Infrastructure Projects

Northern Programmes

The Network Rail (Huddersfield to Westtown (Dewsbury) Improvements) Order

Huddersfield Viaduct (MVL3/92) – Heritage Assessment

Network Rail

March 2021

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Inserts

1. INTRODUCTION

1.1 Report objectives

1.1.1 The Scheme is part of a wider programme of works known as the Transpennine Route Upgrade (TRU) (herein referred to as the 'Programme') which will improve the Transpennine railway between Manchester, Huddersfield, Leeds and York and improve connections between key towns and cities across the north of England. The Scheme will contribute to the overall TRU Programme aims of increasing service capacity and offering journey time benefits through:

- Four tracking and upgrading of the existing railway line including track realignment (currently the majority of the railway in the Scheme area has two tracks);
- Electrification of the line;
- Increase in line speeds;
- Provision of sections of new railway;
- Provision of new grade-separated junction within the Ravensthorpe area;
- Remodelling of stations including platform extension works at Deighton, Mirfield and Huddersfield; and
- Provision of replacement station at Ravensthorpe.

1.1.2 As well as the works identified above, various other engineering works are necessary including strengthening and replacement of bridge decks (rail and highway); electrification of the line and provision of associated infrastructure will require raising the height, demolition of or replacement of bridge structures.

1.1.3 The Transport and Works Act 1992 introduced section 12(3A) into the Planning (Listed Buildings and Conservation Areas) Act 1990, the effect of which is to "call-in" for determination by the Secretary of State applications to the local planning authority for Listed Building Consent where such consent is required in consequence of proposals included in an application for a Transport and Works Act Order (TWAO). The procedures in the Transport and Works Applications (Listed Buildings, Conservation Areas and Ancient Monuments Procedure) Regulations 1992 then apply to the call in of such Listed Building Consent applications.

1.1.4 Huddersfield Viaduct (MVL3/92) was designated as a Grade II Listed building in September 1978. The Historic England list description (included in full in Appendix B) names the listed building as "Huddersfield Railway Viaduct". Throughout this Heritage Assessment the structure is referred to as "Huddersfield Viaduct (MVL3/92)".

1.1.5 This Heritage Assessment has been compiled in support of an application for Listed Building Consent by Network Rail in respect of the proposed works on the Grade II Listed Huddersfield Viaduct (MVL3/92) (NHLE 1223531), Kirklees, West Yorkshire.

1.1.6 This Heritage Assessment will seek to:

- Identify and discuss the heritage significance of the listed structure;
- Present the design requirements of the Scheme at the structure;
- Present the process of design development and optioneering which has led to the design proposal for the Scheme in relation to the structure;
- Identify the impacts of the design proposal on the significance of the structure, in the context of current national planning policy and guidance;
- Discuss any mitigation and/or compensation recommended in relation to the structure; and

- Consider the public benefits to be gained from the design proposal in relation to the structure, weighed against the impact on significance, in line with current national planning policy and guidance.

1.1.7 The construction methodology for the proposals, is set out in the Code of Construction Practice (CoCP). Part A of the COCP is provided in Appendix 2-1 in Volume 3 of the Environmental Statement (ES) submitted as part of the TWAO submission. Part B of the CoCP will incorporate a Noise and Vibration Management Plan, a Nuisance Management Plan and a Demolition Methodology Statement. These documents will be submitted to and agreed by the Local Authority pursuant to a condition to be attached to the deemed planning permission[1] prior to construction works commencing. Specific details of mitigation and compensation measures will be detailed in the Conservation Implementation and Management Plan (CIMP) for the Scheme to be submitted pursuant to a condition to be attached to the Listed Building Consent.

1.2 Current conditions

1.2.1 Huddersfield Viaduct (MVL3/92) (Insert 1-1) is a 47-span viaduct which carries the Transpennine Route across the shallow valley to the north of Huddersfield town centre and Huddersfield Station, in Kirklees, West Yorkshire. The viaduct currently carries two tracks for the majority of its length, increasing in number to five on the approach to Huddersfield Station to service train movement for the platform arrangement of the station. The spans of the viaduct primarily comprise arches accommodating various through roads beneath the structure, as well as some businesses.

Insert 1-1 Eastern elevation of Huddersfield Viaduct (MVL3/92), looking north along Viaduct Street.

1.2.2 The viaduct was constructed between 1845 and 1847 as part of the Huddersfield &

[1] On making an order under the Transport and Works Act 1992, the Secretary of State may direct that planning permission shall be deemed to be granted, subject to such conditions (if any) as may be specified in the direction.

Manchester Railway, and is largely of masonry construction. The viaduct was widened in the 1880s, to provide additional tracks along much of its length; the majority of the widening was undertaken in masonry closely matching the original structure, however a number of spans were widened with metallic decks of wrought iron, in particular over John William Street (Span 1), Fitzwilliam Street (Span 4) and Northgate/Bradford Road (Span 29). The viaduct survives largely unchanged in fabric and appearance since the widening of the 1880s, though the number of tracks running over it has been reduced.

1.2.3 The current condition of Huddersfield Viaduct (MVL3/92) varies along its length, though the majority of the structure appears to be in a fair condition[2]. The majority of the masonry spans of the Listed structure appear to have few defects, aside from some evidence of issues with waterproofing and vegetation growth, however, there appear to be some structural issues with the 1880s metallic spans. The current condition of the metallic girders at Northgate / Bradford Road (Huddersfield Viaduct (Span 29) Underbridge (MVL3/92(9))) in particular is considered to be poor (Inserts 1-2 and 1-3). There is evidence of differential settlement of the cross-girders and main girders of the wrought iron spans, while a number of other specific defects in the structure have also been identified including evidence of corrosion on the web and stiffener elements and close to the I-girder connections, defects at the bottom flange ends and at the bearing points. There are also concerns about the condition of the inner bearings of the structure at the interface between the original 1840s masonry arch and the 1880s wrought iron decks, which are hidden within the structure.

Insert 1-2 Underside of metallic spans over Northgate / Bradford Road (Span 29), showing evidence of possible main girder settlement.

[2] The condition of the structure has been examined during survey work undertaken by TRU West between September 2019 and February 2020.

Insert 1-3 Detail of metallic spans over Northgate / Bradford Road (Span 29), showing evidence of corrosion to web and stiffeners (left) and to the members close to the I-girder connection (right).

1.3 Summary of proposal

1.3.1 To achieve the TRU Programme objectives of increasing capacity and reducing journey times, the Scheme requires alterations to be made to the railway along the length of Huddersfield Viaduct (MVL3/92). It is necessary to provide additional tracks for the length of the viaduct and to install Overhead Line Equipment (OLE) along the structure.

1.3.2 It is proposed to undertake a number of works to the Grade II Listed viaduct. In summary, these comprise:

- Increasing the number of tracks along the deck of the viaduct from two to five tracks from the southern end to Span 17 and four tracks from Span 17 to the northern end of the structure;
- The replacement of the deck of John William Street bridge (Huddersfield Viaduct (Span 1) Underbridge (MVL3/92(1))) with a new steel span, widened on the south-eastern side, with parapets either incorporating reused elements of the existing cast iron edge girders, or designed in a style to match the existing structure;
- The replacement of the metallic decks over Northgate / Bradford Road (Huddersfield Viaduct (Span 29) Underbridge (MVL3/92(9)))with new concrete beams, supported on new widened abutments, with both the new parapets and abutments designed in a style to respond to the existing structure;

- The reconstruction of the north-western corner of the abutment at Fitzwilliam Street (Huddersfield Viaduct (Span 4) Underbridge (MVL3/92(3))),to be clad in masonry to match its existing appearance;
- The installation of OLE along the length of the viaduct, with portals attached to the exterior of the structure on the east side and the southern half of the west side, and supported on the track bed of the viaduct on the northern half of the west side;
- The installation of a signal gantry approximately over Spans 2 and 3 (Huddersfield Viaduct (Span 2-3) Underbridge (MVL3/92(2))) to provide signals for train movement into and out from Huddersfield Station; and
- The strengthening of the spandrel walls at localised points along the viaduct where required, achieved through either tie bars and pattress plates or a slab below the track bed.

1.3.3 The design development process has included appraisal of various options to identify an approach which delivers the operational requirements, whilst also minimising impacts on the heritage significance of the structure as far as possible. This is outlined below in Section 3.2. The design has been developed alongside consultation with Historic England and the Kirklees Council Conservation Officer; this is detailed below in Section 1.5.

1.3.4 It is noted that the proposals relating to Huddersfield Viaduct (Span 1) Underbridge (MVL3/92(1)), as well as other elements of the overall proposals such as the signal gantry, are directly related to the proposed works at Huddersfield Station; the proposals for the Station include the extending of platforms northwards onto Huddersfield Viaduct (Span 1) Underbridge (MVL3/92(1)). Huddersfield Station is itself Grade I Listed, and the proposals there also require Listed Building Consent. The proposals for the works at Huddersfield Station are detailed in the following documents:

- Huddersfield Station Heritage Assessment, submitted with the Listed Building Consent application for the Station (NR17); and
- Huddersfield Station Design & Access Statement, submitted in support of the TWAO submission (NR15a).

1.4 Legislative and policy context

Legislation

1.4.1 The Planning (Listed Buildings and Conservation Areas) Act 1990 (as amended) governs the designation and works to listed buildings in England.

1.4.2 The Act states in **s.1 (5)**:

'In this Act "listed building" means a building which is for the time being included in a list compiled or approved by the Secretary of State under this section; and for the purposes of this Act—

(a) any object or structure fixed to the building;
(b) any object or structure within the curtilage of the building which, although not fixed to the building, forms part of the land and has done so since before 1st July 1948, shall be treated as part of the building.'

1.4.3 Under the Act, no one is permitted to undertake or cause to be undertaken any works that would affect the character of a listed building unless the works are authorised. **Section 16** of the Act identifies that whether such works can be carried out is determined by the local planning authority or the Secretary of State:

'(1) Subject to the previous provisions of this Part, the local planning authority or, as the case may be, the Secretary of State may grant or refuse an application for listed building consent and, if they grant consent, may grant it subject to conditions.

(2) In considering whether to grant listed building consent for any works the local planning authority or the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.

(3) Any listed building consent shall (except in so far as it otherwise provides) ensure for the benefit of the building and of all persons for the time being interested in it.'

1.4.4 In relation to the granting of Listed Building Consent, **Section 17** of the Act stipulates that conditions attached to Listed Building Consent may include those with respect to:

'(a) the preservation of particular features of the building, either as part of it or after severance from it;

(b) the making good, after the works are completed, of any damage caused to the building by the works; [and]

(c) the reconstruction of the building or any part of it following the execution of any works, with the use of original materials so far as practicable and with such alterations of the interior of the building as may be specified in the conditions'.

1.4.5 It is also defined in s.17 (2) that a condition '*may also be imposed requiring specified details of the works (whether or not set out in the application) to be approved subsequently by the local planning authority or, in the case of consent granted by the Secretary of State, specifying whether such details are to be approved by the local planning authority or by him'.*

1.4.6 The Act also states in **s.66 (1)**:

'In considering whether to grant planning permission or permission in principle for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses'.

1.4.7 The Planning (Listed Buildings and Conservation Areas) Act 1990 (as amended) also governs duties of the local planning authority relating to conservation areas, particularly Sections 69, 72 and 74.

Section 69 requires local planning authorities to define as conservation areas any *'areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance'.*

Section 72 confers a general duty *'with respect to any buildings or other land in a conservation area… special attention shall be paid to the desirability or preserving or enhancing the character or appearance of that area'*.

Section 74 defines that demolition of a building in a conservation area is not permitted '*without the consent of the appropriate authority*'.

National Policy

1.4.8 The National Planning Policy Framework (NPPF) provides the Government's national planning policy on the conservation of the historic environment, supported by the Planning

Practice Guidance (updated July 2019). It was published in March 2012 and revised in February 2019. This Heritage Assessment aims to address relevant policy within the NPPF in relation to Section 16 'Conserving and enhancing the historic environment' and includes an assessment of significance of the heritage assets and their setting that may be affected by the proposed works, in compliance with paragraphs 189-202.

1.4.9 The following paragraphs as set out in the NPPF include key provisions considered of particular importance to this application.

Paragraph 189 - *In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance.*

Paragraph 193 - *When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss, or less than substantial harm to its significance*.

Paragraph 194 - *Any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification. Substantial harm to, or loss of:*

a) grade II listed buildings, or grade II registered parks or gardens, should be exceptional;

b) assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade I and II listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional.*

Paragraph 195 - *Where a proposed development will lead to substantial harm to (or total loss of significance of) a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or total loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:*

a) the nature of the heritage asset prevents all reasonable uses of the site; and

b) no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and

c) conservation by grant-funding or some form of not for profit, charitable or public ownership is demonstrably not possible; and

d) the harm or loss is outweighed by the benefit of bringing the site back into use.

Paragraph 196 – *Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal, including, where appropriate, securing its optimum viable use*.

Paragraph 197 – *The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that directly or indirectly affect non-designated heritage assets, a balanced judgment will be required having regard to the scale of any harm or loss and the significance of the heritage asset*.

1.4.10 The National Planning Practice Guidance (Historic Environment) (PPG) gives further information on how national policy is to be interpreted and applied locally. The PPG includes particular guidance on matters relating to protecting the historic environment. The PPG for historic environment was significantly updated in 2019 to reflect the changes made in 2018/19 to NPPF policy.

Local Policy

1.4.11 The Kirklees Local Plan was adopted in February 2019 and is now the statutory development plan for Kirklees providing a set of planning policies.

1.4.12 Kirklees Council recognises that *heritage assets are an irreplaceable resource and should aim to conserve them in a manner appropriate to their significance*[3]. Section 14.1 of the Local Plan sets out **Policy LP35** relating to the historic environment. The entire text of this policy is reproduced below:

Policy LP35 Historic Environment

1. *Development proposals affecting a designated heritage asset (or an archaeological site of national importance) should preserve or enhance the significance of the asset. In cases likely to result in substantial harm or loss, development will only be permitted where it can be demonstrated that the proposals would bring substantial public benefits that clearly outweigh the harm, or all of the following are met:*

   a) *the nature of the heritage asset prevents all reasonable uses of the site;*

   b) *no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation;*

   c) *conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible; and*

   d) *the harm or loss is outweighed by the benefit of bringing the site back into use.*

2. *Proposals which would remove, harm or undermine the significance of a non-designated heritage asset, or its contribution to the character of a place will be permitted only where benefits of the development outweigh the harm having regard to the scale of the harm and the significance of the heritage asset. In the case of developments affecting archaeological sites of less than national importance where development affecting such sites is acceptable in principle, mitigation of damage will be ensured through preservation of the remains in situ as a preferred solution. When in situ preservation is not justified, the developer will be required to make adequate provision for excavation and recording before or during development.*

3. *Proposals should retain those elements of the historic environment which contribute to the distinct identity of the Kirklees area and ensure they are appropriately conserved, to the extent warranted by their significance, also having regard to the wider benefits of development. Consideration should be given to the need to:*

   a) *ensure that proposals maintain and reinforce local distinctiveness and conserve the significance of designated and non-designated heritage assets;*

[3] Kirklees Council, Kirklees Local Plan Strategy and Policies, 2019, 141. https://www.kirklees.gov.uk/beta/planning-policy/pdf/local-plan-strategy-and-policies.pdf.

b) *ensure that proposals within Conservation Areas conserve those elements which contribute to their significance;*

c) *secure a sustainable future for heritage assets at risk and those associated with the local textile industry, historic farm buildings, places of worship and civic and institutional buildings constructed on the back of the wealth created by the textile industry as expressions of local civic pride and identity;*

d) *identify opportunities, including use of new technologies, to mitigate, and adapt to, the effects of climate change in ways that do not harm the significance of heritage assets and, where conflict is unavoidable, to balance the public benefit of climate change mitigation measures with the harm caused to the heritage assets' significance;*

e) *accommodate innovative design where this does not prejudice the significance of heritage assets;*

f) *preserve the setting of Castle Hill where appropriate and proposals which detrimentally impact on the setting of Castle Hill will not be permitted*

1.5 Consultation

1.5.1 Historic England and Kirklees Council have been involved in ongoing stakeholder consultation with Network Rail through the development of the Transpennine Route Upgrade between Huddersfield and Westtown (Dewsbury).

