A66 Northern Trans-Pennine project TR010062

4.4 Consultation Report Annex L: S47 consultation material Part 4

APFP Regulation 5(2)(q)

Planning Act 2008 Infrastructure Planning

(Applications: Prescribed Forms and Procedure)

Regulations 2009

Volume 4

June 2022

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

A66 Northern Trans-Pennine Project Development Consent Order 202x

4.4 CONSULTATION REPORT ANNEX L PART 4

Regulation Number:	Regulation 5(2)(q)
Planning Inspectorate Scheme Reference	TR010062
Application Document Reference	4.4
Author:	A66 Northern Trans-Pennine Project Team, National Highways

Version	Date	Status of Version
Rev 1	13 June 2022	DCO Application

Contents

Part 1

1. S47 notice
2. Copy of S47 notice in Newspapers
3. Statutory public consultation leaflet/poster
4. Leaflet notification zone map
5. List of poster locations
6. Sample social media posts
7. Statutory public consultation press releases
8. Statutory public consultation brochure
9. Statutory public consultation feedback form
10. Statutory public consultation exhibition boards
11. Statutory public consultation target area
12. Map book
13. Copies of paid for advertising
14. Virtual consultation page
15. Project website
16. Newspaper adverts
17. Preliminary environmental information report – non-technical summary

Part 2

18. Preliminary environmental information report with appendices and figures

Part 3

19. Construction method and management statement

Part 4

20. Route development report

Part 5

21. Project design report

Part 6

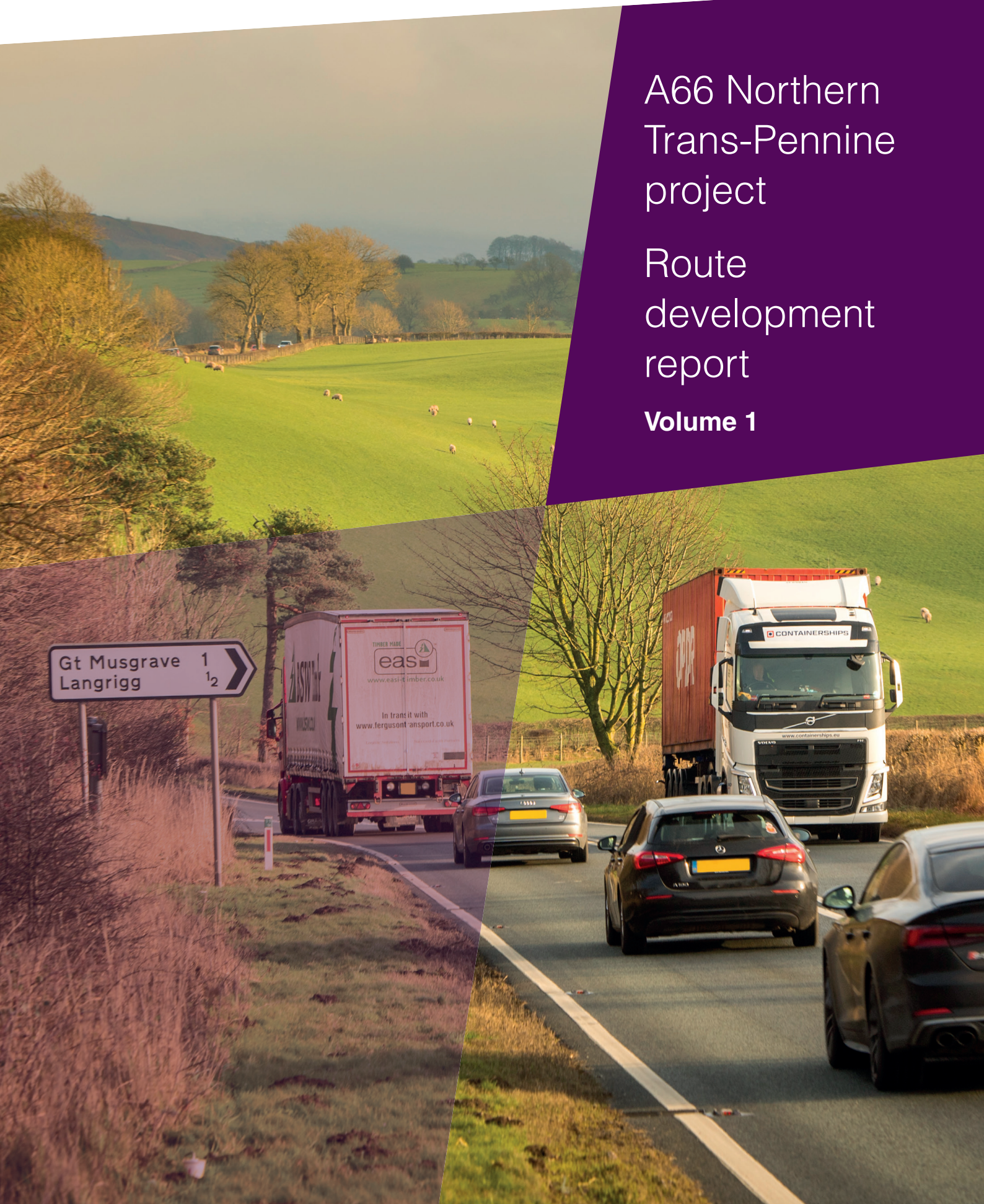
22. Local traffic report

highways england

A66 Northern Trans-Pennine project

Route development report

Volume 1



CONTENTS

1. Introduction 1
1.1 Purpose of the Route Development Report 1
1.2 Project Context 2
1.3 Project History 3
1.4 Project Summary 3
1.5 Structure of this document 4
2. Project objectives 6
3. Summary of previous route options assessments 8
3.2 About the Project Control Framework 8
3.3 Pre-project - Northern Trans-Pennine Routes Strategic Study 8
3.4 Options phase - PCF Stage 1 Option identification 9
3.5 Options phase - PCF Stage 2 Option selection 10
Public consultation 2019 11
Preferred Route Announcement May 2020 11
4. Design development process 13
4.1 PCF Stage 3 Preliminary Design 13
Design development during PCF Stage 3 Preliminary Design 13
Assessment and appraisal of alternatives 15
Stakeholder engagement throughout PCF Stage 3 Preliminary Design 17
5. Design development of schemes 18
5.2 M6 Junction 40 Penrith 18
Description of existing scheme 18
Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection 18
Public consultation Summer 2019 18
Preferred Route Announcement May 2020 19
PCF Stage 3 Preliminary Design 19
Statutory Consultation Autumn 2021 20
5.3 M6 Junction 40 to Kemplay Bank Roundabout 21
Description of existing scheme 21
Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection 22
Public consultation Summer 2019 22
Preferred Route Announcement May 2020 22
PCF Stage 3 Preliminary Design 22
Statutory Consultation Autumn 2021 24

5.4 Penrith to Temple Sowerby 24
Description of existing scheme 24
Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection 25
Public consultation Summer 2019 26
Preferred Route Announcement May 2020 26
PCF Stage 3 Preliminary Design 26
Statutory Consultation Autumn 2021 27
5.5 Temple Sowerby to Appleby 27
Description of existing scheme 27
Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection 28
Public consultation Summer 2019 29
Preferred Route Announcement May 2020 30
PCF Stage 3 Preliminary Design 30
Development of Preferred Route 32
Development of alignment alternatives 36
Presentation of route alignment alternatives at July 2021 stakeholder engagement events 41
Alignment alternatives sifting for Statutory Consultation 42
Statutory Consultation Autumn 2021 48
5.6 Appleby to Brough 50
Description of existing scheme 50
Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection 51
Public consultation Summer 2019 52
Preferred Route Announcement May 2020 52
PCF Stage 3 Preliminary Design 52
Development of Preferred Route 54
Development of alignment alternatives 57
Presentation of route alignment alternatives at July 2021 stakeholder engagement events 64
Alignment alternatives sifting for Statutory Consultation 66
Statutory Consultation Autumn 2021 76
5.7 Bowes Bypass 78
Description of existing scheme 78
Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection 79
Public consultation Summer 2019 80
Preferred Route Announcement May 2020 80

PCF Stage 3 Preliminary Design 80
Statutory Consultation Autumn 2021 81
5.8 Cross Lanes to Rokeby 82
Description of existing scheme 82
Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection 83
Public consultation Summer 2019 83
Preferred Route Announcement May 2020 83
PCF Stage 3 Preliminary Design 83
Development of junctions proposals from Preferred Route Announcement 85
Development of junctions following Winter 2020 Project Update 86
Design development of Cross Lanes junction alternatives 87
Design development of Rokeby junction alternatives 89
Presentation of junctions alternatives at August 2021 stakeholder engagement event 91
Alternatives sifting for Statutory Consultation 94
Statutory Consultation Autumn 2021 102
5.9 Stephen Bank to Carkin Moor 103
Description of existing scheme 103
Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection 104
Public consultation Summer 2019 104
Preferred Route Announcement May 2020 105
PCF Stage 3 Preliminary Design 105
Statutory Consultation Autumn 2021 106
5.10 A1(M) Junction 53 Scotch Corner 107
Description of existing scheme 107
Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection 107
Public consultation Summer 2019 108
Preferred Route Announcement May 2020 108
PCF Stage 3 Preliminary Design 108
Statutory Consultation Autumn 2021 109
6. Abbreviation list 110
7. Glossary 111
8. Bibliography 115

TABLES

Table 1 Project objectives 6
Table 2 Shortlist options recommended for public consultation 9

Table 3 Preferred Route as announced in May 2020 12
Table 4 Discipline-specific assessment criteria for sifting matrices 16
Table 5 Route alternatives assessed for Temple Sowerby to Appleby in April 2021 38
Table 8 Appleby to Brough route alternatives presented at stakeholder engagement events, July 2021 65
Table 11 Appleby to Brough - route combination taken to Statutory Consultation in Autumn 2021 77
Table 12 Junction combinations presented at August 2021 stakeholder engagement event 92
Table 13 Sample traffic modelling output for B6277 Moorhouse Lane and C165 Barnard Castle Road 92
Table 14 Summary of sifting matrix for Cross Lanes junction – eastern baseline and western alternative 94
Table 15 Summary of sifting matrix for Rokeby junction – western baseline and eastern alternative 98

FIGURES

Figure 1 Project Control Framework Major Projects Lifecycle 8
Figure 2 Preferred Route as announced in May 2020 12
Figure 3 PCF Stage 3 design principles 13
Figure 4 M6 Junction 40 as shown at public consultation Summer 2019 19
Figure 5 Alternatives developed during PCF Stage 3 Preliminary Design for Kemplay Bank 23
Figure 6 PCF Stage 3 scheme development summary for Temple Sowerby to Appleby 31
Figure 7 Winter 2020 Project Update extract for Temple Sowerby to Appleby - Kirkby Thore 34
Figure 8 Winter 2020 Project Update extract for Temple Sowerby to Appleby - Crackenthorpe 35
Figure 9 Alignment alternatives presented for Temple Sowerby to Appleby at July 2021 stakeholder engagement events 42
Figure 10 PCF Stage 3 scheme development summary for Appleby to Brough 53
Figure 11 Winter 2020 Project Update extract for Appleby to Brough 56
Figure 12 Development of announced Preferred Route for Appleby to Brough - Black Route 57
Figure 13 Alignment alternatives presented for Appleby to Brough at July 2021 stakeholder engagement events 65
Figure 14 PCF Stage 3 scheme development summary for Cross Lanes to Rokeby 84
Figure 15 Winter 2020 Project Update extract for Cross Lanes to Rokeby 86
Figure 16 Baseline eastern junction for Cross Lanes 87
Figure 17 Alternative western junction for Cross Lanes 88

Figure 18 Baseline western junction for Rokeby..... 90
Figure 19 Alternative eastern junction for Rokeby..... 91
Figure 20 Cross Lanes to Rokeby Black Option: Cross Lanes western junction and Rokeby western junction..... 93
Figure 21 Cross Lanes to Rokeby Red Option: Cross Lanes eastern junction and Rokeby eastern junction..... 93
Figure 22 Cross Lanes to Rokeby Blue Option: Cross Lanes western junction and Rokeby eastern junction..... 93
Figure 23 A1(M) Junction 53 Scotch Corner as shown at public consultation Summer 2019 108

1. Introduction

1.1 Purpose of the Route Development Report

1.1.1 The Route Development Report is intended to describe the development of the route design and alignment for the A66 Northern Trans-Pennine project (hereafter referred to as 'the project') that has occurred since the publication of the Preferred Route Announcement (PRA) in May 2020. This report has been prepared to support Statutory Consultation in Autumn 2021 by enabling the local community, stakeholders and any other interested parties to understand the process of design development undertaken since announcement of the Preferred Route.

1.1.2 For the purposes of the Route Development Report, the project is considered as nine schemes, from M6 Junction 40 Penrith to the west, to A1(M) Junction 53 Scotch Corner to the east, as outlined in detail in 1.4 below. Since the PRA, the design of these schemes has continued to develop as part of Highways England's staged development process known as the Project Control Framework (PCF) (refer to Section 3.2 for further detail). Design development is a normal part of the lifecycle of bringing forward a major infrastructure project, and design development has occurred for a number of reasons, including:

- New and/or revised information (such as additional environmental surveys, traffic modelling, etc.).
- Further engagement with the public, with landowners, with statutory and non-statutory bodies.
- As a natural next phase of work beyond PCF Stage 2 to prepare for Statutory Consultation, additional engagement and development of the design required for a Development Consent Order (DCO).

1.1.3 For the A66, this has included further development of the design of the Preferred Route, as well as the identification of alternative alignment routes developed in response to further work undertaken to understand the baseline environment of the project and having regard to engagement responses and feedback received.

1.1.4 The Route Development Report does not seek to cover the entirety of design development since publication of the PRA but focuses on the principal changes to the route or locations of junctions. These changes have arisen from the design process, technical and environmental assessment work and ongoing stakeholder engagement. These factors have further informed the design to test, check and challenge previous findings and have helped to ensure that the project meets its objectives (refer to Chapter 2 for further detail).

1.1.5 The Route Development Report therefore covers the following:

- Where alternatives to the Preferred Route or to the locations of junctions have been considered (even if no change was subsequently recommended).
- Where alternatives have been considered that have the potential to affect important designated areas or features such as Areas of Outstanding Natural Beauty (AONB), Special Areas of Conservation (SAC), Scheduled Ancient Monuments (SAM), Registered Parks and Gardens (RPG), etc.

