensure future structural integrity. It is noted that the subway is currently disused and blocked off to prevent unauthorised access. Given the current condition of the structure, it is proposed to eliminate the future maintenance liability by infilling the enclosed length with foamed concrete and infilling between the wing walls with a granular or a suitable site won material.

4	Recommendation
	Since the subway appears to be disused and blocked off to prevent unauthorised access, it is considered the most cost-effective solution is to infill the structure with foamed concrete and so eliminate any future maintenance lability. Essential works, estimate cost: £11,500: ▪ Covering and protection of the gas pipe and investigation made to determine ownership. ▪ Pedestrian restraint system at the subway edges Works that can be deferred, estimated costs: £49,500: ▪ Foamed concrete infill of the subway ▪ Infill between wing walls with Granular material

4.2.13 Gas Works A

1	Structure Details			
	Structure Name	Gas Works (A)		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 9A		
	Structure Key	NR ID: 1207351271		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Unused access track		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	The bridge carries the disused railway over an unused access track. The structure is a single span steel girder bridge with steel deck plates and parapets supported on brick abutments and wingwalls. The structure has a span of 12.12m and a width of approximately 12.0m The parapets have a height of 1.4m.  Figure 26 - Gas Works A			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A

	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			
	HA/ALL	Assumed historic railway loading	SV/STGO/SO	N/A
	Critical Elements	Steel deck plates		
	Parapet	The existing parapet is 1.4m high, which is suitable edge protection for cycle and pedestrians, however it is below the requirement for equestrian usage (1.8m).		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: May 2015 Visual exam: Aug 2019		
	Condition / Change in Condition	The overall condition of the structure is considered to be fair to poor. This is primarily a result of the steel deck plates which are expected to be severely corroded on the topside as they are currently covered by the pathway above and inaccessible for inspection. The latest inspections identified that there was extensive surface corrosion throughout all metal elements of the structure. There is minor mortar loss throughout the wingwalls and abutments. There is extensive vegetation growth to the top of the structure including large trees. The existing surfacing is a gravel path. It is suitable for pedestrians, cyclists and horses but unsuitable for wheelchair users and child buggies.		
	Change in Standards	No design or assessment records are available to confirm the standards previously used for this structure.		

Figure 27 - View under and over the structure

		There were no formal design standards used until 1923, with girder bridges designed on an empirical basis. BS 153 was introduced in 1923, which was the precursor to BS5400 that was first issued in 1978. For girder bridges designed to BS 153, the permissible stress principles would have been used. Current design and assessment standards use the limit state principles. The latest standards for assessment of steel highway bridges are CS 454 and CS 456 (steel structures).
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	Bearings, steel deck plates
	Hidden critical elements	Steel deck plates
	Interim measures	N/A
	Conclusion	The overall condition of the structure is considered to be fair to poor. However, owing to the significant reduction in loading from trains to NMU and small maintenance vehicles, it is considered that the structure can be brought up to adequate condition for carrying the proposed Greenway, provided the maintenance interventions listed below are undertaken.
4	Recommendation	
	It is recommended that the following works are undertaken to render the structure suitable for carrying the proposed Greenway. Essential works, estimate cost: £9,000: ▪ Clear overgrown vegetation and trees, and treat roots as appropriate, over the disused railway track and the embankments ▪ Resurfacing Works that can be deferred, estimate cost: £186,000: ▪ The steel deck-plates should be exposed and repaired as necessary. At detailed design stage consideration should be given to covering the deck plates with a thin (75mm) reinforced concrete slab and a proprietary spray-applied waterproofing membrane should then be applied. ▪ All steelwork should then be blast-cleaned and painted with a 2 or 3 coat HAPAS certified system. Note the possible presence of lead in the original paint system ▪ Re-pointing of masonry abutments ▪ Parapet extension (see Section 6) ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage	

4.2.14 Gas Works B

1	Structure Details			
	Structure Name	Gas Works (B)		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 9B		
	Structure Key	NR ID: 1207351272		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Unused access track		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	The bridge carries a spur of the disused railway over an unused access track. The structure is a single span reinforced concrete bridge supported on reinforced concrete abutments and wingwalls. The structure has a span of 12.12m and a width of 9.0m The parapets have a height of 1.4m.  Figure 28 - Gas Works B			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A
	Assessment Date	Not known	Report Number	N/A

	Current Assessed Capacity			
	HA/ALL	Assumed historic railway loading	SV/STGO/SO	N/A
	Critical Elements	Bridge deck and abutments		
	Parapet	The existing parapet is 1.4m high, which is suitable edge protection for cycle and pedestrians, however it is below the requirement for equestrian usage (1.8m).		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Additional detailed exam: May 2015 Visual exam: Aug 2019		
	Condition / Change in Condition	The structure overall is in significantly poor condition. The latest detailed and visual examination identified that there were extensive areas of spalling with exposed reinforcement throughout the structure. There is extensive vegetation growth to the top of the structure including large trees.		

Figure 29 - View on bridge deck soffit

		 Figure 30 - View over the structure
	Change in Standards	No design or assessment records are available to confirm the standards previously used for this structure. There were no formal design standards used until 1923, with girder bridges designed on an empirical basis. BS 153 was introduced in 1923, which was the precursor to BS5400 that was first issued in 1978. The first design code for concrete structures was introduced in 1934, with the limit state approach being applied since publication of CP 110 in 1972. The latest standards for assessment of concrete highways bridges are CS 454 and CS 455 (reinforced concrete)
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	Multiple areas of exposed and corroding reinforcement
	Hidden critical elements	Bearings
	Interim measures	N/A
	Conclusion	The structure overall is in a significantly poor condition. Moreover, it is not on the direct route of the disused railway, but appears to have carried a spur line, leading to the original gasworks site. The recommended route for the Greenway is over the Gas Works A bridge, leaving this structure redundant. Given the poor condition of the structure it is therefore proposed to not incorporate this bridge within the Trafford Greenway scheme. Consequently no works are proposed.
4	Recommendation	
	No works are recommended to this structure since it is not proposed to incorporate it within the Trafford Greenway scheme. However, the bridge is in a significantly poor condition, and it is recommended that the owners are contacted and made aware of their responsibility regarding upkeep and public safety.	

4.2.15 Culvert 900mm

1	Structure Details			
	Structure Name	Culvert 900mm		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 14		
	Structure Key	NR ID: 12023854		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Small watercourse		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	The culvert carries the disused railway over a small watercourse. The structure is a single span brick and earthenware pipe-culvert. The structure has a span of 650mm and width (length) of 55.0m There are currently no parapets on this structure.  Figure 31 - Culvert 900mm			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A
	Assessment Date	Not known	Report Number	N/A

	Current Assessed Capacity			
	HA/ALL	Assumed historic railway loading	SV/STGO/SO	N/A
	Critical Elements	The brickwork section of the culvert, approximately 29m long from the upstream end		
	Parapet	There are currently no parapets on this structure.		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: Nov 2016 Visual exam: Jul 2021		
	Condition / Change in Condition	The structure overall is in fair to poor condition. The latest inspection identified that there was mortar loss and missing and displaced bricks throughout the brickwork section of the culvert. Recommendation to replace the worst 10m length. There is also debris in the invert although it does not appear to be restricting flow at this time. There is mortar loss and calcite staining and algae growth to the wingwalls and headwalls. The existing surfacing is a gravel path. It is suitable for pedestrians, cyclists and horses but unsuitable for wheelchair users and child buggies.		

Figure 32 - End elevation

		 Figure 33 - View inside the culvert from cctv survey
	Change in Standards	No design or assessment records are available to confirm the standards previously used for this structure. Masonry is now designed to BS EN 1996 and buried rigid pipes to BS EN 1295.
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	Displaced stonework in masonry section
	Hidden critical elements	None
	Interim measures	N/A
	Conclusion	Overall, the structure is in a fair to poor condition. Owing to the significant reduction in loading from trains to NMU and small maintenance vehicles, the structure is considered adequate for carrying the proposed Greenway, provided the maintenance interventions listed below are undertaken.
4	Recommendation	
	It is recommended that the following works are undertaken to render the structure suitable for carrying the proposed Greenway: Essential works, estimated cost: £2,400 ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage Works that can be deferred, estimated cost: £19,500 ▪ Re-line approximately 10m length of masonry culvert where the brickwork is missing and dislodged. ▪ Repoint other accessible masonry.	

4.2.16 Sinderland Brook

1	Structure Details			
	Structure Name	Sinderland Brook		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 15		
	Structure Key	NR ID: 12023856		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Sinderland Brook		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	The bridge carries the disused railway over Sinderland Brook. The structure is a 2-span bridge consisting of concrete beams on stone abutments and central stone pier. The structure has 2 spans of 2.69m each. Width is approximately 20m. There are currently no parapets on this structure.			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A
	Assessment Date	Not known	Report Number	N/A

Figure 34 - Sinderland Brook

	Current Assessed Capacity			
	HA/ALL	Assumed historic railway loading	SV/STGO/SO	N/A
	Critical Elements	Bridge deck, pier and abutments		
	Parapet	There are currently no parapets on this structure.		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: Aug 2014 Visual exam: July 2020		
	Condition / Change in Condition	The structure overall is in fair to poor condition The latest detailed examination identified that there was minor mortar loss throughout the abutments, wingwalls and pier along with odd minor fractures. There are odd fractured bed stones. There is silt build up against the abutments beginning to restrict flow in the watercourse. The parapet has been removed from the top of the structure (possibly stolen). There is vegetation growth to the top of the structure including trees.		
	Change in Standards	No design or assessment records are available to confirm the standards previously used for this structure. There were no formal design standards used until 1923. BS 153 was introduced in 1923, which was the precursor to BS5400 that was first issued in 1978.		

Figure 35 - View under and over the structure

		The first design code for concrete structures was introduced in 1934, with the limit state approach being applied since publication of CP 110 in 1972. The latest standard for assessment of highways bridges is CS 454 and CS 455 for reinforced concrete structures.
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	None
	Hidden critical elements	None
	Interim measures	N/A
	Conclusion	The structure is in fair condition. Owing to the significant reduction in loading from trains to NMU and small maintenance vehicles, the structure is considered adequate for carrying the proposed Greenway, provided the maintenance interventions listed below are undertaken.
4	Recommendation	
	It is recommended that the following works are undertaken to render the structure suitable for carrying the proposed Greenway. Essential works, estimated costs: £13,000 ▪ Install equestrian parapets over the structure ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage Works that can be deferred, estimate costs: £7,000 ▪ Repairs and re-pointing of stonework ▪ Clear silt in invert ▪ Vegetation clearance	

4.2.17 Culvert 900mm

1	Structure Details			
	Structure Name	Culvert 900mm		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 17		
	Structure Key	NR ID: 12023862		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Small Watercourse		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	The culvert originally carried a small watercourse beneath the disused railway, but now appears to be redundant. The structure comprises a single span brick arch on brick walls at the downstream end and a flat top concrete slab on brick walls at the upstream end. The structure has a span of 970mm and a length of 40m. There is only an open steel post and ail parapet to the downstream end of the structure, which is sub-standard.  Figure 36 - Culvert 900mm			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A

	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			
	HA/ALL	Assumed historic railway loading	SV/STGO/SO	N/A
	Critical Elements	Bridge deck and abutments		
	Parapet	There is only an existing parapet to the downstream end of the structure, which is inadequate to current standards.		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: Feb 2017		
	Condition / Change in Condition	The condition of the structure is considered to be poor The upstream end appears to have collapsed and is now non-functional. There is significant deterioration of pointing throughout the structure. There is spalling to 4 of the face rings and 1 loose brick on the downstream end. It is proposed to demolish and backfill the structure with site won material.		

Figure 37 - View over the structure

		 Figure 38 - View insider the structure
	Change in Standards	No design or assessment records are available to confirm the standards previously used for the structure. There were no formal design standards used until 1923. BS 153 was introduced in 1923, which was the precursor to BS5400 that was first issued in 1978. The first design code for concrete structures was introduced in 1934, with the limit state approach being applied since publication of CP 110 in 1972. The latest standard for assessment of highways bridges is CS 454 and CS 455 for reinforced concrete structures. Arch bridges were historically designed and assessed by empirical method, with the modified MEXE method being introduced in 1963 for highway, and which remains one of the four acceptable analysis methods recommended by the current standard CS 454.
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	None
	Hidden critical elements	None
	Interim measures	N/A
	Conclusion	The structure overall is in poor condition and appears to be no longer functional. It is therefore proposed to demolish and backfill with site won material
4	Recommendation	
	Further investigation should first be made to verify that the structure is no longer functioning and is redundant. When this is verified, it is recommended that the structure is demolished and backfilled using site won material. Grading of the embankments at each end of the culvert will eliminate the need for parapets. Essential works, estimated costs: £10,000 ▪ Demolition and infill	

4.2.18 Manchester Road

1	Structure Details			
	Structure Name	Manchester Road		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 19		
	Structure Key	NR ID: 12023864		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Manchester Road		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	The bridge carries the disused railway over Manchester Road. The structure is a single span 'Battle Deck' Type of structure comprising 3no welded steel box girders and steel deck plates with cross girders welded to the deck plates, which in turn are bolted onto the main box girders with hook bolts. This all sits on stonework abutments. Access hatches are located at each end of each box girder. The structure has a span of 14.1m and a width of 9.3m. The existing open post and rail parapets have a height of 1m.			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A

Figure 39 - Manchester Road

	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			
	HA/ALL	Assumed historic railway loading	SV/STGO/SO	N/A
	Critical Elements	Bridge deck and abutments		
	Parapet	The existing parapet is 1m high, comprising open post and rail, which is not suitable of cyclist (1.4m) or equestrian use (1.8m).		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: Oct 2017 Visual exam: July 2021		
	Condition / Change in Condition	The structure overall is in fair condition. The latest detailed examination identified that there were minor areas of corrosion throughout the metal elements of the structure. There is also corrosion to the steel bolts throughout. The masonry elements of the structure have minor mortar loss throughout and small areas of seepage and fractures. There are scrape marks to the bottom faces of the girders and the structure is missing bridge strike information plates. Boundary fencing is missing adjacent to the wingwalls. There is extensive vegetation growth to the top of the structure and behind the wingwalls. The disused railway track bed and sleepers are still in place.		

Figure 40 - View under and over the structure

	Change in Standards	No design or assessment records are available to confirm the standards previously used for this structure. There were no formal design standards used until 1923, with girder bridges designed on an empirical basis. BS 153 was introduced in 1923, which was the precursor to BS5400, first issued in 1978. For steel girder bridges designed to BS 153, permissible stress principles would have been used. Current design and assessment standards use limit state principles. The latest standards for assessment of steel highway bridges are CS 454 and CS 456 (for steel structures).
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	Steel bearings.
	Hidden critical elements	Internal surfaces of box girders, deck plates.
	Interim measures	N/A
	Conclusion	The structure in fair condition overall. Owing to the significant reduction in loading from trains to NMU and small maintenance vehicles, the structure is considered adequate for carrying the proposed Greenway, provided the maintenance interventions listed below are undertaken.
4	Recommendation	

It is recommended that the following works are undertaken to render the structure suitable for carrying the proposed Greenway:

Essential works, estimated costs: £25,000

- Install appropriate parapets or safety fences along the proposed Greenway over the bridge and its approaches over the high embankments
- Clear overgrown vegetation and trees, and treat roots as appropriate, over the disused railway track and the embankments
- Removal of existing track bed from over the structure and footpath surfacing to an acceptable standard for NMU usage

Works that can be deferred, estimate costs: £39,000

- Patch painting of impact damaged areas of girders
- Painting of discreet areas of corrosion throughout the steelwork
- Filling of fractures in abutments

4.2.19 Timperley Brook

1	Structure Details			
	Structure Name	Timperley Brook		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 20		
	Structure Key	NR ID: 12023865		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Timperley Brook		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	The bridge carries the disused railway over Timperley Brook. The structure is a single span stone and brickwork arch culvert. The structure has a span of 3.6m and a width of 21.3m. The parapets have a height of less than 0.5m.  Figure 41 - Timperley Brook			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A
	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			

	HA / ALL	Assumed historical railway loading	SV / STGO / SO	N/A
	Critical Elements	Arch ring, spandrels and abutments		
	Parapet	The existing parapet is less than 0.5m high, which is below the required edge protection for cyclist (1.4m) or equestrian usage (1.8m).		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: Aug 2015 Visual exam: Aug 2019		
	Condition / Change in Condition	The structure overall is deemed to be in fair condition. The latest detailed examination identified that there are areas of mortar loss throughout the structure and areas of water staining. Spalling bricks to arch soffit.  Figure 42 - View under the structure Displaced copings and spandrels pushing out. The structure has been inaccessible since the last detailed examination due to excessive vegetation growth throughout the structure. The parapets are below the required height for all users. The original railway track bed, railings and sleepers are still in place.		

		 Figure 43 - View over the structure
	Change in Standards	No design or assessment records are available to confirm the standards previously used for this structure. Arch bridges were historically designed and assessed by empirical methods, with the modified MEXE method being introduced in 1963 for highway bridges, and which remains one of the four acceptable analysis methods recommended by the current standard CS 454.
	Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
	Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
	Vulnerable details	Spandrels
	Hidden critical elements	None
	Interim measures	N/A
	Conclusion	The structure is in fair condition overall. Owing to the significant reduction in loading from trains to NMU and small maintenance vehicles, the structure is considered suitable for carrying the proposed Greenway, provided the maintenance interventions listed below are undertaken.
4	Recommendation	
	It is recommended that the following works are undertaken to render the structure suitable for carrying the proposed Greenway: Essential works, estimated costs: £17,500 ▪ Removal of existing railway track bed, railings and sleeps, and vegetation and footpath surfacing improvement to an acceptable standard for Greenway usage ▪ Install appropriate parapets or safety fences along the proposed Greenway over the bridge ▪ Removal of significant vegetation from behind the training walls Works that can be deferred, estimated cost: £9,500 ▪ Repair of missing coping stones to training walls ▪ Repointing and repair of bulging spandrel wall	

4.2.20 Attenbury's Lane

1	Structure Details			
	Structure Name	Attenbury's Lane		
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 21		
	Structure Key	NR ID: 12023866		
	Date Commissioned	Assumed early 1900s.		
	Obstacles Crossed	Footpath		
	Bridge Carries	Disused railway		
	Brief Description of Structure			
	The bridge carries the disused railway over a footpath. The structure is a single span stone and brick arch subway. The structure has a span of 3.57m and a width of 8.57m. The parapets have a height of 1.88m.  Figure 44 - Attenbury's Lane			
	Reason for Structural Review	Assess suitability for carrying the proposed Greenway.		
2	Existing Assessment Details or Design Records			
	Inspection for Assessment Date	Not known	Recorded Condition	None
	AIP for Assessment	Not available	Status	N/A
	Assessment Date	Not known	Report Number	N/A
	Current Assessed Capacity			

	HA/ALL	Assumed historical railway loading	SV/STGO/SO	N/A
	Critical Elements	Bridge deck and abutments		
	Parapet	The existing parapets comprise 1.88m high open metal posts and rails. The parapet height is adequate for both cyclist (1.4m) and equestrian (1.8m) use. However, the condition and design may be unsuitable for Greenway.		
	Pier Impact	N/A		
	Certification	Not available		
	Calculations	Not available		
	As built drawings	Not available		
	Comments on Assessment			
	No existing design or assessment records are available.			
3	Evaluation			
	Inspection Date	Detailed exam: Jul 2015 Visual exam: Jul 2019		
	Condition / Change in Condition	The structure overall is in fair condition. The latest inspections identified that there are areas of mortar loss throughout the structure and odd areas of spalling and erosion. Some historical fractures to northern wing walls and odd missing stones to all wingwalls. There is also significant vegetation and tree growth behind the wingwalls. The existing surfacing is a gravel path. It is suitable for cycle and pedestrian traffic. However, it would be unsuitable for wheelchair users.		

Figure 45 - Typical view of arch barrel intrados

	 Figure 46 - View over the structure
Change in Standards	No design or assessment records are available to confirm the standards previously used for this structure. Arch bridges were historically designed and assessed by empirical methods, with the modified MEXE method being introduced in 1963 for highway bridges, and which remains one of the four acceptable analysis methods recommended by the current standard CS 454.
Change in Loading	The bridge will carry non-motorised traffic (including pedestrian, cyclist and equestrian) from the proposed Greenway, and light maintenance vehicles
Required capacity	Pedestrian loading and light maintenance vehicles up to 7.5t
Vulnerable details	None
Hidden critical elements	None
Interim measures	N/A
Conclusion	The bridge is in fair condition overall. Given that the bridge was originally designed to carry trains, and since no significant deterioration is evident that would compromise the structural integrity, it is considered to be suitable for the loading requirements of the proposed Greenway.

4	Recommendation
	It is recommended that the following works are undertaken to render the structure suitable for carrying the proposed Greenway: Essential works, estimate cost: £27,500 ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage ▪ Install appropriate parapets or safety fences along the proposed Greenway over the bridge and its approaches over the embankments ▪ Clear overgrown vegetation and trees, and treat roots as appropriate, over the disused railway track and the embankments Works that can be deferred, estimate costs: £8,500 ▪ Masonry repairs and repointing to arch ring and abutments ▪ Repair of fractures in NE and SE wing walls

4.3 Overbridges

The load carrying capacity of overbridges are of less significance to the functioning of the proposed Greenway. Assessment of the overbridges instead focuses on safety risks of the public using the Greenway underneath, for example risk regarding objects falling, water leakage, available headroom and natural light.

4.3.1 Sinderland Road

1	Structure Details	
	Structure Name	Sinderland Road
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 10 Trafford Council Bridge Register Ref: 123
	Structure Key	NR ID: 1207351273
	Date Commissioned	1850
	Obstacles Crossed	Disused Railway
	Bridge Carries	Sinderland Road
	Brief Description of Structure	
	The bridge is a 3-span structure, carries Sinderland Road (a farm access road) over the disused railway track. The bridge deck consists of concrete beams and slab cantilevers, supported on masonry abutments and concrete crosshead beams on circular columns.	
2	Evaluation	
	Inspection Date	Visual exam: Nov 2019
	Inspection Summary	The latest inspections reported the structure was found to be in good condition, defects identified included:

Figure 47 - Sinderland Bridge (disused railway track under span 3)

		▪ Fire damage to the column base ▪ Ponding under the structure (not found during 2022 site walkover) caused by a salt glazed pipe under a farm track ▪ Missing brickwork to the parapet

Figure 48 - Water ponding (under span 1)

Figure 49 - Missing brick to parapet (over span 1)

3	Recommendation
	Defects identified from the latest inspections do not appear to affect span 3, where the disused railway track is located. Loss of bricks to the bridge parapets should be monitored, and if any bricks become loose particular over span 3, loose bricks should be removed or reinstated. It is considered currently no defects on the structure pose a risk to potential users of the Greenway, and thus no maintenance works for the structure are required. General de-vegetation and footpath surfacing improvement are envisaged to be undertaken as part of the overall Greenway alignment / route improvement works.

4.3.2 Dunham Road

1	Structure Details	
	Structure Name	Dunham Road
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 11
	Structure Key	NR ID: 12023850
	Date Commissioned	1885
	Obstacles Crossed	Disused Railway
	Bridge Carries	Dunham Road
	Brief Description of Structure	
	The bridge has 2 spans and carries Dunham Road over the disused railway. The structure comprises a longitudinal cast iron girders with transverse deck jack arches deck and a reinforced concrete slab decks, supported on masonry abutments and pier.	

Figure 50 - Dunham Road (view under bridge deck)

2	Evaluation	
	Inspection Date	Visual Examination: Nov 2019
	Inspection Summary	The structure was found to be in fair condition. Defects found on the structure include: ▪ Flooding under the structure (not found during 2022 site walkover) ▪ Corrosion to the girders and tie bars ▪ Broken tie bars ▪ Open joints to the jack arches on span 2

Figure 51 - Flooding under the structure in Nov 2019

3	Recommendation
	Defects identified on the cast iron span do not appear to pose immediate risk of objects falling onto the disused railway track below. Condition of the deck should be monitored during future inspections. Flooding issues highlighted by the 2019 inspection were not seen during the site visits undertaken in 2022. The overall Greenway alignment / route improvement works at later stage should confirm this is an exceptional event or a route alignment / drainage issue, and to be addressed by the design as appropriate. General de-vegetation and footpath surfacing improvement are envisaged to be undertaken as part of the overall Greenway alignment / route improvement works.

4.3.3 Woodcote

1	Structure Details	
	Structure Name	Woodcote
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 16
	Structure Key	NR ID: 12023859
	Date Commissioned	1870
	Obstacles Crossed	Disused Railway
	Bridge Carries	Woodcote Road
	Brief Description of Structure	
	The bridge has 3 spans and carries Woodcote Road over the disused railway and Sinderland Brook. The structure comprises a longitudinal cast iron girders with transverse deck jack arches deck central span (where the proposed Greenway would be located below), and 2 masonry arch spans, supported on masonry abutments and pier.	