1.5.2 Regular meetings with both these historic environment stakeholders have been held to discuss structures of heritage significance on the alignment of the railway which are subject to impacts during the construction or operation of the proposed scheme. The first of these meetings was held in September 2019[4], with subsequent meetings held approximately every six to eight weeks, each meeting covering a group of structures (with not every structure discussed at every meeting). Each meeting is referred to as a 'round' of consultation in the bullet point list below.

1.5.3 The design development of the Scheme in relation to Huddersfield Viaduct (MVL3/92) was discussed during meetings with the statutory historic environment stakeholders on the following dates:

- A meeting on 4 September 2019 - W3 Bridges and Structures – Historic England / Kirklees Council (Conservation) Engagement (1st round);
- A meeting on 17 October 2019 - W3 Bridges and Structures – Historic England / Kirklees Council (Conservation) Engagement (2nd round);
- A meeting on 5 December 2019 - W3 Bridges and Structures – Historic England / Kirklees Council (Conservation) Engagement (3rd round);
- A meeting on 23 January 2020 - W3 Bridges and Structures – Historic England / Kirklees Council (Conservation) Engagement (4th round);
- A meeting on 10 March 2020 - W3 Bridges and Structures – Historic England / Kirklees Council (Conservation) Engagement (5th round);
- A meeting on 21 April 2020 - W3 Bridges and Structures – Historic England / Kirklees Council (Conservation) Engagement (7th round);
- A meeting on 23 July 2020 - W3 Bridges and Structures – Historic England / Kirklees Council (Conservation) Engagement (9th round);

[4] Meeting held on 4 September 2019 in Leeds.

- A meeting on 25 August 2020 - W3 Bridges and Structures – Historic England / Kirklees Council (Conservation) Engagement (11th round); and
- A meeting on 17 September 2020 - W3 Bridges and Structures – Historic England / Kirklees Council (Conservation) Engagement (12th round).

1.5.4 At the meeting of **4 September 2019**, the heritage significances of Huddersfield Viaduct were introduced. The level and natures of survey works were presented in order to understand the likely nature of required strengthening works. It was raised that OLE would be required on the Viaduct as a critical driver for the Scheme is electrification. It was suggested that design options explored the least visually intrusive approach to attaching OLE to the Viaduct. It was also explained that the through girders along John William Street (Span 1 at the southern end) collide with the proposed new track alignment and that designs were being developed to replace the deck in this location. It was shared that the Northgate / Bradford Road (Span 29) was subject to condition surveys, particularly the metallic external spans build on historic masonry as part of the 1880s expansion, to ascertain strength and capacity.

1.5.5 At the **17 October 2019** meeting, it was stated that the track layout and re-modelling of the P-way and switches and crossings over John William Street bridge at the southern end of the Viaduct was still being developed. It was suggested that only minor strengthening would be required at Fitzwilliam Street (Span 4). Survey results were expected in November 2019 for Northgate / Bradford Road (Span 29), which would provide information on condition which would feed into the assessment to calculate capacity. The consensus was that the results would most likely confirm the need for new decks and strengthening. The current survey results for the rest of the structure's masonry sections revealed the need for only minor repairs to support the additional tracks.

1.5.6 Huddersfield Viaduct was only briefly mentioned in the **5 December 2019** meeting, which was to confirm that surveys were ongoing and these would be shared and the next meeting.

1.5.7 The meeting on **23 January 2020** covered John William Street bridge (span 1), Fitzwilliam Street (Span 4) and Northgate / Bradford Road (Span 29). Inspections to Fitzwilliam Street (Span 4) due to be completed in February or early March 2020; with current indications that there may be some strengthening required to the abutment of the bridge where it connects to the main viaduct. At Northgate / Bradford Road (Span 29), it was explained that surveys were showing corrosion and wear and tear at track level. This would likely mean that the metallic deck would need replacing. Masonry surveys were near completed and showed no critical concerns and would result in minor strengthening. It was stated that OLE designs had started and an update would be ready for the next meeting.

1.5.8 Three options were presented on resolving the issue of the through girders clash with the new track alignment over John William Street bridge (span 1) (discussed further below in paragraphs 3.2.4 to 0). The condition of the cast iron parapets was also discussed, which highlighted evidence of general corrosion that may need consideration of replacements. There was keen interest in understanding the results of a more formal survey of the parapets to obtain an accurate indication of the extent of degraded material and what likely percentage of parapet would need to be replaced. An action to present sketch elevations at the next meeting was agreed.

1.5.9 The main purpose of discussion at the **10 March 2020** meeting was the design of OLE portals on the Viaduct (discussed in more detail below in paragraphs 3.2.28 to 3.2.32). In respect of the P-way design, it was anticipated that 12 OLE portals would be required across the Viaduct; this would be achieved with 5 portals on the four-track section and seven portals on the five-track section. It was explained that the use of seven anchor portals would be necessary in places across the Viaduct. Anchor portals require external fixing of mast and tie backs. It was explained that over the four-track section on the northern side, portals

could be accommodated on the inside of parapets; whereas the southern side external fixing of OLE would be necessary due to limited space on the inside of the Viaduct. Along the five-track section, both northern and southern sides of the Viaduct would not be able to house the OLE foundations and therefore external fixings would be required. Stakeholders appreciated the explanations given but were keen to gain an understanding of the optioneering work and the lack of alternatives.

1.5.10 The **21 April 2020** meeting was dedicated to Northgate / Bradford Road (Span 29). The scheme design implications for this part of the Viaduct was explained (see below, paragraphs 3.2.15 to 3.2.22) with the requirement for the metallic span sections to hold a single track to achieve four-tracking; the amount of switches and crossing required for access into Huddersfield Station; moving tracks from sitting on long timbers to being positioned on track ballast, which requires extra depth along the structure. The survey results were also shared: signs of differential settlement on down-side (western side); girders significantly corroded and metallic spans with isolated defects which would be difficult and complex to repair. Options A to F for Northgate / Bradford Road (Span 29) were then presented with Options A and F being immediately discounted. A discussion on the other options then ensued with an action to present more details on option implications in respect of health and safety, costs and constructability. It was recommended that as much of Span 29 should be retained and made visible as possible; although it was appreciated by Stakeholders that the 1880s metallic spans were failing to provide the structural integrity now required for the new Scheme, due to its poor condition.

1.5.11 The **23 July 2020** Meeting presented the further work completed on OLE installation over the Viaduct. The constraints were re-visited with confirmation that there is insufficient space for OLE foundations between John William Street bridge (Span 1) and Span 16. On the western side of the Viaduct from Span 16 there is space to located OLE within the structure. There was concern that at the southern end of the Viaduct which links into the Leeds end of Huddersfield Station, that there are a number of new interventions such as footbridge, signal gantry, OLE portals and emergency access arrangements at John William Street bridge (span 1). It was agreed that some visualisations should be created to show the level of change from all the new elements.

1.5.12 In respect of Northgate / Bradford Road (Span 29), Option E was presented as the preferred approach. Discussion took place regarding the introduction of new materials (concrete) against the masonry structure and the loss of the 1880s metallic *sections* and what this would mean for the significance for the Viaduct and this Span 29 (discussed further below in paragraphs 3.2.23 to 3.2.25). Visualisations were requested to support understanding of the level of change, the nature of the relationship between old and new material and material types.

1.5.13 It was confirmed that the sub-structure and abutment of Fitzwilliam Street (Span 4) would require strengthening (see below, paragraphs 3.2.11 to 3.2.13). Concrete was proposed which would be inserted behind the original sandstone. Any historic fabric that is removed would be replaced, either by reusing the historic stone removed for the works or using new sandstone that matches the appearance of the existing.

1.5.14 An update was provided on John William Street bridge (span 1). The south-eastern section of the bridge would need to be extended outwards to accommodate an emergency egress, allowing for safe evacuation of passengers from the Leeds end of Huddersfield Station. It was stated that survey works had not be facilitated and as such there remained a gap in knowledge about the quality and number of possible re-useable parapets at the south-eastern side. The design ethos is to replicate the style of the north-western side and that it may be that this is in wholly new material. It was agreed that justification for expanded section in the same style would need to be clearly expressed.

1.5.15 A meeting to gain further agreement on approaches was held on **25 August 2020**. It was confirmed that the signal gantry would be accommodated on the inside of the Viaduct (discussed below in paragraphs 3.2.33 to 3.2.35). Three material options (see below, 3.2.25) were presented for the new parapet at Northgate / Bradford Road (Span 29) of pre-cast concrete, weathering steel and painted steel cladding. Stakeholders agreed after some discussion that visualisations would be useful of all three. All agreed with the new masonry abutments and additional buttresses in sandstone finish a good approach which would raise to full height meeting the new shorter span length. The surveys anticipated at John William Street bridge (span 1) had not been able to take place and it was therefore agreed that further discussions would be had with stakeholders after surveys had been undertaken in order to agree an approach for the retention repair, re-use and new parapet sections of the bridge.

1.5.16 At the **17 September 2020** meeting, three material choice visualisations were presented for the new deck parapets at Northgate / Bradford Road (Span 29). Following discussions on the suitability and impacts on the significance of the Viaduct at this location as well as its length, the pre-cast concrete proposal was selected (see below, paragraphs 3.2.25 to 3.2.26).

1.5.17 Engagement with Historic England and Kirklees Council with regards to Huddersfield Viaduct (MVL3/92) will continue through the period of submission and determination of the TWAO and subsequently into the discharge of conditions to be attached to the Listed Building Consents.

2. HERITAGE ASSETS AND THEIR SIGNIFICANCE

2.1 Huddersfield Viaduct (MVL3/92) (Grade II Listed, NHLE 1223531)

Historic background

History of the Transpennine Route

2.1.1 The Transpennine Route between Huddersfield and Westtown (Dewsbury) was constructed and opened between 1836 and 1849. The route today comprises sections of rail line developed by different railway companies, characteristic of the wider Transpennine Route between York, Selby and Manchester. The complex chain of companies and projects is a typical product of the "Railway Mania" of the mid-1840s, the height of a period of commercial confidence and expansion in the railways5.

2.1.2 Between Huddersfield and Westtown (Dewsbury), the Transpennine Route is made up of sections of:

- The Manchester & Leeds Railway, constructed 1836-39, between Ravensthorpe and Heaton Lodge;
- The Leeds, Dewsbury & Manchester Railway, constructed 1845-47, between Westtown (Dewsbury) and Ravensthorpe; and
- The Huddersfield & Manchester Railway, constructed 1846-49, between Heaton Lodge and Huddersfield.

2.1.3 The line formed a new, more direct route to the West Riding from Manchester, in competition to the earlier Manchester & Leeds Railway which had been constructed through the Calder Valley in the late 1830s. The more direct route was enabled partly through the advances in tunnel construction and large-scale engineering technology, notably realised through the construction of the 3-mile Standedge Tunnel under the Pennine watershed to connect the line between the Upper Thame and Colne Valleys. Between Huddersfield and Westtown (Dewsbury), the line is partly characterised by such examples of large scale and/or pioneering engineering structures, including tunnels, viaducts and both masonry and cast iron bridges.

2.1.4 The development and expansion of the railways and their associated infrastructure during the first half of the 19th century, was characterised by the considerable influence on those towns which experienced the development of this new mode of transport. The railways resulted in place-making and industrial growth, as towns benefited from the connections and influences which they brought with them. The Transpennine Route between Huddersfield and Westtown (Dewsbury) certainly had an influence on towns, forming an additional infrastructure element of the expansion of settlements such as Huddersfield already underway as a result of the growth of textile, mining and maltings industries. The prime example of this is seen through Huddersfield Station, a magnificent exercise in architectural patronage, which itself influenced the growth and development of the town centre and shaped the character of Huddersfield's architecture. Other stations along the route are more minor examples and have been altered or rebuilt during their lifetime.

2.1.5 With the continued growth of the network and expansion in volume of passenger and freight traffic during the second half of the 19th century, the London and North Western Railway (LNWR) embarked on widening the Transpennine Route between Ravensthorpe and Stalybridge during the 1880s and 1890s. A number of the stations and structures along the Route were altered during this period to accommodate the widening of the line.

[5] Alan Baxter Associates, 2019. *TransPennine Route Upgrade Route-wide Statement of Significance*. 14.

2.1.6 Huddersfield Viaduct (MVL3/92) was constructed as part of the Huddersfield & Manchester Railway, which, for much of its length, followed the route of the Huddersfield Narrow and Broad Canals. Built between Stalybridge and Heaton Lodge, the railway was characterised particularly by the scale of engineering achievement of the railway alignment and structures along it, perhaps more so than others that today make up the Transpennine Route (see above, paragraph 2.1.3). Before the railway's completion, the Huddersfield & Manchester Railway Company had been absorbed into the LNWR.

2.1.7 The history and significance of the Transpennine Route is discussed at more length in the Route-Wide Statement of Significance (Alan Baxter, 2019). This was produced to characterise the overall heritage significance of the Transpennine Route as a whole, and is included in Appendix 6.1 of the Environmental Statement for the Scheme.

Huddersfield Viaduct (MVL3/92)

2.1.8 Huddersfield Viaduct (MVL3/92) was constructed between 1845 and 1847, built to span the approximate 606m of low valley from Huddersfield Station across the town towards Leeds, in the direction of Deighton. It is not known for certain who the engineer of the Viaduct was, though it was possibly Thomas Nicholson, who was employed by LNWR to build other structures along the line including Standedge Tunnel[6]; alternatively, it may have been A. S. Jee, who was responsible for a number of other bridges and viaducts along the route, including Slaithwaite Viaduct (MVL3/61) (Grade II Listed, NHLE 1224049), Crimble Viaduct (MVL3/64) (Grade II Listed, NHLE 1233737) and Milne (Lockwood) Viaduct (MVL3/76) (Grade II Listed, NHLE 1220121). The viaduct was only completed after adjustments were made to raise it following errors in calculating gradients.

2.1.9 The viaduct was widened in the 1880s, around the same time that Huddersfield Station was enlarged, and as part of the widening of the railway between Huddersfield and Heaton Lodge Junction. The original 1847 structure carried four tracks from its southern end until Span 27 (on the southern side of Northgate / Bradford Road), with the section north of this only two tracks wide. In 1881, the viaduct was widened by an extra track width to the western side on the southern section, up to Span 27, and then on both sides north of Span 27, resulting in the entire length of the viaduct being the same width. The widening of the viaduct also resulted in the widening of the bridges over John William Street (Span 1), Fitzwilliam Street (Span 4) and Northgate / Bradford Road (Span 29). The arch over Fitzwilliam Street (Span 4) originally carried four tracks, and an additional track was added on the north side, while the arch over Northgate / Bradford Road (Span 29) originally carried two tracks and was widened by two tracks on the north side and one track on the south side. The viaduct carried five tracks along its length after the widening, with these additional tracks opening in 1884[7].