1.1.6 The Route Development Report will not cover the development of the design for the following:

- The layout of junctions, unless there is a different location proposed for the junction.
- The provision of additional farm and/or land access, etc.
- The provision of walking, cycling and horse-riding facilities.
- The provision of environmental mitigation land.
- Proposals for land for drainage and/or ponds, including relocation of previously identified elements.
- Proposals for land for borrow pits, including relocation of previously identified elements.
- Any other development of the preliminary design not covered in the above points which does not involve changes to the route or junction locations.

1.1.7 An initial explanation of the design development process is provided within the Project Design Report consultation document. Following Statutory Consultation, this will be developed further to have regard to consultation and continuing design development work to support the DCO application. In addition, how design development has been informed by the engagement and consultation processes will be set out within the Consultation Report to be submitted with the DCO application.

1.1.8 The scheme descriptions or alignment colours included in this report may differ from those set out in the Preliminary Environmental Information Report (PEIR). The PEIR was produced as the design for the project was still under development, and therefore should be regarded as a preliminary account of the principal environmental issues identified to the point that this design 'snapshot' was taken. Further information on the function and status of the PEIR is provided in Section 1.1 and Section 2.5 of the PEIR.

1.2 Project Context

1.2.1 The existing A66 is a key national and regional strategic transport corridor and link for a range of travel movements. It carries high levels of freight traffic and is an important route for tourism and connectivity for nearby communities. There are no direct rail alternatives for passenger or freight movements along the corridor.

1.2.2 The A66 corridor crosses five local authority areas, being a mix of County, Unitary and District Councils, namely Cumbria County Council, North Yorkshire County Council, Durham County Council, Eden District Council and Richmondshire District Council. It runs through the North Pennines Area of Outstanding Natural Beauty between Brough and Bowes. The Lake District National Park is approximately 2km south-west of Penrith and the Yorkshire Dales National Park is located approximately 3.5km south of the A66.

1.2.3 Despite the strategic importance of the A66, the route between the M6 at Penrith and the A1(M) at Scotch Corner is only intermittently dualled and has six separate sections of single carriageway. The route also carries local slow-moving agricultural vehicles and other traffic making short journeys and there are a high number of private and direct access points onto the A66 along this length. These have an impact on other users and their safety, especially on the single carriageway sections. The variable road standards, together with the lack of available diversionary routes when incidents occur, affects road safety, reliability, resilience and attractiveness of the route.

1.2.4 If the existing A66 route is not improved, it will constrain national and regional connectivity and may threaten the transformational growth envisaged by the Northern Powerhouse initiative and the achievement of the Government levelling-up agenda.

1.3 Project History

1.3.1 In 2014, the Department for Transport (DfT) announced its five-year investment programme for making improvements to the Strategic Road Network (SRN) across England. The project is one of more than 100 schemes identified as part of the first Road Investment Strategy (RIS1) 2015-2020 (DfT, 2015b). Funding for delivery of the project has been confirmed within the second Road Investment Strategy (RIS2) (DfT, 2020a), which covers the period between 2020 and 2025 which was published in March 2020. The project is aligned with the principles set out in RIS1 and RIS2 which promotes improving the road network to support the economy, create a greener network, making a safer and more reliable network, a more integrated network and a smarter network. The project delivery team are also working towards conformity with the National Networks National Policy Statement (NNNPS) (DfT, 2014a).

1.3.2 Highways England has been appointed by the Secretary of State to be the highway authority, traffic authority and street authority for the Strategic Road Network Initial Report and pursuant to the Infrastructure Act 2015.

1.3.3 The upgrading of the existing A66 route is being progressed by Highways England supported by a multi-disciplinary design team. An options appraisal has been undertaken through a staged process and a Preferred Route was announced in May 2020. The design has since been developed, assumptions tested and validated, and an Environmental Impact Assessment (EIA) is currently ongoing, all of which will support an application for a DCO.

1.3.4 The project is now in the Preliminary Design stage, which includes:

- Undertaking surveys (such as topographical, geotechnical and environmental);
- Consulting with the community and stakeholders including exhibitions, preparing and making available preliminary environmental information, completing the consultation report for the Stage and resolving outstanding issues where possible;
- Refining the preliminary design of the Preferred Route;
- Preparing the draft DCO application; and
- Completing the EIA and preparing the Environmental Statement (ES).

1.3.5 Highways England intends to submit a DCO application to the Planning Inspectorate on behalf of the Secretary of State in Spring 2022. The application will be supported by a range of plans and documents.

1.4 Project Summary

1.4.1 The A66 Northern Trans-Pennine project is a programme of works to improve the A66 between the M6 Junction 40 at Penrith and A1(M) Junction 53 at Scotch Corner. The project will involve upgrading single carriageway sections of road to dual carriageway standard and making improvements to the junctions along the route. Parts of the project involve online widening of the carriageway and some are offline (in other words, new sections of road that follow a different route but reconnect into the main A66 alignment).

1.4.2 Along with dualling the sections of single carriageway, other improvements will be made along the route, such as junction improvements at the M6 Junction 40 at Penrith and minor improvements to the existing dual carriageway sections of the A66 within the existing highway boundary (for example, new signs or road markings). Once complete, the project will lead to the entire 80km route having two lanes in both directions.

1.4.3 Along the length of the A66 it covers, the project has been split into a number of schemes as shown below:

- M6 Junction 40 Penrith
- M6 Junction 40 to Kemplay Bank
- Penrith to Temple Sowerby
- Temple Sowerby to Appleby
- Appleby to Brough
- Bowes Bypass
- Cross Lanes to Rokeby
- Stephen Bank to Carkin Moor
- A1(M) Junction 53 Scotch Corner.

1.4.4 It should be noted that for Statutory Consultation in Autumn 2021, some materials (for example, the PEIR and Statutory Consultation Brochure) combine the first two schemes shown into one single “M6 Junction 40 to Kemplay Bank” scheme. This is similar to the approach taken in previous consultation materials, for example the 2019 Public Consultation Brochure. They have been split in the Route Development Report to allow clearer reporting of the work done since PRA in May 2020 to develop M6 Junction 40.

1.4.5 Previous consultation materials also split the Temple Sowerby to Appleby scheme into two sections, Kirkby Thore to the west and Crackenthorpe to the east. For the purposes of the Route Development Report, these sections have been combined into a single scheme to better reflect the approach to design development since PRA in May 2020.

1.4.6 For plans of the current proposals for each scheme, refer to Volume 2 of the Route Development Report. For details of design development to date, refer to Chapter 5 below.

1.5 Structure of this document

1.5.1 The structure of this document is as follows:

- Sections 1.2, 1.3 and 1.4 set out the project context, history and description.
- Chapter 2 covers the project objectives for the A66 Northern Trans-Pennine Project as a whole. It details what Highways England have set out to achieve with this nationally significant infrastructure development.
- Chapter 3 provides a summary of previous route options assessments carried out, from previous PCF Stages 1 (Option Identification) and 2 (Option Selection).
- Chapter 4 provides an overview of the design development process that has followed during PCF Stage 3 (Preliminary Design).

- Chapter 5 covers the design development of each scheme. From west to east, these are: M6 Junction 40 Penrith, M6 Junction 40 to Kemplay Bank Roundabout, Penrith to Temple Sowerby, Temple Sowerby to Appleby, Appleby to Brough, Bowes Bypass, Cross Lanes to Rokeby, Stephen Bank to Carkin Moor, A1(M) Junction 53 Scotch Corner.

2. Project objectives

2.1.1 The core project objectives for the A66 Northern Trans-Pennine project can be broken down according to the following themes: safety, connectivity, economy, tourism, environmental, community, capacity and reliability. Further detail is provided in Table 1 below.

Table 1 Project objectives

Theme	Project objectives
Safety	To provide a consistent standard of dual carriageway, to help reduce the number of accidents and improve safety for all users of the network.
	To use the 'old' A66 as part of the local road network to provide better, safer routes for cyclists, pedestrians and other Non-Motorised Users.
Connectivity	To improve connectivity for people living and working nearby by creating better facilities for cyclists and pedestrians.
	To improve connectivity between the key employment areas of Cumbria, Tees Valley, Tyne and Wear and North Yorkshire.
Economy	To improve strategic regional and national connectivity, particularly for freight hauliers. Heavy goods vehicles (HGVs) account for a quarter of all traffic on the road and any delays to journeys can have a negative effect on business and commerce, including lost working time, loss of perishable goods, and missed shipment slots. Support the economic growth objectives of the Northern Powerhouse and UK Government levelling-up agenda.
Tourism	To improve access to key tourist destinations such as the North Pennines, Lake District and Yorkshire Dales.
Environmental	To minimise noise levels for people living and working near the route and reduce the congestion currently occurring in the single carriageway sections.
	To minimise any potential negative impacts on the natural environment and landscapes of the North Pennines and Lake District through sensitive design and where appropriate, mitigation.
Community	To re-connect currently severed communities and provide better links between settlements along the route, as well as improving access to services such as healthcare, employment areas and education.
Capacity	To provide the additional capacity required to reduce delays and queues during busy periods and improve the performance of key junctions such as the A66/A6 at Kemplay Roundabout and the M6 Junction 40.
Reliability	To reduce congestion and improve the reliability of people's journeys between the M6 at Penrith and the A1(M) Scotch Corner. An improved A66 will lead to less accidents which will make the road more reliable.
	To provide increased resilience through dualling the carriageway, allowing the option to close lanes where required due to accidents, breakdowns or maintenance works and keep still traffic moving.

2.1.2 These objectives are borne from Highways England's three priorities, as detailed below:

- Safety: "By 2040, we aim for no one to be killed or seriously injured while travelling or working on our network."

- Customer: “We will shape our future by listening to, predicting and responding to the needs of our customers.”
- Delivery: “We are upgrading our network to be fit for the 21st century and driving a step change in efficiency.”

2.1.3 These priorities underpin everything that Highways England does and are critical to guiding the progression of the A66 Northern Trans-Pennine project through successful planning, delivery, management and operation. Further detail can be found online at Highways England’s website.

3. Summary of previous route options assessments

3.1.1 A summary of previous route options assessments carried out is presented below.

3.1.2 Note that detail on the assessments for each scheme is presented in Chapter 5 below and that this Chapter 3 text is intended only as an overview of the general process.

3.1.3 To provide context, a summary of the previously referenced Project Control Framework is included below.

3.2 About the Project Control Framework

3.2.1 The Project Control Framework (PCF) is a joint Department for Transport and Highways England approach to managing major infrastructure projects. It is designed to support the development and delivery of major projects and comprises a standardised project life cycle, deliverables, project control processes and governance arrangements.

3.2.2 All major road projects are progressed through the PCF, which is split into three phases:

- The Options phase – identifies the preferred road solution to the transport problem. By the end of this phase there is certainty that, for example, the project will involve widening along a specific route.
- The Development phase – focuses on the design of the preferred solution taking it through the necessary statutory processes up to the point where a decision to commit to invest in building the road solution can be made.
- The Construction phase – is where the road solution is built, handed over for operation and the project is closed down.

3.2.3 These phases cover eight Stages of project development, known as the Major Projects Lifecycle. The A66 Northern Trans-Pennine project is currently at PCF Stage 3, the start of the Development Phase, as shown in Figure 1 below.

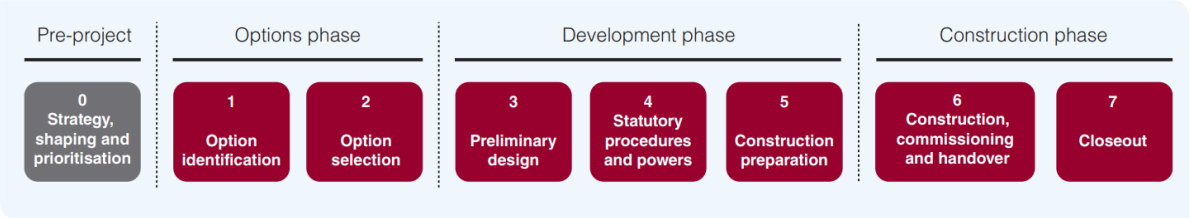


Figure 1 Project Control Framework Major Projects Lifecycle

3.3 Pre-project - Northern Trans-Pennine Routes Strategic Study

3.3.1 In 2014, as part of Highways England's first Roads Investment Strategy, the Northern Trans-Pennine Routes Strategic Study (NTPRSS) was announced. This study formed one of six national strategic studies located in the North of England.

3.3.2 The NTPRSS concentrated on two trans-Pennine routes with aims to improve connectivity and deliver transformational economic growth across the Northern Region. The two routes considered were the A69 between Carlisle and Newcastle, and the A66 between Penrith and Scotch Corner.

3.3.3 The study concluded that full dualling options were expected to deliver the greatest level of strategic benefits, with the A66 full dualling option delivering particularly strong benefits in terms of strategic connectivity and journey time reliability, as well as making a significant contribution to the Northern Powerhouse economic growth agenda and supporting access to key tourist sites. Other options which represented a lower level of intervention, such as the junction improvement and bypass options, would provide some localised journey time reliability and environmental benefits; however, the scale of these benefits would understandably be much smaller than more extensive interventions, and the contribution made towards achieving the intervention-specific objectives around economic growth and strategic connectivity would be much less significant.

3.3.4 The study also found a much clearer strategic case for the proposed improvements on the A66 compared to the A69 which better meets the intervention specific objectives set out for the study.

3.3.5 The outcome of the Study was published in the Northern Trans-Pennine Routes Strategic Study Stage 3 Report, which informed the 2016 HM Treasury Autumn Statement announcement of plans to dual the A66 and the start of the A66 Northern Trans-Pennine project.

3.4 Options phase - PCF Stage 1 Option identification

3.4.1 Highway England's PCF Stage 1 involves the identification of broad route options to be taken to public consultation. Work is undertaken at this Stage to assess these options in terms of environmental impact, traffic forecasts and economic benefits, allowing for refinement of the cost estimates of options (including an allowance for risk).

3.4.2 For the A66 Northern Trans-Pennine project, PCF Stage 1 Option Identification began in 2017 when Highways England commissioned their technical consultant for the stage, with a brief to identify viable dualling options for consideration.