Figure 52 - Woodcote central span

Figure 53 - Woodcote side spans

2	Evaluation	
	Inspection Date	Detailed Examination: Oct 2017 Visual Examination: Aug 2019
	Inspection Summary	The structure was found to be in fair condition. Defects found on the structure include: ▪ Open joints throughout ▪ Loss of section to tie bars on span 2 jack arch soffit ▪ Hollow sounding brickwork to span 2 jack arch soffit ▪ Spalling to span 2 jack arch soffits (no loose material) ▪ Leaning masonry to parapet ▪ Loose bricks to parapets ▪ Corrosion to the outer edges of the girders
3	Recommendation	
	Defects identified on the cast iron span do not appear to pose immediate risk of objects falling onto the disused railway track below. Condition of the deck should be monitored during future inspections. General de-vegetation and footpath surfacing improvement are envisaged to be undertaken as part of the overall Greenway alignment / route improvement works.	

4.4 Sinderland Lane

1	Structure Details	
	Structure Name	Sinderland Lane (Stamford Brook Railway Bridge)
	Structure Number	Network Rail: ELR: WJP1, Structure ref: 18A Trafford Council Bridge Register Ref: 350
	Structure Key	NR ID: 120734349
	Date Commissioned	2006
	Obstacles Crossed	Disused Railway
	Bridge Carries	Turnbull Road
	Brief Description of Structure	
	The bridge is a single span structure, comprises a prestressed beams deck supported on reinforced concrete abutments. It carries Turnbull Road over the disused railway.	
		
	Figure 54 - Sinderland Lane (Stamford Brook Railway Bridge)	
2	Evaluation	
	Inspection Date	Visual Examination: Aug 2019
	Inspection Summary	The structure was found to be in good condition. Defects found on the structure include: ▪ Vegetation growth throughout ▪ Fire damage to the concrete on the abutments and wingwall ▪ Unstable timber fence

Figure 55 - Damaged and unstable fences above wing walls

3	Recommendation
	It is recommended that the loose timber fences over the wing walls are repaired or replaced to ensure no risks of them falling onto the proposed Greenway. General de-vegetation and footpath surfacing improvement are envisaged to be undertaken as part of the overall Greenway alignment / route improvement works.

5 Cadishead Viaduct Options Appraisal

5.1 Introduction

Cadishead Viaduct is a 5-span structure comprising a central span (span 3) of twin wrought iron trough-decks on three lattice girders. The trough-decking spans transversely between the girders forming a single through deck. The side spans are masonry arches, with all spans supported on masonry piers. The central span is 42.6m long and the side spans range between 13.3m and 14.3m long. The masonry parapets to the side spans are approximately 1m high and in disrepair. The entire structure is skewed at approximately 25 degrees.

The height of the structure above ground level varies from approximately 5.0m at the abutments to approximately 30.0m over the canal.

It is noted that in British practice, trains typically run on the left side, and railway directions are usually described as "up" and "down", with "up" being towards a major location, which historically is the direction towards London. The existing examination reports and records have been interpreted in this light.

The requirement for the route is to accommodate pedestrians, cyclists and possibly horse riders. It is also desirable that the structures on the route should be able to carry the occasional maintenance vehicle (max weight 7.5 tonnes).

It is understood that there may be a potential desire for the Trafford Greenway to accommodate a bus route or even reinstate as a rail route at some time in the future.

- Bus route: this would significantly increase the proposed loading, the viability of which cannot be assessed qualitatively, and is therefore outside the scope of this report. However, it is noted that the transverse bracing to the top chords of the existing girders presents a height limit (approximately 4.3m) which may determine the type of bus which could be utilised (options 2 and 3). This height clearance will be reduced by the addition of the concrete deck.

- Rail-route: the current headroom of the bridge was based on non-electrified trains. The minimum headroom is 5.8 m for electrified rails or 4.8 m for non-electrified routes. Therefore the existing bridge would be unfit for purpose in either scenario and any refurbishment options (2 or 3) would not cater for rail use.

For any of the above uses, the canal span would have to be replaced with a new bridge (as in Option 1). As per the brief, this has not been explored in detail as part of this study, however the costs associated with the provision of a rail/highway bridge would be approximately an order of magnitude higher than the costs of a pedestrian bridge (more than 10 times more expensive).

5.2 Existing Structural condition

The latest Detailed Examination Report (DER 2020) notes that overall the structure is considered to be in poor condition, primarily as a result of defects to the metal central span. The masonry elements of the structure are judged to be generally in fair condition, with the exception of the old-standing missing brickwork to the parapets. Multiple areas of spalling and fractures are evident throughout the structure.

The DER and the latest Visual Examination Report (VER 2019) record both the historic defects as well as the current condition of all elements. No significant deterioration over time is recorded other than would be expected. It appears that since the structure has become dis-used, little remedial work has been undertaken beyond ensuring the structure remains safe to canal traffic

passing beneath the central span. Shipping containers have been placed across both ends of the structure to prevent access to the central span where the trough decking is judged to be unsafe for any live loading.

Figure 56 - Photo showing placement of shipping containers to prevent access to unsafe areas of the structure

In deriving costs of all options, notice has been taken of the costs quoted by Network Rail in the latest detailed and visual exam reports, as well as discussions with experienced steel fabricators, painting contractors and demolition experts. It is assumed that none of the works recommended in latest Inspection report, the DER of 2020, have been undertaken. All costs have been adjusted for July 2022 values. The whole life cost (capital and future maintenance) has been taken into account when considering the various options.

Overall, the structure is considered to be in poor condition, primarily as a result of defects in the wrought iron trough decking of span 3, which has a significant number of large holes resulting from corrosion. These are visible from ground level, and are mentioned in previous inspection reports.

Figure 57 - Typical example of the more severe corrosion damage to trough decking. Note the complete loss of section at the bottom of the trough (typical)

There are also a number of minor bracing members missing from the lattice trusses. In addition, it is noted that water is able to pond on the top surface of the bottom chord of the trusses, such that the potential for corrosion of the bottom chord is exacerbated.

A number of shipping containers, together with palisade fencing and barbed wire, have been placed over piers 1 and 4 in order to block access to the centre-span (span 3) where the exposed trough decking is in a dangerous condition. These containers overhang the sides of the structure, resulting in areas of parapet having been demolished. The remaining masonry elements of the structure are generally in a fair condition, although there are multiple areas of spalling and fractures which require repair, as follows:

Wing wall (NE) - fair condition but shows displacement up to 100mm.

- Hairline fractures to both abutments.
- Arch barrels - fractures are historic (no change since 2013). All arch soffits in fair condition. Multiple longitudinal fractures with isolated areas of open joints and calcite leaching, some hairline fractures to stone face rings.
- Piers - All in fair condition. Typical defects dampness, calcite leaching, open joints, spalling and vertical fractures.
- Bed stones and Cills - Typically fair condition, some areas of dampness and calcite leaching. Isolated areas of spalling at elevations.
- Parapets - Large areas of brickwork missing (historic). Large areas of open joints typically 20mm. Isolated areas of spalling. 2No. vertical step fractures to South elevation. Many copings are missing.
- Sub-surface drainage system requires cleaning; gutters and downpipes require total replacement

It is noted that there is no record of an underwater inspection ever having been carried out to determine the condition of the foundations to piers 2 and 3. The risk of scour in considered to be low risk Level 1 in accordance with BD 97. However, although the canal is not considered high risk in terms of scour, it would be prudent to consider undertaking an underwater inspection..

5.3 Proposed Options for Central Span (Span 3)

Viable options for bringing this structure back into use as a part of the proposed Trafford Greenway scheme are driven by the condition of the metal central span (span 3) which crosses over the Manchester Ship Canal. The three principal options for rectifying this central span are set out as follows, and discussed in detail below:

- Option 1: Demolition of span 3 and replacement with a footbridge
- Option 2: Partial refurbishment of span 3 (one half) and demolition of the other half
- Option 3: Refurbishment of the whole span 3

5.3.1 Option 1 – Demolition of span 3 and replacement with a footbridge

Demolish the whole of the span 3 steel deck and replace with a 3-4 m wide steel foot/cycle/equestrian bridge (Pratt truss or similar). The structure can be made capable of carrying occasional 7.5 tonne maintenance vehicles but would not be capable of carrying the

potential bus/rail route, although a similar structural form could accommodate this at additional cost, which is outside the scope of this report.

Preliminary discussions with contractors familiar with this type of work indicate that both demolition and erection will require a 1000t crawler crane.

The existing twin decks and three lattice trusses are totally removed and set on the canal bank. See demolition section below.

The weight of the new Pratt truss is approximately 40 tonnes and the 1000t crane would be operating at a maximum reach of 38m.

Figure 58 - Photo showing a Pratt truss of similar form, although this structure only carries a footway/cycleway. Option 1 requires a slightly heavier structure with 1.8m parapets to carry equestrian and maintenance vehicle loading

The truss can be fitted with either a steel or a timber deck. The timber deck provides open drainage and can be fitted in-situ following installation of the frame thus reducing the weight of the main lift. The steel deck requires a sound deadening overlay to accommodate equestrian use. For the passage of maintenance vehicles, it may be necessary to cast an in-situ concrete deck over the steel plates.

Benefits

- Ongoing liability of an old superstructure is avoided.
- Costs of mobilising demolition crane and equipment are fully utilised. It may also be possible to use the same crane for demolition of old bridge and installation of new footbridge
- Future maintenance costs of a new structure, designed to modern codes of practice, are minimal, leading to smaller whole life costs.
- Less uncertainty for future maintenance costs
- High certainty of construction costs

Dis-benefits

- Demolition and installation costs are high owing to the height of the span over the canal and difficult access

- Although beyond the scope of this report, the proposed structure would be incapable of carrying any potential bus/rail route. Should this future desire be realised, the structure would need to be replaced at that time.
- The appearance of the structure will be altered on the skyline, although we are not aware of this structure being listed or protected.

5.3.2 Option 2 – Partial refurbishment of span 3 (one half) and demolition of the other half

Demolish one deck (between two lattice girders) and refurbish the other remaining deck. The choice of which deck to retain will be dependent upon the condition and defects recorded at the inspection for assessment. The deck and girders which together are in the most favourable condition will be assessed to determine what repairs are required to make the structure serviceable for the proposed loadings.

The method of demolition for this option is similar to that for Option 1, except that only one trough deck is removed together with the one associated outside lattice girder. Demolition costs are slightly reduced, but mobilisation and preliminary costs are similar, since a similar crane would be needed as in Option 1.

Figure 59 - Photo showing a view looking east along the northernmost deck showing the existing lattice girders and metal deck troughing

It is anticipated that the deck to be refurbished will be constructed as a reinforced concrete slab spanning transversely between the lattice girders (See refurbishment section below)

Benefits

- The ongoing liability of retaining the second deck is removed and associated maintenance costs are reduced.
- Aesthetically the structure retains the original profile, although we are not aware of this structure being listed or protected

- The existing trough decking can be used as non-participating formwork when casting the deck
- The deck can be designed to carry any future bus/rail route, although headroom beneath the top chord bracing of the lattice girders may be limiting.
- The width of retained deck is wider than Option 1.

Dis-benefits

- The full cost of mobilising and de-mobilising the 1000t crane is incurred for only partial demolition
- Ongoing maintenance cost of repainting the refurbished deck after 25/30years are higher than for a modern bridge
- There will be more repairs required during future maintenance than for a new bridge.
- The trough decking remains a maintenance liability even though having very little structural function
- Addition extra weight from the concrete deck added (however partly compensated by the removal of one of the decks and lattice girders)
- Uncertainty about the amount of strengthening works that will be necessary and costly strengthening works design needed
- There will be a need for an inspection for assessment and assessment of the existing bridge which will be costly (in the region of £200, 000)
- The bearings on the retained deck will remain a greater maintenance liability than for a modern, lighter structure.

5.3.3 Option 3 – Refurbishment of the whole span 3

This option is to retain both existing decks, to refurbish one deck and undertake the necessary repairs to render the remaining deck structurally safe (no demolition)

There is no demolition with this option, and the deck and girders which together are in the most favourable condition will be assessed to determine what repairs are required to make the structure serviceable for the proposed loadings.

Figure 60 - Photo showing similar reinforced concrete deck construction on existing metal deck troughing (Walkley Lane Bridge). In this case the troughing is in better condition and is designed to be participating, with shear stud connectors welded to the top surface of the troughing

There is a considerable capital cost saving since there is no demolition required, but the maintenance liability is the greatest of all the options since both decks need to be maintained to serviceable levels.

Benefits

- All demolition costs are avoided.
- No need for heavy cranes and associated preliminary works, providing locations for set up on canal banks. Access requirements to the bridge location are reduced.
- The deck can be designed to carry any future bus/rail route, although headroom beneath the top chord bracing of the lattice girders may be limiting.
- The width of retained deck is wider than Option 1.

Dis-benefits

- The existing decks remain a liability. The redundant deck must be blocked to access from above and maintained to remain safe for canal traffic below.
- Ongoing maintenance cost of repainting the refurbished deck after 25/30years are higher than for a modern bridge
- Uncertainty about the amount of strengthening works that will be necessary and costly strengthening works design needed
- Significant additional extra weight added (concrete deck), foundations would have to be assessed and assessments of foundations are notoriously difficult to undertake given no As Built records have been found for the bridge
- There will be a need for an inspection for assessment and assessment of the existing bridge which will be costly (in the region of £200,000)
- This option has the greatest maintenance liability of all options

- The redundant deck must be permanently blocked off to prevent access from the Greenway.
- The redundant deck must be maintained to an adequate standard to remain safe to canal traffic passing beneath, and to not jeopardize the structural integrity of the refurbished span to which it will remain attached.
- The trough decking on the refurbished deck remains a maintenance liability (to ensure safety of canal traffic passing beneath) even though having very little structural function,
- The bearings on both decks will remain a greater maintenance liability than for a modern, lighter structure.

5.3.4 Options cost estimate

Table 2 -Central Span Options Cost Comparison

	Option 1	Option 2	Option 3
Capital	£2,083,200	£2,629,200	£2,569,200
Maintenance (60yrs)	£112,800	£201,400	£315,200

Please note that these costs are based on estimated costs which have been derived within the report for comparative purposes only. The overall risk allowance consists of:

- Uncertainties (these represent possible variations of anticipated works/materials). For example there are higher uncertainties for options 2 and 3 than for Option 1.
- Risk allowance – this is an allowance for unforeseen events
- Optimism Bias (OB) - this is an allowance to compensate for a tendency to underestimate the costs of civil engineering projects. A flat 20% percentage was added on all options to cover the risk allowance and OB.

All costs are at July 2022 values. The detailed costs are in Appendix F:.

5.3.5 Demolition (Options 1 and 2)

Demolition of the existing twin decks and three lattice trusses (Option 1) would be undertaken incrementally. It is anticipated that a temporary platform would be erected, suspended from the top chords of the trusses, to provide a working platform from which the trough decking can be removed. The lattice girders can then be lifted out individually and set down beside the crane on the canal bank adjacent to the northern end of the west abutment. The 1000t crawler crane is operating with a rigid boom at 42m reach.

5.3.6 Design considerations for replacement span (Option 1)

Vibration serviceability of the replacement central span may well be a deciding factor in the design of the bridge. Mass tuned dampers may need to be considered. Because of the requirement to allow passage of occasional maintenance vehicles (max weight 7.5 tonnes) the cost of dampers is included in the estimate provided (approximately £50,000).

The allowance for occasional maintenance vehicles on the bridge complicates the design and directly affects the loadings such as horizontal braking forces, vehicular impact on parapets etc. Removable bollards must be provided to restrict access to authorised vehicles only. The cost estimates provided make allowance for this.

5.3.7 Installation of replacement footbridge (Option 1)

Due to its length, the replacement footbridge will need to be delivered to site in at least 2 sections and welded/bolted together on site. Delivery access and installation can either be from the west bank of the canal or from the canal below. Although installation from the canal requires a significantly smaller crane, the additional cost of floating the bridge into position and lifting from a

pontoon mounted crane or barge, together with the additional cost of the pontoons, tugs, water safety equipment etc. is considered to make this option least favoured.

Costs have been evaluating allowing for a level crane standing area adjacent to the northern end of the west abutment. An 800 or 1000T crane is required due to the radius of lift and the necessary stand-off distance. The bridge sections are welded together prior to the final lift to install. Welders and painters will be on site for approximately 2 weeks preparing the truss prior to the final lift. Final installation will take approximately 3 days.

5.3.8 Refurbishment of existing decks (Options 2 and 3)

It is anticipated that the troughing of the deck to be retained is first assessed for its ability to act as non-participating permanent formwork for a new reinforced concrete deck slab. Any necessary repairs to the trough decking will be made to ensure it can adequately support the weight of the wet concrete. Particular attention will be paid to the interface between the troughing and the lattice girder, as this location is prone to corrosion. A similar assessment and strengthening/repair work design will be necessary for the supporting lattice girders to support the proposed design loading. It is anticipated that all metalwork will be re-painted at this stage (blast clean and repaint with full encapsulation necessary). The troughing will then be overlain with a porous membrane to ensure no loss of the concrete matrix before reinforcement is fixed and the new concrete deck is cast. It is likely that a lightweight concrete mix would be used to keep the additional weight to the minimum.

5.4 Maintenance works that can be deferred

Maintenance works are required to be carried out to the side spans and substructures to maintain these elements in a serviceable condition. It is considered that all of these works are not safety critical and can be deferred for a period until after the opening of the Greenway. These works include:

- Masonry repairs and repointing, including crack stitching repair to structural cracks in arch barrels.
- Drainage system repairs and improvement
- Vegetation clearance on and around the structure

More details of the proposed maintenance works and associated cost breakdown are included in Appendix F.

If these works are deferred, only essential repairs are required prior to opening the Greenway. Monitor remaining masonry fractures at 6-monthly intervals after opening the Greenway.

5.4.1 Cost estimate of works that can be deferred

Table 3 – Maintenance works costs that can be deferred

Capital	£89,900
Maintenance (60yrs)	£39,000

Please note that these costs are based on estimated costs which have been derived within the report for comparative purposes only. All costs are at July 2022 values.

5.5 Options for Parapets

The parapets to spans 1,2,4 and 5 are of masonry construction. The lattice girders themselves form the parapets of span 3. (Options 2 & 3). Alternatively, the parapets are an integral part of the new deck span (Option 1).

The required parapet height for equestrian use is 1.8m, the bottom 600mm of which must be solid infill. The following costs are based on a parapet height of 1.8m although the requirement for equestrian use has yet to be confirmed. For cyclists and pedestrians, the required parapet height is 1.4m. Consideration is given to either fixing steel posts (Key Clamp or similar) to the inside face of the existing masonry parapets and extending the height with mesh infill or to constructing a free-standing equestrian parapet inboard.

Extending the existing parapets with additional masonry is considered impractical due to additional weight and stability against lateral load (equestrian impact and wind). Raising the existing masonry parapets with a see-through posts and rail steel system may be seen as unsuitable for horses -views from the local equestrian society should be sought.

5.5.1 Sub-Option X – Parapet extension

Existing parapets are raised to provide 1.4 m for cyclists or 1.8m height for equestrian use (if deemed necessary). This option is discussed further in Section 6.

Benefits of extending existing parapets

- This is the least costly option.
- May permit opening of the Greenway to pedestrian traffic only before the parapet works are completed. Cyclists may also be allowed early access provided they dismount.

Dis-benefits of extending existing parapets

- Horses may be deterred from crossing such a high structure directly adjacent to the parapet

5.5.2 Sub-Option Y – New parapets

Existing parapets are repaired and remain at existing height. New parapets 1.8m high are erected inboard of existing.

Benefits of new parapets inboard of existing

- Horses and riders may be more comfortable being kept in-board of the edges of the viaduct

Dis-benefits of new parapets inboard of existing

- This is a more costly option, both capital and maintenance
- Early opening of the structure to pedestrian traffic only is not practical

5.5.3 Options cost estimate

Table 4 -Parapet options cost comparison

	Sub-Option X	Sub-Option Y
Capital	£40,000	£148,000
Maintenance (60yrs)	£16,000	£23,200

These costs are based on estimated costs which have been derived within the report for comparative purposes only. All costs are at July 2022 values.

5.6 Appearance

Although Historic England have no record of the structure being listed, the form of the existing central span over the canal is recognizable and holds a dominant position within the flat landscape. Any replacement span should be sympathetic to the historic nature of the bridge and remain in keeping with the refurbished side spans. Consultation should be sought, and careful consideration given to the ultimate appearance of the structure as a whole. The location is prominent in the landscape, visible to local properties and walkers.

Options 2 and 3 will preserve the existing appearance of the structure on the skyline. Option 1 will present a change in appearance, the magnitude of which will be determined by the final design. There is the opportunity, at a small increase in cost, to create a more aesthetic span, for example having a curved top chord.

5.7 Sustainability and Use of Natural Resources

For the reinforced concrete elements, use of recycled aggregates or furnace slag based lightweight aggregates such as Lytag, as well as cement replacements can be considered.

Any metal which is removed from the site, particularly in respect to Options 1 and 2, can be re-cycled. In addition, and where possible, any material arisings from the bridge refurbishment may be re-used elsewhere on the Trafford Greenway project.

Where possible, locally sourced material will be used and, if necessary, may be rendered suitable for incorporation into the permanent works.

5.8 Durability / Design Life

The design working life of the replacement span will be Category 5 (120 years design working life) in accordance with CD 350 and NA to BS EN 1990 2002. The remaining design life of the masonry elements is determined by the quality and effectiveness of the ongoing maintenance regime. If well maintained it is expected that the masonry elements of the structure should remain good for the working life of any replacement span 3, as they are not subject to the same deterioration as either steel or reinforced concrete. Drainage of the side spans is critical, and the superstructure should be designed with suitable falls to drain water off all spans for all options. An approved waterproofing system should be used on the deck of span 3 and all accessible buried concrete surfaces, where they occur, should be waterproofed using two coats of bituminized paint.

The necessary movement joint(s) at the ends of span 3 for all options should be carefully designed to alleviate the effects of water leakage through the joints. This will reduce the need for excessive future maintenance or replacement of bearings or expansion joints.

All piers, particularly those adjacent to the canal (piers 2 and 3) should be checked for any signs of foundation movement. The barrel fractures noted in the latest examination reports are not indicative of foundation movement, but it would be prudent for this to be verified in the course of the refurbishment design.

5.9 Health and Safety, and Potential Risks and Constraints to the Project

There are several health and safety hazards associated with refurbishment of the viaduct that are common across all options, including:

- Working with large plant or machinery
- Working at height (30 m+) for the deck works
- Potential interface with existing services, if any
- Working adjacent to a large watercourse
- Falling materials from the deck onto a navigable canal

Potential risks and constraints common to all options include that:

- Requirement for access and use of canal-side area can be satisfied.
- Any land purchases/permissions required for the works can be obtained
- All licence requirements can be met including closure of the Manchester Ship Canal during critical operations

5.10 Departures from Standards

A departure from standards may be required for extending existing masonry parapets (spans 1,2,4 and 5) using steelwork.

5.11 Construction Issues

The viaduct is offline from the highway network so there is no concern regarding traffic management. It is assumed that the Greenway, parts of which are currently in public use, can be closed for the duration of the works.

The presence of Manchester Ship Canal and high bridge headroom means a heavy crane is required for demolition and installation of a new deck, as discussed in sections above, and/or substantial temporary works for bridge deck refurbishment. Access and egress of such heavy plant will have to be carefully considered.

5.12 Operation and Maintenance

Option 1 can be designed to require minimal maintenance whilst options 2 and 3 will require higher maintenance where parts of the original metal structure are retained. Option 3 has the highest maintenance liability since the redundant span must be maintained to a minimum standard to ensure safety of canal traffic passing beneath. The maintenance liability for the refurbished span of both options 2 and 3 will be similar.

Routine operation and maintenance measures such as regular inspections and drainage cleaning should be carried out for all options. Access to the central span for principal inspections and significant maintenance work must be by hanging scaffold or rope access. All other parts of the structure can be accessed by either Mobile Elevated Working Platform (MEWP) or rope access.

5.13 Discussion and Recommendations

In this report we have considered three primary options for providing a viable crossing over the Manchester Shipping Canal. The benefits and dis-benefits of each scenario have been discussed, including sub-options for parapet upgrades.

The option to construct the equestrian parapet in-board of the existing masonry parapets over spans 1,2,4 and 5 has been discussed, and it is considered that the benefits of an inboard parapet are outweighed by the additional cost. Consequently, sub-option X is preferred, although it is recommended that the views of any local horse societies are sought regarding the anticipated behaviour of horses crossing the viaduct.