2.1.10 The townscape around the viaduct has altered considerably since its construction, though a number of the historic buildings which characterised this area by the end of the 19th century still survive. Though Huddersfield had begun to expand to the north of the town centre at the time of the construction of the railway, a large amount of the land over which the viaduct ran was still agricultural fields at the point of its completion. The continued urban development and expansion of Huddersfield meant that, by the widening of the structure in the 1880s, the majority of the townscape around the structure had been constructed and was characterised by industrial premises. The street pattern, largely still appreciable today, had been developed, including Viaduct Street, running parallel to the structure on its east side. Through the 20th century, the density of residential and commercial premises around the structure has been reduced, with more modern commercial unites replacing works and

[6] Historic England List Description, 'Huddersfield Railway Viaduct'. https://historicengland.org.uk/listing/the-list/list-entry/1223531. Accessed 29 September 2020.
[7] Network Rail National Records Centre, Doc Ref 002357LNE.

streets of terraces. The A62 Unna Way Ring Road has also been developed as one of the main routes through the structure. Some modern development has introduced prominent modern elements to the townscape, notably the considerable chimney of the incinerator at a household waste recycling centre off the A62 Leeds Road, towards the northern end of the viaduct. Nevertheless, the viaduct still forms a prominent element of the townscape of this area of Huddersfield, in spite of areas where its historic character has changed.

Description

2.1.11 Huddersfield Viaduct (MVL3/92) (Insert 2-1) is largely constructed of rock-faced stone, and comprises 47 arches, spanning a distance of approximately 600m across the townscape to the north of Huddersfield town centre. Due to the topography of the area, the height of the railway alignment above ground level varies along the viaduct's length, with the railway alignment broadly level; the ground falls from south to north, with the viaduct's lowest height above the ground at its southern end over John William Street, and tallest arches at the northern end where it meets the embankment. While the viaduct does comprise 47 spans, the skew of John William Street and Fitzwilliam Street passing through the structure at the southern end mean that the western elevation of the viaduct presents as 45 spans, with Spans 2 and 3 only being visible on the eastern elevation.

Insert 2-1 Eastern elevation of Huddersfield Viaduct (MVL3/92), viewed from southern end of Viaduct Street.

2.1.12 At the southern end of the viaduct, a bridge with wrought iron plate parapets carries the line across John William Street. Between John William Street and Northgate / Bradford Road, the viaduct consists of 26 segmental headed arches, while between Northgate / Bradford Road and the northern end of the viaduct, the structure comprises 18 round headed arches. Where principal roads pass through the arches, these feature rusticated voussoirs. The viaduct has pilasters acting as buttresses, in the same style as the rest of the masonry facing; these are located in pairs or groups of four at critical points along its length, notably on either side of those larger skewed arches through which principal roads pass, some featuring wrought iron ties. The parapet is constructed with smoother stone.

2.1.13 A number of both major and minor roads pass under the viaduct through the arches. Where historically principal roads, such as Fitzwilliam Street and Northgate / Bradford Road, pass under the viaduct the segmental headed arches are wider; in the case of the latter, the

original 1847 arch is supplemented by wrought iron bridge decks on either side, with wrought iron plate parapets, dating from the widening of the bridge in 1881 (see below, 2.1.15). Over John William Street and the western side of Fitzwilliam Street the wrought iron railway bridge has painted parapets with distinctive patterning (Insert 2-2).

Insert 2-2 Western elevation of Huddersfield Viaduct (MVL3/92) , showing metallic spans of Fitzwilliam Street (Span 4) (left) and John William Street (Span 1) (right).

2.1.14 As noted above, the widening of the Viaduct in the 1880s to accommodate five tracks included the construction or alteration of metallic spans to widen the bridges over John William Street (Span 1), Fitzwilliam Street (Span 4) and Northgate / Bradford Road (Span 29). The arch over Fitzwilliam Street (Span 4) was widened using wrought iron main girders, cross girders and floor plates, as was the arch over Northgate / Bradford Road (Span 29).

2.1.15 Though the widened sides of the viaduct are also faced in the same rock faced stone as the earlier sections, the intrados of the arches feature a straight joint where the addition was made, with smaller red or blue engineering bricks used for the intrados. Over Northgate / Bradford Road, the original arch remains, with the viaduct widened through the addition of wrought iron spans on either side of the original structure (Insert 2-3). A similar arrangement exists over Fitzwilliam Street, where a wrought iron span was added to the western side of the original 1847 arch. Over John William Street, there is little visible evidence to differentiate the additional wrought iron span on the western side of the bridge from the earlier eastern part, both being constructed and styled in similar fashion. The widened masonry sections are legible in the visible straight joints on the undersides of these arches.

Insert 2-3 Eastern elevation of Huddersfield Viaduct (MVL3/92) , showing 1880s widened metallic span over Northgate / Bradford Road (Span 29), with the original 1840s arch visible in the centre of the span.

2.1.16 Today, for the majority of the viaduct's length, the structure carries two railway lines: a single up-line towards Huddersfield Station and a single down-line towards Deighton. On the approach to the station at the southern end of the viaduct, the total number of lines increase to six where they cross the span over John William Street (two of these splitting immediately after). Aside from the width of the structure, few features remain from the historic track layout. Historically the Viaduct featured larger signal gantries and signal boxes, however today there are only small operational elements atop the structures such as electrical service boxes.

2.1.17 A number of the arches are today occupied by businesses; some of these utilised the space under the arches as workshops, with few alterations, while others have constructed entire buildings within the arch, including shop fronts and mezzanine levels (Insert 2-4). This is a feature of the entire length of the Viaduct, though is particularly noticeable along the east side of the structure along Viaduct Street and Lower Viaduct Street and on the west side of the viaduct to the rear of the houses along Alder Street. This use of the space within the Viaduct, though today forming a distinctive aspect of the structure's character, has altered any historic pattern of arches being partly or wholly blocked (the Historic England list description suggests this was once the case, particularly in the round arches at the northern end of the viaduct[8]).

[8] Historic England List Description, 'Huddersfield Railway Viaduct'. https://historicengland.org.uk/listing/the-list/list-entry/1223531. Accessed 29 September 2020.

Insert 2-4 Eastern elevation of Huddersfield Viaduct (MVL3/92) on Viaduct Street, showing use of arches by businesses.

Setting of Huddersfield Viaduct (MVL3/92)

2.1.18 The setting of Huddersfield Viaduct (MVL3/92) comprises a number of different notable elements, including the structure's visual prominence in the townscape, views to, from, across and through the viaduct, its permeability and wider relationships with the railway and other similar structures in the area.

2.1.19 The viaduct is one of the most prominent features of the townscape north of the centre of Huddersfield; this visual prominence is one of the defining elements of the structure's setting. The arches of the viaduct and movement of trains along it, have been a notable element of the townscape since its construction. Evidenced by its presence in short and longer distance views across this area of the town, and by the experience of those passing along roads underneath it, the structure's scale and form also mean that it is characterised as a permeable barrier and focal point within the urban landscape. Huddersfield has largely retained its historic low-rise townscape and this has ensured that the viaduct retains its historic prominence.

2.1.20 Views towards, across and through the viaduct emphasise the rhythm of the arches and scale of the structure. The way in which the majority of the roads that approach the viaduct do so from an oblique angle, offers views along sections of the viaduct, and while fewer roads approach the viaduct square on, or terminate in junctions perpendicular to it, such occasions do offer views emphasising the viaduct's profile and scale. Notable views along the length of the viaduct, for example along Viaduct Street running parallel to the structure, also emphasise its scale and the rhythm of the arches.

2.1.21 The viaduct also shapes the experience of those traveling along it by train, through the kinetic views offered from the elevated position atop the structure. For those passing through, arriving at or departing from Huddersfield, these views represent first or last

impressions of the town, emphasising the topography and historic nature of the townscape of Huddersfield. The kinetic nature of the views also introduces dramatic incrementally revealed vistas of this townscape on approaching the viaduct from the north, or when departing the station.

2.1.22 It is notable that views of, from or along viaducts form a common element of the townscape and landscape around Huddersfield generally, with a number of other viaducts constituting prominent features within the wider area (see below paragraphs 2.1.29 to 2.1.31). As a consequence, rhythmic arches, such as those of Huddersfield Viaduct (MVL3/92), crossing valleys form part of the grain of Huddersfield's townscape. The viaducts all have common characteristics, such as permeability, rhythm of repeated arches (though length and height differ from one structure to another), and none of them particularly act as divisive elements representing breaks in townscape character or development. Together they evidence the long-distance connections offered to the people of Huddersfield by 19th century railway development. These common relationships also contribute to Huddersfield Viaduct (MVL3/92) 's setting.

Significance

2.1.23 Huddersfield Viaduct (MVL3/92) represents one of the numerous large-scale engineering features which characterised the achievement of the original Transpennine Route construction, as well as the wider development of the network during the Heroic Age (1841-50) of railway building. The Viaduct is significant for its engineering achievement and scale, enhanced by the relatively few alterations and the legibility of its widening in the 1880s. As well as the historical and evidential value derived from these aspects, the rhythm of the arches and monumental scale also provides the Viaduct with architectural interest.

2.1.24 The survival of the viaduct evidences the great engineering achievement which characterised the period of 'railway mania' during the 1840s and '50s. In this respect, the structure derives both historical and architectural interest from its associations and monumental engineering form. The viaduct has considerable historical value through its status as a surviving element of this period of railway development and also through its associations with the Huddersfield & Manchester Railway and the engineering of the line by figures such as A. S. Jee. There is also association with the LNWR expansion of the network and widening of the line in the 1880s; this is evidenced through the survival of historic fabric enabling understanding of this phase of development (see below). That the viaduct is still in use as part of the operational rail network enhances the structure's historical value, through the continuity of its function and legibility.

2.1.25 That the viaduct has undergone relatively few alterations and additions subsequent to its widening in 1881 enhances both its historical and evidential value. The survival of historic fabric provides the potential to further understand the structure, the engineering approaches which created it and the development during the 19th century. The 1881 widening represents the one notable period of change which the viaduct underwent, and this change is still legible today, with the straight joints in the brickwork under the arches visible (see Insert 2-5), and the differing materials in some of the spans, for example Span 29 across Northgate / Bradford Road. Recent research, undertaken to inform the proposals for the scheme, has also identified internal brick relieving arches, which were not previously known about, and may have been constructed as part of strengthening the structure at the time of its widening (shown in Insert 2-5).

Insert 2-5 Evidence of widening of the viaduct in the 1880s, visible in the masonry; straight joints showing widened arches (left) and internal relieving arches (right).

2.1.26 The form of the viaduct also gives the structure considerable aesthetic, as well as evidential, value. This is both in terms of the architectural detail of its engineering, and its profile and presence within the townscape. This is true both as a whole, spanning the wide valley to the north of the town centre, and also at more specific points along its length; in both cases the scale of the structure is a prominent element of the historic environment, its form lifting it above the purely functional. This is the case, for example, in the wrought iron parapet of the span over John William Street immediately north of the station, the wider segmental arch over Fitzwilliam Street, and the three arches today utilised together to channel the ring road of Unna Way under the viaduct. The viaduct forms a recognisable element of Huddersfield's townscape, evidencing the engineering achievement of the railway and also the skill of those responsible for its design and construction.

2.1.27 The Viaduct derives significance from its setting, both in terms of its prominence within the townscape, evidenced in views towards and through it, and those views of the town afforded passengers traveling by train over it. The viaduct is integral to the first and final experiences of the town for those using Huddersfield Station, and the experience of the town from those passing through while traveling along the line between Huddersfield and Leeds. Though Huddersfield has undergone considerable urban change since the mid-19th century, nevertheless these views have some historic integrity, and the overall experience of an elevated vista across the town would be experienced in largely similar fashion today as by those using the railways in the years after its construction. Similarly, the visual presence of the viaduct in the townscape of Huddersfield also contributes to its significance. It is a significant part of the townscape north of the town centre, characterised by views of the arches and along its length (with the addition of the frequent movement of trains atop it), as well as the permeability of the structure in terms of those using roads passing beneath it. The structure thus derives significance from this element of its setting, as an element of the townscape experienced on a daily basis by the people of Huddersfield; this is enhanced further with a number of arches utilised by businesses, for example along Viaduct Street.

Group value

2.1.28 Masonry railway bridges in general across the Transpennine Route to the west of Leeds have been characterised as being of local or regional interest, depending on their architectural quality, contribution to wider historical interest of the route, and their group value; it has been noted however that, as a group, they are not of substantial national

interest due to their dating from a period of railway development when thousands of similar structures were erected[9].

2.1.29 However, the Route is notable for the succession of viaducts, required due to the hilly terrain which it navigates. Though this is the case for almost all the constituent elements of the wider route, the Huddersfield and Manchester Railway cut across extremely challenging landscape, necessitating the construction of several significant viaducts. There are seven viaducts along the line, all of which bear similarities in style, even though the specific topography and surrounding environment of each is slightly different. These are mainly of masonry construction, utilising materials such as Millstone Grit and Lower Coal Measures Sandstone from extraction points along the route[10]. The Huddersfield and Manchester Railway viaducts on the route include:

- Uppermill Viaduct (MVL3/31) (Grade II Listed, NHLE 1068120);
- Slaithwaite Viaduct (MVL3/61) (Grade II Listed, NHLE 1224049);
- Crimble Viaduct (MVL3/64) (Grade II Listed, NHLE 1233737);
- Golcar Viaduct[11] (MVL3/69 and MVL3/70) (Grade II Listed, NHLE 1276344); and
- Milne (Lockwood) Viaduct (MVL3/76) (Grade II Listed, NHLE 1220121).

2.1.30 At 47 spans, Huddersfield Viaduct (MVL3/92) is the longest of them all, deriving its defining characteristic from its length rather than its height; unlike the likes of Slaithwaite Viaduct (MVL3/61) and Milne (Lockwood) Viaduct (MVL3/76), Huddersfield viaduct spans a wide shallow valley, instead of a narrow deep one. However, in spite of its character being different, the viaduct derives some significance from the group value with the other structures, which together form an integrated collection evidencing the considerable structural engineering achievement of the railway companies in the 1840s. The group value is further evidenced by the common material and architectural choices in the designs of the structures, which bear common design elements in spite of their differing scale. Similarly, the group value is enhanced by their continuing to form part of the operational railway; as a collective group of assets, they are experienced by those following the rail line (traveling on it, or near it) as coherent features of a single historic route.

2.1.31 Huddersfield Viaduct (MVL3/92) also has group value with the other viaducts that together form an important element in the character of the town of Huddersfield itself. The topography of the landscape surrounding the town centre, in particular the long river valleys, and the rail lines which historically crossed the town, mean that a number of viaducts form prominent elements of Huddersfield's built environment. As well as the Transpennine Route viaducts noted above, such as MVL3/76 Milne (Lockwood) Viaduct and MVL3/69 and MVL3/70 Golcar Viaduct which define settlements to the south of Huddersfield, viaducts on other railway lines also form part of this group, such as Paddock Viaduct (Grade II Listed, NHLE 1134435) and Lockwood Viaduct (Grade II Listed, NHLE 1134434) on the Penistone line. These viaducts have group value both as combined elements defining the historic townscape of Huddersfield and nearby settlements, and also in evidencing the development of the railways through the town in the 1840s and '50s. Huddersfield Viaduct (MVL3/92) derives some significance from this group value as an element of its prominence in Huddersfield's townscape.