3.4.3 This work culminated in the Technical Appraisal Report (TAR) of November 2018. The TAR identified several longlist options for each of the schemes along the route of the A66 Northern Trans-Pennine project. These options were then appraised and those which performed poorly against the project objectives were not taken forward to shortlisting. Those shortlist options were as shown below in Table 2 (adapted from Table 1-2 in the TAR):

Table 2 Shortlist options recommended for public consultation

Scheme	Option	Description
M6 Junction 40 to Kemplay Bank Roundabout	2B	Underpass option at Kemplay Bank
	2E	Flyover option at Kemplay Bank
Penrith to Temple Sowerby	4A	Online dualling option, with offline section to the south of High Barn
	4B	Online dualling option

Scheme	Option	Description
Temple Sowerby to Appleby	6H1	Kirkby Thore southern bypass
	6J1	Kirkby Thore northern bypass
	6F2	Crackenthorpe bypass, utilising disused railway
	6G2	Crackenthorpe bypass, utilising in part of the old Roman Road
Appleby to Brough	8C1	Warcop West – online dualling
	8A2	Warcop East – offline dualling to the south of the existing A66
Bowes Bypass	10A	Bowes East – online dualling
Cross Lanes to Rokeby	12A	Online dualling, with an offline section to the south avoiding the Old Rectory
	12B	Online dualling
Stephen Bank to Carkin Moor	14A	Western section online dualling, then offline to the south, re-joining A66 to east of Carkin Moor Roman Fort
	14F	Western section online dualling, then offline to the north, re-joining A66 to the west of Carkin Moor Roman Fort
	14G	Western section online dualling, then offline to south, followed by offline to north, re-joining A66 to the west of Carkin Moor Roman Fort

3.4.4 Detail on the assessment criteria employed to arrive at these options can be found in the PCF Stage 1 Technical Appraisal Report.

3.5 Options phase - PCF Stage 2 Option selection

3.5.1 Highway England's PCF Stage 2 culminates in a Preferred Route selection through the process of options refinement and public consultation.

3.5.2 During PCF Stage 2, those shortlisted options identified during PCF Stage 1 (refer to Table 2 above) were subject to a more detailed engineering, traffic, economic, safety, environmental and operational appraisal. Those options that performed satisfactorily against the project objectives, assessment criteria and relevant policy objectives were presented to the public during a non-statutory consultation in Summer 2019. Detail on this process can be found in the Scheme Assessment Report (SAR) published January 2020.

3.5.3 Comments received were analysed, which informed further refinement of the cost estimate for the preferred option (including allowance for risk), and for the environmental impact assessment, traffic forecasts and economic benefits to be refined if required. This environmental impact assessment was informed by the Environmental Assessment Report (EAR), the main purpose of which was to provide an initial environmental assessment of the options presented at this Stage. The EAR was primarily based on desk study information supported with some preliminary focused surveys.

Public consultation 2019

3.5.4 Non-statutory public consultation ran in early Summer 2019 (refer to the Public Consultation Brochure, published by Highways England in Summer 2019). During this consultation stakeholders provided feedback that informed the themes for assessment of the options considered. These themes further informed Option Selection of PCF Stage 2 and the eventual selection of the Preferred Route.

3.5.5 These consultation sessions sought to provide a range of opportunities to provide feedback on options. This included holding 21 events in local areas along the route, as well as meetings with key stakeholders such as local planning authorities, parish councils, ward representatives, landowners, local residents and other road users. Further detail can be found in the Options Consultation Report, published by Highways England in Spring 2020.

3.5.6 Information provided at these consultation events focused on the options proposed for each scheme. The responses from these consultation exercises informed the selection of the Preferred Route for each of the schemes that form the project. Those who engaged with and responded to this consultation demonstrated that there was overwhelming support for the need to make improvements to the A66, although it is acknowledged that this is not necessarily representative of those stakeholders who did not engage with or respond to the consultation.

Preferred Route Announcement May 2020

3.5.7 The Preferred Route Announcement for the A66 Northern Trans-Pennine project was made in May 2020 following public consultation and option selection.

3.5.8 Public opinion and stakeholder feedback was key to developing the Preferred Route, as was the consideration of planning policy, environmental impacts and opportunities for mitigation for the options considered. For detail of additional factors considered, refer to the PRA documentation.

3.5.9 The Preferred Route was as shown in Figure 2 and detailed in Table 3. It identified six sections (referred to as schemes) of single carriageway for upgrade to dual carriageway standard along the A66. In total, the Preferred Route covered approximately 30km of the A66. Detail on each of the schemes can be found in Chapter 5 below.

The preferred route

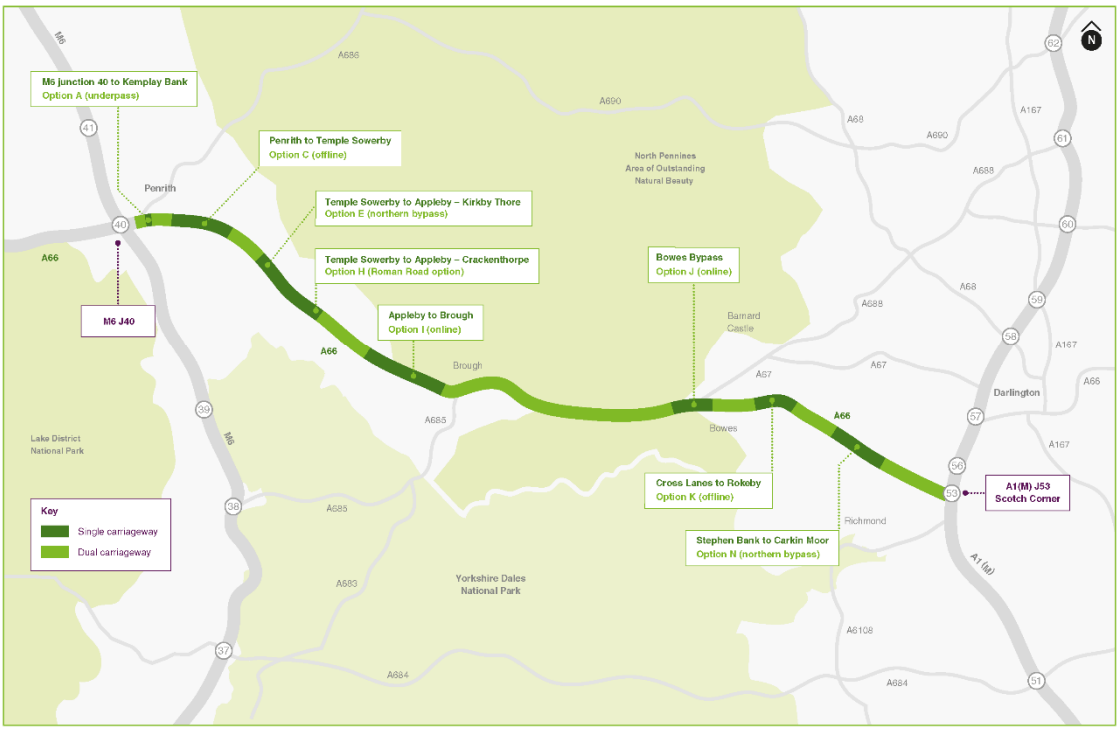


Figure 2 Preferred Route as announced in May 2020

Table 3 Preferred Route as announced in May 2020

Scheme	Preferred Route Option	Developed from PCF Stage 1 Option
M6 J40 to Kemplay Bank Roundabout	Option A	2B
Penrith to Temple Sowerby	Option C	4A
Temple Sowerby to Appleby – Kirkby Thore	Option E	6J1
Temple Sowerby to Appleby – Crackenthorpe	Option H	6G2
Appleby to Brough	Option I	8C1 + 8A2
Bowes Bypass	Option J	10A
Cross Lanes to Rokeby	Option K	12A
Stephen Bank to Carkin Moor	Option N	14F

4. Design development process

4.1 PCF Stage 3 Preliminary Design

4.1.1 As described above the A66 Northern Trans-Pennine project has been progressed through Highways England's PCF Stages 1 and 2 and is now at PCF Stage 3 Preliminary Design, which includes:

- Undertaking surveys, such as topographical, geotechnical and environmental surveys, to provide further information about the route and its surroundings.
- Community consultation including exhibitions, completing consultation reports and resolving outstanding issues where possible.
- Developing the preliminary design of the Preferred Route in line with new data obtained.
- Preparing the draft Development Consent Order application.
- Undertaking the Preliminary Environmental Information Report for Statutory Consultation, plus the Environmental Impact Assessment and Environmental Statement to support the DCO application.
- Contractor engagement, including access to Highways England's regional Delivery Integration Partners (DIPs).

4.1.2 This work is undertaken alongside design development, which Chapter 5 below sets out for each scheme along the route of the A66 Northern Trans-Pennine project. This includes where additional assessment and/or appraisal has been required.

Design development during PCF Stage 3 Preliminary Design

4.1.3 Development of design as part of PCF Stage 3 has been based on a number of design principles; further information on these can be found in the Project Design Report, and are summarised as shown in Figure 3:

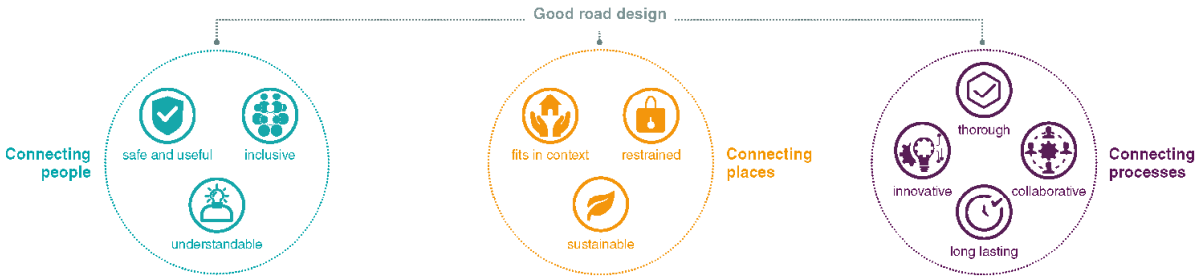


Figure 3 PCF Stage 3 design principles

4.1.4 In practice, this means integrating where possible the following design features for the lengths of new and improved carriageway:

- Typically, each carriageway will comprise two standard 3.65m lanes in each direction, 1.00m hard strips and a central reserve.
- Typically, a minimum verge width of 2.50m will be provided, though increased as required to provide adequate visibility, highway drainage, communication ducts and street furniture.

- No right turn junctions will help to ensure free-flowing traffic. A continuous safety barrier will be included in the central reserve.
- Side roads will be designed as left on/left off junctions if a replacement provision is being provided.
- Side roads and private means of access will be gathered where appropriate to minimise the number of direct accesses onto the A66.
- Compact grade-separated junctions will be utilised.
- Design reflects local context, understood through engagement with the local community.

4.1.5 Construction and buildability have been taken into account during PCF Stage 3 Preliminary Design. However, whilst each scheme (and alternatives considered within a scheme, where relevant – refer below) has its own context and bespoke elements such as topographical, land or structure requirements, schemes share a number of construction principles which will be core to the design and delivery of the project. Further details on these principles, and the wider indicative methods which will be used to construct the project, are set out in the Draft Construction Method Statement (CMS) which will also be available for review as part of the Statutory Consultation in Autumn 2021. This document is produced primarily to enable decision makers, local communities and other interested parties to understand the nature of the works and the various construction activities associated with the project.

4.1.6 Construction impacts have been considered in route selection.The strategy for most schemes has been to look to identify an earthworks balance where material is excavated and then deposited to achieve a net balance, reducing material movements, disturbance and other associated construction impacts.

4.1.7 Traffic management during construction has also been considered during Preliminary Design. The Draft CMS does not serve as a detailed traffic management guide but instead outlines the key traffic management principles which will be reflected in the bespoke traffic management plans. It is expected that during periods of construction there will be some limitations imposed on traffic, with some minor diversions expected for a small percentage of traffic wanting to make shorter journeys. Through efficient design, construction activities will be optimised to maintain traffic on the existing A66 for as long as possible. Works will be divided into three main sections: eastbound; westbound; and interface elements.

4.1.8 Impacts on utilities have also been considered. Whilst disruption will be minimised, construction of the project will require the diversion, relocation or protection of several existing utility assets including water, wastewater, electricity, gas and telecommunications. Wherever possible, services will be maintained with engineered solutions sought to overcome challenges. Consultation will be undertaken with service providers and stakeholders regarding affected utilities services. Further details on these principles, and the wider indicative methods which will be used to construct the project, are set out in the Draft CMS.

4.1.9 Highways England has a number of regional partners known as Delivery Integration Partners to assist with construction of the project. These DIPs work collaboratively together with the project team to allow construction and buildability considerations to be integrated throughout preliminary design and decision making. This has also involved consideration of constraints and gathering the necessary information to produce a delivery programme for construction of the project.

Assessment and appraisal of alternatives

4.1.10 Whilst designs for all schemes have been refined to account for new information obtained during PCF Stage 3 Preliminary Design, three schemes have also had alternative route or junctions assessment and appraisal work undertaken. The alternatives considered within these schemes are:

- Scheme-wide route alternatives within the Temple Sowerby to Appleby scheme (refer to Section 5.5).
- Localised route alternatives within the Appleby to Brough scheme (refer to Section 5.6).
- Junction alternatives within the Cross Lanes to Rokeby scheme (refer to Section 5.8).

4.1.11 The additional assessment and appraisal work associated with these alternatives was necessary for these schemes to test, check and challenge previous findings and to ensure the project continued to meet its objectives. Opportunities to further reduce the environmental and ecological impact as well as the impacts on designated areas and features (such as the Area of Outstanding Natural Beauty, Special Area of Conservation, Special Protection Area and Scheduled Ancient Monuments present along the route) were also considered as part of the evaluation of the alternatives.

4.1.12 The requirement for alternatives assessment and appraisal work for each of these schemes has arisen from consideration of scheme-specific issues. Due to the scale of deviation from the PRA for Temple Sowerby to Appleby, this resulted in a new longlist of concept-level alternatives being developed. An initial sifting process, based on the principles of PCF Stages 1 and 2, was adopted to rationalise the number of alternatives down to those that were promotable based on the information available at the time of the sift.

4.1.13 Following rationalisation of these alternatives, the process of reviewing and assessing them has been undertaken consistent with the approach adopted for the other schemes where alternatives have been developed to concept stage, leading to a comparative assessment.

4.1.14 This comparative assessment utilised a multi-disciplinary sifting matrix identifying discipline criteria and sub-criteria as shown in Table 4 below. These criteria are aligned to the project objectives (refer to Chapter 2) and government guidance and have been used to assess alternatives identified during the design process against the developed PCF Stage 2 options.