Although the cost benefits of deferring some of the non-essential refurbishment works appear small, we consider that the benefits of this may be found to be greater after detailed design, and do have merit. It is anticipated that this decision will be driven by the strategy and availability of grant funding. Owing to the height of the central span over the canal, the cost of accessing this part of the structure for either inspection or future maintenance is high, and forms a larger proportion of the works cost than would otherwise be the case.

Option 1 offers the opportunity to replace an ongoing liability with a newly designed structure with minimal future maintenance costs. The proposed new structure is narrower than that offered by Options 2 or 3, although the final width can be determined at design stage with a relative adjustment of cost (for example a 4 m wide footbridge can be installed, instead of a 3 m wide bridge as assumed in this report).

The need to provide at height access and encapsulate any existing steelwork prior to any refurbishment works, to contain grit blasting and paint spray, adds significant cost to both options 2 and 3. In addition, precautions will need to be taken owing to the presence of lead paint, although encapsulation will be required in any case during grit blasting.

Options 2 and 3 also have a higher maintenance liability since all metal elements that are to be retained will have a significantly higher maintenance requirement going forward. In particular this form of riveted lattice girder, very common during the period of early 19th century railway construction, presents a significant corrosion risk if not adequately maintained. Also there are significant additional costs and uncertainties in the scoping and design of refurbishment works of a 100 year + old structure, which reached the end of its useful life and require major works.

It is understood that there may be a potential desire for the Trafford Greenway to accommodate a bus route or even reinstate as a rail route at some time in the future. As per the brief, this has not been explored in detail as part of this study, however the costs associated with the provision of a rail/highway bridge would be approximately an order of magnitude higher than the costs of a pedestrian bridge (more than 10 times more expensive).

Although in principle one would expect benefits in utilising as much of the existing structure as possible, we believe that this report demonstrates the greater benefits of replacing the central span with a newly designed bridge which will have a design life of 120 years and minimal future maintenance costs.

In spite of the high costs of demolition, Option 1 is also the least costly both in terms of capital and whole life costs. There are also the health, safety and environmental benefits of removing an old and high-maintenance structure from the bridge stock.

Consequently, after considering the benefits and dis-benefits of all viable options it is recommended that Option 1X (new footbridge and parapet extensions to the masonry parapets of the other spans) offers the most practical, sustainable and cost-effective solution.

The total estimated cost of this option is as follows:

Table 5 -Estimated cost of preferred option

Options	Capital Cost	Maintenance Cost (60 yrs.)
Option 1 (3m wide)	£2,083,200	£112,800
Works that can be deferred	£89,500	£39,000
Sub-option X	£40,000	£16,000
Uncertainty, risk and optimism bias	included	nil
Total	£2,212,700	£167,800

Please note that these costs are based on estimated costs which have been derived within the report for comparative purposes only. All costs are at July 2022 values.

6 Parapet Extension

Parapet height requirements for pedestrian and cycle usage is 1.4m. The majority of structures on the Greenway route have parapets that meet or exceed this height and are therefore suitable for use as they are.

Parapet height requirements for equestrian users is 1.8m. Should the route be made available for equestrians, parapet extensions would be required on many of the structures.

Examples for extensions on both steel half-through girder bridges and masonry bridges are detailed below.

The example below shows a parapet extension which is suitable for all of the steel half-through girder bridges:

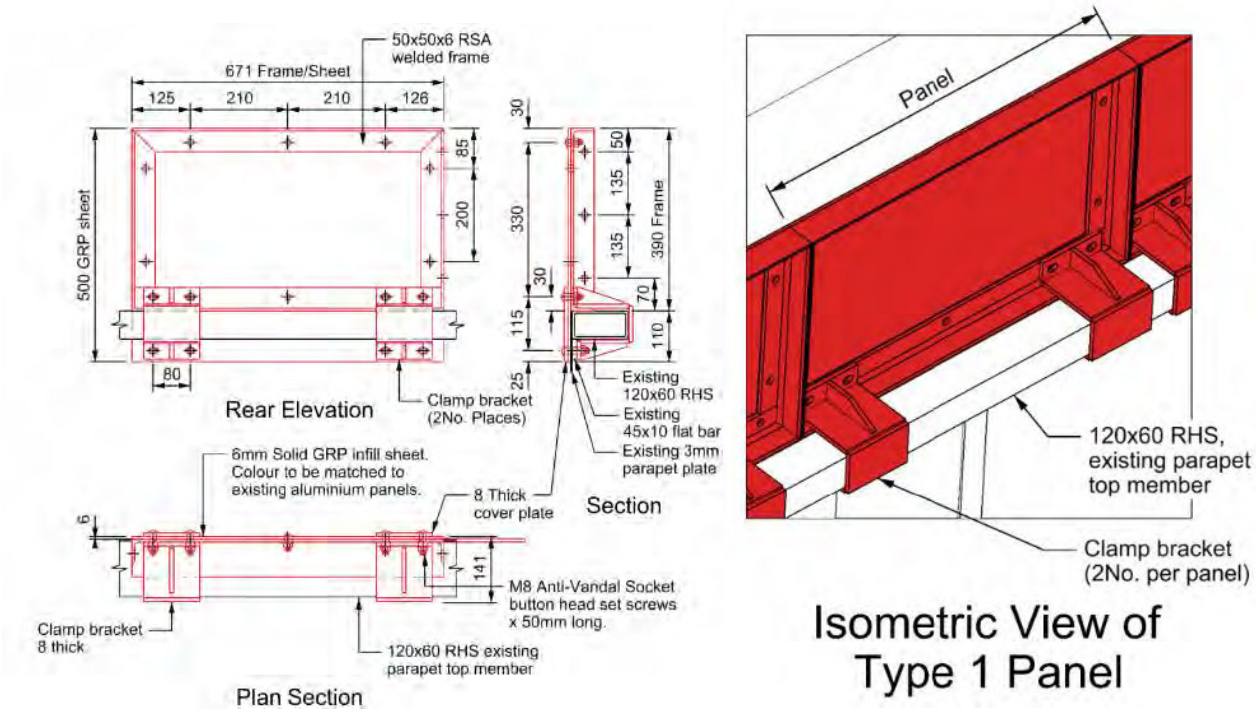


Figure 61 – Parapet extension example for Steel through girder

This option consists of an additional steel panel to reach the required height, connected to the existing parapet using a clamp system on the top flange of the girder. No holes are required through the existing girder meaning this option can be universally applied to all half-through girder type structures on the route.

This example shows a solid plate at the centre of the panels, but we would propose that this is replaced with mesh, although the preferences of the local horse societies should be sought, as discussed for the Cadishead Viaduct in Section 5. The bottom 600mm of any equestrian parapet should be solid, the remaining top section can be open but there is the possibility of horses being spooked in certain circumstances.

The example below shows a method of raising the height of existing masonry parapets:

Figure 62 – Parapet extension example for masonry (Monsal Trail)

This option comprises a Key-Clamp style parapet railing with mesh infill. This is then bolted to the inside face of the existing masonry parapet which forms the solid bottom third of the equestrian parapet as current codes require.

Alternatively the vertical posts can be fixed into sockets drilled into the top of the masonry parapet. Fixing directly to the top of the coping stones is unlikely to be structurally adequate. Fixing into the top is non-preferred owing to the greater cost.

It is anticipated that the parapets may need to be extended beyond the end of the bridge decks where the approach embankments are particularly steep with no or little vegetation to act as a natural guarding.

As discussed for Cadishead Viaduct in Section 5, it may be possible to undertake parapet raising whilst the Greenway is open to limited pedestrian traffic, to reduce the time for which the current route is closed from public use.

7 Conclusions and Recommendations

As discussed in Section 4.3, the structures crossing over the proposed Greenway are in fair condition and very little works are considered necessary to ensure the safety of users of the Greenway passing beneath them. Where there is the danger of loose debris falling onto the Greenway, users can be guided away from the danger areas by suitable guard railing until repairs can be undertaken by the owners of these structures. Consequently no costs have been allocated to repair these structures

The condition of underbridges carrying the dis-used railway route vary from poor to fair, and in need of maintenance works, but given that they have been originally designed to carry trains, even with some deterioration they would be able to support their own weight, NMU live loading and small maintenance vehicles. The exceptions are:

- Moss Lane Bridge which has always been a footbridge and having had some deterioration and lack of maintenance, it is advisable that a capacity assessment be carried out and structural maintenance repairs be undertaken especially to areas of significant section loss
- Cadishead Viaduct – which is the most significant bridge in a poor condition which would be difficult to upgrade, therefore a replacement of the centre span is recommended as the most whole life cost effective options (at a significant cost for both demolition of the existing bridge and replacement NMU bridge)

It is apparent that some small culverts are no longer in use or have become redundant over time, and in these cases it is considered that demolition or filling of the structure is the most cost-effective solution. This avoids the need for immediate repairs, removes all future maintenance liability and is relatively inexpensive to undertake.

The table below summarises the maintenance works recommended for the bridges carrying the dis-used railway (referred to as Underbridges). They have been split in essential works and works that can be deferred. The essential works are generally related to safety aspects such as an even surface safe for NMU usage and adequate parapets. Caution should be taken not to duplicate the surfacing works over bridges if considered separately for the entire route.

For Cadishead Viaduct a number of options have been considered within this report. These are discussed in some detail in Section 5 and the breakdown of associated costs is contained in Appendix F.

Although outside the scope of this report, we have commented on the condition of the old railway route between the structures, which is to form the proposed Greenway. The various segments of route are severely overgrown in places, with inaccessible stretches currently being severed by fencing or other similar safety measures at bridge approaches.

Full access should be obtained at later route alignment design stage, which may require advanced vegetation clearance works and/or special access arrangement. Consideration may also be given to undertaking a topographical survey to ensure compliance with geometry requirements set out in relevant standards and guidance, such as route gradients in accordance with Inclusive Mobility[3].

Original railway track bed, railings and sleepers have been left in places. In addition to extensive vegetation clearance for stretches of the route, it is anticipated that surfacing improvement works will be required to allow disabled access, and to be used by wheelchairs and child buggies.

7.1 Maintenance Interventions

Table 6 summaries the recommended repairs, anticipated capital cost and works duration for each underbridge required in order to allow their incorporation into the proposed Greenway. In addition to the structural reviews in Section 4, a detailed summary of the latest inspection findings and cost breakdowns of the recommended works can be found in the Condition Summary Sheet for each structure in Appendix D.

Table 6 – Structure Maintenance Interventions Summary

Ref No.	Underbridge Name	Owner	RAG	Works Required	Expected Time on Site (weeks)	Construction Cost (incl. 30% contingency)
MAJ\189	New Moss Road Bridge	Network Rail		None - Structure does not support the proposed Greenway, adjacent to the Greenway only.	N/A	£0
WJP1\1	Moss Lane Bridge	Network Rail	Essential works	▪ Steelwork repairs with necessary strengthening works as identified by the structural assessment, and repainting ▪ Vegetation clearance on the footpath over the bridge deck, along both girders / parapets ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage ▪ Safety fencing reinstatement at approaches to the structure	4	£67,500
			Works that can be deferred	▪ Masonry repairs and repointing to substructures and wing walls ▪ Parapet extension (if 1.8 m required)	8	£203,000
WJP1\3	Liverpool Road Bridge	Network Rail	Essential works	▪ Replace the parapet extensions to the masonry parapets ▪ Vegetation clearance – remove vegetation and trees and treat roots on the footpath over the bridge deck ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage ▪ Remove existing palisade fences and locked gates. Suitability of retaining existing palisade fences as restraint system for NMU over the embankments should be assessed	3	£30,000

Ref No.	Underbridge Name	Owner	RAG	Works Required	Expected Time on Site (weeks)	Construction Cost (incl. 30% contingency)
				▪ Install approach fencing at the 4 corners of the structure		
			Works that can be deferred	▪ Masonry repairs and repointing throughout– replace missing and weathered bricks, and repoint open mortared joints and cracks.	2	£27,500
WJP1\4	3ft Bridge Arch Culvert	Network Rail	Essential works	▪ Vegetation clearance to locate structure for inspection	N/A	£1,500
WJP1\4A	A57 Cadishead Way / North Bank Bridge	City of Salford	Essential works	▪ Footpath surfacing improvement to an acceptable standard for Greenway usage ▪ Install appropriate pedestrian parapets or guardrails along the proposed Greenway over the bridge and its approaches over the high embankments	3	£35,000
WJP1\5	Cadishead Viaduct	Network Rail	Essential works	▪ Central span replacement with new NMU/footbridge ▪ Side span parapet extension	16	£2,083,200 £40,000
			Works that can be deferred	▪ Side spans maintenance works including masonry repairs, drainage repairs and vegetation clearance	8	£89,900
WJP1\7A	Footpath Subway / Lynn's Subway	Trafford MBC	Essential works	▪ Footpath surfacing improvement to an acceptable standard for Greenway usage	1	£2,000
			Works that can be deferred	▪ Clear overgrown vegetation and trees, and treat roots as appropriate, over the disused railway track and the embankments ▪ Replacement and repair of joints sealant between the reinforced concrete units ▪ Maintenance painting to existing parapets over the headwalls	2	£14,000

Ref No.	Underbridge Name	Owner	RAG	Works Required	Expected Time on Site (weeks)	Construction Cost (incl. 30% contingency)
WJP1\7	Lymm Road	Network Rail	Essential works	▪ Footpath surfacing improvement to an acceptable standard for Greenway usage ▪ Remove existing palisade fences at bridge ends ▪ Install appropriate pedestrian parapets or guardrails along the proposed Greenway over the bridge and its approaches over the high embankments	2	£7,300
			Works that can be deferred	▪ Repair areas of minor spalling to concrete beams ▪ Clear significant vegetation from behind wing walls ▪ Repair open joints and stepped fractures in wing walls ▪ Waterproofing may require replacing within the next 10 years ▪ Clear overgrown vegetation and trees, and treat roots as appropriate, over the disused railway track and the embankments	6	£63,000
WJP1\8	Partington Station Subway	Network Rail	Essential works	▪ Footpath surfacing improvement	1	£3,000
			Works that can be deferred	▪ Vegetation clearance ▪ Demolish deck of disused structure and backfill with granular fill material	3	£42,000
WJP1\9	Footway Subway	Network Rail	Essential works	▪ Covering and protection of the gas pipe and investigation made to determine ownership. ▪ Pedestrian restraint system at the subway edges	2	£11,500
			Works that can be deferred	▪ Foamed concrete infill of the subway ▪ Infill between wing walls with Granular material	4	£49,500

Ref No.	Underbridge Name	Owner	RAG	Works Required	Expected Time on Site (weeks)	Construction Cost (incl. 30% contingency)
WJP1\9A	Gas Works A	Network Rail	Essential works	▪ Clear overgrown vegetation and trees, and treat roots as appropriate, over the disused railway track and the embankments ▪ Resurfacing	1	£9,000
			Works that can be deferred	▪ The steel deck-plates should be exposed and repaired as necessary. At detailed design stage consideration should be given to covering the deck plates with a thin (75mm) reinforced concrete slab and a proprietary spray-applied waterproofing membrane should then be applied. ▪ All steelwork should then be blast-cleaned and painted with a 2 or 3 coat HAPAS certified system. Note the possible presence of lead in the original paint system ▪ Re-pointing of masonry abutments ▪ Parapet extension ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage	9	£186,000
WJP1\9B	Gas Works B	Unknown	Essential works	Recommend that Greenway to pass through WJP1\9A Gas Works A, therefore no works required. ▪ Consult bridge owner and block off structure to prevent access by Greenway users ▪ Concrete repairs	N/A	N/A
WJP1\14	Culvert 900mm	Network Rail	Essential works	▪ Footpath surfacing improvement to an acceptable standard for Greenway usage	1	£2,400
			Works that can be deferred	▪ Re-line approximately 10m length of masonry culvert where the brickwork is missing and dislodged. ▪ Repoint other accessible masonry.	2	£19,500
WJP1\15	Sinderland Brook	Network Rail	Essential works	▪ Install equestrian parapets over the structure ▪ Footpath surfacing improvement to an acceptable standard for Greenway usage	2	£13,000

Ref No.	Underbridge Name	Owner	RAG	Works Required	Expected Time on Site (weeks)	Construction Cost (incl. 30% contingency)
			Works that can be deferred	▪ Repairs and re-pointing of stonework ▪ Clear silt in invert ▪ Vegetation clearance	1	£7,000
WJP1\17	Culvert 900mm	Network Rail	Essential works	▪ Demolition and infill	2	£10,000
WJP1\19	Manchester Road	Network Rail	Essential works	▪ Install appropriate parapets or safety fences along the proposed Greenway over the bridge and its approaches over the high embankments ▪ Clear overgrown vegetation and trees, and treat roots as appropriate, over the disused railway track and the embankments ▪ Removal of existing track bed from over the structure and footpath surfacing to an acceptable standard for NMU usage	3	£25,000
			Works that can be deferred	▪ Patch painting of impact damaged areas of girders ▪ Painting of discreet areas of corrosion throughout the steelwork ▪ Filling of fractures in abutments	5	£39,000
WJP1\20	Timperley Brook	Network Rail	Essential works	▪ Removal of existing railway track bed, railings and sleeps, and vegetation and footpath surfacing improvement to an acceptable standard for Greenway usage ▪ Install appropriate parapets or safety fences along the proposed Greenway over the bridge ▪ Removal of significant vegetation from behind the training walls	3	£17,500
			Works that can be deferred	▪ Repair of missing coping stones to training walls ▪ Repointing and repair of bulging spandrel wall	2	£9,500

Ref No.	Underbridge Name	Owner	RAG	Works Required	Expected Time on Site (weeks)	Construction Cost (incl. 30% contingency)
WJP1\21	Attenbury's Lane	Network Rail	Essential works	▪ Footpath surfacing improvement to an acceptable standard for Greenway usage ▪ Install appropriate parapets or safety fences along the proposed Greenway over the bridge and its approaches over the embankments ▪ Clear overgrown vegetation and trees, and treat roots as appropriate, over the disused railway track and the embankments	3	£27,500
			Works that can be deferred	▪ Masonry repairs and repointing to arch ring and abutments ▪ Repair of fractures in NE and SE wing walls	2	£8,500

Total estimated value of essential works, without Cadishead Viaduct: £262,000

Total estimated value of works that can be deferred, without Cadishead Viaduct: £668,500

Total estimated value of essential works: £2,385,400

Total estimated value of works that can be deferred: £758,400

Colour	Definition
	Essential works to allow use by Greenway NMU users
	Works that can be deferred until later
	No structural repairs needed in the context of use by Greenway and/or bridge in good condition