2.2 Other heritage assets

2.2.1 The location of the heritage assets discussed below are shown in the location plan in

[9] Alan Baxter Associates, 2019. TransPennine Route Upgrade Route-wide Statement of Significance. 37.
[10] Alan Baxter Associates 2017. TransPennine Route Statement of History and Significance: West of Leeds. 24.
[11] Golcar Viaduct comprises two halves, one dating to the opening of the line in 1840s, and the other from the widening of the route by LNWR in the 1880s. Each half has their own engineer line references.

Appendix A.

Listed Buildings

Huddersfield Station (Grade I Listed, NHLE 1277385)

2.2.2 The Grade I Listed Huddersfield Station (NHLE 1277385) is located immediately south of the southern end of Huddersfield Viaduct (MVL3/92). The two assets are closely connected, both in terms of their history and development, and also operationally, with the viaduct forming the approach to the northern end of the station.

2.2.3 Huddersfield Station is a significant piece of architecture and engineering, reflecting the historic importance of the Transpennine Route[12]; the exceptional interest of the station is reflected in its Grade I Listing. The station was constructed jointly by the LNWR and Lancashire & Yorkshire Railway between 1846 and 1850, with the main station building designed by J. P. Pritchett. Originally comprising one long platform, the station was expanded in the 1880s to meet the requirements for growing capacity, with an island platform and large trainshed roof constructed to accommodate additional tracks. Today the Station maintains a large amount of its historic fabric, elements of which contribute to its overall significance. The key elements which contribute are: the principal station building, the trainshed roof, platform arrangement and the tea rooms on the central island platforms. The station as a whole derives its significance largely from its historical and evidential value as an element of the railway which has undergone only limited change, evidencing the historic railway architecture, engineering and operations, as well as its communal value grounded in its role in shaping Huddersfield's townscape and as a continuing focal point for the civic life of the town[13]. The station also derives significance from its setting, particularly the visual and non-visual relationships between the principal station building and townscape surrounding St George's Square, its relationship with the historic goods yard and warehouses to the west of the station and the experience of those using the station itself.

2.2.4 Huddersfield Viaduct (MVL3/92) and Huddersfield Station form part of a wider integrated group of historic buildings and structures associated with 19th century railway infrastructure, alongside surviving elements of the former station goods yard. The station and viaduct share a particularly close relationship, with views offered from the northern end of the station platforms out along the viaduct (), and those views from on the viaduct itself a key part of the experience of passengers arriving at or departing from the station. That both elements continue to form part of the operational railway and remain largely unchanged since their last major phase of development in the 1880s enhance not only their respective significances, but also the relationship between the two. Both the station and the viaduct derive some significance from their setting through their historic interrelationship.

[12] Atkins, 2018. TransPennine Route Upgrade: Huddersfield Station Statement of Significance.
[13] Ibid. 65.

Insert 2-6 View north from the northern end of Huddersfield Station platforms along the deck of Huddersfield Viaduct (MVL3/92).

2.2.5 As noted above in paragraph 1.3.1, there is some overlap between the proposals for Huddersfield Viaduct (MVL3/92) and the Grade I Listed Huddersfield Station; further information on the history and significance of Huddersfield Station is contained within the Huddersfield Station Heritage Assessment.

Other Listed Buildings

2.2.6 There are a number of other Listed Buildings in proximity to Huddersfield Viaduct (MVL3/92); the majority of these are located at the southern end of the structure close to Huddersfield Station. There are 14 Listed Buildings located within approximately 100m of the southern half of the Viaduct.

2.2.7 Seven of these Listed Buildings have particularly notable relationships with the Viaduct, particularly in terms of views across or between the buildings and structure. These comprise:

- The Sportsman and Marhaba Takeaway (Grade II Listed, NHLE 1464388), located facing the Viaduct at the junction of John William Street and Fitzwilliam Street;
- The Empire Cinema (Grade II Listed, NHLE 1288963), located approximately 30m south of John William Street (Span 1);
- 70-78 John William Street (Grade II Listed, NHLE 1313875), located approximately 90m south of John William Street (Span 1);
- 72-78 Fitzwilliam Street (Grade II Listed, NHLE 1134224), located approximately 50m west of Fitzwilliam Street (Span 4);
- Freemasons Hall (Grade II Listed, NHLE 1134225), located approximately 75m west of Fitzwilliam Street (Span 4);
- 82 Fitzwilliam Street (Grade II Listed, NHLE 1134226), located approximately 90m west of Fitzwilliam Street (Span 4); and
- 84 Fitzwilliam Street (Grade II Listed, NHLE 1134227), located approximately 110m west of Fitzwilliam Street (Span 4)

2.2.8 The Sportsman and Marhaba Takeaway (Grade II Listed, NHLE 1464388) comprises a public house, constructed in the 1930s, with a notable interior dating from the 1950s. Located at the junction of John William Street and Fitzwilliam Street, the principal elevations

of the building face towards the viaduct, with the structure forming a prominent element of the building's setting. The Listed Building derives some of its overall significance from its setting, considering its corner position, particularly its relationship with the surrounding historic streetscape, including the viaduct.

2.2.9 The Empire Cinema (Grade II Listed, NHLE 1288963) and 70-78 John William Street (Grade II Listed, NHLE 1313875) form the northern end of the historic streetscape of John William Street. The Empire Cinema dates from the early 20th century, constructed in a distinctive style characteristic for cinemas of that date, and has retained its historic character in spite of a change of use. 70-78 John William Street is one of a large number of Classical commercial buildings constructed on the streets around St George's Square during the mid-19th century. Both buildings contribute to the historic character of the street, which in turn evidences the historic development of this area of Huddersfield; each of the two buildings reflective of the nature of the town's historic development contemporary to their construction. Views along the streetscape which evidence the history and development of these buildings also include the viaduct, which in turn forms part of the wider contemporary historic environment. These form an element of the setting of both buildings, though this is particularly the case for the Empire Cinema, where its corner position indicates the historic importance of views towards its corner entrance. The Listed Buildings derive some significance from their setting, particularly with relation to such views along the historic streetscape, of which intervisibility with the viaduct forms one element.

2.2.10 The four Grade II Listed Buildings located between 72 and 84 Fitzwilliam Street (NHLEs 1134224, 1134225, 1134226 and 1134227) form part of the historic streetscape of Fitzwilliam Street which survives between the viaduct and the Ring Road. These comprise a pair of large commercial buildings, a Freemasons Hall and a pair of terraced houses, all of mid-19th century date. This set of buildings retain their historic character, and the streetscape is recognisable in evidencing the 19th century growth and development of Huddersfield through their architectural expression. Views along the streetscape which evidence this also include the viaduct, which in turn forms part of the wider contemporary historic environment (Insert 2-7). This is particularly the case considering the topography of Fitzwilliam Street, which descends downhill towards Spans 1 and 4 of the Viaduct. These Listed Buildings derive some significance from their setting, particularly with relation to such views along the historic streetscape, of which intervisibility with the viaduct forms one element.

Insert 2-7 View east along Fitzwilliam Street towards Huddersfield Viaduct; note the Grade II Listed 72-78 Fitzwilliam Street (NHLE 1134224) are visible on the left.

Conservation Area

2.2.11 The southern end of Huddersfield Viaduct (MVL3/92) is located within the Huddersfield Town Centre Conservation Area. Comprising the majority of Huddersfield's historic core, the Conservation Area is bordered by the Ring Road in its northern half, extending from the station, St George's Square and the end of the Viaduct, down to New Street and Queen Street at its the south end.

2.2.12 The Conservation Area contains a large number of listed buildings, largely of commercial character and dating to the late 18th and 19th centuries, very much defining the townscape of the centre of Huddersfield. The survival of such buildings and integrity of historic townscape character within the Conservation Area evidences the expansion of the town during the late Georgian and Victorian period, contributing to its significance. A large number of the buildings within the area continue to be used, though modern shop fronts and alterations have degraded their appearance in some areas. However, the Conservation Area largely retains its historic character. The edges of the Conservation Area are defined partly by later development, particularly to the south, such as the Ring Road, Huddersfield Bus Station and the Kirklees Council offices. Though the Ring Road has severed the centre of the town from those other areas of historic expansion to the west, nevertheless there are still visual and non-visual connections which still evidence the wider spread of the town's development and form part of the Town Centre Conservation Area's setting.

2.2.13 Huddersfield Viaduct (MVL3/92) makes a small contribution to the significance of the Conservation Area, albeit as part of the historic railway infrastructure that defines the historic townscape at the northern end of the Conservation Area. The structure forms a prominent element of the historic streetscape on entering the Conservation Area from the north, as well as being a notable feature of views into and out of the Area. Similarly, for those traveling along the viaduct by train, the raised position provides notable views across towards the historic core of the town, evidencing the historic character of the Conservation Area (see

above, paragraph 2.1.27). The viaduct is one element of the wider historic environment associated with the railway around Huddersfield Station, and the association between these elements contributes to understanding the significance of the historic townscape development and grain of this area, albeit this only forming one element of the wider significance of Huddersfield's historic core.

Non-Designated Heritage Assets

2.2.14 The Environmental Statement (Chapter 6 of Volumes 2i and 2ii) produced for the Scheme has identified 15 non-designated heritage assets located in proximity to Huddersfield Viaduct (MVL3/92). These comprise:

- The historic extent of Huddersfield Station goods yard (HER 6525), located immediately south of the southern end of the viaduct;
- The railway station water tower (HER 10539), located approximately 25m south of John William Street bridge (Span 1);
- The site of Brick Mill, located immediately east of John William Street bridge (Span 1);
- The site of Britannia Works, located immediately east of Viaduct Street, approximately 25m east of the viaduct;
- The site of Newtown Goods Station, located around Beck Road, approximately 50m west of the viaduct;
- The former Viaduct Works, located on Ray Street and Lower Viaduct Street, approximately 25m east of the viaduct;
- The historic extent of Hillhouse Sidings, located approximately 50m north of the northern end of the viaduct; and
- The sites of eight signal boxes or signal posts formerly sited on the viaduct.

2.2.15 Two of the above assets relate to the historic infrastructure at Huddersfield Station: the extent of the historic goods yard (HER 6525) and the former railway station water tower (HER 10539). The historic goods yard today contains some stabling sidings for the station, as well as an area of car parking and a number of buildings, while also being closely associated with other listed structures at the station. The former water tower is today used as offices, having been converted in c. 2012. These assets, along with others at the station, share a historical and operational relationship with the viaduct, as elements of the wider historic railway infrastructure that characterises this part of the Transpennine Route. This relationship forms an element of their setting, which contributes to their significance.

2.2.16 The Former Viaduct Works comprises a courtyarded industrial workshop premises, dating largely to the mid-late 19th century, which has today been converted to student accommodation. The former works face onto the corner of Ray Street and Lower Viaduct Street, immediately east of the viaduct; originally a corner entrance faced towards the viaduct, though this has been bricked up and is no longer in use. The building is of local interest, forming another surviving element of the mid-late 19th century historic townscape of this part of Huddersfield, and shares a historic relationship with the viaduct from which it takes its name, as well as the visual relationship of the viaduct's prominent position opposite the works. This element of the building's setting makes some contribution to the former works' significance.

2.2.17 The remaining non-designated assets listed above all comprise the historic sites of buildings or structures either on or around the viaduct, which are no longer extant. In the case of the sites of Brick Mill, Britannia Mill and Newtown Goods Station, no historic buildings associated with these survive. The historic extent of Hillhouse Sidings is still distinguishable in the landscape, though little remains that is associated with its historic use. Historic mapping identifies a number of operational railway structures which were located on the deck of the viaduct itself, including signal boxes at both the northern and southern ends. None of these survive, and though any sub-surface remains for example footings of walls would have a relationship with the rest of the viaduct, it is not known whether any such remains are extant below the track bed. It is considered that none of these elements derive significance from the viaduct, considering their own lack of survival of historic fabric.

3. PROPOSALS

3.1 Background to proposals

3.1.1 To achieve the TRU Programme objectives of increasing capacity and reducing journey times, the Scheme requires alterations to be made to the railway along the length of Huddersfield Viaduct (MVL3/92). It is necessary to provide additional tracks for the length of the viaduct and to install OLE along the structure.

3.1.2 At the southern end of the viaduct, the reconfiguration of the tracks and platforms at Huddersfield Station[14] mean that changes will be required to the viaduct to facilitate the proposals at the station. John William Street bridge (Huddersfield Viaduct (Span 1) Underbridge (MVL3/92(1))) will be affected by the platform extensions to Huddersfield Station which are required to service longer trains. The existing girders of Span 1 protrude above track level and will clash with the proposed platforms (which extend over Span 1) and the proposed track alignment. A signal gantry is also required at the southern end of the viaduct for trains leaving the station and travelling towards Leeds. Due to the platform extensions it is not possible for the signal positions to be off the viaduct to the south as they are at present.

3.1.3 To facilitate the increased number of tracks along the viaduct, changes are also required to Northgate / Bradford Road (Huddersfield Viaduct (Span 29) Underbridge (MVL3/92(9))). The metallic sides of Span 29 have been out of use for several decades and the wrought iron members have deteriorated beyond repair. Additionally, the original Span 29 deck did not carry high speed ballasted track but instead used longitudinal timbers. For the proposed track alignment and speeds the existing decks are not suitable.

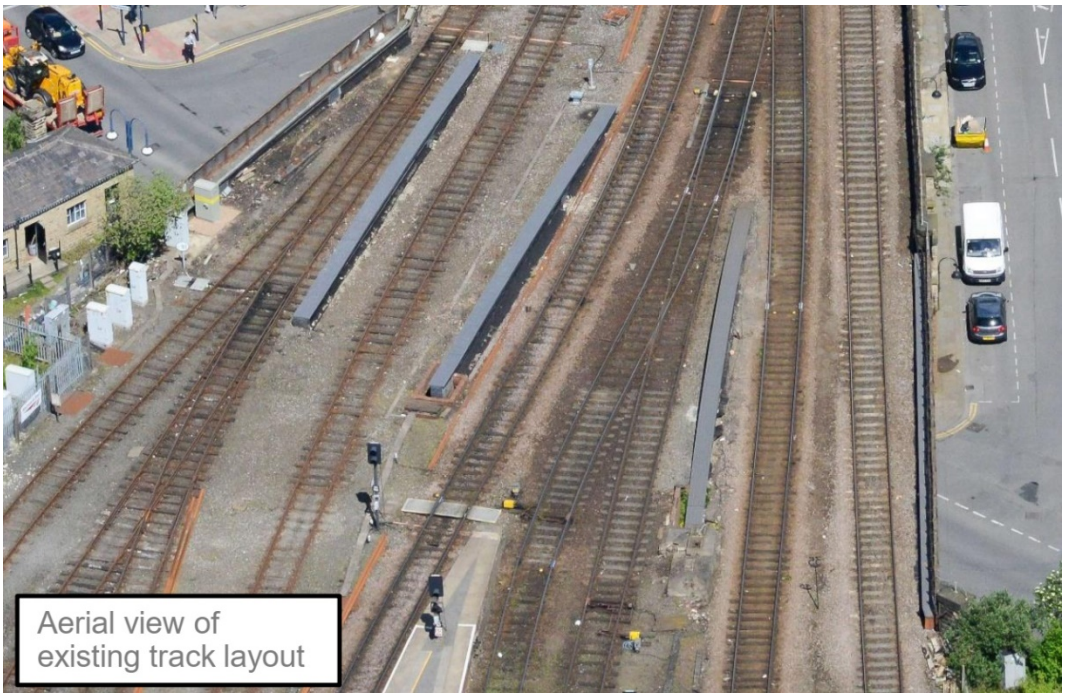
3.2 Design development and justification

3.2.1 The design development process included optioneering to determine the preferred approach to various elements of the proposals. The detail of the design development around these individual elements of Huddersfield Viaduct (MVL3/92) are examined further below. Design development for the viaduct has taken into consideration a number of factors including the significance of the Listed structure, operational requirements and constructability. The design development process has also involved engagement with a number of different stakeholders, including Historic England and Kirklees Council (as detailed above in paragraphs 1.5.4 to 1.5.5).