Table 4 Discipline-specific assessment criteria for sifting matrices

Engineering	Highways standards compliance, utilities, geotechnics and earthworks, structures, drainage and hydrology, Construction Design Management (CDM), construction cost, buildability
Environment (during construction and operation)	Biodiversity, road drainage and water environment, geology, soils, contaminated land and groundwater, noise and vibration, landscape and visual, population and human health, air quality, material, assets and waste, cultural heritage, climate
Traffic and economics	Traffic volume, journey time savings, safety, economy, accessibility (including walking, cycling and horse-riding opportunities)
Stakeholders	Land take, residential, commercial, recreation and leisure, wider community issues
Policy conformity	National Policy, Local Development Plan

4.1.15 The performance of a proposed alternative for a scheme was recorded as having a better, neutral or worse impact with respect to each of these criteria when compared to the baseline. Explanation and justification for these assessed outcomes have been recorded in the matrices.

4.1.16 Following the assessment against individual criteria the assessment matrix was considered holistically by the integrated project team using professional judgement and evaluation to determine a preference based on the balance of all the factors presented. No specific weighting mechanism was used albeit the relevance of assessment impacts such as policy conformity and the likelihood of development consent being granted were given greater consideration during the assessment and subsequent reviews.

4.1.17 Policy conformity as outlined above was critical to review and assessment of alternative designs developed during PCF Stage 3 Preliminary Design, as any proposals taken forward to application for a DCO must conform with national policy. Section 104(3) of the Planning Act 2008 requires that:

> *"(3) The [Secretary of State] must decide the [DCO] application in accordance with any relevant national policy statement, except to the extent that one or more of subsections (4) to (8) applies."*

4.1.18 For the schemes where alternatives to what was announced as part of the Preferred Route in May 2020 are proposed, the relevant national policy statement that applies is the National Networks National Policy Statement (NNNPS) and its associated policies. Within this, there are key policy tests set out regarding development within internationally and nationally designated sites such as the Special Area of Conservation at Temple Sowerby to Appleby, the Area of Outstanding Natural Beauty at Appleby to Brough and Bowes Bypass, and the Grade II* Registered Park and Garden at Rokeby Junction. Specific requirements are outlined in 5.5, 5.6 and 5.8 below as appropriate.

4.1.19 Review of these policy requirements is necessary to ensure that the DCO application is evidence based, justified, accepted and ready for Examination. It is important that these issues are considered now at the pre-application stage of the DCO, to ensure sufficient time to obtain and consider feedback through consulting on design development and alternatives.

4.1.20 Copies of all the sifting matrices produced to assess alternatives for Temple Sowerby to Appleby, Appleby to Brough, and Cross Lanes to Rokeby can be found in Appendix A. Plans and profiles for the alternatives considered for these three schemes can be found in Volume 2 of the Route Development Report.

4.1.21 A preferred alignment is presented at Statutory Consultation for all schemes. Detail for each scheme is provided in Chapter 5 below, with plans and profiles provided in Volume 2 of the Route Development Report. As part of the Statutory Consultation, consultees will be invited to provide feedback on the preferred alignment and provide their comments formally through that channel where they will be reviewed and regard given to them in the final preparation of the application for development consent. Information will be provided as part of the Statutory Consultation on all the alternatives considered.

Stakeholder engagement throughout PCF Stage 3 Preliminary Design

4.1.22 For the project as a whole, there has been ongoing stakeholder and public engagement throughout PCF Stage 3 Preliminary Design to inform decision making and documents such as the PEIR (produced for Statutory Consultation in Autumn 2021) and the Environmental Statement (to be provided in Spring 2022 to support the DCO application).

4.1.23 This has included engagement with landowners, local planning authorities, statutory environmental bodies, other statutory consultees and other organisations regarding emerging designs, the assessment methodology and baseline data. Design reviews (including with the Design Council, an independent charity and the government's advisor on design), and topic-specific focus groups have also informed the process.

4.1.24 A Project Update was provided in Winter 2020, which included a virtual public engagement event to ensure the project complied with Covid-19 restrictions in place at the time. This update provided further detail of the development of the Preferred Route, including junction locations and emerging junction layouts. Hard copies of engagement materials were distributed to homes and businesses along the length of the project to ensure those with limited or no internet access could take part in the engagement process. Phone consultations and online chat forums were also available to enable stakeholders to provide feedback, with views sought from landowners and local communities in particular. This feedback has since informed the design development.

4.1.25 For those schemes where alternatives have been developed during PCF Stage 3 Preliminary Design, public engagement on the alternatives has informed assessments. This engagement has included in-person events held in Kirkby Thore, Warcop and Barnard Castle through July and August 2021.

4.1.26 Throughout PCF Stage 3, engagement and liaison has continued through a network of public liaison officers working on the ground. Engagement has been undertaken with stakeholders such as landowners, residents, business owners, community liaison groups and users of the A66 route, including emergency services and hauliers. This engagement has been in-person where it has been possible to comply with Covid-19 restrictions in place at the time. Otherwise, telephone conversations and correspondence have been used to ensure continued engagement with interested and affected parties throughout Preliminary Design.

4.1.27 Full detail on the consultation undertaken for the project can be found on the project website and in consultation materials produced to date.

5. Design development of schemes

5.1.1 Design development during PCF Stage 3 Preliminary Design is discussed below for all schemes. Supporting information such as assessment matrices, graphics, illustrations showing the alternatives considered at the various stages of the assessments where relevant, will be provided as necessary or reference made to where this information is available in other documentation.

5.2 M6 Junction 40 Penrith

Description of existing scheme

5.2.1 M6 Junction 40 Penrith is an existing grade-separated junction on the M6 motorway to the south-west of Penrith, with strategic and local significance. It is a signal controlled roundabout junction serving access and egress to and from the M6 and the A66 with an additional fifth arm to the A592, serving Penrith to the north.

Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection

5.2.2 At PCF Stage 1 Option Identification, a preliminary assessment of the junction indicated that it was likely the operational capacity of the existing junction would be exceded following full dualling of the A66 as it became a more attractive route for users, resulting in an increase in traffic at the major junctions to access it. This increase in traffic would likely lead to greater congestion and tailbacks on the junction approaches if circulation were not improved. Further information can be found in the PCF Stage 1 Technical Appraisal Report.

5.2.3 At PCF Stage 2 Option Selection, improvements to the capacity of the M6 Junction 40 were proposed based on analysis of available data. However, it was acknowledged that these options would require further analysis and development at PCF Stage 3 Preliminary Design, to accommmodate the interdependency of the junction and the A66, drawing on more detailed traffic modelling. Further information can be found in the PCF Stage 2 Scheme Assessment Report.

5.2.4 As such, proposals for M6 Junction 40 were not presented at public consultation in 2019 in detail due to the uncertainty and need for preliminary design of the wider route to be considered.

Public consultation Summer 2019

5.2.5 As outlined above, initial proposals for improvements to M6 Junction 40 were excluded from the non-statutory consultation held in Summer 2019, as its focus was to seek views on the Preferred Route options for the improvement schemes on the A66. Consultation material noted that high-level capacity assessments had been carried out that confirmed the existing junction would not provide adequate capacity in its current form once the A66 project is built. Figure 4 below was included in consultation material to indicate the parts of the junction likely to be impacted by works though it was noted that further traffic analysis would be required to support preliminary design.

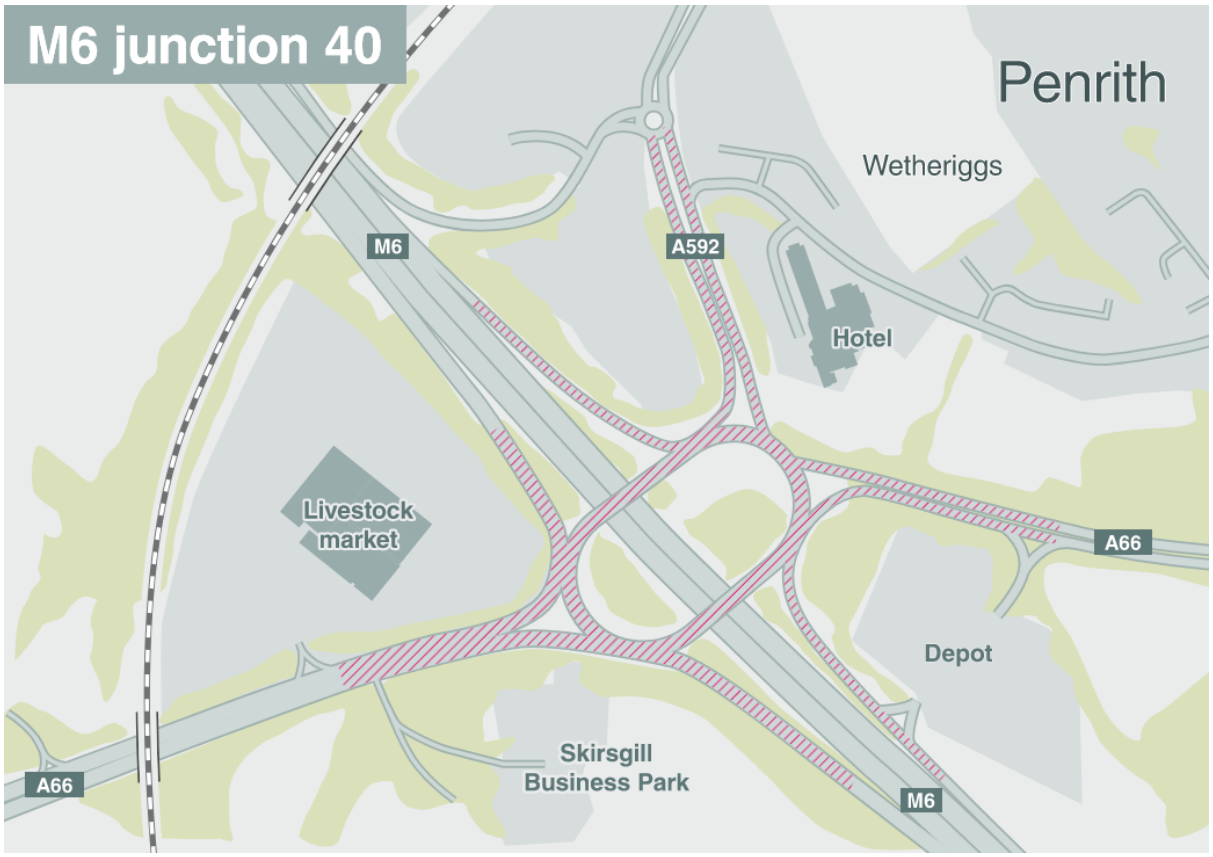


Figure 4 M6 Junction 40 as shown at public consultation Summer 2019

Preferred Route Announcement May 2020

5.2.6 The Preferred Route Announcement of May 2020 did not explicitly reference proposals for M6 Junction 40 Penrith. As with other junctions along the route, proposals were to be progressed once a Preferred Route had been selected and developed.

PCF Stage 3 Preliminary Design

5.2.7 At PCF Stage 3 Preliminary Design, more detailed traffic modelling has been conducted that considers the interactions of road users both along the route of the A66 and with the junctions to it.

5.2.8 At PCF Stage 2 Option Selection it was assumed that an extra lane may be required on the circulatory carriageway of the M6 Junction 40. PCF Stage 3 traffic modelling of the junction has confirmed that this offers negligible benefits. This is especially true when construction complexity is accounted for, including significant impacts on operation of the Penrith Interchange Roundabout and the M6 below during construction.

5.2.9 Compared to the PCF Stage 2 proposed junction layout, the PCF Stage 3 junction layout proposed that:

- Instead of four circulatory lanes on the roundabout, three were proposed within the confines of the junction carriageway footprint and bridge deck whilst

maintaining all movements from all approaches. Spiral markings on the circulatory would be complemented by widened approaches with an increased number of lanes to improve flow and capacity.

- Instead of free-flowing left-turning lanes on the A66 and M6 off-slip approaches, the PCF Stage 3 arrangement proposed to widen the aforementioned approaches, remove the free-flowing left-turn and control all lanes on each approach under the same signal phase. With this lane arrangement, the active travel cycle and footway route can still be maintained with controlled crossings and a more suitable alignment can be achieved with less impact on accesses and less additional land take (particularly on the A592 approach, where Cumbria Police had highlighted a left-turning issue and the need to widen the approach to improve stacking and queuing capacity back to the M6).
- As proposed at PCF Stage 2, junction modelling confirmed that three lanes would be required between the M6 Junction 40 and Kemplay Bank Roundabout to maintain the desired operational performance of the A66 network and the alignment with the widened approiaches at M6 Junction 40.

5.2.10 The modelling and subsequent analysis undertaken demonstrated that during congested periods such as afternoon peaks, the PCF Stage 3 layout performs better from a capacity perspective than the PCF Stage 2 layout. There was little difference in operational performance of the junction layouts for the morning peak traffic flows.

5.2.11 As such, it was demonstrated that for expected peak flows, an improved level of operational capacity can be achieved without having to widen the circulatory carriageway of M6 J40 and constructing free-flow left-slip lanes. Instead, widening and controlling the approach lanes and providing a spiral lane arrangement on the roundabout will achieve a comparable improved performance. For further detail, refer to the Local Traffic Report provided at Statutory Consultation.

5.2.12 In addition, to provide a better and safer access into Skirsgill Depot, it is proposed to relocate the existing access approximately 95m to the east.

5.2.13 The proposals presented for Statutory Consultation in Autumn 2021, on which views are being sought are as summarised below. These proposals will increase capacity and improve traffic flow at the junction.

Statutory Consultation Autumn 2021

5.2.14 Plans and profiles for the proposals taken forward to Statutory Consultation in Autumn 2021 can be found in Volume 2 of the Route Development Report.

5.2.15 M6 Junction 40 will provide a three-lane circulatory carriageway with spiral markings on the current roundabout, as outlined in 5.2.9. The A66 between M6 Junction 40 and Kemplay Bank Roundabout will be widened to three lanes in each direction. Widening will be required on the following five approach arms to provide additional lanes and a dedicated left-turn facility, each controlled under its own signal phase:

- M6 North
- M6 South
- A66 East
- A66 West
- A592 Ullswater Road.