Figure 63 - Structural Repairs RAG Key

8 References

1) Cheshire Lines Greenway – Initial Feasibility Study, Jacobs, March 2019

2) Local Transport Note 1/20 Cycle Infrastructure Design, July 2020

3) Inclusive Mobility, December 2021

4) CD 353 Design Criteria for Footbridges, March 2020

5) CD 143 Designing for Walking, Cycling and Horse-Riding, March 2021

Appendix A: Bridges Map

Bridge No. WJP1/9A

Construction Material: Reinforced Concrete

Bridge No. WJP1/9B

Construction Material: Steel

Construction Material: Early steel

Bridge No. WJP1/1

Construction Material: Reinforced Concrete

Bridge No. WJP1/4A

Construction Material: Early steel

Bridge No. WJP1/6

Construction Material: Reinforced Concrete

Bridge No. WJP1/7

Construction Material: Cast Iron

Bridge No. WJP1/9

Construction Material: Cast Iron

Bridge No. WJP1/11

Construction Material: Reinforced Concrete

Bridge No. WJP1/15

Construction Material: Cast Iron

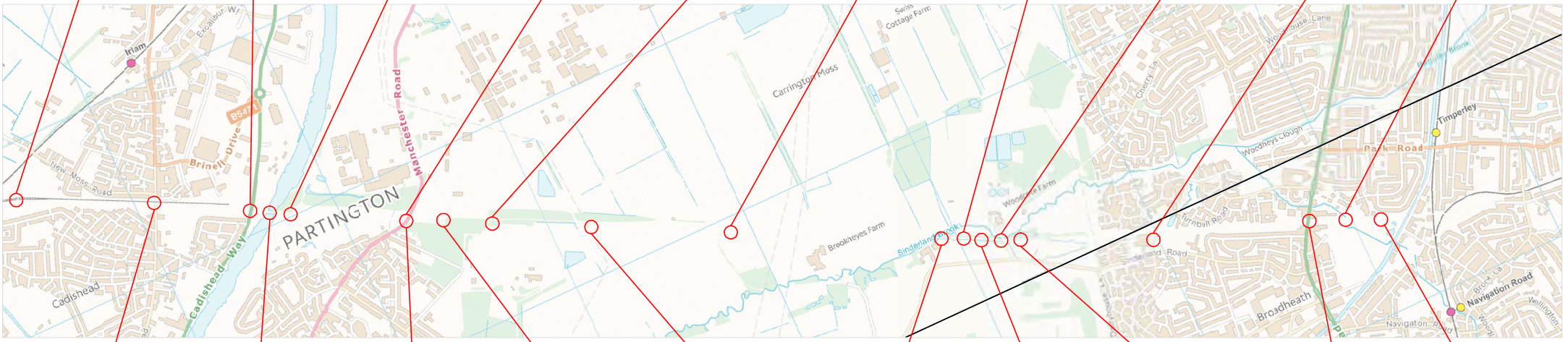
Bridge No. WJP1/16

Construction Material: Steel

Bridge No. WJP1/18

Construction Material: Brick

Bridge No. WJP1/20



Bridge No. WJP1/3

Construction Material: Brick

Bridge No. WJP1/5

Construction Material: Early steel

Bridge No. WJP1/7A

Construction Material: Reinforced Concrete

Bridge No. WJP1/8

Construction Material: Brick

Bridge No. WJP1/10

Construction Material: Pre-tensioned Concrete

Bridge No. WJP1/14

Construction Material: Clay pipe work and Brick

Bridge No. WJP1/15A

Construction Material: Mass Concrete

Bridge No. WJP1/17

Construction Material: Brick

Bridge No. WJP1/19

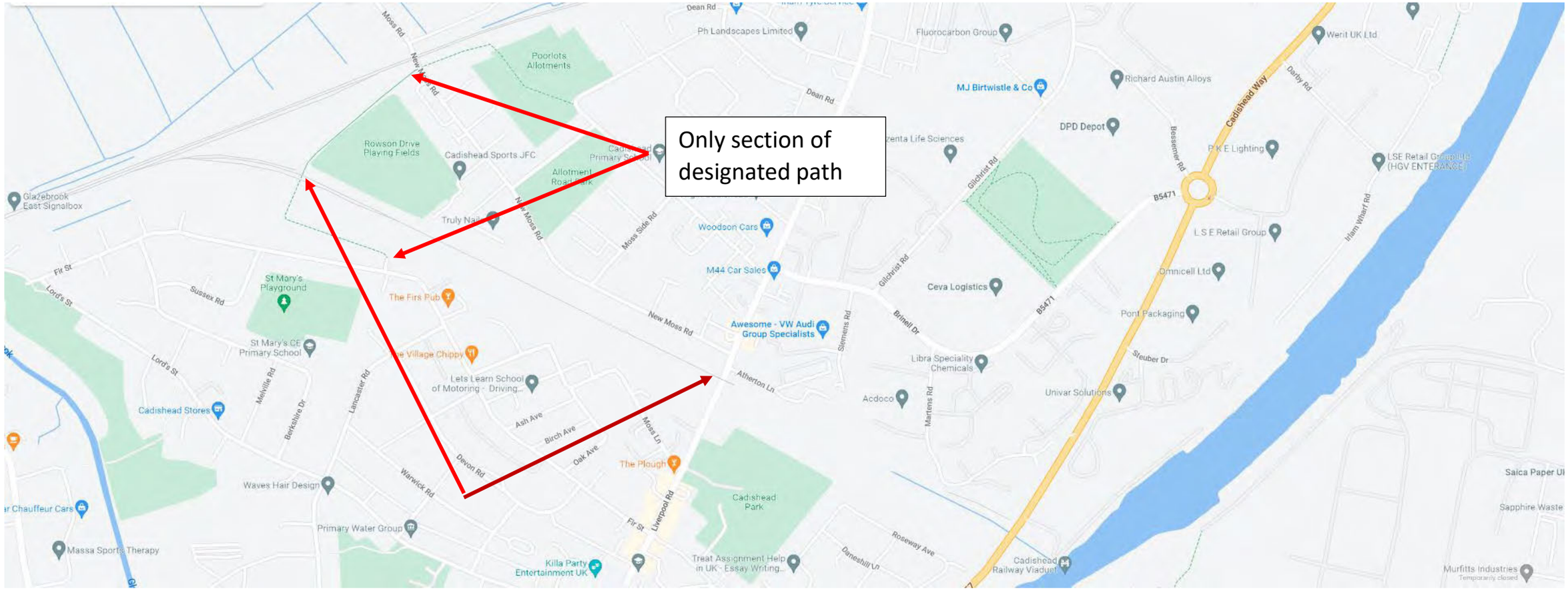
Construction Material: Steel

Bridge No. WJP1/21

Construction Material: Brick

Appendix B: Route Overview

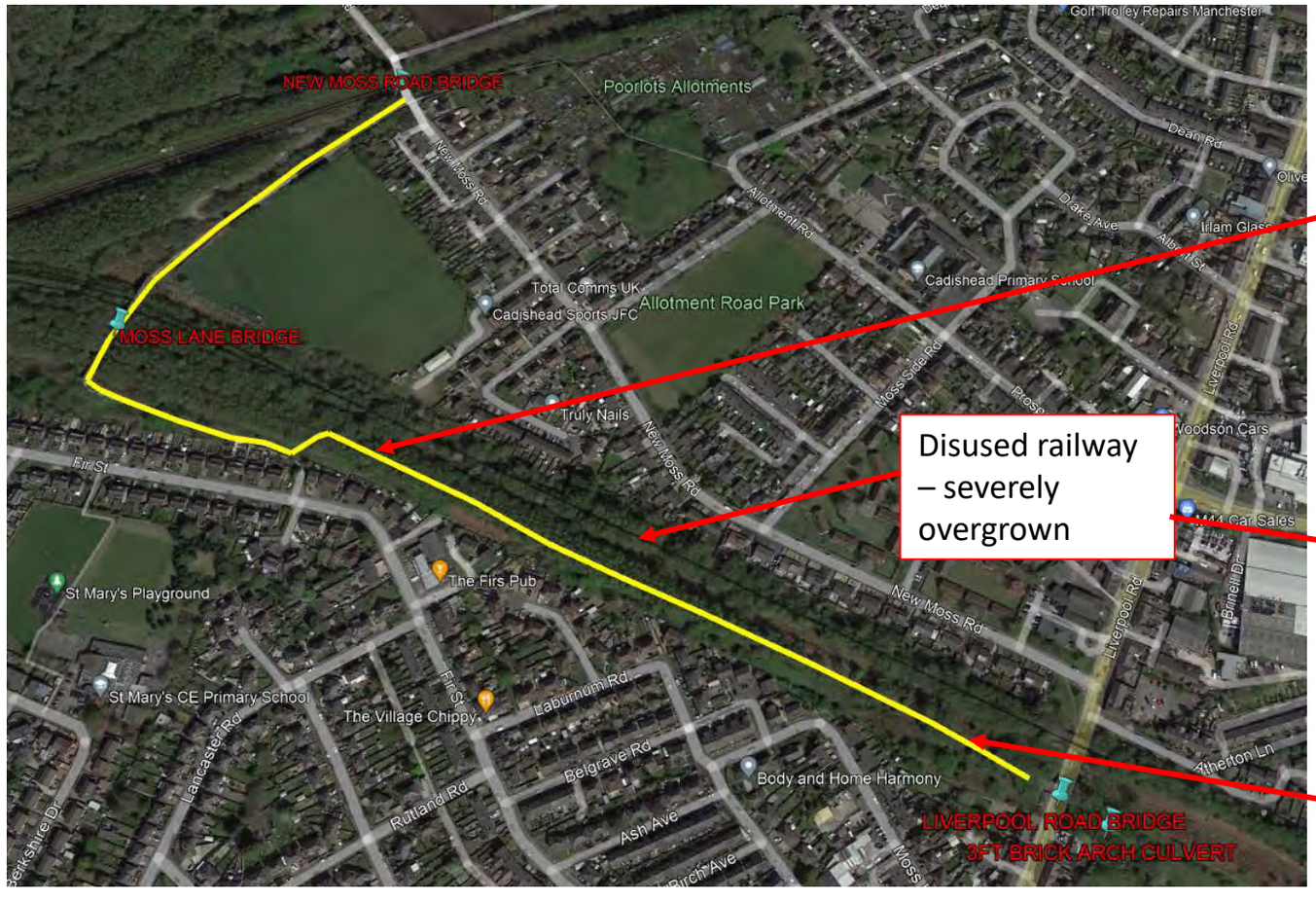
Segment 1 – New Moss Road footpath to Liverpool Road



Characteristics:

- Crossing over Moss Lane Bridge then a narrow footpath continuing parallel to the dis-used rail line (not along it) – see below
- No designated footpath from the estate spur to Liverpool Road, but still a usable narrow footpath, leading to the masonry arch bridge over Liverpool Road, not the old steel bridge at the north of it.

Segment 1 – New Moss Road footpath to Liverpool Road

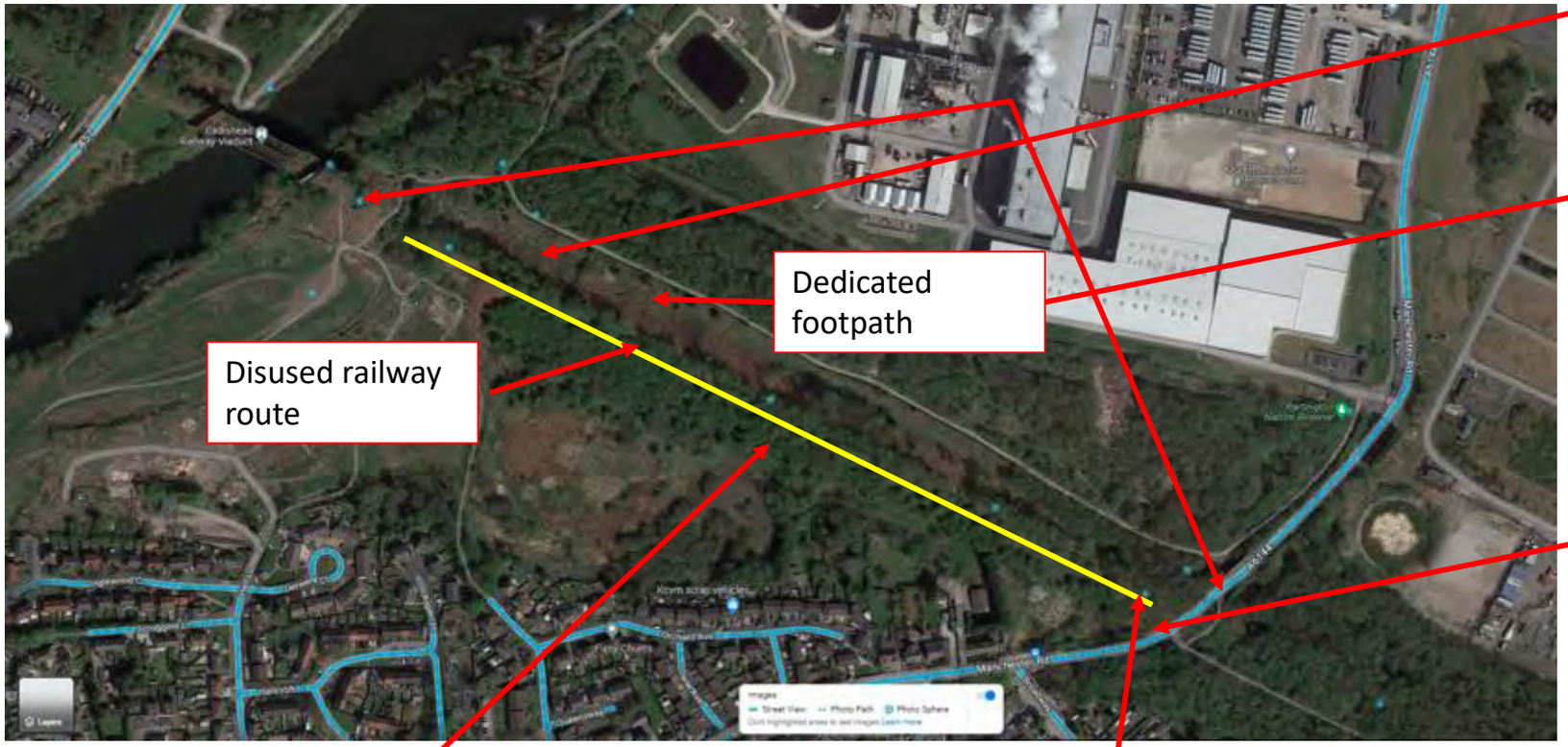


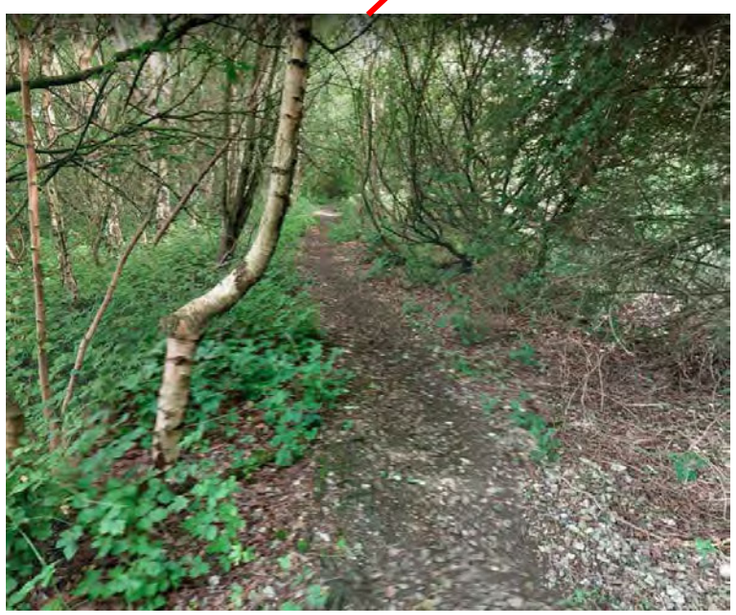
Segment 2 –Liverpool Road – Cadishead Viaduct

Characteristics:

- No designated footpath from Liverpool Road towards Partington, but still a usable narrow footpath, less vegetated than the previous Segment
- Unknown access to the path, not a through route by walkers due to being severed by Liverpool Road and Cadishead Viaduct, likely only used by locals

Segment 3 – Cadishead Viaduct – Manchester Road



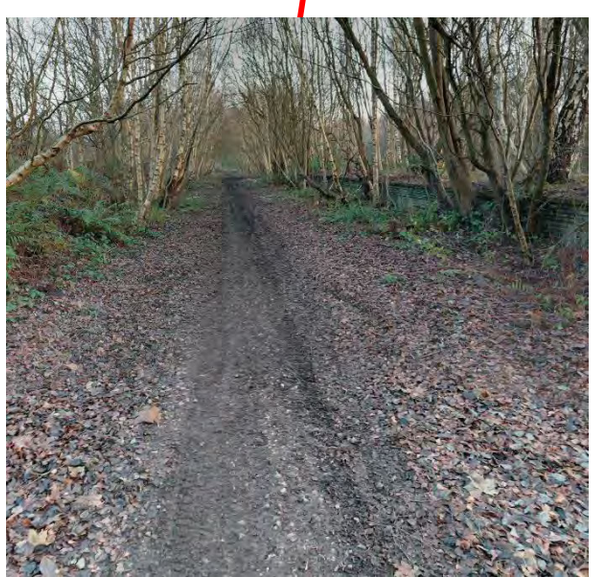


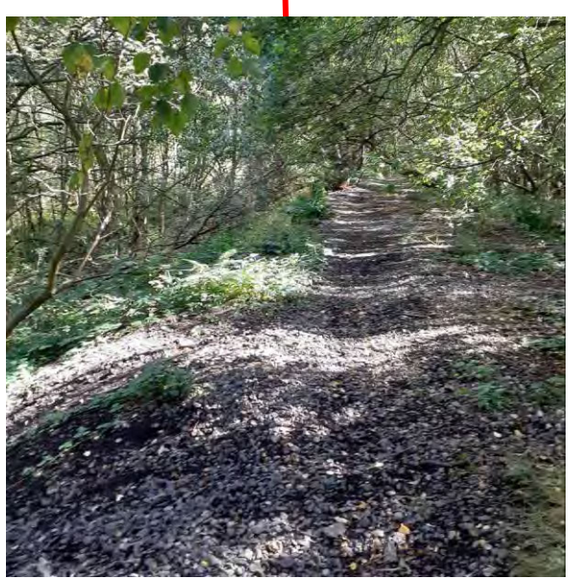
Characteristics:

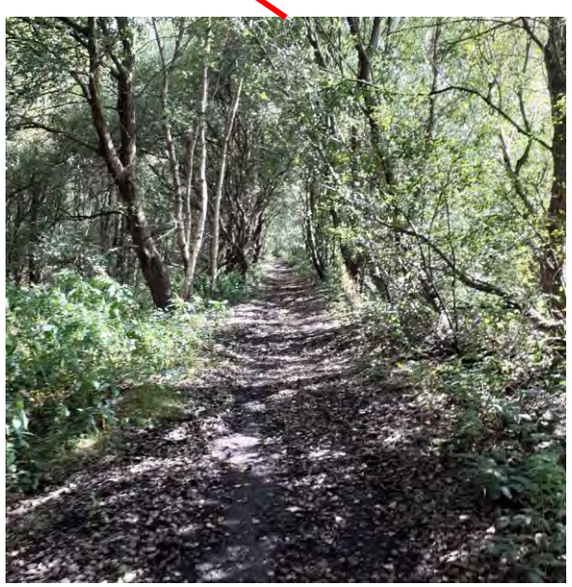
- Designated footpath at bottom of the dis-used railway embankment. Going under Manchester Road Bridge

- However, a narrow path still exists along the dis-used railway line through dense woodland (going over Manchester Road – fenced off Lymm Road bridge)

Segment 4 –Manchester Road – Sinderland Road (over Gasworks A steel bridge)



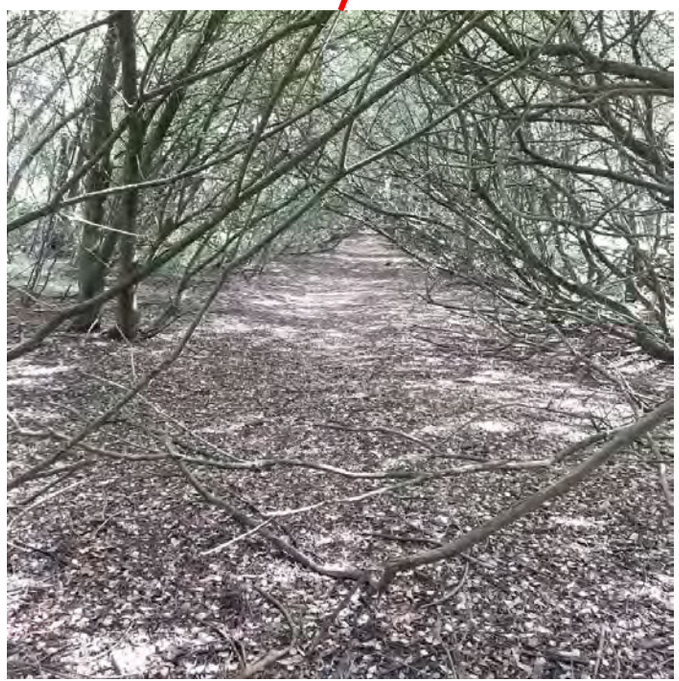




Characteristics:

- Designated and well used footpath, on the old route of the dis-used railway
- Also a parallel well trodden path running parallel with the dis-used railway starting from the layby on A6144 Manchester Road, gradually going up the embankment of the dis-used railway and eventually crossing over the concrete bridge at the gas Works.

Segment 5 – Sinderland Road – Dunham Road



Characteristics:

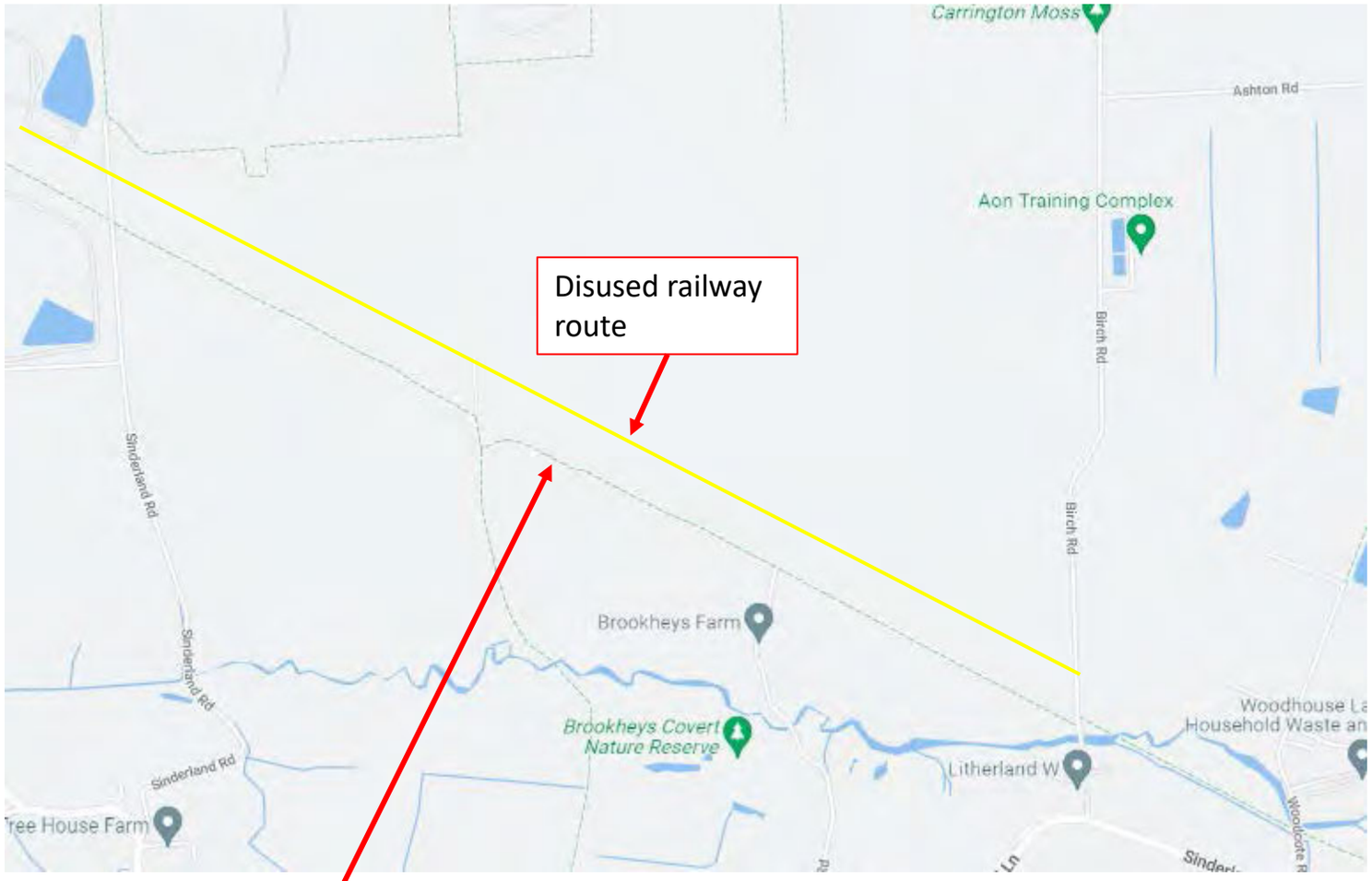
- Not a well trodden path, but a corridor does exist along the line of the dis-used rail, interspersed with areas of poorly drained patches becoming impassable after wet periods and large trees and branches across the path. Marked in Google Maps as a footpath.

Segment 6 –Dunham Road – Birch Road

Characteristics:

- The route of the dis-used railway is not maintained/ accessible as a footpath due to vegetation overgrowth. Quite flat area, not on an embankment. There is a narrow footpath to the south of the rail route which is also marked in Google Maps as a footpath.

Segment 6 –Dunham Road – Birch Road



Note:

- The narrow footpath to the south of the rail route which is marked in Google Maps as a footpath is not along the route of the dis-used rail.

Segment 7 – Birch Road – Woodcote Road

Characteristics:

- There is a narrow footpath through heavily vegetated areas which coincides with the route of the dis-used railway. Flat area, not on an embankment. Shown in Google Maps as a footpath.

Segment 8 – Woodcote Road – Broadheath Community School

Characteristics:

- There is a very narrow footpath through heavily vegetated areas which coincides with the route of the dis-used railway. Flat area, not on an embankment. Shown in Google Maps as a footpath.

Segment 9 –Broadheath Community School – A56 Manchester Road

Characteristics:

- The dis-used railway is not usable as a footpath and no alternative footpath was see during the site visit. No footpath shown in Google Maps either. There are sections of track and sleepers still in place. Significant works would be required to convert the dis-used rail route into a greenway.

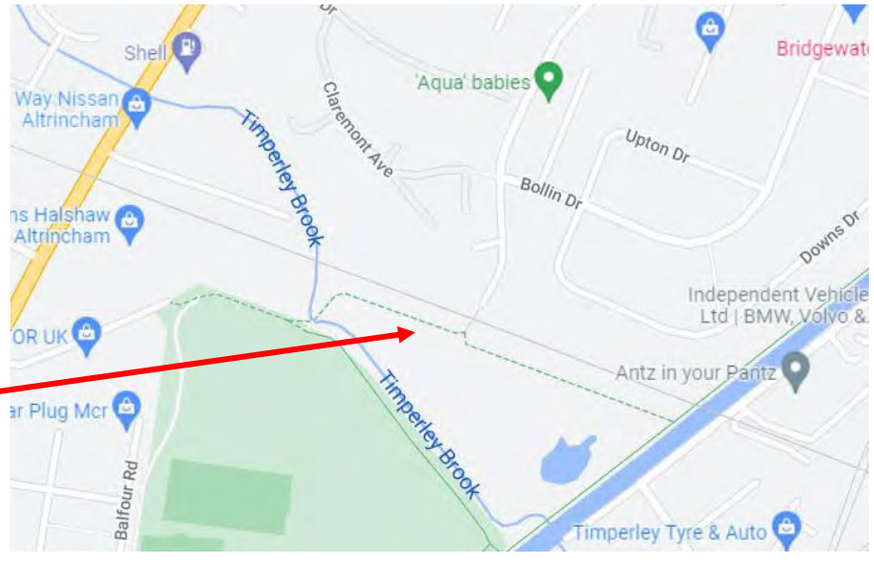
- Access over the bridge over A56 Manchester Road is prevented by locked gates

Segment 10 – A56 Manchester Road – Bridgewater Way Canal

Characteristics:

- The dis-used railway is not usable as a footpath and no alternative footpath was see during the site visit. No footpath shown in Google Maps either. There are sections of track and sleepers still in place. Significant works would be required to convert the dis-used rail route into a greenway.