John William Street Bridge (Span 1)

3.2.2 As noted above in paragraph 3.1.2, the track and platform alignment proposals for delivering the aims of the TRU Programme at Huddersfield Station involve the introduction of a fourth through platform, with the existing and proposed additional platforms to be extended over John William Street bridge (Span 1) to accommodate longer trains. The current girder arrangement of the bridge (shown below in Insert 3-1) clashes with the proposed track alignment and platform extension, therefore, an intervention is necessary in order to accommodate the proposed rail infrastructure.

[14] Further detail on the proposals for Huddersfield Station, including the background to the proposals and requirements of the Scheme at this location, are included in the Huddersfield Station Heritage Assessment and Huddersfield Station Design Statement.



Insert 3-1 Existing track alignment looking north over John William Street (Span 1), showing the through girders of the deck constraining the arrangement.

3.2.3 The early stages of design development considered whether it was possible to retain the existing historic bridge deck and modify the structure to suit the new track and platform alignment. However, this was not feasible as extensive modifications to the existing main girders would be required; by removing approximately 80% of the main girders to accommodate the track and platforms, the bridge would require significant strengthening works. These would entail providing several beams in a grillage arrangement to the underside of the bridge, which would significantly lower the headroom for vehicles traveling under the bridge making it unsuitable for larger vehicles, and therefore impractical. As a result, it was determined that a replacement bridge deck was required to deliver the Scheme.

3.2.4 For the design development of the replacement bridge deck over John William Street, three different options for the arrangement of the span were considered:

- Option 1 – a new single-span structure, matching the arrangement of the existing bridge;
- Option 2 – a new two-span bridge, with a single pier in the highway alignment on John William Street; and
- Option 3 – a new three-span bridge, with two piers, one either side of the highway carriageway on John William Street.

3.2.5 For both Options 2 and 3, the approach to the design of the replacement would have an impact on the highway arrangement on John William Street. For Option 2, the two-span deck arrangement would result in an additional pier located in the middle of the highway along John William Street, requiring the road to be adjusted to run one carriageway on either side of the pier. For Option 3, two additional piers would be located along the highway, one on either side of the carriageway, separating vehicles from the pavement areas. In both cases, this would result in the loss of the existing car parking under the bridge and would constrain either the highway alignment or the pavement areas for pedestrians. The significant modifications required to the highway resulted in both Options 2 and 3 being discounted.

3.2.6 The proposed single-span Option 1 for the replacement bridge deck was therefore preferable over the alternative options. The design was further developed based on this approach, essentially replacing the bridge with a new deck which matches the existing in arrangement.

3.2.7 Further design development of the replacement structure over John William Street focussed on the design of the deck, in particular the width of the deck with respect to the proposed platforms above and the style of the parapets.

3.2.8 With the proposed extension of the station platforms onto the bridge deck above John William Street, the replacement deck design needed to respond to the operational requirements around passenger safety; in this case on the eastern side of the bridge deck where the proposed extended platform 2 would be sited. As well as ensuring sufficient parapet height for the rear (east side) of the platform, there is also a requirement for provision of a fire escape with fire refuge at this end of the platform to ensure the safety of passengers were a train to catch fire at the northern end of platform 2. The design of the replacement deck for John William Street bridge was developed to incorporate this into the girder design of the eastern side of the deck. This resulted in the bridge deck being wider than the existing structure, with the fire refuge and escape route being contained within the part of the bridge extending to the east of the structure's existing footprint; this could be achieved either through a cantilever section of the deck, or by widening the abutment of the span on the eastern side of the viaduct. The latter approach would result in the north-eastern widened abutment significantly encroaching into the footpath on Viaduct Street, requiring the realignment of the Viaduct Street / John William Street junction. The cantilever approach could be constructed without the requirement to alter any of the fabric of the viaduct beyond Span 1. Consequently, the approach of a wider replacement deck with a cantilever section on the eastern side was progressed.

3.2.9 The design of the parapets of the replacement deck was developed to respond to the significance of both the Grade II Listed viaduct and the adjacent Grade I Listed station, with an awareness that the existing metallic deck forms part of an integrated historic environment of 19th century railway infrastructure and is also of a distinctive form and style. It was considered that the best way to achieve this was for a replacement structure of modern interpretation but reflecting the historic character of the bridge and thereby its relationships with the wider historic environment. A completely new design approach to the structure would risk introducing an element of discord into the townscape around the viaduct and degrading the legibility of the span as being an element of the wider Grade II Listed viaduct. The design of the parapet for the replacement structure was therefore developed to maintain the existing visual appearance of the bridge, with the proposed parapet design for the edge girders reflecting the existing stylistic approach.

3.2.10 The design for the replacement structure also realises opportunities where possible for the retention and reuse of existing historic fabric. Further assessment of the condition of the existing cast iron parapets is required, and their potential for retention and reuse will not be fully known until this has been carried out. However, the design has been developed in a way which means the proposals could utilise the reuse of existing parapet sections if this is possible, with their style being matched by the replacement if not; the ongoing design development process around this detail will involve continued engagement with statutory historic environment stakeholders and delivery of an appropriate approach in line with the CIMP (see below, paragraphs 3.3.6 and 4.2.9).

Fitzwilliam Street (Span 4)

3.2.11 The viaduct span over Fitzwilliam Street (Span 4) comprises a masonry arch of the original 1840s viaduct along with a metallic deck extension on the northern side, of a similar structure to that of John William Street (Span 1), albeit without the through girders. The

proposed alterations in track alignment over Span 4 would not provide considerable increases in loading to the structure, however an assessment of its condition identified some structural issues with the northern pier of the span. This included evidence of cracking through the abutment and cracking of the padstone. The metallic deck itself underwent repairs in the 2000s, however the assessment identified that the span requires some work to strengthen it, focussed around the northern abutment.

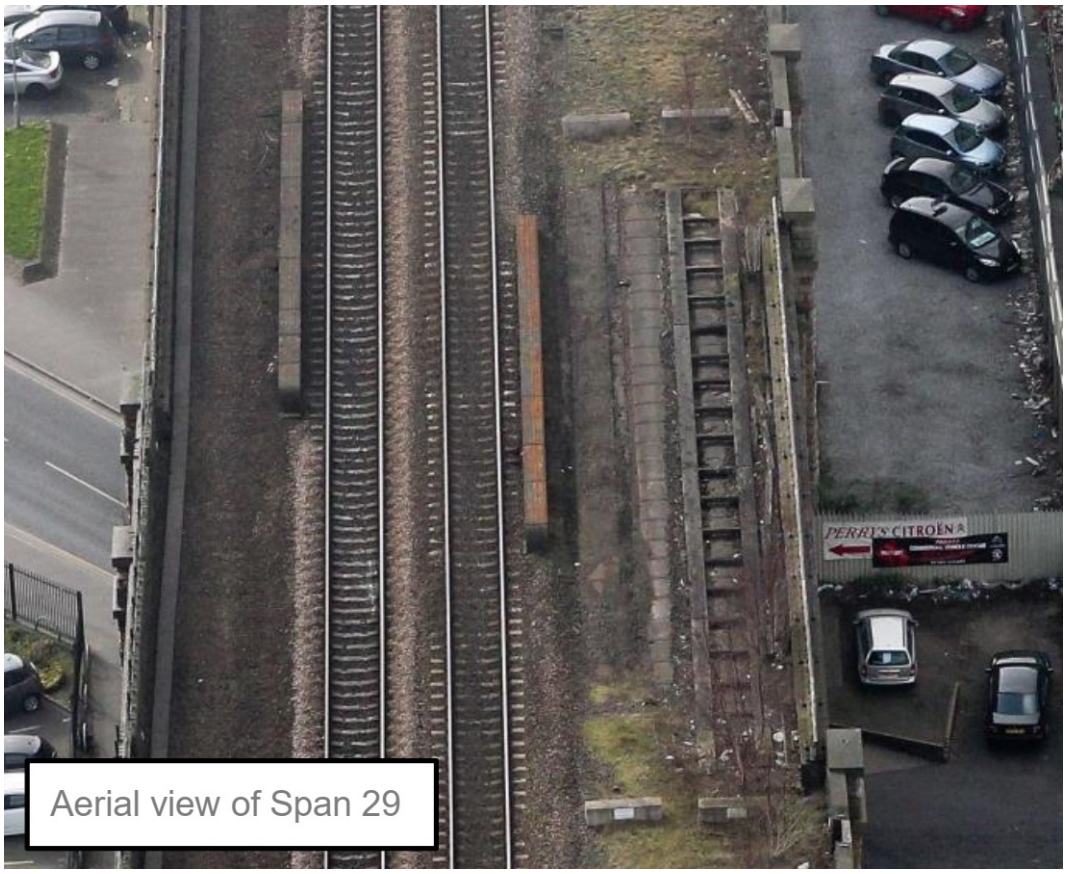
3.2.12 The development of the design to respond to this issue considered the extent of the defects and determined that reconstruction of the north-western corner of the northern abutment of the span, with the defects in that area not being restricted simply to the padstone. The design approach was shaped to maintain the existing character and appearance of the historic structure. To this end, the design was developed to incorporate the repair of the substructure of the abutment, the top section of which would be undertaken using a concrete cill beam (Insert 3-2), but with a masonry cladding that would reflect its current appearance. This would maintain the existing character of the viaduct in this location.

Insert 3-2 Indicative representation of design proposal for works to north-western abutment at Fitzwilliam Street (Span 4) – the blue bar represents the likely temporary propping required during works.

3.2.13 Further assessment of the loading on the metallic deck is required though it is currently proposed that some localised strengthening is undertaken to the metallic section of the deck; this would be done in a manner which would result in minimal changes to its appearance and would not appreciably alter its character. As with the works to John William Street (Span 1) (see above, paragraph 3.2.10), the design development process around this will involve continued engagement with statutory historic environment stakeholders and delivery of an appropriate approach in line with the CIMP (see below, paragraphs 3.3.6 and 4.2.9).

Northgate/Bradford Road (Huddersfield Viaduct (Span 29) Underbridge (MVL3/92(9)))

3.2.14 As noted above in paragraph 1.2.3, the existing metallic extensions to Span 29 over Northgate / Bradford Road (Insert 3-3), are in a poor condition and have been redundant for a number of years. The proposed track alignment and line speed at this location requires alterations to the structure. The design of the proposals to Span 29 was developed through a process of optioneering around form and materials taking into account both operational requirements and the impact on the appearance and significance of the Listed viaduct.



Insert 3-3 Existing track alignment looking south over Northgate / Bradford Road (Span 29), showing the through I-girders of the widened metallic decks on either side of the structure.

3.2.15 For the design approach to develop the proposals for the metallic sections of Span 29, six options were considered:

- Option A: Strengthening the existing deck *in-situ*;
- Option B: Replacing part of the existing structure with new girders and strengthening the remainder;
- Option C: Replacing with a half through steel construction (typical railway underbridge);
- Option D: Replacing with a bespoke steel box directly below each track (different configuration to existing box girder with cross girders);
- Option E: Replacing with prestressed concrete beams on new abutments; and
- Option F: Replacing with an *in-situ* precast block arch in either concrete or masonry.

3.2.16 Option A was discounted early on in the design development process; assessment of the structural condition of the existing metallic elements demonstrated the extent of their poor condition. It is not possible to strengthen the existing deck *in-situ* to meet the requirements of the Scheme across this part of the Viaduct.

3.2.17 With the discounting of Option A it was accepted that the proposal would entail the replacement of at least some of the span with new structures. Basic design principles for this approach were identified, specifically around responding to the historic appearance of the structure and legibility of its form. In particular, it was defined that the replacement should not infiltrate into the crown of the arch of the structure, or block views towards it from either side, thereby retaining the legibility of the surviving 1840s masonry arch of the span.

3.2.18 Option F was discounted partly on the basis of these design principles, though this approach also carried considerable issues around the complexity of design and cost. The high skew and long span of the structure dictate that precast arch sections would not be viable. Moreover, extensive formwork would be required for such a structure, along with a considerable cost and complicated construction sequence that would bring with it a lot of disruption to both the railway and the highway. Though an arch would be in keeping with the original viaduct, it would not reflect the nature of the 1880s change and would also not bring with it any additional operational benefits compared with different approaches.

3.2.19 Option B was also discounted due to a combination of the constraints of the existing masonry arch and the condition of the existing structure, elements of which would need to be retained and strengthened. Option B would have involved the replacement of the inner I-section girders and part of the cross-girders, with the rest of the existing structure retained *in-situ* and strengthened. The poor condition of the existing elements deems their retention and strengthening to be unviable, with the configuration of the structure currently meaning there is considerable risk of hidden defects. The increased weight of the replacement structure due to the requirement for a ballasted deck would also have necessitated the strengthening of the abutments of the span. Option B would also have had considerable construction complexity during replacement of the inner elements.

3.2.20 Options C and D both approached the replacement of the sections of the span with similar metallic decks; essentially providing a modern equivalent of the existing structure. In the case of Option C this was with a standard through-girder arrangement, while the alternative Option D used bespoke box girders. Though both these approaches could provide structures which realised the width of the span and delivered solutions with familiar materiality and structural arrangement, each also posed operational and maintenance issues. For Option C, the main issue was around the geometric constraints on the inner girders; the lateral position of the through girder structure would govern the track geometry over the span, which would reduce flexibility of track alignment on completion of the scheme and in the future. With Option D, though this approach would provide a more bespoke design which addressed some of the issues with Option C, the complexity of fabricating and access for require maintenance inspection provided considerable constraints to such an approach. The box girders required in Option D would require inspection from the inside, introducing considerable safety issues around access and maintenance. Further to the individual issues for each Option, in the case of both Option C and D, the reuse of the existing abutments of the structure would also prove problematic. Strengthening work to the abutments may be required, while the loading and bearing positions would reintroduce the potential for corrosion of hidden metallic elements and pose problem for inspection and maintenance, both of which are already issues for the existing structure.

3.2.21 Option E comprised constructing new widened abutments to Span 29 on either side of the structure and replacing the metallic sections of deck with a precast concrete beam deck. Option E was considered preferable to Options C and D from an operational perspective, as the deck provides complete freedom for the placement of the track alignment, as well as avoiding exposed steelwork, thereby delivering maximum flexibility of track arrangement across the structure. Option E therefore also realises potential for placement of switches and crossings over Span 29, which would improve train movement into and out of Huddersfield Station, delivering benefits for passengers. The approach also removes the loading from the existing abutments; placing a concrete deck on the existing abutments would not be

practicable, as the wider span would necessitate a considerably larger deck, which would have a greater visual impact, including obscuring the crown of the arch of the original 1840s viaduct.