5.2.16 It is intended that all existing accesses will be accommodated. The scheme will also include signal controlled crossings to serve the existing shared cycle and footway connection on the western side. Existing pedestrian and cycle connections will be retained on the Penrith South Bridge western side alongside Skirsgill Business Park. This will also be the case for the Skirsgill north-west pedestrian and cycle connections. The existing cycle and pedestrian route to Skirsgill Depot will be directed through a controlled crossing at the roundabout, due to safety considerations with the existing uncontrolled crossing which would be exacerbated by the widening of the A66 eastern arm to three lanes.

5.2.17 The existing police platform located on the Penrith North Bridge to the eastern side, between the M6 off-slip and A592, will be retained in its current location. The existing police platform on the Penrith South Bridge western side will be relocated further into the widened verge to allow for the new dedicated left-hand lane from the M6 off-slip.

5.2.18 Whilst the improvements proposed are within the highway boundary and do not require additional land take, land take is shown on plans in the area to accommodate potential requirements for environmental mitigation to be delivered as part of the scheme. The land required for the scheme will be confirmed through the application for development consent.

5.3 M6 Junction 40 to Kemplay Bank Roundabout

Description of existing scheme

5.3.1 This scheme runs from M6 Junction 40 at Penrith through to east of Kemplay Bank Roundabout; an at-grade five-arm roundabout immediately south of Penrith that operates under full signal control. Currently, the A66 is two lanes in each direction, eastbound and westbound.

5.3.2 Of the five arms of Kemplay Bank Roundabout, two serve the A66, with two-lane entries and exits towards the M6 at the west and the eastbound A66 at the east. A further two arms serve the A6 with single carriageway flared entries and exits towards Penrith in the north and Shap in the south. The fifth arm of Kemplay Bank Roundabout serves the A686 Carleton Avenue, to the north-east of the junction.

5.3.3 Emergency services also have direct access onto Kemplay Bank Roundabout from the south-east, between the A66 westbound arm and the A6 southbound arm.

5.3.4 Kemplay Bank Roundabout is constrained by Penrith Community Hospital to the north, and Penrith Community Fire Station to the south. Cumbria Constabulary and the Fire Service access the A66 via an underpass on the A686 (Carleton Avenue) to the East of Kemplay Bank Roundabout. Kemplay Bank Roundabout often suffers from high levels of congestion, affecting the flow of traffic along the A66 and for north and southbound traffic using the A6. This bottleneck can also have an impact on Junction 40 of the M6. Vehicles slowing down as they approach Kemplay Bank Roundabout can lead to potential safety issues, creating problems for both east/west and north/south traffic as it passes through the roundabout.

5.3.5 This section of the A66 carries approximately 30,200 vehicles per day, 19% of which are heavy goods vehicles.

Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection

5.3.6 At PCF Stage 1 Option Identification, three options were identified for consideration to improve the A66 between M6 Junction 40 and Kemplay Bank Roundabout. Further detail can be found in the PCF Stage 1 Technical Appraisal Report.

5.3.7 At PCF Stage 2 Option Selection, it was confirmed that the approach roads and junction at Kemplay Bank require improvement. This led to the proposal to widen the A66 between M6 Junction 40 and Kemplay Bank Roundabout to three lanes in each direction. Widening would consequently be required on the five approach arms to provide additional lanes and dedicated left-turn capability, each controlled under its own signal phase.

5.3.8 Two options, either an underpass or an overpass for the A66 through Kemplay Bank, to provide an uninterrupted route for the A66 eastbound and westbound were taken forward to Statutory Consultation. Refer to the PCF Stage 2 Scheme Assessment Report for further detail of these options.

Public consultation Summer 2019

5.3.9 The two options, Option A and Option B presented at public consultation in Summer 2019 outlined the need to improve the approach roads and junctions along the section of the A66 from M6 Junction 40 to Kemplay Bank Roundabout. The public consultation focused on determining a preference for either an underpass or overpass option at Kemplay Bank Roundabout. Both options included access for emergency services onto the A6 to the south-east of the roundabout, rendering the existing access underpass redundant. Direct access for the Fire Service onto the roundabout was also to be maintained as existing. Refer to the 2019 Public Consultation Brochure for further detail.

5.3.10 The PCF Stage 2 Scheme Assessment Report stated that there were no post-consultation design changes to the options proposed.

Preferred Route Announcement May 2020

5.3.11 The Preferred Route Announcement of May 2020 concluded that the underpass option was preferred for this section of the route, primarily due to it having a less negative environmental impact than the alternative overpass option.

5.3.12 It was noted that both visual and noise impacts could be expected to be less with an underpass option when compared to an overpass. The underpass option also removed the need to purchase a larger area of the local recreation grounds to the north of Kemplay Bank Roundabout.

PCF Stage 3 Preliminary Design

5.3.13 At PCF Stage 3 Preliminary Design, these proposals have been developed further for Statutory Consultation in Autumn 2021. This development is as outlined below.

5.3.14 The main principles of the Preferred Route as announced in May 2020 have been retained, however it is now proposed to retain and extend the emergency services access underpass to the A686 in its current locations.

5.3.15 This proposal is the result of ongoing engagement with Cumbria County Council and Cumbria Constabulary as part of PCF Stage 3 Preliminary Design development. Concerns were raised about the proposed access route to the A6 and following more

detailed traffic modelling it became clear that what was proposed at Stage 2 was not a viable solution for this section of the works. The modelling showed that the operation of the additional proposed signalised junction on the A6 accessing the Fire and Police site included within the Stage 2 design could potentially be compromised by queueing traffic either from the Kemplay Bank Roundabout signals or the Eamont Bridge Signals.

5.3.16 As part of the design development process several alternatives were developed including access on to the A6 as well solutions to the east to connect to Carleton Avenue via an overbridge. A sketch of these options is shown in Figure 5 below.

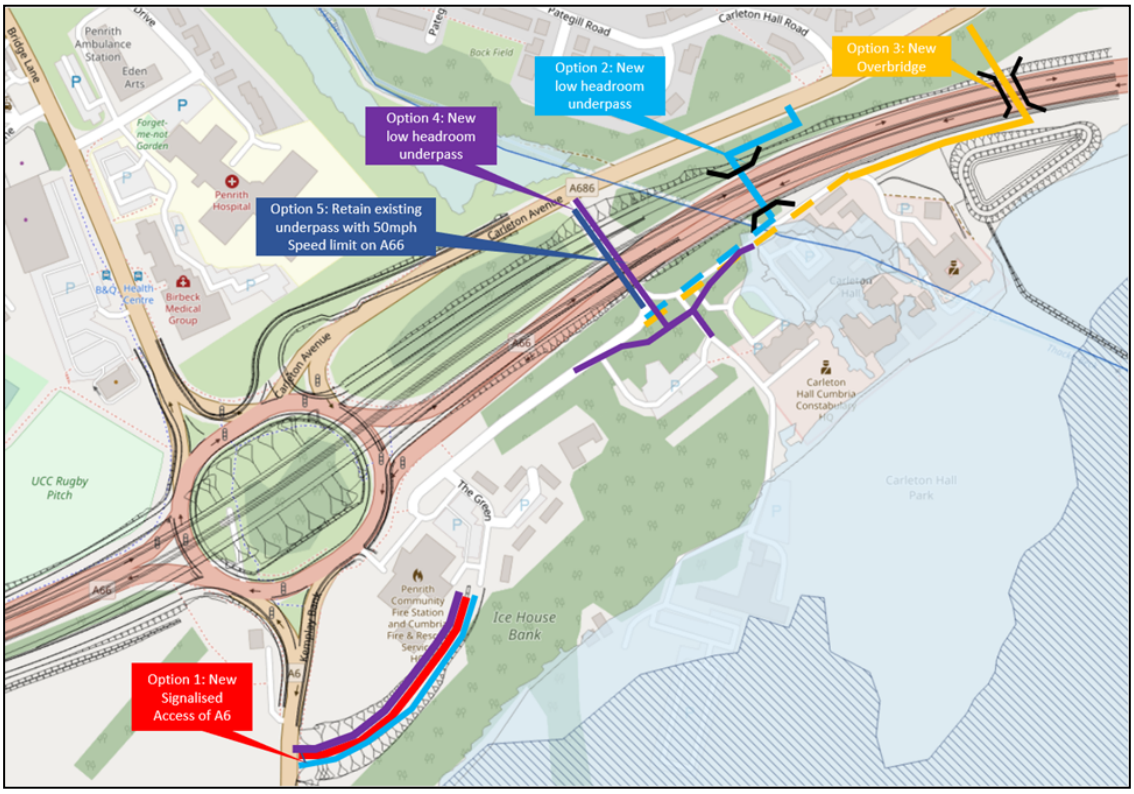


Figure 5 Alternatives developed during PCF Stage 3 Preliminary Design for Kemplay Bank

5.3.17 These alternatives were assessed with respect to environmental considerations, traffic modelling and impact on journey times, buildability, estimated budget costs and impact on programme. During this process, regular engagement with Cumbria County Council, Cumbria Constabulary and Cumbria Fire and Rescue Service ensured that the design continued to be aligned with emergency services requirements.

5.3.18 In order to retain and extend the underpass in its current location the vertical geometry of the A66 needed to be tightened (both crest and sag curves). To achieve this it is proposed that the speed limit on the A66 between M6 Junction 40 Penrith and Kemplay Bank Roundabout will be 50mph (rather than 70mph) in both directions, for a section approximately 2.3km in length. With tighter vertical geometry it is possible to form the A66 underpass over a shorter length and thus retain the emergency services access underpass in its current location. A 70mph solution would have meant compromising the headroom at the underpass as it would take a longer distance to rise back up from the lowest point of the A66. This would limit the size of

vehicles that could use the underpass and hence severely impact the emergency services teams that currently use it.

5.3.19 Although route consistency at 70mph was a factor in developing the PCF Stage 2 options, the need to provide safe access for emergency services was considered of greater signficance during PCF Stage 3 Preliminary Design. It is also considered that the impact of reducing the speed limit along this section of the A66 would be limited, given traffic would likely be moving more slowly on approach to either M60 Junction 40 or Kemplay Bank Roundabout thereby creating better speed transition.

5.3.20 The PCF Stage 3 proposal has been received favourably by both Cumbria County Council and Cumbria Constabulary and will therefore be presented at Statutory Consultation in Autumn 2021. Further detail on engagement undertaken to develop the preliminary design proposals will be made available and reported on within the Consultation Report to be submitted with the DCO application.

Statutory Consultation Autumn 2021

5.3.21 Plans and profiles for the proposals taken forward to Statutory Consultation in Autumn 2021 can be found in Volume 2 of the Route Development Report.

5.3.22 The design being presented at Statutory Consultation in Autumn 2021 includes a new dual carriageway under Kemplay Bank Roundabout, allowing free-flowing traffic eastbound and westbound on the A66, improving access to Penrith and the A6. This scheme will include upgraded, replacement on- and off-slip roads to Kemplay Bank Roundabout allowing users to safely join and leave the A66 in both directions. Minor realignment of the A6 and A686 arms will be required to accommodate the new slip roads serving the local road network with links to Penrith, Eamont Bridge and other local settlements.

5.3.23 It is proposed that the A66 between M6 Junction 40 Penrith and Kemplay Bank Roundabout will have a speed limit of 50mph along this section of the route. This will have a number of benefits that include allowing the existing underpass from Carleton Avenue to the Cumbria Constabulary and Cumbria Fire and Rescue Service sites (to the south of the A66) to be retained. This underpass also serves as a key route for walkers, cyclists and horseriders and will be extended accordingly, to accommodate the widened A66.

5.3.24 Signalisation of the roundabout will be retained to facilitate safe crossing for walkers, cyclists and horse riders (WCHs) at all five arms. Cycleways and footways currently located through the centre of the roundabout will be re-routed around the roundabout. The current pedestrian and cycle route on the northern side of the A66 running between M6 J40 and Kemplay Bank Roundabout will be retained in the new design proposals.

5.3.25 A replacement lay-by will be provided on the eastbound carriageway (between M6 J40 and Kemplay Bank Roundabout). The existing lay-by on the westbound carriageway between Kemplay Bank Roundabout and M6 Junction 40 will be removed and will not be replaced, due to insufficient space to accommodate one safely.

5.4 Penrith to Temple Sowerby

Description of existing scheme

5.4.1 The A66 between its junction with the B6262 at Brougham and the Temple Sowerby Bypass is single carriageway and follows the route of the old Roman Road. Whilst

between Brougham and the Center Parcs junction the existing horizontal and vertical alignment generally appears to be to standard, beyond Center Parcs to the Temple Sowerby Bypass both the horizontal and vertical alignments are poor and therefore unsuitable for incorporation into the permanent works.

5.4.2 Variations in carriageway width and horizontal and vertical alignment make for an inconsistent driving experience thus creating safety issues. There are several junctions and direct accesses along this section, with a number of them being private means of access to residential and commercial properties. These accesses can further exacerbate the safety concerns outlined above. Three direct accesses have right turn facilities for opposing traffic, where it can be difficult for cars to join the main highway:

- The B6262 junction.
- The access to the United Utilities sewage treatment plant.
- The access to Center Parcs.
- The access to the former Llama Karma Kafé (although this is shared with an adjacent gated field access).

5.4.3 There are a further four major/minor priority direct accesses serving Whinfell Park, Whinfell Cottage and two at the Hamlet of Lane End. There are currently more than fifteen field accesses between Brougham and the section of dual carriageway at Temple Sowerby.

5.4.4 Other features include the provision of an unsegregated lay-by on the eastbound carriageway towards the end of this section. This lay-by generally displays several sub-standard features, e.g. short merge and diverge taper lengths and a short stacking length.

5.4.5 There are no WCH facilities in this section although an on-road cycle lane is marked at the commencement of the Temple Sowerby Bypass which diverts users to the local highway network. There are bus stops at three locations along this section, Whinfell Park/Cottage (westbound and eastbound stops), School House at Lane End (westbound and eastbound stops) and Whinfell House at the start of Temple Sowerby Bypass (westbound and eastbound stops).

5.4.6 This section of the A66 carries approximately 19,500 vehicles per day, 24% of which are heavy goods vehicles.

Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection

5.4.7 At PCF Stage 1 Option Identification, three options were identified for consideration to improve the A66 between Penrith and Temple Sowerby. Each of these sought to dual the section of single carriageway, and are detailed in the PCF Stage 1 Technical Appraisal Report.

5.4.8 At PCF Stage 2 Option Selection, these three options were reduced to two. One option was discounted for reasons including route length, severance to properties and the need for additional structures and service roads leading to it being poorer value for money than the alternatives proposed. For further details refer to the PCF Stage 2 Scheme Assessment Report.