- There are some footpaths around the route



Appendix C: Structures List

Greenway Structures

No.	ELR	M	Yds	Owner	NR Bridge ID.	Network Rail Name	Owner Bridge ID	LA Bridge Name	Bridge Type (for greenway)	Material	Photo
1	MAJ	25	313	Network Rail	189	New Moss Road Bridge			Underbridge (for the pedestrian route)	Cast Iron & Reinforced Concrete	
2	WJP1	25	72	Network Rail	1	Moss Lane			Underbridge - footbridge	Steel	
3	WJP1	25	775	Network Rail	2	Cadishead Station Subway - filled			Former Bridge Structure	Masonry	No photo
4	WJP1	25	870	Network Rail	3	Liverpool Road (B5320)			Underbridge	Masonry	
5	WJP1	25	924	Network Rail	4	3ft Brick Arch Culvert			Underbridge - Culvert	Masonry	No photo
6	WJP1	25	1442	City of Salford	4A	A57 Cadishead Way	494	North Bank Bridge	Underbridge	Reinforced concrete	
7	WJP1	25	1563	Network Rail	5	Cadishead Viaduct			Underbridge - Viaduct	Steel	
8	WJP1	25	1669	Network Rail	6	Mersey Viaduct			Former Bridge Structure	N/A	
9	WJP1	26	626	Trafford MBC	7A	Footpath Subway	57	Lynns Subway	Underbridge	Reinforced Concrete	
10	WJP1	26	626	Network Rail	7	Lymm Road			Underbridge	Reinforced Concrete	
11	WJP1	26	744	Network Rail	8	Partington Station Subway			Underbridge	Masonry	

No.	ELR	M	Yds	Owner	NR Bridge ID.	Network Rail Name	Owner Bridge ID	LA Bridge Name	Bridge Type (for greenway)	Material	Photo
12	WJP1	26	1056	Network Rail	9	Footway Subway			Underbridge	Cast Iron	
13	WJP1	26	1098	Network Rail	9A	Gas Works			Underbridge	Steel	
14	WJP1	26	1098	Unknown	9B	Gas Works			Underbridge	Reinforced Concrete	
15	WJP1	26	1627	Network Rail / Trafford MBC	10	Sinderland Road	123	Sinderland Road	Overline Bridge	Pre-tensioned Concrete	
16	WJP1	27	638	Network Rail	11	Dunham Road			Overline Bridge	Cast Iron	
17	WJP1	28	250	Network Rail	14	Culvert 900mm			Culvert - Underbridge	Brck and earthenware pipe	
18	WJP1	28	265	Network Rail	15	Sinderland Brook			Underline Bridge	Reinforced Concrete	
19	WJP1	28	400	Network Rail	15A	Side Footbridge			Side of Line Bridge	Reinforced Concrete	
20	WJP1	28	651	Network Rail	16	Woodcote			Overline Bridge	Cast Iron	
21	WJP1	28	651	Network Rail	17	Culvert 900mm			Culvert	Masonry	
22	WJP1	28	1672	Network Rail / Trafford MBC	18A	Sinderland Lane	350	Stamford Brook Railway Bridge	Overline Bridge	Pre-tensioned Concrete	

No.	ELR	M	Yds	Owner	NR Bridge ID.	Network Rail Name	Owner Bridge ID	LA Bridge Name	Bridge Type (for greenway)	Material	Photo
23	WJP1	29	718	Network Rail	19	Manchester Road			Underbridge	Steel	
24	WJP1	29	947	Network Rail	20	Timperley Brook			Underbridge	Masonry	
25	WJP1	29	1090	Network Rail	21	Attenbury's Lane			Underbridge	Masonry	

Appendix D: Condition Summary Sheets

BRIDGE NAME

New Moss Road Bridge

PHOTO

BRIDGE DETAILS

Structure Type:	One span over tracks is cast iron with carbon fibre strengthening, second span is concrete also with carbon fibre strengthening. Underbridge.
No. of spans:	2
Span dimensions:	Span 1: 7.91m Span 2: 4.86m
Height dimensions:	Height Span 1: 4.14m Span 2: 4.58m
Parapet dimensions:	The minimum parapet height is 1.4m

LOADING

The bridge carries New Moss Road a single carriageway over the live CLC Liverpool to Manchester line. Assumed the bridge was designed to 40t HA/ALL. No change in loading anticipated resulting from Greenway.

CONDITION SUMMARY

The structure is in fair condition.

COSTS

	Category	Location	Est Cost £	Description
1	Steelwork	Tie Bars	nil	Investigate the need for the corroded tie bars and remove. Renew if required. £10,000 estimated by NR but not required for Greenway.
2	Pipe and Carriers	Service pipe	nil	Investigate ownership and liability for the service pipe suspended off the soffit and remove or reinstate/refurbish. £1,000 estimated by NR but not required for Greenway.
3	Masonry	Pier, Abutments, Parapets & Wing Walls	nil	Masonry repairs including pointing open joints, replacing spalled damaged bricks. £10,000 estimated by NR but not required for Greenway.
		Total	**£0**	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2021 DE	**Main Girders**	**Fair**	Scaling to the bottom flanges of the outer girders, patches & spots of corrosion to the outer faces of the outer girders.
2	2021 DE	**Brick Jack Arches**	**Fair**	Span 1 Brick jack arches, generally in a fair condition showing general weathering and area's of hollow sounding brick. Tie bars between the arches are severly corroded.
3	2021 DE	**Concrete Deck**	**Fair**	Minor casting defects, small areas of leeching to the elevations
4	2021 DE	**Bolts**	**Good**	Tie bar ends on the outer faces of the main girders, no defects noted.
5	2021 DE	**Abutments**	**Fair**	Downside: Only minor defects noted. Upside: Brickwork repairs have been carried out to the buttresses and fractures repointed, some fractures remain.
6	2021 DE	**Pier**	**Fair**	Brickwork repairs have been carried out to the buttresses and fractures repointed, some fractures remain
7	2021 DE	**Wing Walls**	**Fair**	Downside: Only minor defects noted. Upside: Odd bricks spalled and isolated open joints, missing brickwork
8	2021 DE	**Pointing**	**Fair**	Approximately 17m2 total showing slight deterioration
9	2021 DE	**Parapets**	**Fair**	Minor defects noted to the outer faces, i.e weathered joints. Diagonal hairline fractures at repair full height of Parapet to the road face of the low mileage parapet. Spalled and displaced brickwork to end of the high mileage parapet. Parapets steel cappings were in fair condition.
10	2021 DE	**Bedstones and Cills**	**Fair**	Two cracked bedstones on the pier of span No 1. Slight weathering to the remainder of the bedstones Concrete cills of span 2. No defects noted other than wetness & water stains
11	2021 DE	**Bearings**	**Cannot Determine**	Not examined, built into the brickwork.
12	2021 DE	**Waterproofing**	**Cannot Determine**	Some evidence of water percolation to span 2.
13	2021 DE	**Drainage**	**Fair**	Water staining to the pier face beneath span 2.
14	2021 DE	**Painting**	**Poor**	Paintwork defective particularly in areas of corrosion.
15	2021 DE	**Track/Road Condition**	**Fair**	No defects noted to the track. The protective raised concrete kerbs are damaged towards the upside end.
16	2021 DE	**Ballast Walls**	**Fair**	No defects noted other than slight weathering.
17	2021 DE	**Vegetation**	**Fair**	Tree growth adjacent to the downside high mileage wing wall. Trees also growing in close proximity to the disused span from the track bed.
18	2021 DE	**Pipe and Carriers**	**Poor**	Pipe support is missing. Severe corrosion throughout the 3 remaining pipe carriers, but were firm when sounded with a prodder. Long standing defect. Severe corrosion throughout the un-lagged part of the pipe traversing jack arch No 2. Long standing defect.
19	2021 DE	**Carbon Fibre Strengthening**	**Good**	Carbon fibre strengthening strips to concrete deck to span 2 majority in good condition with no deformation noted. 250mm of staining present to high mile strip.

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1	Jack arch supports / cross girders	Low	-

BRIDGE NAME

Moss Lane Bridge

PHOTO

BRIDGE DETAILS

Structure Type:	Metallic underbridge
No. of spans:	4 spans
Span dimensions:	Span 1 - Clear span between bearings: 58'-0" (MGE1) and 55'-0" (MGE2) Span 2 - Clear span between bearings: 51'-0" Span 3 - Clear span between bearings: 51'-0" Span 4 - Clear span between bearings: 51'-0"
Height dimensions:	Span 1 - Height: 7.460m Span 2 - Height: 7.370m (IS1) and 5.047m (IS2) Span 3 - Height: 4.615m Span 4 - Height: 4.594m
Parapet dimensions:	Parapet height of 1.328m from surfacing to the top of main girder

LOADING

The structure carries a footpath over the redundant railway. It is assumed that the structure was originally designed to pedestrian loading to historical standards, which would be less conservative than loading requirements to current standards. Latest inspections reported moderate/severe sections losses to girders, full section loss at bearing stiffener. Assessment and Inspection for Assessment recommended.

CONDITION SUMMARY

The structure is in fair to poor condition. Girder section losses could affect load carrying capacity.

COSTS

	Category	Location	Est Cost £	Description
1	Painting	Bridge deck girders and troughing	£190,000	Blast clean all metalwork, carry out metalwork repairs where required, prime and overcoat throughout.
2	Vegetation	Throughout structure	£1,000	Cut back vegetation and treat roots
3	Steelwork repairs	Bridge deck girders and troughing	£15,000	Repair holes to steelwork
4	Other	Retaining wall	£3,000	Undermining of concrete retaining wall to ballast retention
5	Handrail renewal/repair	Bridge approaches	£3,000	Install missing safety fencing
6	Handrail renewal/repair	Parapet	£10,000	Increase parapet height to 1.8m by installing 0.4m high Kee Clamp handrail to the girder flange
7	Footpath surfacing improvement	Surfacing	£15,000	Assumed laying of semi-bound surfacing material, e.g. Ultitrec
8	Inspection for assessment	Design	£8,500	Inspection includes special access and trial holes for hidden critical elements
9	Bridge deck assessment	Design	£25,000	CS454 assessment for bridge deck
		Total	**£270,500**	
		Total essential	**£67,500**	
		Future works	**£203,000**	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2020 DE	**Bearing**	**Fair**	Bearing pads in good condition.
2	2020 DE	**Main Girders**	**Fair**	Girders in fair condition with areas in poor condition.
		Span 1		3mm loss of section to underneath of bottom flange at supports. Knife edging and notches to internal end of bottom flange at supports, up to 200x80mm section loss. 2-4mm section loss to internal top surface of bottom flange to full length of girder. Isolated de-lamination and notch to internal edge of top flange of HM girder, section loss of 200x50mm. Rivet heads typically corroded 1-3mm.
		Span 2		4mm loss of section to underneath of bottom flange at supports. Knife edging and notches to internal edge of bottom flange at supports, up to 150x40mm section loss. 2-4mm section loss to internal top surface of bottom flange to full length of girder. Rivet/bolt heads typically corroded 1-3mm.
		Span 3		Areas of up to 3mm loss of section to underside and edges of bottom flange at supports and midspan. The thickness of the internal edge of the bottom flange is down to 5mm at High Mileage Pier 3 support. 50mm diameter hole to the web, located 800mm from the top flange. Web thickness is down to 6mm in the area surrounding this hole. 2-4mm section loss to internal top surface of bottom flange, to full length of girder. Water seepage through the deck is evident. Rivet/bolt heads typically corroded 1-3mm.
		Span 4		Area of complete loss of section to the web of the low mileage girder over the support at pier 3, 1261mm x 76mm is visible. Notches to main girders at the interface with the transverse concrete repair beam, up to 250x100mm section loss. Areas of up to 3mm loss of section to underneath and edges of bottom flange at supports and midspan. 2-4mm section loss to internal top surface of bottom flange to full length of girder. Water seepage through the deck is evident. Rivet/bolt heads typically corroded 1-3mm.
3	2020 DE	**Parapets and Pilasters**	**Fair**	1.328m minimum height is below the required 1.8 for equestrian use
4	2020 DE	**Water Proofing**	**Cannot Determine**	Areas of seepage were observed to the abutments, which suggests that the waterproofing system may have failed in these areas.
5	2020 DE	**Abutments**	**Fair**	Abutment in fair condition. General weathering to masonry with 5-10mm losses. Areas of open joints throughout, up to 40mm deep. Areas of light vegetation growth.
6	2020 DE	**Bedstones and Cills**	**Fair**	Generally fair condition.
7	2020 DE	**Piers**	**Fair**	Piers in fair condition Some masonry pilasters have been partially or wholly removed. Steel plates have been welded between MGE's where this is the case. General weathering to masonry with 5-10mm losses. Areas of open joints throughout, up to 40mm deep. Areas of light vegetation growth.
8	2020 DE	**Wing and Retaining Walls**	**Fair**	Wingwalls in fair condition. General weathering to masonry with 5-10mm losses. Areas of open joints throughout, up to 40mm deep. Areas of light vegetation growth.
9	2020 DE	**Drainage**	**Poor**	No current drainage infrastructure noted. Inadequate drainage evident.
10	2020 DE	**Painting**	**Poor**	Generally poor condition
11	2020 DE	**Pointing**	**Fair**	Generally, in fair condition. Areas of open joints throughout, up to 40mm deep.
12	2020 DE	**Rivets and Bolts**	**Fair**	Rivet/bolt heads typically corroded 1-3mm. Some rivets/bolts missing.
13	2020 DE	**Track/Road**	**Fair**	

14	2020 DE	**Trough Decking**	**Fair**	Troughing is in fair condition. Typical loss of 3mm to bottom surface of troughing at support and midspan.
15	2020 DE	**Vegetation and Debris**	**Good**	Minor vegetation growth
16	2020 DE	**Wing Safety Fencing**	**Poor**	Poor condition. Safety fencing to north abutment approach is missing

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1	Girders / trough deck connections	High	Condition at connections would affect u-frame restraint to girders. Recommend trial holes to investigate as part of inspection for assessment

BRIDGE NAME

Liverpool Road Bridge

PHOTO

BRIDGE DETAILS

Structure Type: Brick arch underbridge
No. of spans: 1 Span
Span dimensions: Clear span: 10.88m
Height dimensions: 9.04m
Parapet dimensions: Parapet height of 1.85m

LOADING

The structure was designed to carry trains over Liverpool Road. Historic train loading is considered to be more onerous that the Greenway loading requirements (footwat loading with light maintenance vehicles up to 7.5t).

CONDITION SUMMARY

The structure is in fair condition.

COSTS

	Category	Location	Est Cost £	Description
1	Masonry re-pointing	Arch barrel, abutments, wing walls and parapets	£15,000	Re-point all open joints and fractures throughout structure.
2	Brickwork/stone repairs	Parapets and pillasters, abutments and newels	£7,500	Replace missing and weathered bricks across structure.
3	Parapets	Parapets	£10,000	Replace the metal parapet extension
4	Approach fencing	On approaches to the bridge	£8,000	Install 10 m approach fencing on all 4 corners
5	Vegetation	Over bridge deck and embankments	£1,500	Remove vegetation and treat roots, point the root joints.
6	Footpath surfacing improvement	Surfacing	£10,000	Assumed laying of semi-bound surfacing material, e.g. Ultitrec
7	Traffic management	Liverpool Road	£5,000	TM for masonry works
8	Remove gates	At each end of bridge	£500	Remove the pallisade fencing gates currently blocking access across the bridge
		Total	**£57,500**	
		Total essential	£30,000	
		Future maintenance works	£27,500	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2020 DE	**Arch Ring**	**Poor**	Numerous longitudinal fractures up to 1mm wide. Some minor weathering to the bricks up to 5mm.
2	2020 DE	**Parapets and Pilasters**	**Poor**	1m Vertical 3mm fracture up side. 1m diagonal 5mm fracture up side. 7m2 hollow sounding brick work to upside. 5m2 hollow sounding brickwork to down side. Odd spalled brick up to 5mm depth. Non offensive graffiti.
3	2020 DE	**Spandrels**	**Poor**	Various vertical fractures on the upside and downside sprandrels up to 1mm thick. Areas of seepage to both sprandrels.
4	2020 DE	**Water Proofing**	**Cannot Determine**	Signs of failure
5	2020 DE	**Abutments**	**Fair**	2 missing bricks on the high mileage abutment. Various vertical fractures up to 1mm depth. Odd bricks weathered up to 5mm deep.
6	2020 DE	**Bedstones and Cills**	**Fair**	Weathered brickwork throughout up to 15mm deep. 2 no bedstones vertically fractured open 2mm to the high mileage abutment.
7	2020 DE	**Wing and Retaining Walls**	**Fair**	Numerous spalled copings up to 80mm depth. 2 no bricks missing below the copings on the downside low mileage wing wall. 2.1m diagonal 1mm fracture on the upside high mileage wall.
8	2020 DE	**Drainage**	**Cannot Determine**	Signs of failure
9	2020 DE	**Handrails**	**Poor**	Bridge handrails have missing sections and moderate corrosion to all.
10	2020 DE	**Painting**	**Fair**	Paint breakdown to handrails and posts.
11	2020 DE	**Pointing**	**Fair**	Arch ring: 2m2 open joints up to 10mm depth Parapet (upside): 15m2 open joints up to 20mm depth Parapet (downside): 14m2 open joints up to 20mm depth Spandrel (upside): 1m2 open joints up to 15mm depth Spandrel (downside): 1m2 open joints up to 10mm depth Abutment (high mileage): 11m2 open joints up to 10mm depth Abutment (low mileage) : 8m2 open joints up to 10mm depth Wing wall (up side high mileage): 15m2 open joints up to 15mm depth Wing wall (up side low mileage): 18m2 open joints up to 20mm depth Wing wall (down side high mileage): 15m2 open joints up to 20mm depth Wing wall (down side low mileage): 5m2 open joints up to 10mm depth
12	2020 DE	**Rivets and Bolts**	**Fair**	Areas of moderate corrosion to all bolts to handrails.
13	2020 DE	**Track/Road**	**Fair**	Mature trees growing on the top surface, otherwise no defects recorded.
14	2020 DE	**Vegetation**	**Fair**	Mature trees growing on the top surface. Light weeds and grasses growing to parapet faces.
15	2022 Visit	**Other**	**Fair**	Access to the structure is prevented by Pallisade fencing. Fencing will need to be removed for the Greenway.

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1	None	-	-

BRIDGE NAME

A57 Cadishead Way / North Bank Bridge

PHOTO

BRIDGE DETAILS

Structure Type:	Reinforced concrete box culvert
No. of spans:	1 span
Span dimensions:	Span: 16.7m
Height dimensions:	Height: 7m
Parapet dimensions:	1m Kee Klamp (over head walls and wing walls only)

PREVIOUS LOADING

The structure was constructed around 2003 long after the railway decommisioned. Consequently it can be assumed that the structure would have been designed for pedestrain loading as a minimum to BD37/01. As-built drawing shows a slab thickness of 1.75m and a span/depth ratio of 10. This means the bridge was very likely designed to vehicle loading (possiblly to allow for future development). However, there are no reinforcement

CONDITION SUMMARY

The structure appears to be in a good condition.

COSTS

	Category	Location	Est Cost £	Description
1	Pedestrian fencing/guardrail	Footpath	£25,000	Currently kee clamp edge protection at wingwalls and spandrels. Install guardrail 10 m on approaches and across the bridge on either side.
2	Footpath surfacing improvement	Surfacing	£10,000	4 m wide greenway construction
		Total	**£35,000**	
		Essential works:	£35,000	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2017 PI	**Deck**	**Good**	Minor shrinkage cracking noted, less than 0.3mm. Minor spalling revealing a rusting plate over construction joint, monitor during future inspections
2	2017 PI	**Spandrels**	**Good**	Non-structural masonry facade displays isolated brickwork defects (popped brickwork). Steel arch lintel element on Southwest head wall have localised mortar failures and the lintels are not in line with arch radius.
3	2017 PI	**Abutments**	**Good**	No defects noted.
4	2017 PI	**Wing and Retaining Walls**	**Good**	No defects noted.
5	2017 PI	**Pointing**	**Good**	No defects noted.
6	2017 PI	**Parapets/Safety Fence**	**Poor**	Minor weathering present to paintwork of safety fence, however, no pedestrain parapet providing adequete edge protection for proposed greenway.
7	2017 PI	**Bedstones and Cills**	**Good**	No defects noted.
8	2017 PI	**Bearings**	**N/A**	
9	2017 PI	**Waterproofing**	**Good**	No signs of waterproofing failure from the avaliable photos
10	2017 PI	**Drainage**	**Good**	No signs of drainage issues from the avaliable photos
11	2017 PI	**Track and Road Condition**	**Good**	Minor debris build up on South abutment walkway.
12	2017 PI	**Pallisade Fence**	**Good**	No defects noted. Consider removing to enable access ramp from the A57 to be constructed.
13	2017 PI	**Vegetation**	**Good**	Minor vegetation/saplings over wing wall

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1	Box culvert (abutments) & wing walls	Low	RC element is hidden behind the brick cladding. However, due to the young age of the structure the risk of corrosion is considerd low.

BRIDGE NAME

Footpath Subway / Lynn's Subway

PHOTO

BRIDGE DETAILS

Structure Type:	Reinforced Concrete Subway
No. of spans:	1 span
Span dimensions:	Span: 2.3m
Height dimensions:	Height: 2.17m
Parapet dimensions:	~1.0m (over headwalls and wing walls only)

PREVIOUS LOADING

The structure was designed to carry trains. Historic train loading is considered to be more onerous that the Greenway loading requirements (footwat loading with light maintenance vehicles up to 7.5t).

CONDITION SUMMARY

The structure is in fair condition.

COSTS

	Category	Location	Est Cost £	Description
1	Footpath surfacing improvement	Surfacing	£2,000	Assumed laying of semi-bound surfacing material, e.g. Ultitrec.
2	Vegetation	Over bridge deck and embankments	£2,000	Cut back vegetation and treat roots.
3	Joint sealant	Between reinforced concrete units	£1,500	Reseal mastic to joints.
4	Lighting	Multiple	£500	Test and provide replacement light bulbs where required.
5	Painting	Parapets over the headwalls	£10,000	Maintenance painting to existing parapets over headwalls.
		Total	**£16,000**	
		Total essential	£2,000	
		Future maintenance works	£14,000	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2014 DE	**Concrete Units**	**Fair**	23 pre cast concrete sections numbered 1 to 23 from the upside between headwalls: Section 20 is 35mm lower than section 19, the joint has been longstanding pointed up throughout and noevidence of further movement noted. Section 23 is 40mm lower than section 24, the joint has neither mastic nor pointing throughout, there appears to be no resent movement as this would result in rutting or fractures to the footpath below. Minor difference in height less than 10mm throughout the remaining sections. The mastic jointing is void between the upside headwall and panel 1, between panel 1& 2 and between panels 22 & 23.
2	2014 DE	**Headwalls**	**Fair**	Generally good throughout.
3	2014 DE	**Wing Walls**	**Fair**	Generally good throughout. However, there are areas of void mastic joiubtubg between the wing walls and headwalls and on the downside Glazebrook End there are defects including: - Minor area of spalling 30mm long, 30mm wide and 50mm deep located 1.1m above ground level at the join with the headwall - Vertical hairline fracture to full height located at the change in height .1m from the headwall
4	2014 DE	**Waterproofing**	**Fair**	Generally good throughout but evidence of minor staining between units 1 and 2 (mastic jointing void between the units)
5	2014 DE	**Hand railing**	**Fair**	Minor areas of corrosion and pitting less than 1mm to the hand railing located to the tops of both headwalls. The provided parapet system is not suitable for equistrain use and a 1.8m high system should be installed at the track level.
6	2014 DE	**Painting**	**Fair**	It would appear only the outer headwalls and wing walls were originally painted and parts of the inner units subsequently painted to cover graffiti, there is minor loss and bubbling and generally dulling to the headwallsand wing walls.
7	2014 DE	**Track and Footpath Condition**	**Fair**	The track bed has been lifted and appears to be used by dog walkers gaining access up both embankments, there are large trees and vegetation growing throughout, bridge 7 is fenced of at both ends to prevent access.
8	2014 DE	**Vegetation**	**Poor**	Large trees and vegetation grown throughout the former track bed. Brambles growing over the wing walls.
9	2014 DE	**Lighting**	**Fiar**	Some of the light bulbs were reported to not be working in 2013. Undertake a check to see which lights (if any) need replacing.

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1	None	-	-

BRIDGE NAME

Lymm Road

PHOTO

Note: the structure is on the disused railway but may be unsuitale for the Greenway route as an alternative path may be preferable

BRIDGE DETAILS

Structure Type:	Concrete deck bridge with brick abutments and wingwalls.
No. of spans:	1
Span dimensions:	Span: approx. 7m
Height dimensions:	Height: approx. 7m
Parapet dimensions:	Height: 2m

PREVIOUS LOADING

The structure was designed to carry trains over 2-lane public highway. Therefore the proposed pedestrian loading will be lower than the historic railway requirements.

CONDITION SUMMARY

The structure is in a fair condition.

COSTS

	Category	Location	Est Cost £	Description
1	Resurfacing	General	£6,500	Cut back vegetation and treat roots.
2	Repointing	General	£4,000	Repoint brickwork throughout.
3	Dainage	Downpipes	£3,000	Install downpipes to the abutments.
4	Waterproofing	Deck	£50,000	Bridge deck re-waterproofing. Footpath surfacing excavation and reinstatement
5	Palisade fence	Over abutments	£800	Remove and dispose of existing palisade fences at each end of the bridge
6	Vegetation	General	£6,000	Cut back vegetation and treat roots.
		Total	**£70,300**	
		Essential work:	**£7,300**	
		Future maintenance work	**£63,000**	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2021 DE	**Bearings**	**Fair**	Timber packing found between concrete deck units and cill to both LM and HM. Timber wet and rotting up to 10- 30mm. All concrete deck units displaced however they appear to be as built.
2	2021 DE	**Main Girders**	**Fair**	Spall with exposed reinforcement. Vehicle impact damage present to both sides and to underside of girders throughout.
3	2021 DE	**Parapets & Pilasters**	**Fair**	Parapet girders present to both elevations of the bridge with evidence of minor spalling. Gaps also found to both elevation between main girders up to 30mmm.(appear as built)
4	2021 DE	**Waterproofing**	**Poor**	Deck wet throughout and signs of failure present between some of the concrete deck units.
5	2021 DE	**Abutments**	**Fair**	Open joints present to both abutments throughout. Wetness and staining present. 4no core holes to both abutments. Impact damage.
6	2021 DE	**Bedstones and cills**	**Fair**	Wetness and staining present with algae growth in some areas. 1no vertical fracture to LM cill, downside end.
7	2021 DE	**Wing & Retaining Walls**	**Fair**	Separation fracture to downside LM wing wall mitre joint. Open joints present to all wing walls. Loose to hammer brickwork downside LM newel, downside HM newel. Hollow present upside HM newel & wing wall. Vertical/ Vertical stepped fractures present to upside LM wing wall & upside HM wing wall.
8	2021 DE	**Drainage**	**Fair**	4no core holes present to each abutment looks to be acting as weep holes, these are all partially blocked up to 50%.
9	2021 DE	**Gutters & Downpipes**	**Poor**	Downpipes missing from LM upside and HM downside abutments, just below deck. Water run down is only occurring to HM downside abutment.
#	2021 DE	**Handrails**	**Fair**	Connection bolts corroded up to 1mm deep.
#	2021 DE	**Pointing**	**Fair**	Open joints present to brickwork approx. 70m2 total throughout up to 20-30mm deep.
#	2021 DE	**Vegetation**	**Poor**	Vegetation and small trees growing to top of all 4 wing walls. Small trees and vegetation also growing on top of structure.
#	2021 DE	**Rubbish**	**Fair**	Minor rubbish collecting around wing walls and on top of structure.
#	2021 DE	**Anti-trespass Fencing**	**Poor**	Anti tress pass has been vandalised and pulled down towards HM end.