3.2.22 Though it was recognised that Options C and D delivered a design approach in keeping with the materiality of the 1880s widening of the span through the use of metallic structures, Option E delivered considerable operational and construction benefits. Option E also presented the opportunity to acknowledge the loss of the metallic elements of the existing span and the historic character of the structure in its design, for example by cladding the widened abutment in stone to reflect the appearance of the existing masonry of the viaduct, and the incorporation of panels or patterns on the edge beam to reference the lost 1880s metallic elements. Considering the operational and construction benefits, and the opportunities to mitigate some of the impact of the change in appearance of the structure, Option E was progressed as the preferred approach.

3.2.23 Further design development of the preferred approach focussed on the materiality and style of the concrete deck parapets, in particular in considering how the design could respond to the existing structure and acknowledge the loss of the 1880s metallic spans. With regard to the material finish of the parapet, three options were considered:

- Option 1: A fully concrete structure, with the potential for the concrete parapet to be designed in a way which reflects the historic metallic parapets;
- Option 2: Installing metallic panelling comprising painted steel onto the exterior of the concrete parapet; and
- Option 3: Installing metallic panelling comprising weathering steel onto the exterior of the concrete parapet.

3.2.24 The development of the approach to the design of the parapet included consideration of both operational and structural requirement, as well as the impact on heritage significance and appearance in the context of the wider built environment. From an operational perspective, Option 1 was preferred to Options 2 and 3, as installing metallic panelling onto the outside of the concrete deck poses maintenance and health and safety issues, as it introduces a secondary element of a different material into the structure. There would be the potential for durability issues around the metallic elements, plus the risks associated both with maintaining it, and also of it detaching and falling onto the highway below.

3.2.25 The materiality of the three Options was also considered in terms of impact on the significance of the Grade II Listed structure. It was considered desirable to try to ensure the design responded to the 1880s metallic spans which would be lost in terms of the language of the parapet, and therefore Options 2 or 3 were initially preferred from a heritage perspective; however, it was recognised that being honest in the style of replacement and acknowledging the loss of the metallic spans was also an important design driver. Option 3 was dismissed, as a weathering steel parapet was considered to not be as compatible in style with the rest of the viaduct nor the surrounding townscape, thereby appearing an incongruous addition to the structure. Though Option 2, the painted steel panelling, would reflect most closely the existing 1880s metallic spans, it was considered that Option 1 would also provide opportunity for reflecting the lost historic structure, due to the potential to design a pattern in relief into the concrete parapet to reflect the metallic panelled style.

3.2.26 Based on the operational issues around introducing a secondary metallic element into the parapet of the structure, and the potential for a relief design on a concrete parapet to both respond to the lost metallic elements of the historic span and also provide honesty in acknowledging the change to the structure, Option 1 was considered to be the most viable approach to the parapet design.

OLE and signal gantry

3.2.27 The design development process included optioneering to determine the position of the OLE portals along the viaduct. Three design options were considered in an order of preference to try to limit changes to the historic fabric and impact on the appearance and setting of the structure.

3.2.28 The options considered comprised:

- Option 1: To locate the OLE portal masts and foundations on the deck of the existing structure, in board of the parapets. This would be possible if sufficient clearance is available from the tracks to the parapet. This option would require no modifications to be made to the deck structure, or the parapet structure;
- Option 2: To support the OLE portals within the width of the parapet by locally removing and rebuilding the parapet around the OLE mast and foundation (at the required locations). This option would be pursued if there was insufficient clearance for the portals and their foundations to be located in board of the existing parapets (i.e. if Option 1 was not possible), and where the parapet is of sufficient thickness; and
- Option 3: To fix the OLE portal masts to the exterior of the viaduct at pier locations. This option would be pursued if there was insufficient clearance for the portals and their foundations to be located neither in board of the existing parapets, nor within the existing parapet thickness (i.e. if neither Option 1 nor Option 2 were possible). This option was not preferred due to the greater visual impact.

3.2.29 The proposed track alignment along the viaduct comprises supporting five tracks between the southern end of the viaduct and Span 17, with this reducing to four tracks between here and the northern end of the structure. The proposed alignment mean that the additional tracks bring the railway much closer to both the east side of the viaduct for its entire length, and closer to the west side between the station and Span 17. The clearances required for the OLE portals mean that there would be insufficient space to accommodate Option 1 or Option 2 for the placement of the portals on the eastern side of the viaduct for its entire length. As a result, Option 3 was progressed on the eastern side of the viaduct, with portals attached to the outside. On the western side of the structure, it was similarly necessary to discount both Option 1 and 2 between the station and Span 17, however north of this point there was sufficient clearance to accommodate the portals on the structure.

3.2.30 The design of the OLE with respect to the western side of the viaduct was further developed through consideration of the visual consistency of the approach along the structure. Though the clearances for the OLE mean that the portals could be located on the exterior of the structure from Span 17 northwards, it was considered preferable to maintain the visual consistency of the approach along this section of the viaduct; with the exception of a block of commercial units between Spans 25 and 29, this part of the northern elevation of the viaduct is relatively open to wider views, and therefore a consistent approach to the intervention which reflected the consistency and rhythm of the historic structure is considered a more sympathetic approach at this location. North of Span 33, the western elevation of the viaduct is not visible from the public highways, instead backing onto houses along Alder Street; at this point, siting the OLE inside the parapets on the deck of the viaduct would be a more sensitive approach. Consequently, the design approach taken was for the OLE to be located on the exterior of the viaduct (Option 3) on both sides of the structure from the southern end of the viaduct until Span 33, and from Span 33 northwards for the portals to be attached to the exterior (Option 3) on the east side, and sited on the deck inside the parapets (Option 1) on the west side. This approach was considered to be the best compromise between operational requirement, sensitive design and responding to the setting of the structure and its experience from the surrounding townscape at different sections along its length.

3.2.31 A number of elements of the OLE design over the viaduct are partly dictated by the track arrangement along the structure. With the railway lines across the viaduct providing the approach to Huddersfield Station, the track arrangement is required to realise an appropriate level of flexibility for train movement into and out of the station, enabling trains to access the required platform arrangement to deliver the aims of the Scheme for improved service. This has an influence over the style and positioning of OLE, with a requirement for OLE portals to be positioned at certain locations with respect to changes in track alignment, switches and crossings and the termination of lines. In particular, it is necessary to incorporate a number of anchor portals – OLE portals with diagonal ties – where tracks diverge and OLE wires terminate. The design of the OLE sought to minimise these where possible, given their scale is larger than normal OLE portals, thereby introducing a larger new feature onto the deck of the structure.

3.2.32 The positioning of the OLE portals along the viaduct was also required to respond to the track arrangement, however the design of this too developed to attempt to minimise the number of portals and place them sensitively where possible to the structure. This has led to design proposals which places OLE portals over piers, and, wherever practicable, perpendicular to the parapets of the structure. In some places on the structure, it was determined that this wasn't possible; this was due either to the skew of roads passing underneath, for example around Northgate / Bradford Road (Span 29), or due to the track alignment and position of other infrastructure, for example at the southern end of the viaduct on the wide approach to Huddersfield Station around John William Street (Span 1). The position of the OLE attachment on the external face of the viaduct, where required, also sought to be designed in a way to be sympathetic to the historic fabric and character of the structure. This resulted in designing the OLE to be attached above the springing points of the arches, avoiding clashes with the pilasters or voussoirs of the arches themselves which would occur if the OLE was attached lower on the face of the structure.

3.2.33 As noted above, the proposed extensions of the platforms at Huddersfield Station onto the southern end of the viaduct require the installation of a signal gantry on the viaduct at an appropriate position between Spans 2 and 4. The design development process for the signal gantry included considering options around the form of the gantry to meet operational requirements while minimising the visual and physical impacts on the Listed viaduct.

3.2.34 For the placement of a signal gantry, five positions were initially considered, however three of these were quickly discounted based on operational constraints of signal sighting out of the station and the physical constraints of the foundations required. Two options for the position and form of the gantry were developed and considered in detail:

- Option 1 – Support the signal gantry on the outside of the viaduct between Spans 3 and 4, and on a column over the pier between tracks.
- Option 2 – Support the signal gantry on a track-level concrete beam above Span 3, and a column over the triangular pier behind Spans 2 and 3.

3.2.35 The optioneering of the position of the signal gantry considered the same preferences with respect to attaching to the structure as for OLE (as detailed above in paragraph ***3.2.28***). Attaching to the exterior of the viaduct was considered to be less preferable than locating the signal gantry entirely on the deck of the structure. This approach is further justified as the signal gantry usually requires larger steelwork sections than for OLE. Consequently, Option 2 was considered preferable to Option 1, given that it avoided the requirement to support the gantry on any of the exterior of the viaduct. Option 2 provided an approach which minimised both the physical impact on the historic fabric of the viaduct and also the visual impact on the structure's setting through changes to its appearance. Option 2 was thereby chosen as the preferred proposed approach.

Masonry spans

3.2.36 Assessments of the condition and loading capacity of the masonry spans of Huddersfield Viaduct (MVL3/92) were carried out[15] to inform the design development for these spans; this was particularly around understanding capacity for the increased number of tracks and the installation of OLE. Though the assessments identified that the general condition of the masonry spans of the viaduct is good, there were some issues identified, in particular around the spandrel walls.

3.2.37 For at least part of the viaduct, the assessment indicated that it will be necessary to strengthen the masonry spandrel walls; this is due to the alignment of additional tracks being closer to the spandrel walls and parapets than the current track alignment. The strengthening may require:

- The introduction of tie bars and pattress plates; and/or
- Installation of a reinforced concrete strengthening detail behind the spandrel walls and parapet at track level.

3.2.38 The viaduct already features a number of examples of historic strengthening which has taken place with tie bars and pattress plates (see Insert 3-4). Any strengthening works required to the spandrel walls of this nature could be carried out in keeping with the historical strengthening, with similar styles of pattress plates to reduce the change in appearance of the structure. Similarly, were the installation of reinforced strengthening behind the spandrel wall be required at points along the structure, this could be carried out in a manner which avoided any changes to the exterior appearance of the spandrel walls. Consequently, whichever design approach is required will minimise, and avoid completely where possible, changes to the character and appearance of the Listed structure which would impact on its significance.

Insert 3-4 Example of existing pattress plate on the eastern elevation of the viaduct, between spans 4 and 5.

[15] Assessment carried out by TRU West between September 2019 and February 2020.

3.2.39 The options for the required strengthening are still being developed in line with continuing development of the proposed Scheme. Further design development in this area will be discussed and agreed in ongoing engagement with the statutory historic environment stakeholders, and via the CIMP (see below, paragraph 4.2.9).

3.3 Description of proposals

3.3.1 The proposed works to Huddersfield Viaduct (MVL3/92) involve alterations to a number of separate elements along the structure; these are discussed in more detail below. In summary, the proposed works relating to the Grade II Listed viaduct comprise:

- Increasing the number of tracks along the deck of the viaduct to five tracks from the southern end to Span 17 and four tracks from Span 17 to the northern end of the structure;
- The replacement of the deck of John William Street bridge (Span 1) with a new steel span, widenend on the south-eastern side, with parapets either incorporating reused elements of the existing cast iron edge girders, or designed in a style to match the existing structure;
- The replacement of the metallic decks over Northgate / Bradford Road (Span 29) with new concrete beams, supported on new widened abutments, with both the new parapets and abutments designed in a style to respond to the existing structure;
- The reconstruction of the north-western corner of the abutment at Fitzwilliam Street (Span 4), to be clad in masonry to match its existing appearance;
- The installation of OLE along the length of the viaduct, with portals attached to the exterior of the structure on the east side and the southern half of the west side;
- The installation of a signal gantry approximately over Spans 2 and 3 to provide signals for train movement into and out from Huddersfield Station; and
- The strengthening of the spandrel walls at localised points along the viaduct where required, achieved through either tie bars and pattress plates or a slab below the track bed.

3.3.2 The proposed works to Huddersfield Viaduct (MVL3/92) are shown in the following drawings which accompany this application:

- Location plan (1:2500);
- Existing and proposed plans (151667-TSA-30-MVL3-DRG-T-LP-163100, 151667-TSA-30-MVL3-DRG-T-LP-163101, 151667-TSA-30-MVL3-DRG-T-LP-163102, 151667-TSA-30-MVL3-DRG-T-LP-163103 and 151667-TSA-30-MVL3-DRG-T-LP-163104);
- Existing and proposed east elevations (151667-TSA-30-MVL3-DRG-T-LP-163105, 151667-TSA-30-MVL3-DRG-T-LP-163106, 151667-TSA-30-MVL3-DRG-T-LP-163107, 151667-TSA-30-MVL3-DRG-T-LP-163108 and 151667-TSA-30-MVL3-DRG-T-LP-163109);
- Existing and proposed west elevations (151667-TSA-30-MVL3-DRG-T-LP-163110, 151667-TSA-30-MVL3-DRG-T-LP-163111, 151667-TSA-30-MVL3-DRG-T-LP-163112, 151667-TSA-30-MVL3-DRG-T-LP-163113 and 151667-TSA-30-MVL3-DRG-T-LP-163114);
- Sections showing the proposed OLE (151667-TSA-30-MVL3-DRG-T-LP-163115);
- Typical arch repair detail (151667-TSA-30-MVL3-DRG-T-LP-163118); and
- Sections and fixing details of the proposed signal gantry (151667-TSA-30-MVL3-DRG-T-LP-163119).

John William Street Bridge (Span 1)

3.3.3 It is proposed to replace the existing span of John William Street bridge (Span 1) with a new steel span. This would comprise a steel half-through deck with multiple girders to support the extended platforms at Huddersfield Station and the new track alignment over the structure.

3.3.4 The replacement deck would sit across a slightly different footprint to the historic John William Street bridge; on the western side of the viaduct, the replacement structure would be slightly reduced in coverage on the southern side of the span, while on the eastern side the structure would project slightly further by way of a cantilever section. This part of the deck would accommodate the required fire refuge and emergency exit from the extended platform 2 of the station.

3.3.5 The edge girders of the replacement structure would reflect the distinctive design of the parapets on the existing historic span. This would be achieved either through the retention and reuse of elements of the existing cast iron parapets (if their condition is sufficient to deem this practicable) or through the design of the replacement steel edge girders to match the stylistic approach of the existing parapets.

3.3.6 The condition of the existing parapets will be assessed through further survey work of the structure. The approach to the design of the parapets will be based on the outcome of these surveys and will be further developed and defined in the CIMP. The design will be further developed in consultation with the statutory historic environment stakeholders, as required by condition of the Listed Building Consent.

Fitzwilliam Street (Span 4)

3.3.7 It is proposed to reconstruct the substructure of the northern abutment at Fitzwilliam Street (Span 4). This would involve the breaking down and rebuilding of the sub-structure; the bottom part of this would be done by inserting a masonry bed reinforcement, while the top part above would comprise a concrete corner cill beam. The abutment would then be re-faced in masonry to match its current appearance; this would be undertaken by reusing masonry reclaimed from the existing abutment if possible.

3.3.8 During the construction process, it is likely the metallic deck girder will require propping while the abutment is broken down and rebuilt. This will not involve alterations to the metallic deck.

3.3.9 The condition of the existing metallic deck will be assessed through further survey work of the structure. The approach to any strengthening of the deck required will be based on the outcome of these surveys and will be further developed and defined in the CIMP. The design will be further developed in consultation with the statutory historic environment stakeholders, as required by condition of the Listed Building Consent.