Public consultation Summer 2019

5.4.9 Two options, Option C and Option D were presented at public consultation in Summer 2019. Both consisted of online dualling of the existing carriageway, utilising part of the existing infrastructure for westbound traffic, with a new carriageway predominantly on the northern side of the existing A66 for eastbound traffic.

5.4.10 As the A66 runs adjacent to the hamlet of Lane End and the village of High Barn, the two options proposed were as follows:

- Option C was an offline bypass to the south of High Barn, avoiding the need for any property demolition. From Whinfell Park Farm the road would divert to the south to avoid the hamlet of Lane End, then re-join the A66 at Swine Gill before continuing to the Temple Sowerby Bypass.
- Option D was an online option that would not divert the road away from High Barn and would therefore require the demolition of some buildings.

5.4.11 Both options also proposed a new junction to be constructed at Center Parcs to provide access to the holiday park and local roads.

5.4.12 Between Brougham Castle and Whinfell Park Farm, both options followed the line of the existing A66, utilising the corridor of the existing carriageway where possible. Both the options proposed would have involved the realignment of some local roads and alternative routes would be provided to nearby junctions where required, improving safety and ease of access for local road users.

5.4.13 The PCF Stage 2 Scheme Assessment Report stated that there were no post-consultation design changes to the options proposed.

Preferred Route Announcement May 2020

5.4.14 The Preferred Route Announcement of May 2020 concluded that the option that bypasses the properties at High Barn (Option C) was the preferred option for this section of the route, primarily because it would not require the demolition of the buildings in High Barn and the potential impact this would have on businesses and residents. The alternative option (Option D) did not divert the current road away from High Barn and would therefore have required demolition of properties.

5.4.15 It was noted that Option C also positions the route further from the hamlet of Lane End, which would help to mitigate the noise and visual impact on residents there.

PCF Stage 3 Preliminary Design

5.4.16 At PCF Stage 3 Preliminary Design, these proposals have been developed further for Statutory Consultation in Autumn 2021 and are as outlined below.

5.4.17 During PCF Stage 3 design development, the potential to improve the scheme local to High Barn was explored. It was determined that the geometry of the alignment could be improved and overall land take reduced if the route moved to the north. However, this would require the acquisition and demolition of properties at High Barn. This change from the Preferred Route Announcement has been discussed during meetings and conversations with the landowners concerned and following a review of the low architectural significance of the properties and the potential impacts on farming land of the Preferred Route, a decision was taken to acquire the property at High Barn and re-route the alignment accordingly. This may lead to an increase in noise and visual impact at the hamlet of Lane End which will be subject to further assessment and provision of mitgation as appropriate.

Statutory Consultation Autumn 2021

5.4.18 Plans and profiles for the proposals taken forward to Statutory Consultation in Autumn 2021 can be found in Volume 2 of the Route Development Report.

5.4.19 Upgrading this section of the route will provide full dualling of the existing A66 single carriageway section between Penrith and Temple Sowerby. The works for this section of the route will predominantly involve online widening using the existing carriageway to form one side of the new dual carriageway. The second carriageway will be constructed to the north of the existing carriageway.

5.4.20 A compact grade-separated junction will be constructed at Center Parcs to connect this facility and local roads with the new alignment of the A66. The junction will cater for all movements on and off the A66, making it easier and safer for users to join the main highway and preventing tailbacks at peak times.

5.4.21 A new westbound left on/left off junction will be introduced to the B6262 to facilitate safe access to the local road network. An eastbound left on/left off junction will facilitate access to St Ninian's Church on Winderwath Estate. The new left on/left off junctions will be provided with associated acceleration and deceleration lanes to enable safe access to homes and businesses.

5.4.22 It is proposed that an existing access serving Whinfell Holme Wastewater Treatment Works will be converted to an eastbound left on/left off. It is possible that this access will need to be relocated to the east to facilitate widening of the A66 over the existing Shell Oil pipeline and maintain appropriate cover. This will be confirmed prior to DCO application following further investigations to confirm the line and level of the pipeline.

5.4.23 As a result of works to widen the carriageway, the Llama Karma Kafé hospitality business will close and the property and land will be acquired by Highways England. The proximity of the business to the carriageway meant that the land required for the scheme would effectively extinguish it. Thus, through dialogue and engagement with the landowners it was agreed that Highways England would purchase the site. Highways England continue to look at the longer-term use of the building including the potential that it may be converted to a community venture and/or an amenity parking area with footway linkage to the Countess Pillar English Heritage site.

5.4.24 A number of access tracks have been provided to the north and to the south of the route to facilitate access to ponds for maintenance purposes and accommodate landowner movements. Two accomodation structures have been included within this section of the route to facilitate agricultural vehicles crossing the A66 as a result of converting existing accesses to left on/left off arrangements.

5.5 Temple Sowerby to Appleby

Description of existing scheme

5.5.1 For the purposes of this Route Development Report, Temple Sowerby to Appleby is considered as one scheme, rather than the two that have been previously presented at PCF Stages 1 and 2, to enable a more considered approach to assessments. However, this scheme may be split into two sections, Kirkby Thore and Crackenthorpe, for presentation purposes in the material produced for Statutory Consultation in Autumn 2021.

5.5.2 The A66 between the Temple Sowerby and Appleby bypasses includes more than 8km of single carriageway, which it is proposed to be dualled as part of the overall

route upgrades. The carriageway along this section of the A66 is generally inconsistent, with narrow verges, poor alignment and substandard hardstrips.

5.5.3 The route is mostly located within agricultural pastureland and generally follows the route of the old Roman Road in a south-easterly direction. The route diverges from the Roman Road and passes through the Roman Camp located directly on the A66 east of Redlands Bank Farm. This Roman Camp is one of two Scheduled Ancient Monuments in the vicinity of the scheme, the other being Kirkby Thore Roman Fort and Associated Vicus, surrounding Kirkby Thore village to the south where it meets the existing A66. From the Roman Camp at Redlands Bank, the existing A66 continues southwards to pass Crackenthorpe before connecting to the Appleby Bypass.

5.5.4 There are several existing priority junctions along this section of the existing A66. On the eastbound carriageway, there is a bus lay-by in the diverge taper for Kirkby Thore junction.

5.5.5 At Kirkby Thore, there is single carriageway for a little over 3km alongside the village. This carriageway varies in width and there are several connections with local roads and private access points. A high number of HGVs pass through the village, including lorries accessing businesses to the north. Records show this section of the A66 suffers from high accident rates (potentially due to the poor horizontal and vertical geometry) and as such has already had its speed limit reduced from 60mph to 40mph. Kirkby Thore village is generally to the north of the A66 with a number of properties and businesses adjacent to the south and east with direct access to the A66, including Bridge End Farm and a BP fuel station.

5.5.6 Local to Crackenthorpe, there is single carriageway for approximately 4km alongside the community. The carriageway here also varies in width, with narrow verges and poor alignment presenting visibility issues for network users. There are also several connections with local roads and private access points where accidents could potentially occur.

5.5.7 In addition to the Scheduled Ancient Monuments noted above, the A66 between Temple Sowerby and Appleby also passes alongside the River Eden Special Area of Conservation (SAC) and crosses it where the road passes over Trout Beck, north-east of its confluence with the River Eden. The interaction of the proposed route with these designated sites has been a significant consideration to ensure proposals conform with national planning policy.

5.5.8 This section of the A66 carries approximately 16,500 vehicles per day, 27% of which are heavy goods vehicles.

Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection

5.5.9 At PCF Stage 1 Option Identification, ten options were identified for consideration to improve the A66 between the Temple Sowerby and Appleby bypases. Six options were proposed for the Kirkby Thore section of the scheme, and four options for the Crackenthorpe section. Each of the ten options sought to dual the section of single carriageway. Further information can be found in the PCF Stage 1 Technical Appraisal Report.

5.5.10 Following further analysis, four of the Kirkby Thore and two of the Crackenthorpe options were discounted and therefore not taken forward to public consultation in Summer 2019. Reasons for this included among others, longer journey times,

increased local severance and negative impacts on Scheduled Ancient Monuments. Detail on this appraisal process can be found in the PCF Stage 1 Technical Appraisal Report.

5.5.11 The options taken forward to PCF Stage 2 Option Selection were therefore routes which combined a Kirkby Thore proposal with a Crackenthorpe proposal. In addition, a new proposal was taken forward for the section alongside Kirkby Thore. Further information on this process can be found in the PCF Stage 1 Technical Appraisal Report and the PCF Stage 2 Scheme Assessment Report.

Public consultation Summer 2019

5.5.12 The options presented at public consultation in Summer 2019 were combinations as referenced above in 5.5.11, and were named Option E and Option F respectively for Kirkby Thore and Option G and Option H respectively for Crackenthorpe, for the purposes of the consultation. All four options upgrade the A66 in such a way that its route is diverted away from both Kirkby Thore and Crackenthorpe.

5.5.13 Kirkby Thore Option E proposed a new dual carriageway bypass to the north of Kirkby Thore as an extension of the current Temple Sowerby Bypass. This route proposed to pass through fields to the west before travelling away from the village to the north and east. Option E followed a route which is lower than the surrounding land which would help preserve the visual outlook of properties in the north of Kirkby Thore. An additional junction was proposed to improve access to Kirkby Thore village. As a consequence of location of this proposed junction, access was also improved for businesses in the area, which would serve to reduce HGV traffic through the village. Four new bridges would be required over the existing road network for Station Road, Main Street, Sleastonhowe Lane and the new Kirkby Thore junction to the north of the village. A new bridge over Trout Beck would also be required before the new road returns to the original alignment.

5.5.14 Kirkby Thore Option F proposed a new dual carriageway bypass to the south of Kirkby Thore as an extension of the current Temple Sowerby Bypass. This route proposed to pass through fields and follow the path of an old railway line before re-joining the current A66 just after the fuel station near Spitals Farm. This option would require additional underpasses to provide access for local farms, walkers, cyclists and horse riders, and the demolition of several buildings. A new junction would allow access to the former A66 and the village. The route passed to the south of the known Scheduled Ancient Monument extents, local to the sewage works.

5.5.15 Crackenthorpe Option G proposed a new dual carriageway bypass to the north of Crackenthorpe, with the route following the path of the old railway line. Two new junctions would be created to serve the villages of Bolton, Crackenthorpe and Long Marton. Option G proposed that the new road would re-join the current A66 just to the west of the Settle-to-Carlisle railway line.

5.5.16 Crackenthorpe Option H also proposed a new dual carriageway bypass to the north of Crackenthorpe, however for this option the route followed the original Roman Road to the north of Crackenthorpe and Roger Head Farm. Two new junctions would be created to serve the villages of Bolton, Crackenthorpe and Long Marton. Option H proposed that this option would also re-join the current A66 just to the west of the Settle-to-Carlisle railway line.

5.5.17 The PCF Stage 2 Scheme Assessment Report stated the following post-consultation design changes to the options proposed:

- The junction to the north of Kirkby Thore on Option E would be relocated to Main Street. This aligned the scheme objective of providing connectivity to the village of Kirkby Thore, with the added benefit of connecting to the north and businesses such as British Gypsum and other hauliers. Overall, this resulted in safety benefits for the village through completely removing non-access-related HGV movements from needing to enter the north of the village. It also brought economic and sustainabilty benefits by allowing the removal of an overbridge from the design whilst improving connectivity to businesses.
- For the Crackenthorpe section of the route, the possibilitiy of moving the alignment of Option H to the north as it passed Roger Head Farm to minimise the impact on the viability of this business was investigated.
- The eastbound arm of the junction at Crackenthorpe was also removed from the scheme and replaced with an upgraded junction at the Appleby Bypass to make greater use of existing infrastructure.

Preferred Route Announcement May 2020

5.5.18 The Preferred Route Announcement of May 2020 concluded that the northern bypass (Option E) was the preferred option for the Kirkby Thore section of the route, and the northern bypass furthest from the village (Option H) was the preferred option for the Crackenthorpe section of the route.

5.5.19 Option E was selected as it provides the opportunity to reduce traffic, particularly HGVs, passing through the village of Kirkby Thore. Although this route represented a longer journey time and may be more expensive than the alternative presented, it had reduced environmental impacts whilst still delivering the required improvements. This option also required fewer buildings to be demolished than the alternative Option F. The northern bypass (Option E) was not anticipated to impact on the wildlife corridor on the disused railway line, and also had lower negative impact on biodiversity and the Trout Beck floodplain than Option F.

5.5.20 Option H was selected as the more resilient option of the two proposed; there were diversions available for when accidents happen on the route. This option also avoided an area of potential landslips where remedial works may be required to mitigate this issue. Option H would be routed away from nearby watercourses and floodplains, whereas Option G would potentially have had impact on the River Eden and its floodplains. This preferred option allowed for improved access for non-motorised users to Appleby and adjacent villages by utilising the ‘old’ section of road. Impact on local landowners has also been reduced in selecting this option as the route follows natural features which mark the boundaries of properties, thus reducing land take.

PCF Stage 3 Preliminary Design

5.5.21 At PCF Stage 3 Preliminary Design, the proposals outlined in 5.5.18 through 5.5.20 above have been developed further for Statutory Consultation in Autumn 2021 and are as outlined below. This is part of natural design development that occurs when new data and analysis supplements previously available information, for example the outcomes of surveys and further stakeholder engagement. In addition, the PCF Stage 2 Option Selection work has been revisited to review whether the announced Preferred Route addresses legislative and policy requirements.

5.5.22 Figure 6 summarises the development of the scheme during PCF Stage 3 with respect to a number of alignment alternatives that have been assessed as detailed in the sub-sections that follow.