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1	Waterproofing	Low	Can not determine condition however deck wet throughout and signs of failure present between some of the concrete deck units.

BRIDGE NAME

Partington Station Subway

PHOTO

BRIDGE DETAILS

Structure Type:	Brick arch subway
No. of spans:	1
Span dimensions:	Span: Unknown
Height dimensions:	Height: Unknown
Parapet dimensions:	No Parapet

PREVIOUS LOADING

The structure was designed to carry trains. Historic train loading is considered to be more onerous that the Greenway loading requirements (footwat loading with light maintenance vehicles up to 7.5t).

CONDITION SUMMARY

The structure is in a fair to poor condition.

COSTS

	Category	Location	Est Cost £	Description
1	Infilling	Underside	£37,000	Infilling of structure. Assumed including arch roof demolition and backfill with granular fill material
2	Vegetation	General	£5,000	Cut back vegetation and treat roots.
3	Footpath surfacing improvement	Surfacing	£3,000	Assumed laying of semi-bound surfacing material, e.g. Ultitrec
		Total	**£45,000**	
		Essential works:	£3,000	
		Future Works:	£42,000	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2012 DE / 2019VE	**Headwall**	**Poor**	South Headwall: Only small part visible (approx 5%) due to collapsed side structures and infilling. Missing and loose bricks to the top of the headwall. North staircase entrance and headwall: Partly infilled with rubble and debris with approx 5% visible. Missing and loose bricks to the top of walls.
2	2012 DE	**Sidewalls**	**Fair**	Subway partly infilled to both ends with approximately 40% of brickwork hidden. Isolated areas of water staining and calcite deposits.
3	2012 DE	**Arch**	**Fair**	Isolated areas of water staining and calcite deposits.
4	2012 DE	**Arch Rings**	**Good**	Visible parts in good condition. 1No spalled brick to the north end.
5	2012 DE	**Track/Surfacing condition**	**Good**	Tarmac of former platform and some stone ballast still remains over top of subway.
6	2019 VE	**Safety fence**	**Poor**	No safety fence present.
7	2012 DE	**Vegetation**	**Fair**	South Headwall - 2No trees to either side of headwall with girths 750mm and 600mm. North staircase entrance and headwall - 4No trees growing withing staircase area with girths 200mm.

POTENIAL HIDDEN CRITICAL ELEMENTS

Element	Risk	Comments

BRIDGE NAME

Footway Subway

PHOTO

BRIDGE DETAILS

Structure Type: Brickwork subway with cast iron sections and brickwork headwalls and wingwalls

No. of spans: 1

Span dimensions: Span: 1.99m

Height dimensions: Height: 1.88m

Parapet dimensions: Wooden parapets approx 1.2m high.

PREVIOUS LOADING

The structure was designed to carry trains. Historic train loading is considered to be more onerous that the Greenway loading requirements (footwat loading with light maintenance vehicles up to 7.5t).

CONDITION SUMMARY

The structure is in a fair condition

COSTS

	Category	Location	Est Cost £	Description
1	General	In-fill at lower level	£40,000	Structure is dis-used. Infill with foamed concrete between spandrels to eliminate future maintenance liability
2	General	Between wing walls	£9,500	Infill between wing walls with Granular material
3	Parapet	top-side	£11,000	Install 1.8m high equestrian parapet, one side only
4	Covering Gas Pipe	US adjacent wingwalls	£500	Check if pipe is still exposed and recover
		Total	**£61,000**	
		Essential works	£11,500	
		Works than can be deferred	£49,500	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2020 DE	**Rivets and Bolts**	**Poor**	Bolts to CI arch barrel units are severely corroded and laminated to a max depth of 8mm. Brickwork Barrels: Old standing longitudinal fracture to downside brickwork barrel located 1.68m from CJ. New fracture off above mentioned fracture 0.8m x 3mm.
2	2020 DE	**Arch Ring/Barrel**	**Fair**	Small area of spalling to edges of brickwork at connection with downside end of cast iron section to a max depth of 60mm. Cast iron arch barrel units: Scaling to outer edges to a max thickness of 6mm. Odd small patch of scaling to inner faces of units as paintwork is either missing or flaking away throughout.
3	2020 DE	**Headwalls**	**Good**	Upside - Moss growth and minor seepage. Cast iron barrel units: Cast iron barrel units abutment areas have been rendered with concrete.
4	2020 DE	**Abutments**	**Fair**	Concrete has spalled in numerous small areas up to 20mm deep with loose spall removed during exam. Scaling to visible edges of CI arch barrel units to a max thickness of 6mm. Brick abutments: Isolated erosion up to 2mm deep. Signs of seepage. US LM: Large tree growing directly behind wall to central area and moss growth throughout
5	2020 DE	**Wingwalls**	**Fair**	US HM: Moss growth throughout DS HM: Large tree stump directly behind wall to central area.
6	2020 DE	**Pointing**	**Fair**	Isolated 10mm open joints to wingwalls and headwalls.
7	2020 DE	**Drainage**	**Fair**	Slight seepage visible from wingwalls.
8	2020 DE	**Painting**	**Poor**	Paintwork to cast iron arch barrel units is either missing or flaking away throughout.
9	2020 DE	**Track and road Condition**	**Poor**	Closed line section. The track has been removed from on top of this bridge. General litter, chairs, timber and flag stones to internal part of arch.
10	2020 DE	**Vegetation**	**Poor**	Large tree growing directly behind US LM wing wall. Tree stump to rear of DS HM wing wall. Trees growing throughout former track bed on top of bridge.
11	2020 DE	**Safety Fences**	**Poor**	The safety fences to wing walls and headwalls have several sections missing.
12	2020 DE	**Coping Stones**	**Fair**	Coping stones above headwalls and wing walls odd edges spalled to a max depth of 75mm. Mortar is generally missing from coping cross joints.
13	2020 DE	**Gas Pipe**	**Poor**	A gas pipe runs under this bridge for full length and is partially exposed on the upside adjacent the wing-wall newels.

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1			

BRIDGE NAME

Gas Works A

PHOTO

BRIDGE DETAILS

Structure Type:	Steel Girders and deck plates supported on brick abutments.
No. of spans:	1
Span dimensions:	Span: 12.12m
Height dimensions:	Height: 5.20m
Parapet dimensions:	Unknown

PREVIOUS LOADING

The structure was designed to carry trains over a footpath. Therefore the proposed pedestrian loading will be lower than the historic railway requirements.

CONDITION SUMMARY

The structure is in a fair condition.

COSTS

	Category	Location	Est Cost £	Description
1	Parapets	Topside	£9,000	Raise parapets to 1.8m high for equestrian use.
2	Painting	All steel elements	£175,000	Encapsulate, blast-clean and repaint all steel elements. Potential for lead paint
3	Vegetation	General	£4,000	Cut back vegetation and treat roots throughout the structure, particularly to the topside.
4	Pointing	Abutments and wingwalls	£2,000	Repoint isolated sections of perished mortar and areas of cracking to the abutments and wingwalls.
5	Footpath surfacing improvement	Surfacing	£5,000	Assumed laying of semi-bound surfacing material, e.g. Ultitrec
		Total	**£195,000**	
		Total essential works	**£9,000**	
		Future works	**£186,000**	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2015 DE	**Main Girders**	**Fair**	All Main Girders: Surface corrosion throughout the girder, worst areas being to the underside of the bottom flange, with up to 1mm loss of section at worst, paintwork is breaking down throughout.
2	2015 DE	**Cross Girders**	**Fair**	Surface corrosion to all cross girders, with up to 1mm loss of section to the bottom flanges at worst, paintwork is breaking down.
3	2015 DE	**Rail Bearers**	**Fair**	Surface corrosion to all rail bearers, with up to 1mm loss of section to the bottom flanges at worst, paintwork is breaking down.
4	2015 DE	**Deck**	**Fair**	Surface corrosion and sores throughout the underside of the deck, with isolated areas of loss of section up to 1mm deep at worst. Large areas of paintwork breaking down in areas of corrosion.
5	2015 DE	**Bracings**	**Fair**	Areas of surface corrosion to the majority of cross bracings, with up to 1mm loss of section at worst, paintwork is breaking down.
6	2015 DE	**Outriggers**	**Fair**	Areas of surface corrosion to the majority of the outriggers, with up to 1mm loss of section at worst, paintwork is breaking down.
7	2015 DE	**Rivets and Bolts**	**Fair**	Numerous rivets have surface corrosion and spots, with up to 5% wastage (1mm deep loss of section at worst).
8	2015 DE	**Abutments**	**Fair**	Low mileage abutment: Vertical hairline fracture located in centre of abutment, 2.7m long. Isolated areas of seepage down face of abutment. High mileage abutment: Isolated areas of seepage down face of abutment.

9	2015 DE	**Wingwalls**	**Fair**	US LM: Isolated areas of seepage down face of wing wall, with 1no. tree growing at base of wall. US HM: Isolated areas of seepage down face of wing wall.
10	2015 DE	**Pointing**	**Fair**	Isolated areas of open joints approximately 1.0m2 x 10mm deep at worst.
11	2015 DE	**Parapet Screens**	**Fair**	Large areas of surface corrosion to the inner and outer faces of the parapet screens, with isolated areas of loss of section up to 1mm deep at worst. Large areas of paintwork breaking down in areas of corrosion.
12	2015 DE	**Bedstones**	**Fair**	Low mileage abutment: 1no bedstone spalled 270 x 100 x 50mm deep, located adjacent to Girder 2. 1no bedstone spalled 100 x 100 x 30mm deep, located between Girders 4 and 5. Areas of weathering to several bedstones up to 10mm deep at worst. High mileage abutment: Areas of weathering to several bedstones up to 10mm deep at worst.
13	2015 DE	**Bearings**	**Fair**	All bearings have areas of surface corrosion and spots up to 1mm deep at worst, paintwork breaking down in all cases.
14	2015 DE	**Waterproofing / Drainage**	**Fair**	Areas of seepage down the faces of the abutments and wing walls, indicating a breakdown of the waterproofing system.
15	2015 DE	**Painting**	**Poor**	Large areas of the protective coatings are breaking down to all steel sections throughout the structure, including the main girders, cross girders, deck, bracings, parapets and bearings.
16	2015 DE	**Track & Road Condition**	**Fair**	The access below the bridge is a rarely used access for Persons engaged in works for the National Grid and is closed off to the general public, there are large areas of overgrown vegetation and the ground is water logged and soft underfoot. The topside of the structure has had the tracks removed and is now a footpath used occasionally by the general public. Large areas of overgrown vegetation throughout the area, including trees.

POTENIAL HIDDEN CRITICAL ELEMENTS

Element	Risk	Comments
1		

BRIDGE NAME

Culvert 900mm

PHOTO

BRIDGE DETAILS

Structure Type:	Brick / Earthenware pipe culvert.
No. of spans:	1
Span dimensions:	Span: 650mm
Height dimensions:	Height: 650mm
Parapet dimensions:	N/A

PREVIOUS LOADING

The structure was designed to carry trains. Historic train loading is considered to be more onerous that the Greenway loading requirements (footwat loading with light maintenance vehicles up to 7.5t).

CONDITION SUMMARY

The structure is in fair to poor condition.

COSTS

	Category	Location	Est Cost £	Description
1	Debris	Invert	£3,000	Remove debris from invert of culvert.
2	Brickwork	Barrel	£15,000	Replace 10m section with 650 dia. rc pipe
3	Brickwork	Barel	£1,500	Masonry repairs at junctions
4	Footpath surfacing improvement	Surfacing	£2,400	Assumed laying of semi-bound surfacing material, e.g. Ultitrec
		Total	**£21,900**	
		Total essential works:	£2,400	
		Total works that can be deferred	£19,500	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2016 DE	**Upside Arch Rings**	**Fair**	Calcite staining observed throughout in association with algae moss growth.
2	2016 DE	**Upside Wingwalls**	**Fair**	Calcite staining observed throughout in association with algae moss growth.
3	2016 DE	**Barrel**	**Poor**	Missing / displaced bricks and mortar loss throughout the brick section of the barrel.
4	2016 DE	**Upside Headwall**	**Fair**	Calcite staining observed throughout in association with algae moss growth.
5	2016 DE	**Pointing**	**Poor**	Found to be in poor condition throughout the barrel and fair condition to headwall and wingwalls at Upside end.
6	2016 DE	**Debris**	**Fair**	Brick debris found in the watercourse at 29.2m from the Upside end of the structure, not restricting watercourse.

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1			

BRIDGE NAME

Sinderland Brook

PHOTO

BRIDGE DETAILS

Structure Type:	Concrete beams on stone abutments
No. of spans:	2
Span dimensions:	Span 1: 2.69m Span 2: 2.69m
Height dimensions:	Height: Unknown
Parapet dimensions:	No Parapet

PREVIOUS LOADING

The structure was designed to carry trains. Historic train loading is considered to be more onerous that the Greenway loading requirements (footwat loading with light maintenance vehicles up to 7.5t).

CONDITION SUMMARY

The structure is ina fair to poor condition.

COSTS

	Category	Location	Est Cost £	Description
1	Parapets	Topside	£10,000	Install parapets on each side
2	Vegetation	General	£3,000	Cut back vegetation and treat roots.
3	Repointing	General	£3,000	Repoint stonework throughout structure.
4	De silting	Invert	£1,000	Clear silt build up against the abutments.
5	Footpath surfacing improvement	Surfacing	£3,000	Assumed laying of semi-bound surfacing material, e.g. Ultitrec

Total £20,000

Total essential works	£13,000
Total future works	£7,000

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2014 DE	**Abutments**	**Fair**	Both abutments: Odd stones fractured / above water mark 10m x 0.3m x 25mm joints.
2	2014 DE	**Pier**	**Fair**	Odd stones fractured / above water mark 10m x 0.3m x 25mm joints.
3	2014 DE	**Wingwalls**	**Fair**	Partington end D side covered by embankment. Partington up side 15m² x 75mm joints. Skelton end D side covered by embankment. Skelton up side below coping diagonal joint fracture 2m x 2mm. Skelton up side 10m² x 25mm joints. Skelton end up side at butt joint with newal vertical fracture 1m x 30mm.
4	2014 DE	**Butresses**	**Fair**	Partington ends 4m² x 25mm joints- 1 stone missing at butt joint. Skelton ends 5m² x 25mm joints.
5	2014 DE	**Pointing**	**Fair**	Approx 25m² x 50mm joints average depth throughout span 1. Approx 25m² x 25mm joints average depth throughout span 2.
6	2014 DE	**Parapet Fencing**	**Poor**	Fencing has been removed.
7	2014 DE	**Track**	**Poor**	Debris to top of structure.
8	2014 DE	**Vegetation**	**Poor**	Tree growth throughout top of structure.
9	2014 DE	**Bedstones**	**Fair**	Odd bedstones fractured.
10	2014 DE	**Silting**	**Poor**	Silt starting to build up against abutment restricting flow.

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1			

BRIDGE NAME

Culvert 900mm

PHOTO

BRIDGE DETAILS

Structure Type:	Brick arch on upside and concrete flat top slab on downside
No. of spans:	1
Span dimensions:	Span: 950mm
Height dimensions:	Height: 700mm
Parapet dimensions:	Parapet to upside only. Dimensions unknown.

LOADING

The structure was designed to carry trains. Historic train loading is considered to be more onerous that the Greenway loading requirements (footwat loading with light maintenance vehicles up to 7.5t).

CONDITION SUMMARY

The structure is in a poor condition.

COSTS

	Category	Location	Est Cost £	Description
1	Demolition	General	£10,000	Demolish arch roof and backfill with granular materials, also fill between wing walls to form embankment
		Total	**£10,000**	
		Total essential works:	£10,000	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2017 DE	**Headwalls**	**Poor**	DS headwall: Flat top structure was located during last DE and was non functional due to being blocked with aggregate. Branch debris resting on top. Litter just inside headwall. US headwall: Open joints to the face rings, affecting 90% to 20mm depth. Spalling of 4No face rings with 1No brick loose. A large 500mm deep pool of water covers the lower brickwork courses of the headwall.
2	2017 DE	**Barrel**	**Poor**	Mortar loss to joints throughout. DS end appears to have collapsed.
3	2017 DE	**Debris**	**Poor**	Debris located inside the flat topped structure to the DS end. Fly tipping adjacent HM DS wingwall.
4	2017 DE	**Pointing**	**Poor**	Open joints to the US face rings and throughout the barrel.
5	2017 DE	**Watercourse**	**Poor**	Upstream approach channel was dry at time of last DE. Source of water is uncertain.

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1			

BRIDGE NAME

Manchester Road

PHOTO

BRIDGE DETAILS

	The bridge is a 'Battle Deck' Type of structure which comprises 3no welded steel box girders (with access hatches at each end of the girders), steel deck plates with cross girders are welded to the deck plates, which in turn are bolted onto the main box girders with hook bolts.
Structure Type:	The main girders sit on steel bearings with concrete plinths, which in turn sit on the bearing shelves of the stonework abutments. Concrete cills are located at the top of both abutments. Stonework wingwalls are located at all four corners of the structure. Steel handrails are fixed to channel iron walkways at each side of the bridge.
No. of spans:	1 span
Span dimensions:	Span: 14.1m
Height dimensions:	Height: 5.08
Parapet dimensions:	1m Kee Clamp system

PREVIOUS LOADING

The structure was designed to carry trains over Manchester Road. Therefore the proposed pedestrian loading will be lower than the historic railway requirements.

CONDITION SUMMARY

Fair condition

COSTS

	Category	Location	Est Cost £	Description
1	Vegetation	Downside advanced height sign	£750	Remove vegetation obscuring view of low bridge warning sign or re-locate signage.
2	Bridge strike ancillaries	Both abutments	£300	Install bridge strike incident reporting -information plates to structure.
3	Fencing Repair/Renewal	Both roadside and tracksi	£1,500	Replace damaged/ rotten timber revetment/boundary fencing to prevent unauthorised access and also provide trackside safety to rail staff.
4	Bridge Strike Ancillaries	Upside fence	£200	Replace missing fixing bolt to low bridge sign fixing to ensure signage is secure and vandal proof. The sign is currently only hooked on in position.
5	Vegetation	Both upside wingwalls	£2,000	Remove mature trees growth to rear of wingwalls and treat to prevent regrowth
6	Masonry	General masonry repairs	£4,250	Total area 14m2 open joints, fractures, abutments and wing walls.
7	Steelwork painting	Deck soffit	£30,000	Patch painting
8	Parapets	Topside	£15,000	Replace kee Klamp with parapets (1.8 m if deemed for equestrians), extended beyond end of deck
9	Surfacing	Topside	£10,000	Remove track rails, resurface
		Total	**£64,000**	
		Total essential works	£25,000	
		Total works that can be deferred	£39,000	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2017 DE	**Main Box Girders**	**Fair**	
		Girder 1		Area of impact damage from bridge strike to bottom flange 150mm x 50mm x 10mm deep and located over lane 1 of the Altrincham bound carriageway. Several scrape marks to the underside of the bottom flange and outer face of the web from previous bridge strikes. Old standing defects with no deterioration. Track face of web covered in graffiti. Bitumen sealant fixed to the track face of the web is begging to breakdown and is cracked throughout the length. Debris in and around access at both ends (internal) Corrosion sores and patches to the bottom flange, webs and underside of top flange, worst areas being at theends adjacent to the access hatches. Old standing defects with very slight deterioration (internal) Areas of loss of section to hook bolt cover plates up to 1mm deep (internal) Corrosion staining to several hook bolts (internal) Several scrape marks to the underside of the bottom flange from previous bridge strikes. Old standing defects with no deterioration. Track face of web covered in graffiti.
		Girder 2		Bitumen sealant fixed to the track face of the web is beginning to breakdown and is cracked throughout the length. Debris in and around access at both ends (internal) Corrosion sores and patches to the bottom flange, webs and underside of top flange, worst areas being at theends adjacent to the access hatches. Old standing defects with very slight deterioration (internal) Areas of loss of section to hook bolt cover plates up to 1mm deep (internal) Corrosion staining to several hook bolts (internal) Several scrape marks to the underside of the bottom flange from previous bridge strikes. Old standing defects with no deterioration. Track face of web covered in graffiti.
		Girder 3		Bitumen sealant fixed to the track face of the web is beginning to breakdown and is cracked throughout the length. Debris in and around access at both ends (internal) Corrosion sores and patches to the bottom flange, webs and underside of top flange, worst areas being at theends adjacent to the access hatches. Old standing defects with very slight deterioration (internal) Areas of loss of section to hook bolt cover plates up to 1mm deep (internal) Corrosion staining to several hook bolts (internal)
4	2017 DE	**Cross Girders**	**Fair**	Isolated scrape marks to the undersides of bottom flanges of several cross girders from previous bridge strikes. Old standing defects with slight deterioration.
5	2017 DE	**Deck Plates**	**Fair**	Areas of protective coatings oxidizing to the undersides of the deck plates. Surface corrosion to numerous bolt heads with up to 1mm loss of section at worst, visible to the outer face connections between the cross girders and main box girders (hook bolts)
6	2017 DE	**Rivets and Bolts**	**Fair**	Several hook bolts on the inside faces of the main box girders are showing signs of surface corrosion. Surface corrosion with up to 1mm loss of section to the deck plate splice bolts.
7	2017 DE	**Abutments**	**Fair**	Low millage: Isolated individual stones vertically fractured and hairline in width. Old standing defects with no deterioration. Areas of seepage and water staining down face together with weathered stonework up to 25mm deep. Old standing defects with no deterioration. High mileage: 1no stone spalled below cill beam at US end. 450mm x 300mm x 170mm deep. Old standing defect with slight deterioration. Diagonal fracture 5mm wide extends from underside of cill beam down to downside quoin (1300mm in length), this fracture appears to run into the buttress return. The fracture has been tabbed in the past and remains fractured hairline in width. Old standing defects with no deterioration. Steel angle iron fixed to top of abutment return at downside end. Surface corrosion throughout the angle iron. Old standing defect with no deterioration. Isolated stones vertically fractured all hairline in width. Old standing defects with no deterioration. Areas of weathering to stonework up to 30mm deep at worst.

8	2017 DE	**Wing Walls**	**Fair**	Low Mileage Upside Wingwall: Isolated areas of open joints up to 20mm deep at worst and totalling approximately 0.5m2. Weathering up to 25mm deep. Old standing defects with no deterioration. Low Mileage Downside Wingwall: Isolated areas of open joints up to 20mm deep at worst and totalling approximately 0.5m2. Weathering up to 25mm deep. Old standing defects with no deterioration. High Mileage Upside Wingwall: Isolated areas of open joints up to 20mm deep at worst and totalling approximately 0.5m2. Weathering up to 25mm deep. Old standing defects with no deterioration. High Mileage Downside Wingwall: Isolated areas of open joints up to 20mm deep at worst and totalling approximately 0.5m2. Weathering up to 25mm deep. Old standing defects with no deterioration.
9	2017 DE	**Pointing**	**Fair**	Areas of open joints to the abutments and wing walls, totalling approximately 14.0m2 and ranging from 20mm up to 50mm deep. Old standing defects with no deterioration.
10	2017 DE	**Bedstones and Cills**	**Good**	No defects noted to the concrete cills.
11	2017 DE	**Bearings**	**Fair**	Isolated areas of slight surface corrosion to steel sections.
12	2017 DE	**Waterproofing**	**Fair**	Although the waterproofing system was not examined there is water staining down the faces of the abutments,indicating a breakdown of the waterproofing system. Old standing defects with no deterioration.
13	2017 DE	**Drainage**	**Fair**	Although the drainage system was not examined there is water staining down the faces of the abutments, indicating a breakdown of the drainage system. Old standing defects with no deterioration.
14	2017 DE	**Handrails**	**Fair**	All handrails are in good condition, with the exception of the fixings which are showing signs of light surface corrosion.
15	2017 DE	**Painting**	**Fair**	Isolated areas of paintwork breaking down with areas of missing coatings in areas of previous impact damage.
16	2017 DE	**Track and Road Condition**	**Fair**	The bridge is located on a closed line, however the old track is still in place. Large areas of dense overgrown vegetation to both approaches of the structure trackside, totalling approximately 50.0m2. No defects noted to the road carriageways under the structure.
17	2017 DE	**Vegetation**	**Poor**	Mature trees growing to rear of low mileage US wing wall. Mature tree stump to rear of high mileage US wing wall is beginning to regrow.
18	2017 DE	**Buttresses**	**Fair**	Low Mileage US Buttress: Areas of weathered stonework up to 20mm deep. Low Mileage DS Buttress: Butt joint with abutment return vertical fracture 3mm wide. Old standing defect with no deterioration. High Mileage US Buttress: Areas of weathered stonework up to 20mm deep. High Mileage DS Buttress: Vertical fracture to buttress return starts 1.2m up from ground level and extends 2.6m. Up to 8mm wide. Old standing defect with no deterioration.
19	2017 DE	**Walkways**	**Poor**	This section comprises channel irons with cantilever beams fixed to the main box girders and steel cover plates fixed over the top of the channels. Missing cover paltes to upside and downside walkways. Old standing defects with slight deterioration.
20	2017 DE	**Boundary fencing**	**Poor**	Missing timber fencing adjacent to the wing wall.