Northgate / Bradford Road (Span 29)

3.3.10 It is proposed to remove the existing metallic spans at Northgate / Bradford Road (Span 29) and replace them with prestressed concrete beams. The central 1840s masonry arch of Span 29 would remain in place.

3.3.11 The replacement prestressed concrete deck sections would be supported on new extended abutments. These would be built in front of the existing sandstone abutments on both sides of the structure, and would be designed to respond to the existing appearance of the Listed Viaduct. The new abutments would be clad in stone to match the materiality of the existing viaduct, and the northern and southern faces of the abutments would be recessed slightly to the original 1840s masonry arch, thereby preserving legibility of the historic development of the structure at this span. At the corners of the new abutments, additional masonry pilasters

would be formed, referencing the historic detailing between the existing wrought iron box girder and masonry buttressed abutments.

3.3.12 It is proposed that the replacement structure would include a concrete parapet on both elevations, joined to the concrete beam deck. This would be designed to reflect the appearance of the existing 1880s metallic girders, thus responding to the loss of these elements. The concrete parapet would be of similar depth to the existing wrought iron box girder and parapet and would feature a relief pattern of vertical strips in reference to the web cover plates of the 1880s structure.

OLE and signal gantry

3.3.13 It is proposed to install OLE along the length of the viaduct, and to construct a signal gantry approximately in line with Span 3.

3.3.14 There would be 12 OLE portals located along the viaduct, of which four would be anchor portals. These would be positioned over the piers of the viaduct, and aligned so that the majority would be perpendicular to the parapets of the structure; the exceptions would be the two portals closest to Huddersfield Station and the portal across Span 29, where the skewed alignments of the spans of the viaduct require the portals themselves to be skewed across the structure. On the eastern side of the viaduct, all the OLE portals would be attached to the exterior of the viaduct. On the western side of the viaduct, the OLE portals would be attached to the exterior of the viaduct between the southern end of the structure and Span 33, and then would be located on the deck of the viaduct in bound of the parapets between Span 33 and the northern end of the viaduct. Two additional cantilever portals for the OLE on the approach to Huddersfield Station would be located over Spans 2 and 3; these would be single stanchion cantilevers supported on concrete beams at track level on the deck of the viaduct. A further two single stanchion cantilevers would be attached to the exterior of the western side of the viaduct between Spans 6 and 7 and Spans 9 and 10.

3.3.15 The anchor portals required would require tie wires to adjacent piers, which appear as a diagonal wire from the top of the portal down to an attachment on the viaduct elevation or deck, depending on their position. Four anchor portals are proposed to sit at the piers between Spans 7 and 8, Spans 12 and 13, Spans 27 and 28 and Spans 33 and 34.

3.3.16 The signal gantry would be located approximately between Spans 2 and 3 and will be supported on a concrete beam at track level. The signal gantry would have two columns and would be entirely sited on the deck of the viaduct, requiring no attachment to the exterior of the structure. The concrete beam would be hidden behind the parapets and partially buried in track ballast.

Masonry spans

3.3.17 It is proposed that localised strengthening of the masonry spans of the viaduct is undertaken, specifically around improving the strength of the spandrel walls, to accommodate the new tracks on the viaduct in closer proximity than the existing alignment. It is likely that this will comprise tie bars and pattress plates, and will be required from Span 30 to 47 at the northern end of the viaduct; further assessment of the structure will inform the requirement elsewhere along the length of the structure, with the potential for localised strengthening at other locations.

3.3.18 As discussed above in paragraphs 3.2.36 to 3.2.39, the approach to the strengthening works will be undertaken in a manner which does not change the character of the structure, with any proposals for ties and pattress plates matching the existing historic examples in style, while any additional strengthening of the spandrel walls will be undertaken on the side of the deck of the structure, avoiding any change to the exterior appearance of the viaduct.

3.3.19 The design for the strengthening will be further developed and defined in the CIMP. The design will be further developed in consultation with the statutory historic environment stakeholders, as required by condition of the Listed Building Consent.

3.3.20 The existing post and tube-style handrail along the parapets of the structure would be repaired and extended so that a consistent height of handrail is provided to the full length of both parapets, increasing the protection against falls from height to rail workers and to any passengers evacuating trains in case of an emergency.

4. IMPACT OF PROPOSALS

4.1 Impact on heritage assets

Impact on Huddersfield Viaduct (MVL3/92)

4.1.1 The proposed works will involve permanent alterations to the historic fabric of the Grade II Listed viaduct. This will alter the appearance of the structure, though the extent to which this is altered varies along its length, whilst elements of the design have been defined to respond to the viaduct's significance.

4.1.2 The proposals would result in physical alterations to areas of the viaduct which would entail the loss of historic fabric. At John William Street bridge (Span 1), the existing deck would be removed and replaced, as would the metallic decks over Northgate / Bradford Road (Span 29). In both cases, this would result in the loss of elements of the structure's fabric dating to the widening of the structure in the 1880s. The replacement decks at both locations have been shaped to respond to this loss, reflecting the historic character of the structure while also being honest about the change which is taking place. At John William Street bridge (Span 1), the replacement deck would reflect the design detail of the existing, thereby maintaining the appearance of the structure from the surrounding streets and retaining legibility and consistency with the western side of the bridge, which will remain largely unaltered. At Northgate / Bradford Road (Span 29), the replacement deck would result in a different materiality to the existing, however the concrete parapets of the deck would be designed with relief patterning reflecting the lost metallic spans. Similarly, the widened abutments at this location would be clad in stone to match the existing masonry of the viaduct. The legibility of the widening of the structure at Span 29 would also be retained, with the abutments and deck offset to the original 1840s arch, maintaining the current understanding of the structure's historic development. In both cases, though the works would involve the loss of historic fabric, the proposals would only result in limited harm to significance, as a result of the sensitive design of elements of the replacement structures.

4.1.3 The proposals would also involve localised permanent changes to the fabric of the structure to facilitate the installation of the OLE and signal gantry. In the case of the OLE, for much of the length of the viaduct this would be attached to the exterior of the structure on both sides, which would involve attaching the portals into the historic masonry fabric of the viaduct's spandrel walls, including four locations where anchor portals would also have ties attaching to the structure. The signal gantry would be located entirely on the deck of the structure. This would result in the localised loss or alteration of historic fabric.

4.1.4 The viaduct derives significance from the survival of its historic fabric and appearance, enhanced by the relatively few alterations and the legibility of its widening in the 1880s. The historical and evidential value which are derived from this survival of historic fabric would be slightly reduced by the permanent physical changes detailed above, however the legibility of the widening of the structure, and the majority of the historic masonry of the structure would be retained, partly through sympathetic design of the proposals.

4.1.5 The proposed strengthening works which would be undertaken to the spandrel walls of the masonry spans would have a beneficial impact on the viaduct. The works would enhance the longevity of these elements of the structure, ensuring they could support the OLE and increased number of tracks over the viaduct required for the scheme. The works would be undertaken in a manner sensitive to the structure's existing appearance, by reflecting the historic strengthening work previously undertaken, using ties and pattress plates of similar style. The strengthening works would not themselves alter the significance of the structure and would enhance its operational lifespan.

4.1.6 The proposed changes to the structure, particularly the proposed installation of the OLE and

signal gantry, would change the overall appearance of the structure. However, this would only slightly reduce the significance it derives from its aesthetic value. The architectural detail of its engineering would still be able to be appreciated, albeit the structure would incorporate more modern elements such as the OLE. Similarly, the presence of the structure within the townscape would also retain its current and historic monumentality, experienced through movement along and under it (see below), and though the nature of its prominence would change with the new additional elements, the understanding of the historic and architectural interest of the structure derived from this would be maintained.

4.1.7 As discussed above in paragraph 2.1.27, Huddersfield Viaduct (MVL3/92) derives significance from its setting, both in terms of its prominence within the townscape, evidenced in views towards and through it, and those views of the town afforded passengers traveling by train over it. The proposals would have some impact on this setting, with the changes in the appearance of the structure subtly altering how it is experienced in such views. The OLE, in particular, would form a new element of such views, and while this would enhance the structure's prominence, and the understanding of it as an operational element of the railway would still be able to be appreciated, the legibility of it as a historic structure would be slightly reduced. Nevertheless, views from atop the structure offered to rail passengers would continue to define the experience of the structure and surrounding townscape, while the permeability of the structure would also not be altered. Indeed, from up close, experience of the structure from the surrounding townscape would remain largely unchanged, with the legibility of its significance maintained. Though the proposals would result in notable alterations to elements of the viaduct's setting, these would only slightly affect appreciation of it and its significance, and the extent to which the structure derives significance from its setting only slightly reduced.

4.1.8 The proposals would have some limited impact on the group value which Huddersfield Viaduct (MVL3/92) derives from its relationship both with other viaducts on the Transpennine Route and with those which define Huddersfield's historic townscape. The proposed changes to the structure, particularly the OLE and signal gantry, will alter the structure's appearance, and though its overall prominence in the townscape will remain, this will be subtly altered. However, the similarities between the design language of the masonry structure and those other contemporary viaducts constructed by the Huddersfield and Manchester Railways (see above, paragraphs 2.1.29 and 2.1.30) would still be legible, and these would still be able to be understood as a group of structures originating from the same phase of railway development. The collective experience of the assets through their continued operational use would not be altered by the proposals. Similarly, the changes in the appearance of the viaduct would not alter its understanding as one of a number which define the townscape of Huddersfield; it would continue to form one of a group of structures evidencing the change brought about the Huddersfield through the development of the railways. The extent to which the viaduct derives significance from group value would not be appreciably altered by the proposals, nor would they reduce the extent to which other structures derive significance from their relationship with it.

4.1.9 The proposals would result in less than substantial harm in line with National Planning Policy within the NPPF, and meet the criteria set out under the Kirklees Local Plan Policy LP35 in accommodating innovative design and conserving significance of designated heritage assets.

Impact on other heritage assets

Listed Buildings

4.1.10 The proposals for Huddersfield Viaduct (MVL3/92) are closely related to the proposals for the scheme at Huddersfield Station. The extension of the platforms of the station onto the viaduct directly relates to elements of the proposals for the viaduct, including the

replacement of the deck of John William Street bridge (Span 1) and the proposed signal gantry.

4.1.11 The proposed works to the viaduct would have a very limited impact on the Grade I Listed Huddersfield Station (NHLE 1277385). The proposals will result in some changes to the setting of the station, through the introduction of new elements onto the viaduct which will alter the nature of views out from the northern end of the station along the structure; the OLE and signal gantry will form new prominent elements in this view. The station derives some significance from its relationship with the viaduct, evidenced through visual connections across the structure. Though these views will be altered, the historic and current associations between these elements of the historic railway network will still be able to be appreciated and understood. The design of other physical changes at the southern end of the viaduct have been shaped to respond to the significance of the station and wider historic environment in this area, for example the stylistic choices around the replacement deck for John William Street (Span 1). The proposals will not appreciably detract from the setting of the station, nor will they reduce the extent to which the station derives significance from its association with the viaduct.

4.1.12 Further information on the proposals for Huddersfield Station itself, including assessment of the impact of the scheme on the significance of the Grade I Listed building are included in the Huddersfield Station Heritage Assessment.

4.1.13 The proposals for Huddersfield Viaduct (MVL3/92) will not result in any physical impacts on any other Listed Buildings.

4.1.14 The proposed works to the viaduct will result in a change to the setting of The Sportsman and Marhaba Takeaway (Grade II Listed, NHLE 1464388). As noted above in paragraph 2.2.8, the principal elevations of the building face the viaduct, with its corner entrance orientated towards the junction of Fitzwilliam Street and John William Street. The OLE and signal gantry, as well as the replacement of Span 1 would be clearly visible from the Listed Building, with the former elements introducing new features adding to the visual prominence of the viaduct in the setting of the public house. Though these may serve to slightly degrade the view of the viaduct, this will only slightly alter the relationship between the public house and the surrounding historic streetscape, including the viaduct, from which the Listed Building derives significance. The extent to which it derives significance from its setting will not be appreciably degraded, and the overall significance of the Listed Building will be unchanged.

4.1.15 The proposals will result in changes in the setting of other Listed Buildings; however, these will have little impact on the significance which these assets derive from their setting. The OLE and signal gantry, as well as the proposed replacement deck of John William Street bridge (Span 1) would be visible in views towards, from and across four Grade II Listed Buildings located between 72 and 84 Fitzwilliam Street (NHLEs 1134224, 1134225, 1134226 and 1134227), as well as the Empire Cinema (Grade II Listed, NHLE 1288963) and 70-78 John William Street (Grade II Listed, NHLE 1313875). Though the proposed changes to the viaduct would introduce new elements into these views, the viaduct already forms a prominent element of such views. The structure's prominence would be slightly increased, particularly by the OLE and signal gantry, however the interrelationship between viaduct and the historic streetscape of the other Listed Buildings would remain legible; this is particularly the case considering the design of the replacement of Span 1 over John William Street has been shaped to respond to the structure's historic character and reflect its current appearance. The infiltration of the modern elements of the proposed design into the setting of the Listed Buildings would not appreciably degrade the extent to which they derive significance from their setting. The overall significance of the Listed Buildings would not be changed.

Conservation Area

4.1.16 The proposals for Huddersfield Viaduct (MVL3/92) will result in changes to the appearance of the very northern part of the Huddersfield Town Centre Conservation Area. However, these will not reduce the extent to which the Conservation Area derives significance from the Viaduct. The changes to John William Street bridge (Span 1) and the installation of the OLE and signal gantry at the southern end of the structure will alter the appearance of the viaduct in this area. Though the OLE and signal gantry will introduce new prominent elements into views into and out of the Conservation Area, the design of the proposed works to John William Street bridge (Span 1) will respond to the existing historic deck of the span to minimise the change in character and appearance.

4.1.17 The Viaduct will continue to form a prominent element of the historic townscape in this part of the Conservation Area, while the legibility of its relationship with Huddersfield Station and associated historic railway infrastructure will also remain unchanged. The proposals will not alter the extent to which the viaduct contributes to the historic character of the area, and its contribution to the overall significance of the Conservation Area will not be diminished. The proposals will not impact on the overall significance of the Conservation Area.

Non-Designated Heritage Assets

4.1.18 The proposals for Huddersfield Viaduct (MVL3/92) would result in some changes to the setting of surrounding non-designated heritage assets, however they would not impact on the significance of any of these assets. The proposals will result in the change of the appearance of the viaduct in the vicinity of the former Huddersfield Station goods yard (HER 6526) and the railway station water tower (HER 10539). However, the legibility of the historic interrelationship between these assets will be retained. The viaduct will continue to form part of the historic railway infrastructure along with these assets, and any significance derived from their relationship with the viaduct will be retained. Similarly, the proposals will alter the appearance of the viaduct in the vicinity of the former Viaduct Works, with OLE and the proposed new deck at Northgate / Bradford Road (Span 29) visible from the building. Though the visual relationship between the viaduct and the former works makes some contribution to the latter's significance, the changes to the viaduct will not degrade this relationship. The building and structure will still be legible as elements of the surviving historic townscape of the area, and the prominence of the viaduct in the setting of the works will be unchanged. There will be no impact on the overall significance of the former works as a result of the proposals.

4.1.19 The proposals will not result in any impact on the setting or physical remains of any other non-designated assets.