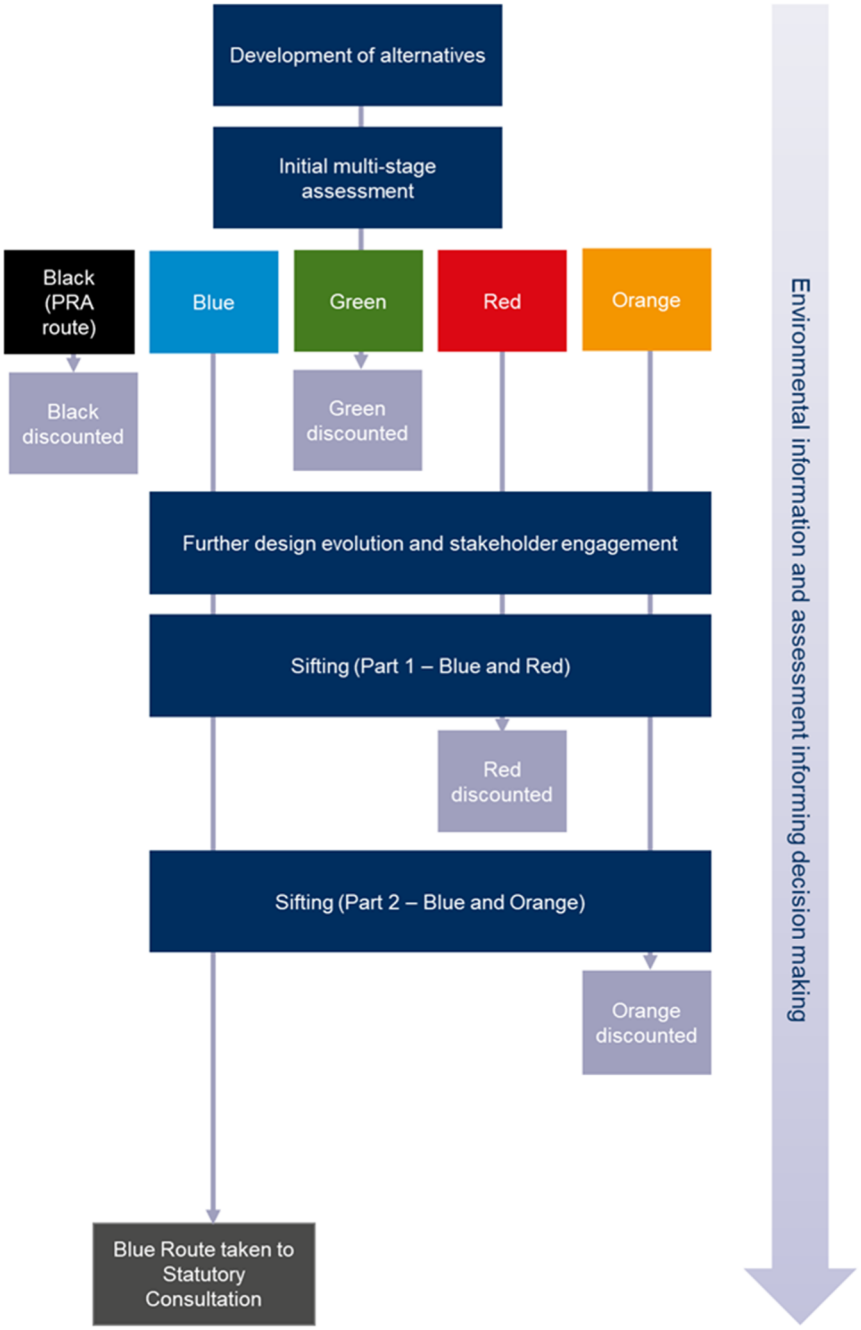


Figure 6 PCF Stage 3 scheme development summary for Temple Sowerby to Appleby

5.5.23 For Temple Sowerby to Appleby, design development work has been undertaken to ensure that the route taken forward minimises the impact of and potential damage to the River Eden Special Area of Conservation (SAC), which is protected as an internationally designated site by legislation and policy.

5.5.24 Within the NNNPS, paragraph 4.22 states:

"Prior to granting a Development Consent Order, the Secretary of State must, under the Habitats Regulations, consider whether it is possible that the project could have a significant effect on the objectives of a European site, or on any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects."

5.5.25 The key policy tests applicable for internationally designated sites are set out in paragraph 4.24 of the NNNPS and as such must be accounted for in assessment of route alignments for this scheme:

"If a proposed national network development makes it impossible to rule out an adverse effect on the integrity of a European site, it is possible to apply for derogation from the Habitats Directive, subject to the proposal meeting three tests. These tests are that no feasible, less-damaging alternatives should exist, that there are imperative reasons of overriding public interest for the proposal going ahead, and that adequate and timely compensation measures will be put in place to ensure the overall coherence of the network of protected sites is maintained."

5.5.26 Regarding assessment of alternatives, details are provided in paragraph 4.26 of the NNNPS, which states:

"Applicants should comply with all legal requirements and any policy requirements set out in this NPS on the assessment of alternatives. In particular:

- *The EIA Directive requires projects with significant environmental effects to include an outline of the main alternatives studied by the applicant and an indication of the main reasons for the applicant's choice, taking into account the environmental effects.*
- *There may also be other specific legal requirements for the consideration of alternatives, for example, under the Habitats and Water Framework Directives.*
- *There may also be policy requirements in this NPS, for example the flood risk sequential test and the assessment of alternatives for developments in National Parks, the Broads and Areas of Outstanding Natural Beauty (AONB)."*

Development of Preferred Route

5.5.27 Between Temple Sowerby and Appleby, the Preferred Route announced in May 2020 developed throughout the early part of PCF Stage 3 Preliminary Design. This route comprises 8.5km of offline carriageway to provide a dual carriageway between the Temple Sowerby and Appleby bypasses. For the dualled sections to be viable, junction improvements will be required to enable access on and off the A66 to improve user safety and reduce congestion.

5.5.28 This led to the development of two junction proposals for the Kirkby Thore section of the route, and two for the Crackenthorpe section of the route.

5.5.29 At Kirkby Thore, a short road was proposed to connect from the Temple Sowerby bypass junction to the old A66, allowing access for local traffic and other road users from Temple Sowerby to Crackenthorpe and beyond.

5.5.30 A new junction was also proposed at Main Street of the north-east of Kirkby Thore to maintain the key local connection onto the A66 and would also provide access to businesses in the area including the British Gypsum Plant via a private access road. This would help to reduce the number of HGVs travelling through the village.

5.5.31 New bridge structures were proposed for both Station Road and Sleastonhowe Lane to allow access over the A66. A diversion would lead from Priest Lane to Station Road to maintain local traffic access.

5.5.32 At Crackenthorpe, one new junction was proposed at Long Marton and a new left on/left off access was proposed to link to the local road network at Crackenthorpe. In addition, it was proposed to make improvements to the existing eastbound junction with the A66 at the start of the Appleby Bypass, to make greater use of the existing infrastructure.

5.5.33 These proposals were presented to the public at a virutal engagement event in November 2020 as part of the Winter 2020 Project Update. Extracts from the brochure produced for this event are shown in Figure 7 for Kirkby Thore junctions and Figure 8 for Crackenthorpe junctions.

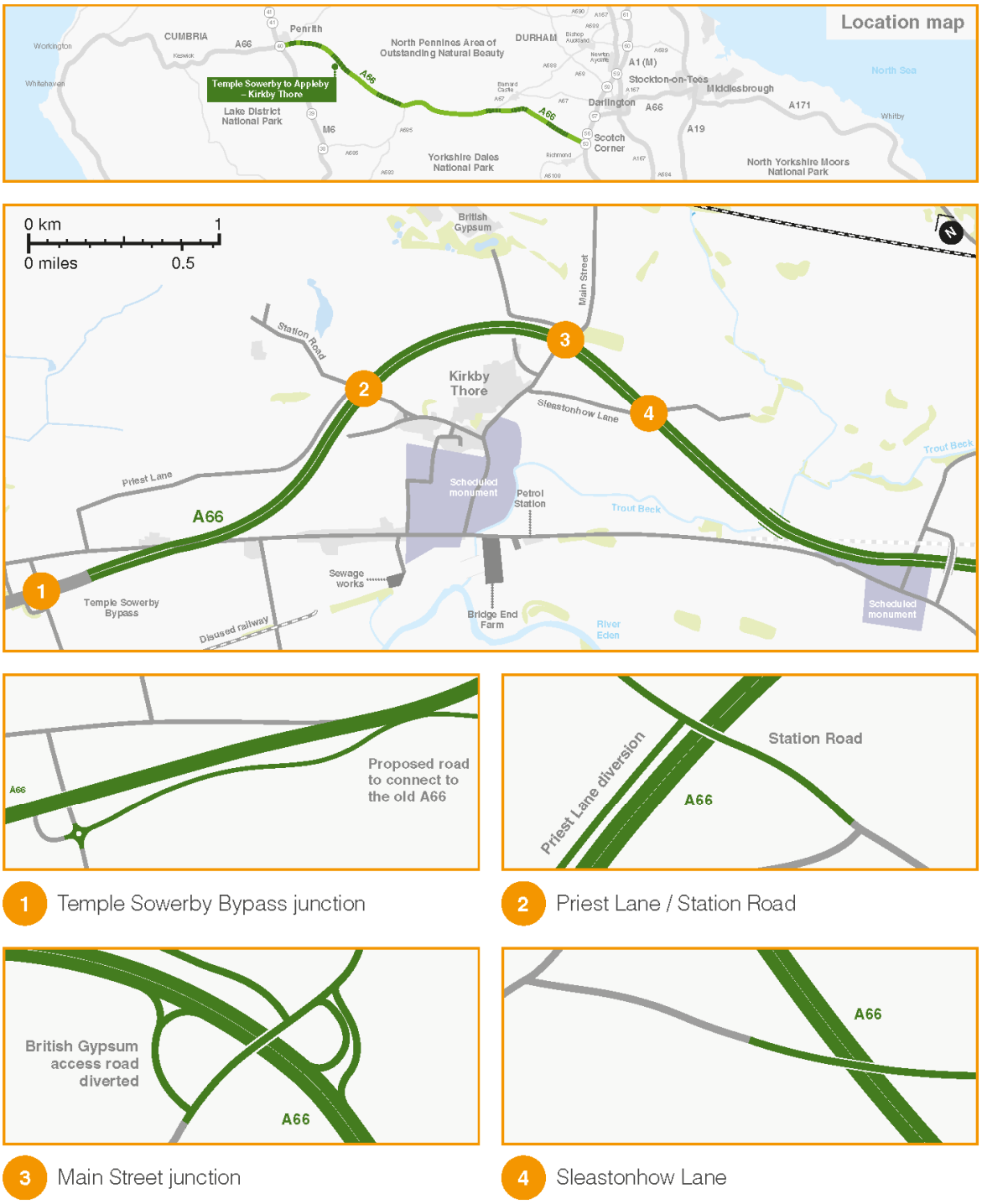


Figure 7 Winter 2020 Project Update extract for Temple Sowerby to Appleby - Kirkby Thore

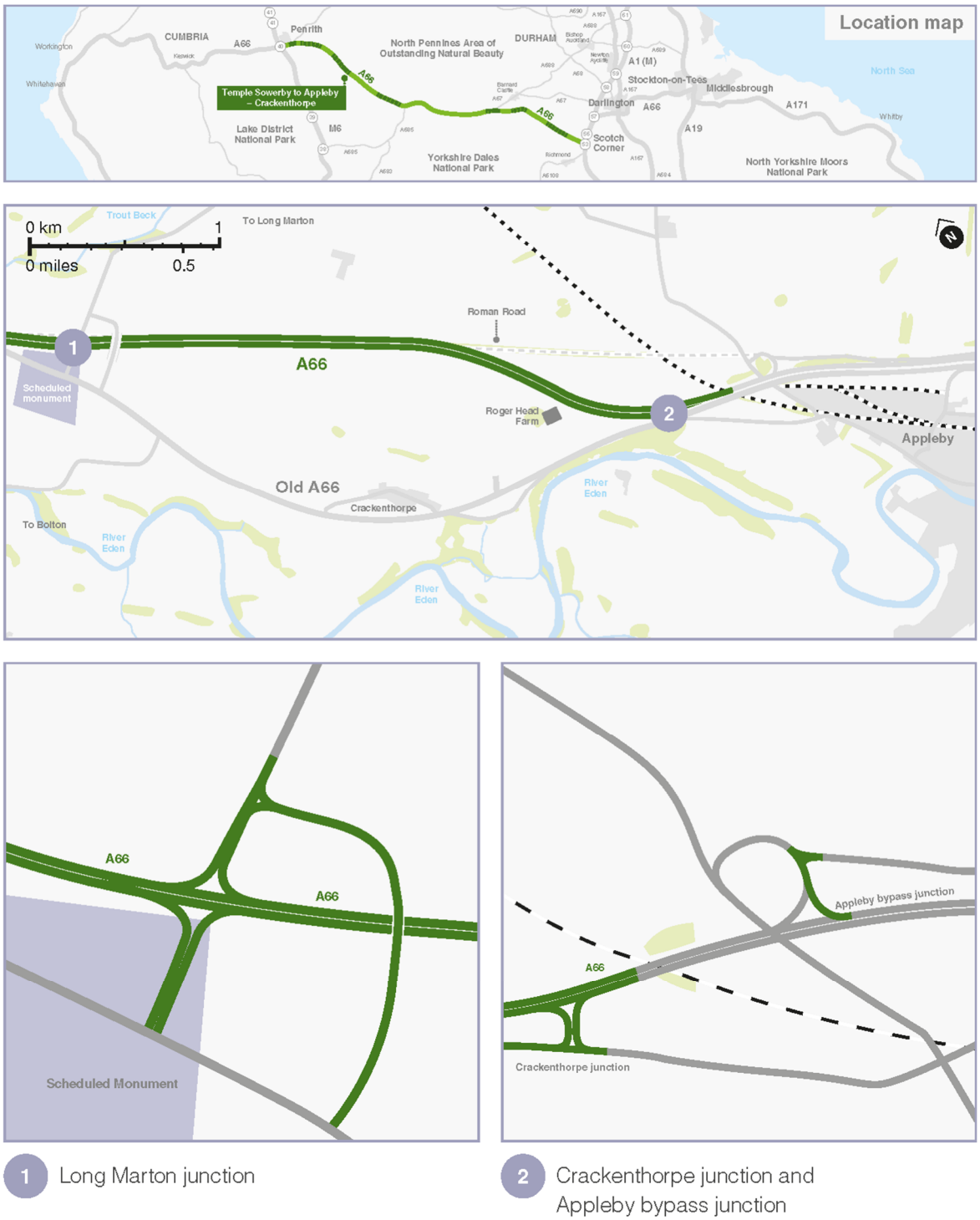


Figure 8 Winter 2020 Project Update extract for Temple Sowerby to Appleby - Crackenthorpe

5.5.34 Over this same period from Summer to Winter 2020, the alignment of the Preferred Route was further developed. This was informed by the findings of assessments and surveys, and a detailed review of policy requirements relevant to Special Areas of Conservation (SAC), Sites of Special Scientific Interest (SSSI) and Scheduled Ancient Monuments (SAM).