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1	Waterproofing	Fair	Although the waterproofing system was not examined there is water staining down the faces of the abutments,indicating a breakdown of the waterproofing system

BRIDGE NAME

Timperley Brook

PHOTO

BRIDGE DETAILS

Structure Type:	Stone and Brickwork Arch
No. of spans:	1
Span dimensions:	Span: 3.6m
Height dimensions:	Height: 2.20m
Parapet dimensions:	Less than 0.5m

PREVIOUS LOADING

The structure was designed to carry trains over Timberley Brook. Therefore the proposed pedestrian loading will be lower than the historic railway requirements.

CONDITION SUMMARY

The structure is in a fair condition.

COSTS

	Category	Location	Est Cost £	Description
1	Bagwork in watercourse	in watercourse	£4,500	From underwater examination report to protect foundations
2	Vegetation	General, tree on HM side	£3,000	Clear vegetation across the site. Assumes that vegetation can remain at sides of greenway over the structure in place of equestrian parapets.
3	Masonry	General repairs	£5,000	Wingwalls and copings
8	Parapets	Topside	£7,500	Replace kee Klamp with parapets (1.8 m if deemed for equestrians), extended beyond end of deck
9	Surfacing	Topside	£7,000	Remove track rails, resurface
		Total	**£27,000**	
		Essential works	£17,500	
		Works that can be deferre	£9,500	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2015 DE	**Barrel**	**Fair**	Brick arch construction, overall fair condition.
2	2015 DE	**Arch Ring**	**Fair**	Stone constructed to both sides, overall fair condition.
3	2015 DE	**Headwalls**	**Fair**	Constructed from bonded stone masonry with string course and coping on top, overall fair condition.
4	2015 DE	**Sidewalls**	**Fair**	Constructed from bonded stone, overall fair condition.
5	2015 DE	**Wingwalls**	**Fair**	Constructed from bonded stone, overall fair condition.
6	2015 DE	**Training Walls**	**Poor**	Downside high mileage: Constructed from bonded stone, overall poor condition. Upside low and high mileage: Constructed from timber posts and planking, overall fair condition
7	2015 DE	**Pointing**	**Fair**	The pointing throughout the structure was found to be in a fair condition.
8	2015 DE	**Waterproofing**	**Fair**	Not examined, it is believed to be in a fair condition as areas of wetness have been noted.
9	2015 DE	**Track condition**	**N/A**	Continuously welded rail on timber sleepers. No significant defects noted.
10	2015 DE	**Vegetation**	**Poor**	Large tree, 0.7m girth, growing on HM side retaining wall. Following inspections hindered by vegetation.
11	2015 DE	**Foundations**	**Good**	Not examined as buried however no defects were noted which suggest foundation failure. Underwater examination recommends bagwork to protect from scour
12	2015 DE	**Banking**	**Fair**	In stable condition, banks are grass and tree lined. Timber shuttering to both sides, overall fair condition
12	2022 Visit	**Parapets**	**Poor**	No suitable parapet. Install an equestrian parapet

POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1			

BRIDGE NAME

Attenbury's Lane

PHOTO

BRIDGE DETAILS

Structure Type:	Stone and brick arch
No. of spans:	1
Span dimensions:	Span: 3.57m
Height dimensions:	Height: 4.15m
Parapet dimensions:	1.88m high (unsuitable for pedestrian use)

PREVIOUS LOADING

The structure was designed to carry trains over a footpath. Therefore the proposed pedestrian loading will be lower than the historic railway requirements.

CONDITION SUMMARY

The structure is in a fair condition

COSTS

	Category	Location	Est Cost £	Description
1	Parapets	Topside	£15,000	Install a1.8 equestrian parapet. Install beyond the wingwalls due to steep edges,, both sides
2	Masonry	Arch Rings, Abutments, Wing Walls	£5,000	Repoint where required
3	Masonry	General	£3,500	Replace missing and spall brick and stonework where required
4	Resurfacing	Topside	£7,500	
5	Vegetation removal	Topside	£5,000	
		Total	**£36,000**	
		Essential works	£27,500	
		Works that can be deferred	£8,500	

GENERAL COMMENTS

	Sources	Item	Condition	Amey Comments
1	2015 DE	**Arch Rings**	**Fair**	Isolated 10mm to 25mm DOJs. Odd small patches hollow sounding. Erosion to odd brick 5mm to 10mm.
2	2015 DE	**Spandrels**	**Fair**	Odd stones eroded 5mm to 10mm deep at US and DS Partington end - Erosion to several stones 5mm deep. Isolated 20mm spalling at quoins.
3	2015 DE	**Abutments**	**Fair**	Northenden - Erosion to several stones up to 10mm deep. Isolated 20mm spalling at quoins. US Northenden Wing Wall: Isolated 25mm to 50mm DOJs around g/l. Isolated stones spalled 50mm deep. Isolated brick spalled 10mmdeep. Trees to rear with girth 800mm. US Partington Wing Wall Old standing DJF to stonework 2.5m long x 1mm. Located under brickwork. 1 Small stone missing. Isolated 25mm to 50mm DOJs.
4	2015 DE	**Wing Walls**	**Fair**	Several trees to rear of wing wall max girth 1.5m. DS Partington Wing Wall Old standing DJF between brickwork and stonework 6m long x 1mm. DJF to top course of stonework 3.5m long x 1mm. Isolated 25mm to 50mm DOJs to stonework. Isolated 25mm to brickwork. DS Northenden Wing Wall Old standing DJF between brickwork and stonework 6m long x 1mm. Isolated 50mm DOJs to stonework. Isolated brick spalled 10mm deep. Isolated 10mm OJs to brickwork
5	2015 DE	**Pointing**	**Fair**	Isolated 25mm to 50mm DOJs to stonework.
6	2015 DE	**Parapets**	**Poor**	Parapets unsuitable for equistrain use. Possible graffiti spray to remove/paint over.
7	2015 DE	**Handrails**	**Poor**	Hand rails are unsuitable for equistrain use and need to be replaced.
8	2015 DE	**Springers**	**Fair**	Partington end – Erosion to several stones 5mm to 10mm deep. Northenden – 1 No spalled 50mm deep. 2 No eroded 40mm deep
9	2015 DE	**Track and Road Condition**	**Good**	This track is disused the track and sleepers have been removed from on top of the bridge.
10	2015 DE	**Vegetation**	**Fair**	US Northenden Wing Wall - Trees to rear with girth 800mm US Partington Wing Wall - Several trees to rear of wing wall max girth 1.5m. Dense ivy has been removed from face since last examination. Several small trees have been removed from around the bridge wing walls prior to undertaking examination.
11	2015 DE	**String Course**	**Fair**	Odd stones 10mm to 15mm erosion.
12	2015 DE	**Copings**	**Fair**	DS Partington wing wall 2 coping missing. Several spalled/eroded up to 50mm deep. DS Northenden wing wall several copings fractured / spalled / repaired.
13	2015 DE	**Ballast Boards**	**Fair**	Non present. But track is disused.
14	2015 DE	**Voussoirs**	**Fair**	US and DS erosion to several stones up to 10mm deep.
15	2015 DE	**Boundary Fencing**	**Fair**	Missing at DS allowing easy access to disused track.

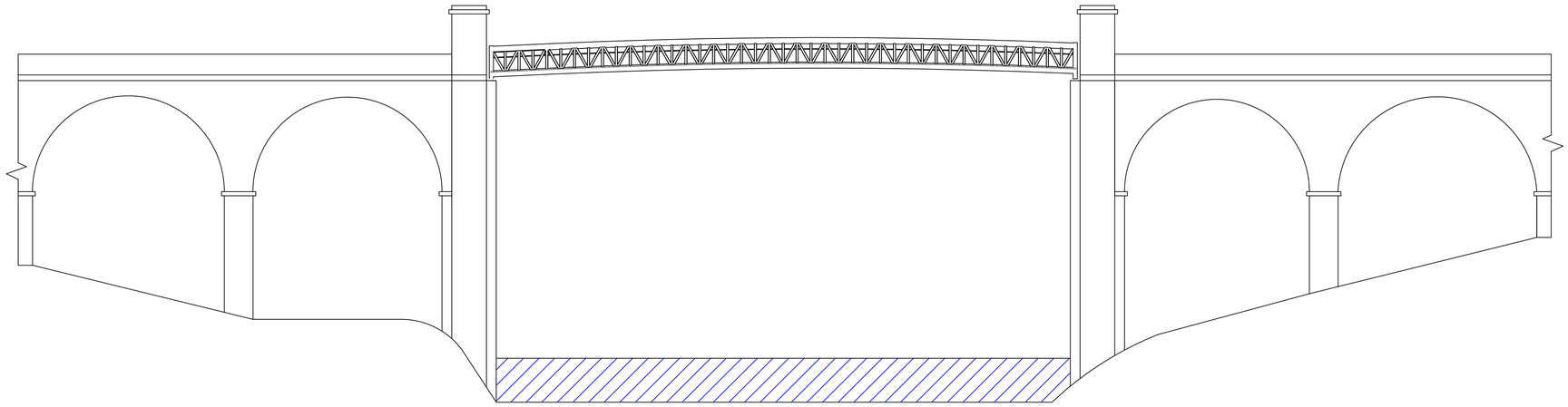
POTENIAL HIDDEN CRITICAL ELEMENTS

	Element	Risk	Comments
1			

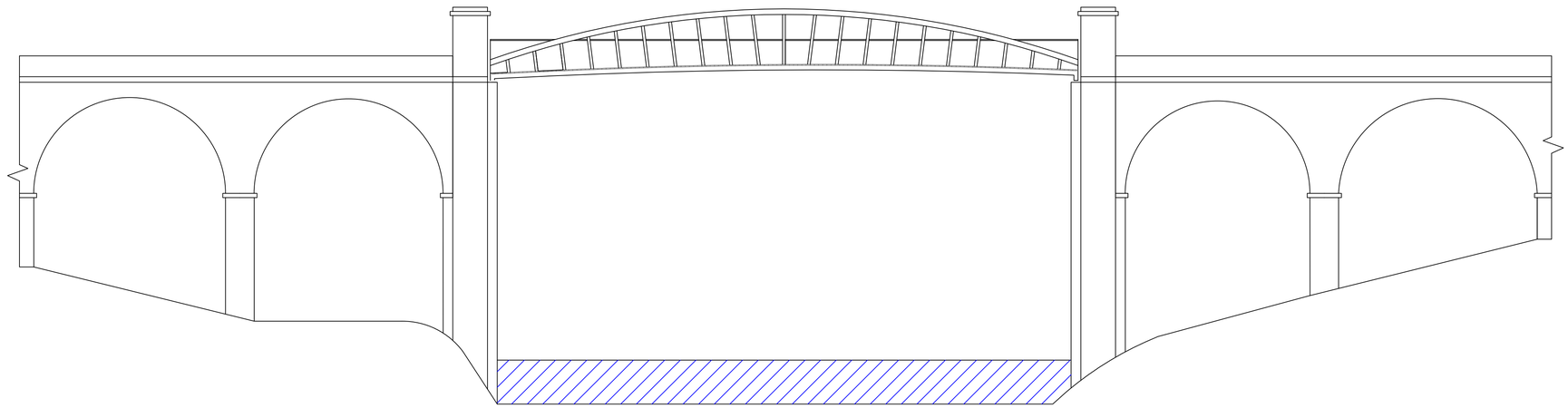
Appendix E: Option Drawings

- CO00201536-AMEY-0-0-DR-S-001 Cadishead Viaduct Option 1
- CO00201536-AMEY-0-0-DR-S-002 Cadishead Viaduct Option 2

0 100



Option 1 - Simple Pratt Truss
NTS



Option 1 - Curved Top Chord Provides Enhanced Aesthetics
NTS

Example of a standard truss with top and bottom chords parallel

Example of an architectural truss with curved top and bottom chord

RESIDUAL DESIGN HAZARDS

(The following information has been collected from Preconstruction Information and Amey CDM Hazard Management Process.)

01 - Environmental hazard
02 - Hazardous substance - e.g. Lead based paint
03 - Falling from height
04 - Risk of hot material
05 - Working with rotary power tools and machinery vibration
06 - Working near water

NOTES

1. All dimensions in millimetres unless stated otherwise.
2. All structural steelwork to be Grade S355J2H to BS EN 10210.
3. Steelwork protective system in accordance with Specification for Highway Works - Series 1900, colour to be RAL5024 Pastel Blue.
4. For replacement span (option 1) decking to be grooved hardwood timber with anti-slip inserts. All timber is to be sourced from sustainable sources.
5. For option 1, parapets to be 1.4m high with vertical bar infill for cyclists to ride over structure without dismounting (or 1.8m high if equestrian use is required. 1.8m high parapets to have bottom 600mm solid infill).
6. Exposed concrete surfaces to have an anti-graffiti coating.

Rev	Revision details	Chkd	Appd	Date

Designed:	Date:
Drawn:	Date:
Checked:	Date:
Approved:	Date:

amey
www.amey.co.uk

Client
TRAFFORD COUNCIL

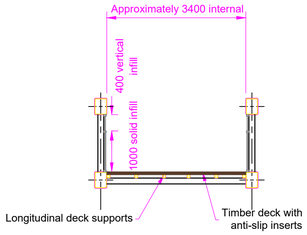
Project Name
Trafford Greenway Scheme

Drawing Title
Cadishead Viaduct - Option Details
Sheet 1 of 2

Original Drawing Size : A1	Scale : 1 : 1250
Dimensions : m	

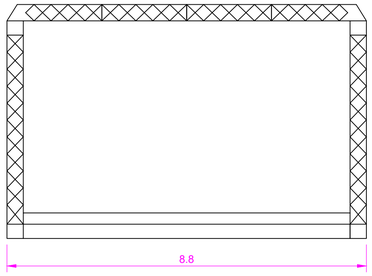
Drawing Status	Suitability
Feasability Report	S2

Drawing No	Rev
CO00201536 - 001	P1



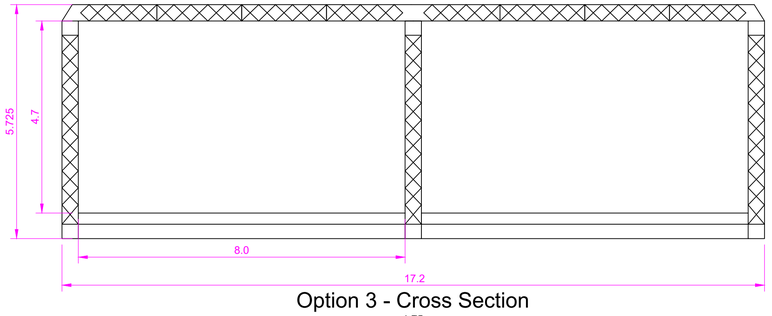
Option 1 - Cross Section

Scale 1:75



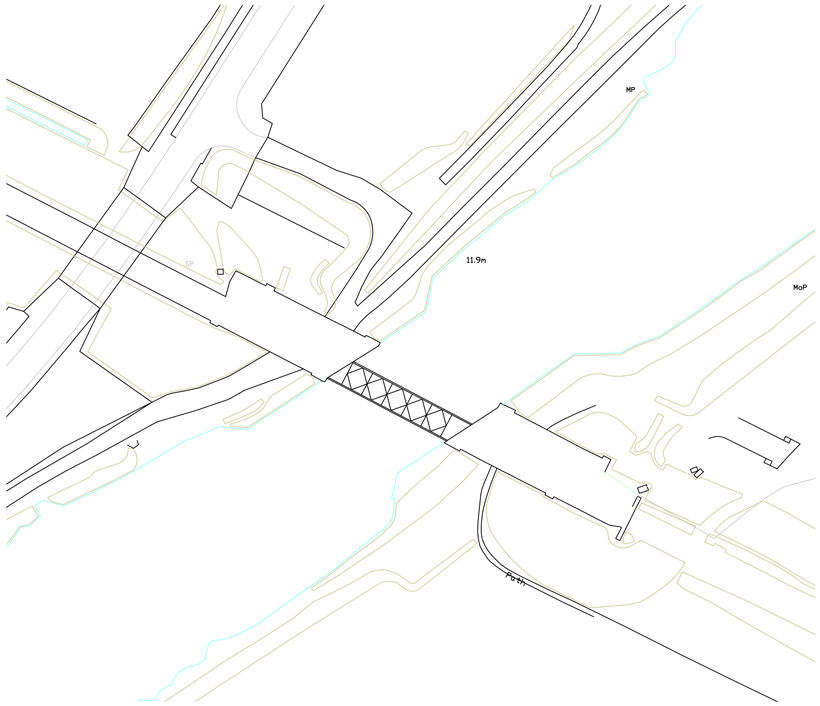
Option 2 - Cross Section

1:75



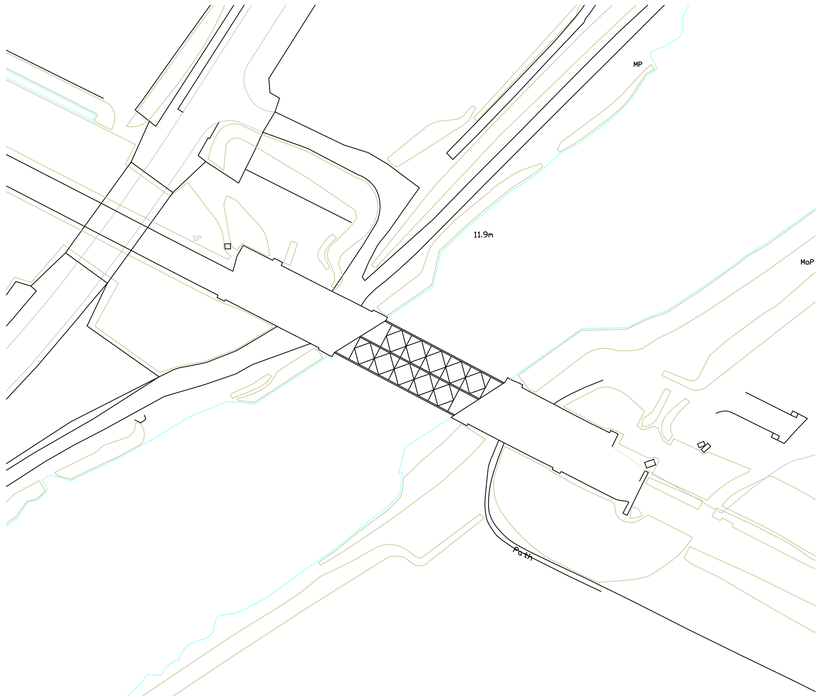
Option 3 - Cross Section

1:75



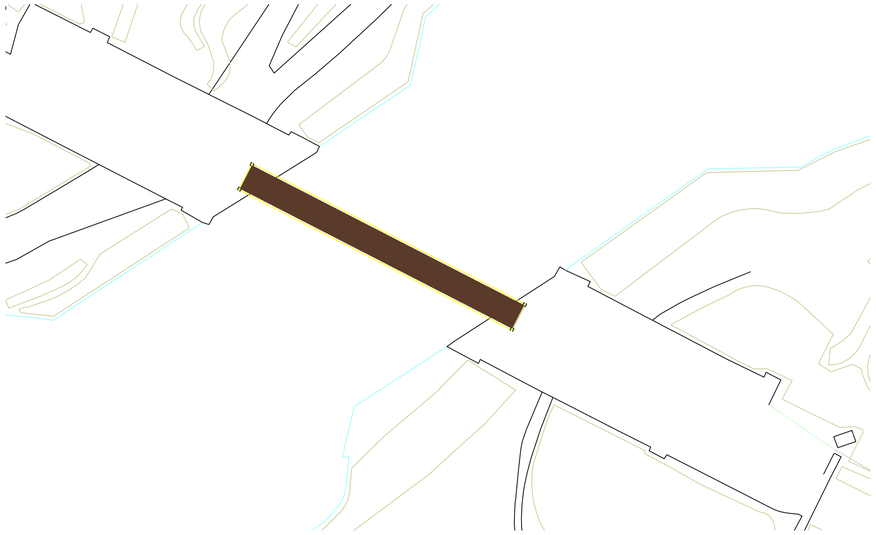
Option 2 - One span refurbished, One span demolished

NTS



Option 3 - Both existing spans retained

NTS



Option 1 - Plan View

NTS

RESIDUAL DESIGN HAZARDS

(The following information has been collected from Preconstruction Information and Amey CDM Hazard Management Process.)

01 - Environmental hazard
02 - Hazardous substance - e.g. Lead based paint
03 - Falling from height
04 - Risk of hot material
05 - Working with rotary power tools and machinery vibration
06 - Working near water

NOTES

1. All dimensions in millimetres unless stated otherwise.
2. All structural steelwork to be Grade S355J2H to BS EN 10210.
3. Steelwork protective system in accordance with Specification for Highway Works - Series 1900, colour to be RAL5024 Pastel Blue.
4. For replacement span (option 1) decking to be grooved hardwood timber with anti-slip inserts. All timber is to be sourced from sustainable sources.
5. For option 1, parapets to be1.4m high with vertical bar infill for cyclists to ride over structure without dismounting (or 1.8m high if equestrian use is required. 1.8m high parapets to have bottom 600mm solid infill).
6. Exposed concrete surfaces to have an anti-graffiti coating.