4.2 Mitigation and compensation

4.2.1 Mitigation has been used in three separate ways: embedded mitigation; additional mitigation measures and compensation. These are briefly described below and have their basis in the hierarchy of mitigation as detailed in LA 104 Environmental Assessment and Monitoring[16].

4.2.2 Embedded mitigation occurs within the design stage and is intended to include elements within the design that avoid or substantially reduce negative change to the significance of a historic asset. It can also include elements where loss of historic significance is compensated through high quality new design and use of materials. There may also be changes that enhance or improve the historic asset. Embedded mitigation is discussed as

[16] Design Manual for Roads and Bridges, LA 104, Sustainability & Environmental Appraisal, Environmental assessment and monitoring. Revision 1 (August 2020).

part of the design development (see above, Section 3.2).

4.2.3 Additional mitigation measures are applied post-design stage and are intended to include processes and activities that will reduce the level of negative change to the significance of an historic asset.

4.2.4 Compensation measures are applied post-design stage and recognise that the impacts cannot be removed or reduced. These measures are intended as a means of recording the negative change to the significance of an historic asset; enabling future dissemination of information about this change.

Mitigation

4.2.5 The design of the proposals has been shaped to incorporate elements which mitigate potential impacts to the Listed structure as far as possible. These elements have been developed in discussions with Historic England and Kirklees Council. Additional information with respect to these elements of design development is included above in Section 3.2.

4.2.6 The design development process has resulted in mitigation being embedded within the design proposals regarding a number of elements of the historic structure. The following design considerations have been taken into account in response to the proposed alterations to the Listed structure:

- The design of the replacement deck over John William Street (Span 1) to reflect the design style and aesthetics of the existing historic metallic deck;
- The design of the replacement concrete decks over Northgate / Bradford Road (Span 29) to respond to the lost metallic spans, including the design of the concrete spans to incorporate relief reflecting the appearance of the existing parapets, the retention of the offsetting between the decks and the barrel of the original masonry arch, and the use of masonry cladding on the proposed abutments to match the existing masonry of the viaduct;
- The siting of OLE portals over piers of the viaduct in most locations, and positioning the signal gantry on the deck of the viaduct as opposed to being attached to the exterior;
- The proposed re-use of masonry to clad the strengthened abutment at Fitzwilliam Street (Span 4); and
- The proposed approach to strengthening the masonry spandrel walls to match the historic strengthening which has been undertaken, using ties and pattress plates.

4.2.7 The Environmental Statement (Chapter 6 of Volumes 2i and 2ii) produced to support the TWAO application for the Scheme has identified further mitigation measures which aim to reduce potential impacts on the significance of heritage assets arising as a result of the Scheme. These additional mitigation measures would be secured by way of conditions to be attached to the deemed planning permission for the Scheme, including the CoCP and the Construction Traffic Management Plan, and the Listed Building Consent for the Huddersfield Viaduct (MVL3/92). In the case of Huddersfield Viaduct (MVL3/92), the additional mitigation measures would comprise:

- An agreed construction traffic programme to minimise the amount of construction traffic using the roads around Huddersfield Viaduct, as much as is reasonably practicable;
- Measures to minimise the visibility of construction activity, plant and hoardings, and to reduce dust and noise; and
- Toolbox talks to disseminate best practice for reducing potential impacts in relation to construction activity associated with the underbridge, for example to help avoid accidental damage.

Recommended compensation

4.2.8 Requirements to undertake compensation in relation to historic buildings, including Listed Buildings, where the proposals of the Scheme would result in physical impacts to them, have been outlined in the Environmental Statement (Chapter 6 of Volumes 2i and 2ii) for the Scheme. These compensation measures would be secured as conditions of the deemed planning permission or Listed Building Consent and aim to offset some of the harm which may occur to the assets' significance as a result of the Scheme.

4.2.9 A Conservation Implementation and Management Plan (CIMP) will be produced which will further define mitigation and compensation measures for historic buildings. Those measures discussed below will be detailed within the CIMP. The CIMP will be secured via a condition of the Listed Building Consent and its contents will be agreed with the Local Authority in consultation with the appropriate stakeholders (Historic England) prior to construction works.

4.2.10 **Historic building recording**: recording of Huddersfield Viaduct (MVL3/92) will be required prior to, or during, the construction of the Scheme, as agreed with the appropriate historic environment stakeholders via the CIMP. This would help to compensate the harm to significance resulting from the infilling by recording of the structure and furthering understanding of its development and value. The historic building recording would be undertaken to the following Levels in accordance with Historic England guidance[17], and would include:

- A recording undertaken to Level 2 of John William Street bridge (Span 1), including a drawn record, photography and a written record;
- A recording undertaken to Level 2 of the Northgate / Bradford Road (Span 29), including a drawn record, photography and a written record;
- A recording undertaken to Level 1 of Fitzwilliam Street (Span 4), including a photographic record;
- A recording undertaken to Level 1 of the sections of the parapet of the viaduct which are proposed to be altered to accommodate the attachment of OLE, including a photographic record.

4.2.11 **Material reuse**: It is recommended that the possibility of sustainable recovery and reuse of the cast iron parapets from the existing John William Street bridge (Span 1) is explored as it can partly compensate adverse impacts arising from the work. The opportunity for this to be explored will be detailed within the CIMP.

4.3 Public benefit

4.3.1 The proposals for Huddersfield Viaduct (MVL3/92) are required to realise the public benefits of the Huddersfield to Westtown (Dewsbury) Scheme. These proposals also support the economic, environmental and social benefits associated with the wider delivery of the TRU Programme.

4.3.2 The Scheme, as part of the wider TRU Programme, would directly and indirectly play a role in improving connectivity through journey time, capacity and reliability improvements, alongside particular improvements for Huddersfield Station enhancing some of Britain's busiest rail track.

4.3.3 The Scheme is vital in supporting the North of England's long-term, low-carbon economic growth, and better-connecting people to jobs, services, education and leisure. The Kirklees Local Plan (paragraph 10.2) recognises the critical connection between effective transport

[17] Historic England, 2016. *Understanding Historic Buildings: A Guide to Good Recording Practice*.

systems and local business productivity and district prosperity.

4.3.4 Due to Huddersfield Viaduct's location and pivotal position in the operational network, the works at the structure are an integral component of achieving TRU Programme ambitions. Without these changes the Scheme would be unable to go ahead. Chapter 21 (Socio-economic) of the ES (Volume 2i of the Scheme-wide Assessment) has been referred to in identifying these benefits.

4.3.5 There are economic and social benefits to be had from the improved Transpennine Route proposals. These include reduction in journey times along this part of the Scheme with the aim of achieving 43-44 minutes between Manchester Victoria and Leeds Central. This will be partially facilitated by enabling line speeds of between 70 – 100 mph along the Scheme as well as through other projects on the Route. The increase in capacity through more train services and longer trains will reduce congestion, increase passenger comfort and improve journey quality. Future passenger modelling has indicated that the numbers of people using the Transpennine Route will increase from 5.33 million to 8.22 million in 2042/43. This would be partially achieved through the creation or enhancement of four tracking across the viaduct, allowing for express trains to by-pass slower trains and freight services. The increased movement of people and goods along this key part of the railway network that connects major cities, towns and transport hubs supports a more economic and socially viable transport solution. The Scheme forms part of the West Yorkshire Transport Strategy for harnessing economic prosperity through a better connected transport network..

4.3.6 As part of the Scheme, there are environmental and sustainable benefits that arise from the improvements to public transport services and the introduction of more environmentally viable energy solutions. The electrification of the line through this part of the Scheme is an investment in 'greener' energy technology meeting Network Rail's Decarbonisation Strategy and bolstering national targets for reducing harmful emissions that cause climate change, which are set out in Government legislation for achieving net zero carbon by 2050.

4.3.7 At Northgate / Bradford Road (Span 29) the concrete deck option removes girders from track level and allows the switch and crossing unit (points) to be placed over Span 29, bringing several sets of points on the viaduct closer to the station. This reduces platform reoccupation time and therefore has an operational benefit for passengers. The concrete option also provides the best long-term value by eliminating the steel/masonry interface at the point where the previous deck had corroded and is challenging to inspect or paint.

4.3.8 The platform extensions onto John William Street bridge (span 1) and the development of an emergency egress at this point, does require rebuilding the eastern side of the bridge on a cantilevered section. This will enable the safe evacuation of passengers from the Leeds (northern) end of Huddersfield Station and benefits users in complying with current health and safety standards as required of an operational station.

5. CONCLUSION

5.1.1 Huddersfield Viaduct (MVL3/92) draws its significance from its historical association with the Heroic Age (1841-50) of railway construction. Built alongside Huddersfield Station, it is a monumental piece of engineering and a notable landmark in Huddersfield. It shares a group value with other viaducts built along the route during the same period and their common characteristics are testament to the growing presence of railway super-building across the challenging landscape of the Pennines.

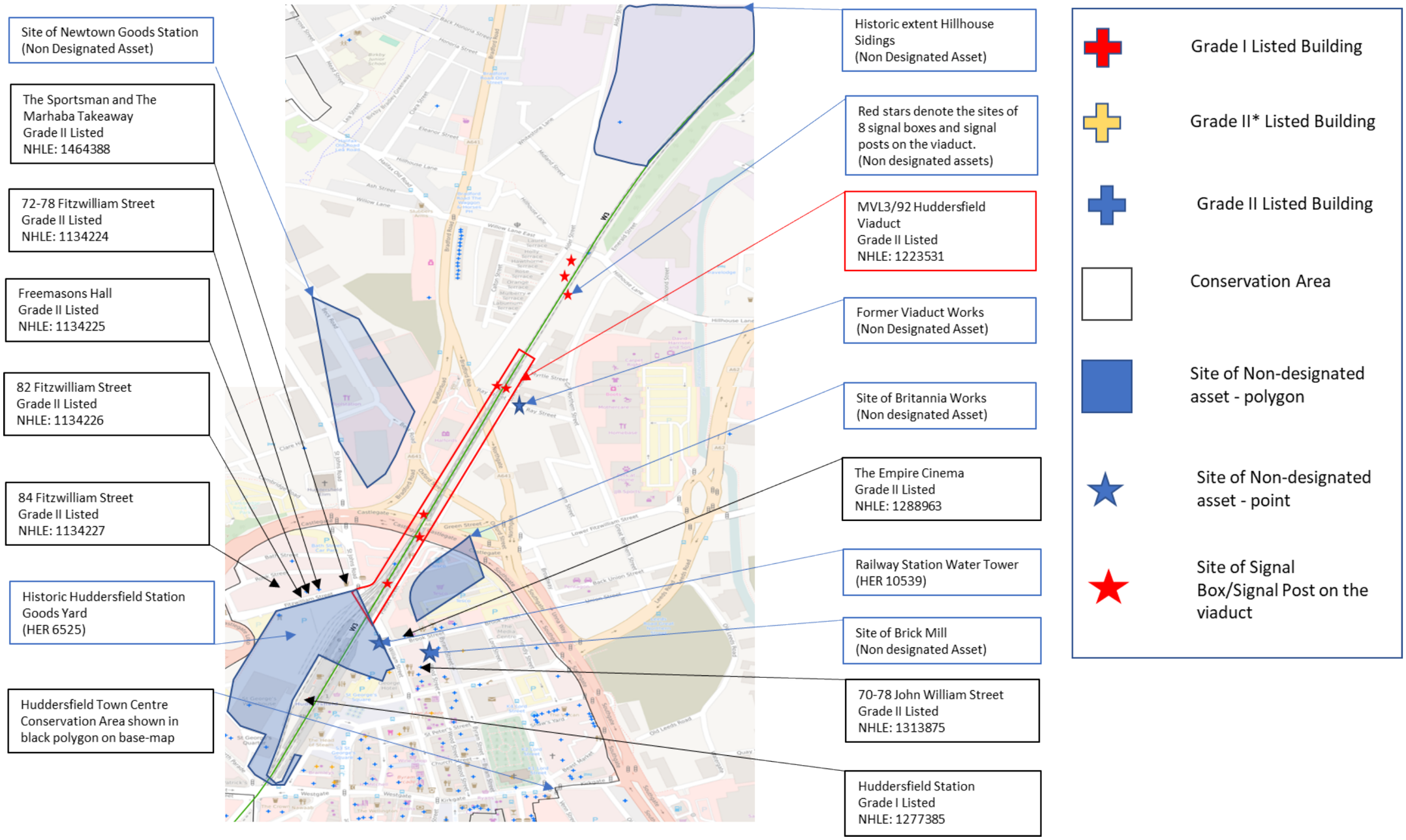
5.1.2 There are several interventions that are required as part of the Scheme along Huddersfield Viaduct. This includes the installation of OLE along its length; the extended new cantilevered section of John William Street (Huddersfield Viaduct (Span 1) Underbridge (MVL3/92(1)); strengthening of masonry along its length and to the abutment of Fitzwilliam Street (Huddersfield Viaduct (Span 4) Underbridge (MVL3/92(3))); replacement deck and masonry walls at Northgate / Bradford Road (Huddersfield Viaduct (Span 29) Underbridge (MVL3/92(9))); and four / five tracking. All of these changes have been considered together and although this does result in an evident amount of change; due to the sensitive design approach employed, the impact on the significance of the viaduct would be less than substantial harm in respect of National Planning Policy Framework. It would meet the criteria set out under the Kirklees Local Plan Policy LP35 in accommodating innovative design and conserving significance of designated heritage assets.

5.1.3 The design process has been undertaken in a strongly collaborative manner and has sought historic environment professional support from the outset. Every effort was made to limit change to the historic structure and regular consultation with historic environment stakeholders and the design team were held throughout the development of options. However, this was unachievable with the operational parameters set.

5.1.4 The proposed works at the viaduct would have a very limited impact on the Grade I Listed Huddersfield Station (NHLE 1277385). The proposals will result in some changes to the setting of the station through the introduction of new elements onto the viaduct but, overall, this will not noticeably detract from the setting of the Station or its relationship with the viaduct.

5.1.5 The proposals satisfy both national and local planning policy regarding the impact of development on Huddersfield Viaduct (MVL3/92) and its setting.

APPENDIX A – LOCATION PLAN



APPENDIX B – HISTORIC ENGLAND LIST DESCRIPTION

Overview

Heritage Category: Listed Building

Grade: II

List Entry Number: 1223531

Date first listed: 29-Sep-1978

Statutory Address: HUDDERSFIELD RAILWAY VIADUCT, VIADUCT STREET

Location

Statutory Address: HUDDERSFIELD RAILWAY VIADUCT, VIADUCT STREET

The building or site itself may lie within the boundary of more than one authority.

District: Kirklees (Metropolitan Authority)

National Grid Reference: SE 14425 17147

Details

VIADUCT STREET 1. 5113 (West Side) Huddersfield Railway Viaduct SE 1417 28/100 II 2. 1845-47. The contractor may have been Thomas Nicholson who was employed by the company to build Stanedge Tunnel. Rock faced stone with smoother imposts stand, and parapet coping. Tapering piers. Eighteen round arches from north and as far as Bradford Road, every third arch part blocked with a smaller concentric arch open. Twenty-six segmental arches from Bradford Road to John William Street, which has a flat iron span. Arches taking principal roads have rusticated ashlar voussoirs buttresses at critical parts 663 yds long. Owing to errors in calculating gradients the viaduct had to be raised to a higher level in course of construction which delayed the opening of the line until 3 August 1847.

Listing NGR: SE1442517147

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