Rev	Revision details	Chkd	Appd	Date

Designed:	Date:
Drawn:	Date:
Checked:	Date:
Approved:	Date:

amey

www.amey.co.uk

Client

TRAFFORD COUNCIL

Project Name

Trafford Greenway Scheme

Drawing Title

Cadishead Viaduct Option Details
Sheet 2 of 2

Original Drawing Size : A1	Scale : 1 : 1250
Dimensions : m	

Drawing Status	Suitability
Feasability Report	S2

Drawing No	Rev
CO00201536 - 001	P1

Appendix F: Cadishead Viaduct Option Cost Estimate

CADISHEAD VIADUCT - OPTION COST ESTIMATE

SPAN 3		Clear span 42.6m Height (approx) 30.0m	OPTION 1			OPTION 2			OPTION 3		
Source		Item and comment	Proposed works	Est capital cost	Est maint. cost	Proposed works	Est capital cost	Est maint. cost	Proposed works	Est capital cost	Est maint. cost
Masonry											
Previous exam reports	4B	Missing/displaced coping stone on top of wall. Located on Ship canal training wall. Requires underwater exam. NR deny responsibility, no change since 2013	Demolish both decks and replace with a 3m wide steel foot/cycle/equestrian bridge (Pratt truss or similar). Steel deck plates covered with accoustic matting for horses. Note: this cost may increase slightly if the new span is required to carry maintenance vehicles.	see below	£112,800 (allows for painting topside of deck plates)	Retain and refurbish half of existing metal deck and 2No. lattice girders. Demolish remaining deck.	see below	£201,400	Refurbish one deck and make the remaining deck structurally safe (no demolition).	see below	£315,200
Site visit Sept 2022		Underwater inspectin required to assess existing/potential scour	Inspection of masonry spans for assessment	£20,000		Inspection of masonry spans and half of span 3 for assessment	£30,000	incl.	Inspection of entire structure for assessment	£40,000	incl.
Site vist Sept 2022		General masonry repairs, re-pointing	Assessment of masonry spans, including check for stability of spans 2 and 4 when span 3 is removed	£75,000		Assessment of masonry spans and one remaining deck of span 3, including check for stability of spans 2 and 4 when span 3 is partially removed	£110,000	incl.	Assessment of masonry spans and both remaining decks of span 3.	£160,000	incl.
Metalwork											
DER 2020		6No. Pin bearings typically in fair condition. Lamination up to 15mm max. Corrosion 1-3mm to base of bearings. 30% loss of paint	Demolition planning	£50,000	incl.	Demolition planning	£50,000	incl.	No demolition	£0	incl.
Site vist Sept 2022		Containers placed to prevent access to span 3	Demolition and removal of existing 3No. Lattice girders and metal trough decking (P.P.O'Connor estiumate)	£900,000	incl.	Part-demolition (P.P.O'Connor estimate)	£500,000	incl.	No demolition	£0	0
DER 2020		3No. Lattice girders. Fair condition, 15mm lamination and 40% paint loss. Connections and diagonals worse, with isolated loss of section	Design, fabricate and deliver to site 45m x 3m steel pratt-truss bridge. Capacity allows for 7.5T mainetenance vehicles (CTS estimate)	£425,000	incl.	Design of new deck and refurbishment works	£200,000	incl.	Design of new deck and refurbishment works	£200,000	incl.
General comment DER 2020		Rivets generally fair, but poor to trough decking with loss of rivet heads	Enabling works, crane on prepared platform, assembly of Pratt truss from two halves. Utilizes prepared area used for demolition Installation. Weight will be approximately 40 tonnes. Requires a 1000t crane lifting at maximum of 38m reach. Cost is for design manufacture and deliver of 40m x 3m Pratt truss bridge	£50,000	incl.	Construct new deck using metal troughing as non-participating formwork	£300,000	incl.	Construct new deck using metal troughing as non-participating formwork	£300,000	incl.
DER April 2020	3A	Full blast clean and metalwork repairs where req'd, and paint		£125,000	incl.	Metal repairs	£200,000	incl.	Metal repairs	£300,000	incl.
DER April 2020	7A	Trough decking in poor condition, loss of section throughout. Lamination up to 30mm. Paint loss 70%	Blast cleaning of existing metalwork n/a	£0	0	Blast clean metalwork and repaint (as advised by Volkerlaser)	£560,000	incl.	Blast clean metalwork and repaint (as advised by Volkerlaser)	£900,000	incl.
Site visit Sept 2022		severe corrosion to meal trough decking. Holes visible in many locations. Deck is unable to carry any imposed loading in current condition	Underwater inspection of piers 2 and 3	nil	nil	Underwater inspection of piers 2 and 3	nil	nil	Underwater inspection of piers 2 and 3	nil	nil
Site visit Sept 2022		corroded lattice girders	Parapet included in new structure	£0	incl.	Parapet mesh provision	£25,000	incl.	Parapet mesh provision	£25,000	incl.
Drainage											incl.
General comment DER 2020		4No. Weep pipes between each cross girder, span 3, generally corroded throughout	Remove shipping containers and repair parapets where containers have been placed	£10,000	incl.	Remove shipping containers and repair parapets where containers have been placed	£10,000	incl.	Remove shipping containers and repair parapets where containers have been placed	£10,000	incl.
DER April 2020	7A	Drill holes to drain standing watertotrough decking at main girder 1.	Undertake drainage repairs	£6,000	incl.	Undertake drainage repairs	£6,000	incl.	Undertake drainage repairs	£6,000	incl.
			Uncertainty	£75,000		Uncertainty	£200,000		Uncertainty	£200,000	
			SUB-TOTAL	£1,736,000	£112,800	TOTAL	£2,191,000	£201,400	TOTAL	£2,141,000	£315,200
			Add risk and OB 20%	£347,200		Add risk and OB 20%	£438,200		Add risk and OB 20%	£428,200	
			Total with risk	**£2,083,200**		**Total with risk**	**£2,629,200**		**Total with risk**	**£2,569,200**	

GENERAL MASONRY, ARCH BARRELS, DRAINAGE AND VEGETATION			WORKS THAT CAN BE DEFERRED		
Source		Item and comment	Proposed works	Est capital cost	Est maint. cost
North Abutment and Wing Wall (NE) - General masonry					
DER April 2020	5A	Masonry repairs. Take down and rebuiuld part of NE wing wall	Reconstruct part of NW wing wall. Monitor remaining defects at 6-monthly intervals to ensure no movement of cracks after opening the Greenway, with requirement to undertake permanent repairs within 4 years Access by scaffold.or MEWP	£4,000	£4,400
General comment DER 2020		Wing wall (NE) - fair condition, but shows displacement up to 100mm			
General comment DER 2020		Abutments - Both east and west in fair condition, minimal defects. Open joints west abut and hairline fractures to east abut			
Span 1 - Arch barrel **Clear span 14.3m, Height (approx) 5.0m**					
General comment DER 2020		Arch rings - Generally fair. Multipe longitudinal fractures with isolated areas of open joints and calcite leaching. Face rings of stone construction also in fair condition. 1No. Diag fracture	Monitor remaining fractures at 6-monthly intervals after opening the Greenway with the intention of undertaking remaining repairs within 4 years. Undertake cross-stitching and crack injection to 30mm wide fracture. Access by scaffold or MEWP	£7,000	£5,550
Previous exam reports	1B	large 30mm wide fracture full vert height. Located D/S wing wall adjacent to tow path. Historic. Shows slight deterioration.			
Previous exam reports	1B	Barrel fractures. Historic. No change since 2013.			
DER April 2020	4A	Continue to monitor fractures to arch barrel soffits			
Span 1 - General masonry					
General comment DER 2020		Spandrels - All typically in fair conditioin,, minimum defects. Open joints.			
Site vist Sept 2022	1S	General masonry repairs and repointing			
General comment DER 2020		Pointing - in fair condition isolated areas of open joints typical 20mm, max 50mm			
DER April 2020	6A	General masonry repairs, crack injection to span 1 frv south			
Span 1 - Drainage and Vegetation					
DER April 2020	7A	Drainage refurb, downpipes and hoppers. remove vegetation, replace missing and broken pipes	undertake drainage repairs	£6,000	
Pier 1 - General masonry					
General comment DER 2020		Piers - All in fair conditiuon. Typical defects dampness, calcite leaching, open joints, spalling and vertical fractures			
General comment DER 2020		Bedstones and Cills - Typically fair condition, some areas of dampness and calcite leaching. Isolated areas of spalling at elevations.	Monitor fractures at 6-monthly intervals after opening the Greenway, with the intention of undertaking permanent repairs within 4 years Access by scaffold and rope	£3,000	£2,750
DER April 2020	4A	Continue to monitor fractures to vert fracture in Pier 1 ret wall			
Site vist Sept 2022	1S	General masonry repairs, re-pointing			
Previous exam reports	2B	area beneath barriers/containers Located above pier 1 not examined, inaccessible. No change since 2013			

GENERAL MASONRY, ARCH BARRELS, DRAINAGE AND VEGETATION			WORKS THAT CAN BE DEFERRED		
Source		Item and comment	Proposed works	Est capital cost	Est maint. cost
Pier 1 - Drainage and Vegetation					
DER April 2020	7A	Drainage refurb, downpipes and hoppers. remove vegetation, replace missing and broken pipes Replace missing m/h cover span 4	undertake drainage repairs	£6,000	
General comment DER 2020		Gutters and downpipes - poor condition. Many missing or broken. All require replacing			
DER April 2020	1A	Vegetation clearance and treat roots at south, west and north faces	undetake vegetation clearance	£200	
Span 2 - Arch barrel **Clear span 13.3m, Height (approx) 20.0m**					
DER April 2020	4A	Continue to monitor fractures to arch barrel soffits and vert fracture in Pier 1 ret wall	Monitor fractures at 6-monthly intervals after opening the Greenway with the intention of undertaking remaining repairs within 4 years. Undertake cross-stitching and crack injection of barrel fractures. Access by rope	£5,000	£5,550
General comment DER 2020		Arch rings - Generally fair. Multipe longitudinal fractures with isolated areas of open joints and calcite leaching. Face rings of stone construction also in fair condition. 1No. Diag fracture			
Previous exam reports	1B	Barrel fractures. Historic. No change since 2013. All arch soffits in fair condition. Multiple longitudinal fractires with isolated ares of open joints and calcite leachingh. Face rings of stone construction also in fair condition.			
Span 2 - General masonry					
General comment DER 2020		Pointing - in fair condition isolated areas of open joints typical 20mm, max 50mm			
General comment DER 2020		Spandrels - All typically in fair conditioin,, minimum defects. Open joints.			
Site vist Sept 2022	1S	General masonry repairs, re-pointing			
DER April 2020	2A	missing masonry, including copings to parapets			
Span 2 - Drainage and Vegetation					
DER April 2020	7A	Drainage refurb, downpipes and hoppers. Replace missing m/h cover	undertake drainage repairs	£6,000	
DER 2020		cut back vegetation on top of deck	undetake vegetation clearance	£150	
Pier 2 - General masonry					
General comment DER 2020		Bedstones and Cills - Typically fair condition, some areas of dampness and calcite leaching. Isolated areas of spalling at elevations.	Monitor fractures at 6-monthly intervals after opening the Greenway with the intention of undertaking permanent repairs within 4 years. Access by rope	£4,000	£2,750
DER April 2020	5A	Masonry repairs, spalled corner east face			
Site vist Sept 2022	1S	General masonry repairs, re-pointing			
General comment DER 2020		Piers - All in fair conditiuon. Typical defects dampness, calcite leaching, open joints, spalling and vertical fractures			
Pier 2 - Drainage and Vegetation					
General comment DER 2020		Gutters and downpipes - poor condition. Many missing or broken. All require replacing	Undertake drainage repairs	£6,000	
DER April 2020	7A	Drainage refurb, downpipes and hoppers.			
DER April 2020	1A	Cut back vegetation and treat roots at north face	Undetake vegetation clearance	£150	

GENERAL MASONRY, ARCH BARRELS, DRAINAGE AND VEGETATION			WORKS THAT CAN BE DEFERRED		
Source		Item and comment	Proposed works	Est capital cost	Est maint. cost
Pier 3 - General masonry					
DER April 2020	5A	Masonry repairs, spalling to west face	Monitor fractures at 6-monthly intervals after opening the Greenway with the intention of undertaking permanent repairs within 4 years. Access by rope	£2,000	£1,750
Site vist Sept 2022	1S	General masonry repairs, re-pointing			
General comment DER 2020		Piers - All in fair conditiuon. Typicall defects dampness, calcite leaching, open joints, spalling and vertical fractures			
General comment DER 2020		Bedstones and Cills - Typically fair condition, some areas of dampness and calcite leaching. Isolated areas of spalling at elevations.			
Pier 3 - Drainage					
General comment DER 2020		Gutters and downpipes - poor condition. Many missing or broken. All require replacing	Undertake drainage repairs	£6,000	
DER April 2020	7A	Drainage refurb, downpipes and hoppers.			
Span 4 - Arch barrel **Clear span 13.6m, Height (approx) 20.0m**			Monitor fractures at 6-monthly intervals after opening the Greenway with the intention of undertaking permanent repairs within 4 years. Access by rope	£5,000	£5,550
Previous exam reports	1B	Barrel fractures. Historic. No change since 2013.			
DER April 2020	4A	Continue to monitor fractures to arch barrel soffits.			
General comment DER 2020		Arch rings - Generally fair. Multipe longitudinal fractures with isolated areas of open joints and calcite leaching. Face rings of stone construction also in fair condition. 1No. Diag fracture			
Span 4 - General masonry					
General comment DER 2020		Spandrels - All typically in fair conditioin,, minimum defects. Open joints. I vert fracture to span 4, south elevation			
DER April 2020	6A	General masonry repairs, crack injection			
Site vist Sept 2022	1S	General masonry repairs, re-pointing			
DER 2020	6A	Repair spalling to span 4			
General comment DER 2020		Pointing - in fair condition isolated areas of open joints typical 20mm, max 50mm			
Span 4 - Drainage and Vegetation					
DER April 2020	7A	Replace missing m/h cover	Replace m/h cover	£2,000	
DER April 2020	7A	Drainage refurb, remove vegetation.	Undertake drainage repairs	£6,000	
DER 2020		Cut back vegetation on top of deck	Undetake vegetation clearance	£150	
Previous exam reports	7B	Dense vegetation. Located U/S. Previously inaccessible, first noted 2019	Undetake vegetation clearance	£450	

GENERAL MASONRY, ARCH BARRELS, DRAINAGE AND VEGETATION			WORKS THAT CAN BE DEFERRED		
Source		Item and comment	Proposed works	Est capital cost	Est maint. cost
Pier 4 - General masonry					
DER April 2020	2A	Missing masonry, including copings to parapets	Monitor fractures at 6-monthly intervals after opening the Greenway with the intention of undertaking permanent repairs within 4 years. Access by rope and scaffold	£2,000	£1,750
Site vist Sept 2022	1S	General masonry repairs, re-pointing			
General comment DER 2020		Piers - All in fair conditiuon. Typicall defects dampness, calcite leaching, open joints, spalling and vertical fractures			
General comment DER 2020		Bedstones and Cills - Typically fair condition, some areas of dampness and calcite leaching. Isolated areas of spalling at elevations.			
Previous exam reports	2B	Area beneath barriers/containers. Located above pier 4 not examined, inaccessible. No change since 2013			
Pier 4 - Drainage and Vegetation					
DER April 2020	7A	Drainage refurb, downpipes and hoppers.	Undertake drainage repairs	£6,000	
General comment DER 2020		Gutters and downpipes - poor condition. Many missing or broken. All require replacing			
DER April 2020	1A	Vegetation clearance and treat roots at north and south faces	Undetake vegetation clearance	£150	
Span 5 - Arch barrel **Clear span 13.8m, Height (approx) 5.0m**					
Previous exam reports	1B	Barrel fractures. Historic. No change since 2013.	Monitor fractures at 6-monthly intervals after opening the Greenway with the intention of undertaking permanent repairs within 4 years. Undertake cross-stitching and crack injection of barrel fractures. Access by scaffold or MEWP	£5,000	£4,550
DER April 2020	4A	Continue to monitor fractures to arch barrel soffits.			
General comment DER 2020		Arch rings - Generally fair. Multipe longitudinal fractures with isolated areas of open joints and calcite leaching. Face rings of stone construction also in fair condition. 1No. Diag fracture			
Span 5 - General masonry					
Site vist Sept 2022	1S	General masonry repairs, re-pointing			
General comment DER 2020		Pointing - in fair condition isolated areas of open joints typical 20mm, max 50mm			
General comment DER 2020		Spandrels - All typically in fair conditioin,, minimum defects. Open joints.			
Span 5 Drainage and Vegetation					
DER April 2020	7A	Drainage refurb, downpipes and hoppers. Replace missing m/h cover	Undertake drainage repairs	£6,000	
DER 2020		Cut back vegetation on top of deck	Undetake vegetation clearance	£150	
Previous examinatin reports	7B	Dense vegetation located U/S. Previously inaccessible, first noted 2019			
South abutment - General masonry					
General comment DER 2020		Abutments - Both east (south) and west (north) in fair condition, minimal defects. Open joints west (north) abut and hairline fractures to east (south) abut	Monitor defects at 6-monthly intervals to ensure no significant degradation, and undertake remaining repairs within 4 years. Access by scaffold or MEWP	£1,500	£4,400
			SUB-TOTAL	**£89,900**	**£39,000**

PARAPETS AND SPANDRELS			OPTION X			OPTION Y		
Source		Item and comment	Proposed works	Est capital cost	Est maint. cost	Proposed works	Est capital cost	Est maint. cost
Span 1								
DER April 2020	2A	missing masonry, including copings to parapets	Repair and raise parapets to 1.8m high using steel post and rail (KeeKlamp or similar) fixed to existing masonry. Must be designed for horizontal equestrian loading, eg a stumbling horse. Will require Departure from Standards	£10,000	£4,000	Re-construct parapets as original.	£2,000	
Previous exam reports	3B	missing/collapsed brickwork. Located parapet both faces. May be more loose brickwork above track, no change since 2013				AND		£5,800
General comment DER 2020		Parapets - Large areas of brickwork missing. Large areas of open joints typically 20mm. Isolated areas of spalling. 2No. Vertical step fractures to South elevation Copings - many missing				Erect new steel parapet 1.8m high both sides, inboard of existing. Ensure bottom 600mm is solid for equestrian use. Posts set in concrete foundation	£35,000	
Span 2								
Previous exam reports	3B	Missing/collapsed brickwork. Located Parapet both faces. May be more loose brickwork above track, Shows deterioration	Repair and raise parapets to 1.8m high using steel post and rail (KeeKlamp or similar) fixed to existing masonry. Must be designed for horizontal equestrian loading, eg a stumbling horse. Will require Departure from Standards	£10,000	£4,000	Re-construct parapets as original.	£2,000	
Site vist Sept 2022		Works required to parapets. 1.8m high parapets are required along entire length of structure for bridleway				AND		£5,800
General comment DER 2020		Parapets - Large areas of brickwork missing. Large areas of open joints typically 20mm. Isolated areas of spalling. 2No. Vertical step fractures to South elevation Copings - many missing				Erect new steel parapet 1.8m high both sides, inboard of existing. Ensure bottom 600mm is solid for equestrian use. Posts set in concrete foundation	£35,000	
Span 4								
Previous exam reports	3B	Missing/collapsed brickwork. Located parapet both faces. May be more loose brickwork above track, no change since 2013		£10,000	£4,000	Re-construct parapets as original. AND	£2,000	£5,800
General comment DER 2020		Parapets - Large areas of brickwork missing. Large areas of open joints typically 20mm. Isolated areas of spalling. 2No. Vertical step fractures to South elevation Copings - many missing				Erect new steel parapet 1.8m high both sides, inboard of existing. Ensure bottom 600mm is solid for equestrian use. Posts set in concrete foundation	£35,000	
Span 5								
Previous exam reports	3B	Missing/collapsed brickwork. Located parapet both faces. May be more loose brickwork above track, no change since 2013	Repair and raise parapets to 1.8m high using steel post and rail (KeeKlamp or similar) fixed to existing masonry. Must be designed for horizontal equestrian loading, eg a stumbling horse. Will require Departure from Standards	£10,000	£4,000	Re-construct parapets as original. AND	£2,000	
Previous exam reports	5B	Missing/collapsed brickwork. Located U/S and D/S parapet. Accessible from approaches, no change since 2013						£5,800
DER April 2020	2A	Missing masonry, including copings to parapets				Erect new steel parapet 1.8m high both sides, inboard of existing. Ensure bottom 600mm is solid for equestrian use. Posts set in concrete foundation	£35,000	
General comment DER 2020		Parapets - Large areas of brickwork missing. Large areas of open joints typically 20mm. Isolated areas of spalling. 2No. Vertical step fractures to South elevation Copings - many missing						
			SUB-TOTAL	**£40,000**	**£16,000**		**£148,000**	**£23,200**

Appendix G: Network Rail Process for Temporary Disposal of Assets and Related Correspondence

Without Prejudice and Subject to Contract

Should you wish to take a temporary interest in this land this land the process is as follows:

Temporary Interest

A temporary interest is one in which Network Rail has an unrestricted right to regain control of the land on demand. Examples include, but are not limited to: licences, a lease with unrestricted breaks for Network Rail.

Should you wish to take a lease/licence in this land the process is as follows:

Detailed description of the Proposed Site Use

A detailed description of the proposed site use should be provided, including:

1. Details of work/site use
2. Programme
3. Insurance details

Procedure & Costs

Due to the level of abortive costs that can arise out of enquiries, we will require a cost undertaking initially, followed by payment in advance at each stage to cover our costs, as follows:

Business and Technical Clearance

The process will begin with us making an application for internal permissions. This is an internal Network Rail procedure where the intention is to learn whether there are any business or technical objections to what is proposed and the reasons.

The Business & Technical Clearance Application fee is £750. The procedure will normally be completed 12 weeks from application, though this may run up to 12 months for particularly complicated clearances. The proposal may be approved with conditions or it may be refused, in the case of a refusal all costs are non-refundable.

Buried Services Survey

Network Rail sites will often require a buried service survey before they can be sold. If required this will be stipulated in the clearance and costs £3,000. The report is normally completed within 3 weeks from instruction. (note – unlikely to be required for oversail)

Surveyors Costs

Network Rail's internal Surveyors costs for managing the transaction will be £1000 (note – if an external agent is instructed to deal with the matter on behalf of NR, our Surveyors costs will be £250)

Legal and Professional Costs

Network Rail requires that their legal and professional costs involved in documenting a transaction will be reimbursed, whether the matter is completed or not. An estimate can be provided once more details are known.

Commercial Fee

A commercial fee is expected for a disposal or use of Network Rail land, where appropriate. Network Rail is under a duty to obtain best value.

Subject to Contract and Network Rail Approval
Any agreement between us is Subject to Contract and Subject to Formal Network Rail Approval

Network Rail's Unrestricted Ability to Break the Lease/Licence

To comply with Network Rail's governing regulations (Licence Condition 17) the lease/licence must have the ability for Network Rail to exercise an unrestricted break with no more than 18 months' notice. Network Rail's preference is for a 6 month rolling unrestricted break.

Summary

Process	Cost	Timeframe
Business Clearance	£750	2-4 weeks
Technical Clearance		Up to 12 Months
Buried Services Survey (if required)	*£3,000*	*3 weeks*
EPC (if required)	*£250*	*2 weeks*
Surveyors Costs	£1000	N/A
Commercial Fee	T.B.C.	N/A
Legal and Professional Costs	T.B.C	4-6 weeks
Total	**£1,250 +£3,000 +£250 (If required) +T.B.C*,****	**15-21+ weeks^**

*All costs detailed here are exclusive of VAT – VAT may be chargeable on these fees depending on the property interest in question.
**All costs detailed here are estimates; more complicated proposals may incur higher costs.
^All timescales detailed here are approximate; more complicated proposals may incur longer timescales.

The initial step therefore should you wish to progress this matter will be for you to provide me with:

- An undertaking for £1,250 + VAT
- A detailed description of the proposal
- A plan showing the exact area of Network Rail land you would like to use
- Any documents relevant to your proposal

I will then submit this for clearance.

Kind regards

[redacted]
[redacted]@networkrail.co.uk

Property NetworkRail

[redacted]@networkrail.co.uk>
Sent: 21 April 2023 14:15
[redacted]@amey.co.uk>
[redacted]@amey.co.uk>
Subject: RE: Temporary use of NR

This was from a few years ago so costs may have changed slightly, I would put a figure of Circa £5k down for property related fees. Due to the size of the parcel of land in question these fees will be relatively low compared to the total transaction valuation.

I wouldn't go on record to disclose a preference as it's only my opinion, I would say there are two options:

1. Disposal of the NR assets.
2. Agree an easement and commuted sum for ongoing maintenance of NR assets.

I think there would need to be a lot more discussion to make a determination on what the NR preference would be for this location as there are a number of factors that could influence the decision.

Regards,

[redacted]

[redacted]@amey.co.uk>
Sent: 21 April 2023 13:40
[redacted]@networkrail.co.uk>
[redacted]@amey.co.uk>
Subject: RE: Temporary use of NR

Thank you for that [redacted] So, is it best to record in our report that NR's preference would be for a form of disposal of land – either temporary or permanent, rather than the LAs contributing to costs towards the upkeep of the bridges?

Btw, I looks like there is a small error in the costs table:

Process	Cost	Timeframe
Business Clearance	£750	2-4 weeks
Technical Clearance		Up to 12 Months
Buried Services Survey (if required)	*£3,000*	*3 weeks*
EPC (if required)	*£250*	*2 weeks*
Surveyors Costs	£1000	N/A
Commercial Fee	T.B.C.	N/A
Legal and Professional Costs	T.B.C	4-6 weeks
Total	**£1,250 +£3,000 +£250 (If required) +T.B.C*,****	**15-21+ weeks^**

Regards,

[redacted] @amey.co.uk; [redacted]

ameyconsulting

Personal pride in our public service | EMPOWER | ENGAGE | EXCEL

Find out about our Practical Planet series at www.amey.co.uk/ameyconsulting

We support and encourage flexible working so whilst it suits me to email you now, please don't feel obliged to respond or action outside your own working hours

[redacted]@networkrail.co.uk>

Sent: 21 April 2023 13:26

[redacted]@amey.co.uk>

Subject: Temporary use of NR

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This email originated from outside of Amey

Be aware that this could be a phishing attempt, do not click links or open attachments unless you recognise the sender and know the content is safe.

OFFICIAL

Hi [redacted]

Al basic process guideline for the temporary disposal or use of NR land.

The process should not be to dissimilar for an Easement or Disposal of the land.

Regards,

[redacted]
[redacted]
[redacted]

[redacted]@networkrail.co.uk
[redacted]

Asset Protection & Optimisation Website

NetworkRail everyone home safe every day