5.5.35 This route had been designed to minimise impact on these designated features as much as possible, however through design development it became apparent that it was not possible to rule out an adverse effect on the integrity of the designated features along the route.

Development of alignment alternatives

5.5.36 As PCF Stage 3 Preliminary Design progressed following the Project Update of Winter 2020, the consenting challenges presented by the designated features were considered in greater detail.

5.5.37 Following an assessment by the project teams that took account of key environmental, engineering and stakeholder feedback, it was considered that the Preferred Route could have significant negative impacts on the Trout Beck watercourse which is both nationally and internationally designated as part of the River Eden SAC / SSSI. This was primarily as a result of the length and orientation of the embankments in the floodplain leading to a disconnection of the floodplain of the watercourse. In order to avoid these issues as far as possible, Natural England identified a preference for a clear span crossing, in order to minimise any risk of impact on the watercourse, floodplain and geomorphology of the site.

5.5.38 Due to the alignment of the Preferred Route, this would have resulted in an 800m clear span structure across the floodplain. Whilst technically possible, the scale of such a structure in the environment would have been unrealistic and inappropriate.

5.5.39 Within the same feedback Natural England accepted that a multi-span structure might be acceptable. However the Preferred Route, at 800m in length, led to a number of concerns about buildability, effect of shading of the watercourse, risk of impact on the protected site during construction, cost, materials and carbon use, as well as wider landscape and visual impacts, therefore it was considered necessary to review the scheme and develop alignment alternatives to shorten the crossing and reduce the impacts on the Trout Beck and SAC.

5.5.40 This review demonstrated that further work was required to specifically consider the implications of accordance of the Preferred Route with key national policies of the NNNPS in relation to the SAC designation. In addition, the PCF Stage 2 Environmental Assessment Report identified a red rating with respect to the potential impact of the preferred alignment alternative against criteria relating to the SAC designation.

5.5.41 Given these findings, and in combination with the Habitat Regulations Assessment (HRA) screening work undertaken for PCF Stage 2 Option Selection, it was determined impossible, based on the available data, to completely rule out an adverse effect on the integrity of the SAC European site at Trout Beck. In such circumstances, paragraph 4.24 of the NNNPS sets out the three tests to be applied in order to apply for derogation from the Habitats Regulations, all of which must be met. In summary, these are as follows (refer to 5.5.25 above):

- No feasible alternatives to the plan or project that are less damaging.
- Imperative reasons of overriding public interest.

- Compensatory measures secured to ensure coherence of network of sites is maintained.

5.5.42 Following this decision to ensure that the alignment alternatives taken forward to the application for a DCO for this section of the A66 present “no feasible, less-damaging alternatives” on the SAC designation, and to mitigate the potential engineering and economic challenges posed by the extent of open span structure required for the Preferred Route of May 2020, alternative crossing points were developed to support assessment against the policy tests.

5.5.43 The design team progressed to consider alternative alignments which would change the type and extents of structure required to carry the A66 through, over, or around, the SAC. It should be noted that these alternative alignments focused on the Kirkby Thore section of the route and that alternative alignments for the Crackenthorpe section of the route were not considered in detail at this point as they did not have a direct impact on the SAC.

5.5.44 With regard to the River Eden SAC, further data and analysis led the design team to test, check and challenge previous assumptions, and as such a constraints plan was produced. A total of 15 principal routes or combination of routes were identified via this process, taking into account potential environmental impacts, project design principles, impacts on landowners, buildability and design safety (shown in Appendix B.1).

5.5.45 The alternatives were subject to a multi-stage assessment, which included early discounting of alternatives based on the following:

- Routes to the south of the River Eden were unviable due to the number of watercourse crossings required, and that the resultant routes were likely to be too long to be considered cost-effective.

- Routes through the area of gypsum mines were considered. The risk profile from PCF Stage 2 was explored and confirmed as being too significant to accept.

5.5.46 The merits of the remaining alternatives were subsequently assessed at a meeting held in March 2021, attended by technical specialists from the integrated project team, the outcomes of which were:

- Routes to the north of Kirkby Thore but principally south of the gypsum mines were considered viable in line with the Preferred Route approach outlined at PCF Stage 2 Option Selection. This led to the development of the Red Route – refer below.

- Online routes were recognised to pass in close proximity to the River Eden and through Scheduled Ancient Monuments but were considered to provide a viable alternative crossing point in respect to Trout Beck and therefore warrant further assessment. This led to the development of the Orange Route – refer below.

5.5.47 A subsequent meeting was held in April 2021, attended by technical specialists from the integrated project team. The routes which were considered at this meeting are summarised in Table 5 below and included in Appendix B.2.

Table 5 Route alternatives assessed for Temple Sowerby to Appleby in April 2021

Route	Description	Northern or Southern Routes
Black	This was the Preferred Route promoted at the end of PCF Stage 2 that swings to the north of Kirkby Thore. This includes an 850m structure crossing of Trout Beck and its associated floodplain.	Northern
Blue	This is a development of the Preferred Route that seeks to minimise the crossing distance of Trout Beck and its associated floodplain by moving eastwards. The structure crossing is approximately 400m.	Northern
Dark Green	This is a development of the Preferred Route that crosses Trout Beck and its associated floodplain through Flood Zone 2 flooding rather than Flood Zone 3. The route is closer to part of the village of Kirkby Thore, whilst both the Dark and the Light Green route (below) were developed to strike a balance between the encroachment into the gypsum mining area and a Scheduled Ancient Monument to the south. The structure crossing Trout Beck and its associated floodplain is approximately 250m.	Northern
Light Green	This route principally follows the line of the Dark Green route (above) to the point where it crosses the existing A66, then runs south of the Scheduled Ancient Monument whilst also improving the horizontal geometry. The structure crossing the Trout Beck and its associated floodplain is approximately 250m.	Northern
Red	This route principally follows the line of the Blue Route (above) to approximately Sleastonhowe Lane, where it diverges slightly north to enable a crossing of the Trout Beck and its associated floodplain as far upstream as possible. This has the result of tying into the old Roman Road (near Crackenthorpe) much further east. The structure crossing the Trout Beck and its associated floodplain is approximately 220m.	Northern
Dark Orange	The route principally follows the line of the existing A66 and crosses the Trout Beck immediately south of the existing road bridge. The route passes through the River Eden floodplain and designated area of Scheduled Ancient Monument south of Kirkby Thore. The structure crossing the Trout Beck and its associated floodplain is dependent on the detailed flood modelling but will range from 110 to 350m in length.	Southern
Light Orange	This route was developed as a variation of the Dark Orange Route (above) to avoid the designated area of the Scheduled Ancient Monument with a recognition that this moved the alignment closer to the River Eden. The structure crossing the Trout Beck and its associated floodplain is dependent on the detailed flood modelling but will range from 110 to 350m in length.	Southern
Purple	This route was developed as the closest representation of an online solution. To achieve this the route is designed to 40mph – all other alternatives are designed to 70mph. This route acquires up to eight residential/business properties and reduces the length of the route in the designated area of the Scheduled Ancient Monument.	Southern

5.5.48 A sifting matrix approach was used to assess the alternatives across several criteria including: environmental and landscape effects, safety, land take, demolition, geomorphology, impact on local businesses including farms and the economy, impact on communities and users, engineering, buildability and cost, carbon and conformity with the NNNPS. A summary of the assessment is provided in Appendix B.3.

5.5.49 As part of this this meeting, the five alternatives which were not discounted and therefore were considered in further detail were as follows:

- Black Route
- Blue Route
- Dark/Light Green Route (referred to in the remainder of the Route Development Report as the Green Route)
- Red Route
- Dark Orange Route (referred to in the remainder of the Route Development Report as the Orange Route).

5.5.50 As part of the sifting review, the Green Route was discounted from further consideration primarily as it brought the route closer to the eastern edge of Kirkby Thore village and could therefore be expected to have more negative noise and visual impact on residents and businesses. In addition, it also had the potential to negatively impact the registered Scheduled Ancient Monument Roman Camp near Redlands Bank Farm.

5.5.51 Whilst the Black Route was deemed to be technically deliverable following the sifting meeting, subsequent considerations determined that it offered no significant benefit over the Blue Route. The potential for an 800m structure across the floodplain remained and comments made by statutory environmental bodies Natural England and the Environment Agency led to the conclusion that the Blue Route offered a preferable solution when compared directly against the Black Route. As a result, the Black Route was discounted.

Further design development of alignment alternative – Blue Route

5.5.52 The Blue Route was developed following analysis of the Environment Agency's flood maps for the area around Trout Beck, to minimise the potential impact of the A66 crossing this watercourse and the River Eden SAC. It proposed a shorter crossing of the SAC than the Preferred Route did, of approximately 400m compared to 800m.

5.5.53 Natural England were advised of the direction of design development and sought confirmation that the form of the structure will be designed such that it minimises the impact on Trout Beck and SAC designation. Whilst a large, expansive structure would be possible, some concerns remained.

5.5.54 The need for detailed flood modelling was recognised, including whether there is residual impact to the SAC both in terms of the completed scheme and potential impacts arising from construction.

5.5.55 The Blue Route includes a new bypass around the north of Kirkby Thore (between the village and the gypsum works) and a new bypass to the north of Crackenthorpe.

5.5.56 Following the alignment of the Preferred Route, the Blue Route would travel in a north-easterly direction from the end of the Temple Sowerby Bypass, crossing over Priest Lane and under Station Road before turning south after passing north of the village.

5.5.57 Heading south, the route would then pass under Main Street, where it was proposed to build a new junction, and under Sleastonhowe Lane. From here, the route would deviate from the Preferred Route, with the alignment further east to allow a shorter crossing of Trout Beck and its floodplain, as outlined in 5.5.52.

5.5.58 The Blue Route would then follow the line of the Preferred Route as it turns in a south-easterly direction to follow the line of the Roman Road towards Appleby. It was proposed to connect this bypass back into the existing A66 at the eastern end of the scheme with access to Crackenthorpe and Appleby being provided via connections to the existing road network.

5.5.59 The Blue Route would impact farms and associated land and require demolition of two residential properties.

5.5.60 This alignment alternative would mean local traffic would be able to use the de-trunked A66 between Appleby and Temple Sowerby as part of the local road network.

Further design development of alignment alternative – Red Route

5.5.61 As with the Blue Route, the Red Route was developed following analysis of the Environment Agency's flood maps for the area around Trout Beck. It sought to reduce impact on the SAC by crossing Trout Beck and its floodplain at a narrower point than either the Preferred Route alignment or the Blue Route alignment. This resulting crossing point is around 220m in length.

5.5.62 It was proposed that the Red Route follow the alignment of the Blue Route from Temple Sowerby Bypass to where the route would pass under Main Street, where it was proposed to build a new junction, and under Sleastonhowe Lane. From here, the road would then run parallel to the existing A66 to cross over two watercourses, Keld Syke and Trout Beck and their associated floodplains. The crossing of Trout Beck would be further east from both the Preferred Route and the Blue Route.

5.5.63 After crossing Trout Beck, the Red Route would head south to re-join the line of the Preferred Route near Crackenthorpe as it follows the line of the Roman Road towards Appleby. It was proposed to connect this bypass back into the existing A66 at the eastern end of the scheme with access to Crackenthorpe and Appleby being provided via connections to the existing road network. This avoided potential impacts on the Roman Camp at Redlands Bank.

5.5.64 The Red Route would impact farms and associated land and require demolition of a residential property.

5.5.65 The Red Route is constrained from moving further to the east because of the existing gypsum mineworkings.

5.5.66 This alignment alternative would mean local traffic would be able to use the de-trunked A66 between Appleby and Temple Sowerby as part of the local road network.

Further design development of alignment alternative – Orange Route

5.5.67 The Orange Route was developed as an alternative which crossed Trout Beck at a point where it was already constrained by the existing A66 bridge at Bridge End. It was considered that this may have an overall lesser effect on the River Eden SAC as the watercourse and its floodplain is already constrained by the existing infrastructure in the area. The intention would be that this would result in a shorter crossing structure, although this could not be confirmed without detailed flood modelling and geomorphological analysis (refer to 5.5.96 below). By moving to a more online solution, the new A66 would be kept within an already developed corridor.

5.5.68 The Orange Route mostly follows the route of the existing A66 along the southern edge of Kirkby Thore, before bypassing Crackenthorpe to the north.

5.5.69 From the end of the Temple Sowerby Bypass the Orange Route initially runs to the north of the existing A66 before crossing to the south, close to Piper Lane. It would then run parallel to the A66, to the rear of a row of houses, before crossing Trout Beck at Bridge End. At this location the river is confined by the existing A66 bridge and other buildings around Kirkby Thore. Kirkby Thore would be accessible via the existing junction at Temple Sowerby and the old A66 which would be connected to the local road network.

5.5.70 East of Trout Beck, the Orange Route would pass through part of Bridge End Farm, requiring the acquistion and demolition of some or all of the farm buildings, and behind the fuel station, running parallel to the existing A66. It would then follow the line of the Preferred Route as it turns in a south-easterly direction to follow the line of the Roman Road towards Appleby. It was proposed to connect this bypass back into the existing A66 at the eastern end of the scheme with access to Crackenthorpe and Appleby being provided via connections to the existing road network.

5.5.71 As this route mostly follows the existing A66, a number of new connections and local roads would be required to allow local traffic to use the current A66 between Appleby and Temple Sowerby. This would result in an extensive network of sideroads for local access.

5.5.72 The Orange Route would have potentially significant detrimental effects on the cultural heritage sites that are located within the existing A66 corridor, most notably the Roman Fort and associated Vicus which it passes south of Kirkby Thore.

5.5.73 The Orange Route also has a significant impact on the farm at Bridge End to the extent that it may not be a viable business.

Presentation of route alignment alternatives at July 2021 stakeholder engagement events

5.5.74 As there has been significant design development during PCF Stage 3 Preliminary Design for this section of the A66 between Temple Sowerby to Appleby, further stakeholder engagement events were held during July 2021 to gather feedback from interested and affected parties on how the design was developing at that point. These sessions included in-person drop-in sessions at Kirkby Thore Memorial Hall with the opportunity for stakeholders to book an appointment to experience a SoundLab (virtual listening tool) simulation of the proposals.

5.5.75 These events were held to present the three route alignment alternatives that had been developed to that point. The alternatives presented were the Blue, Red and Orange routes, as shown in Figure 9 below.

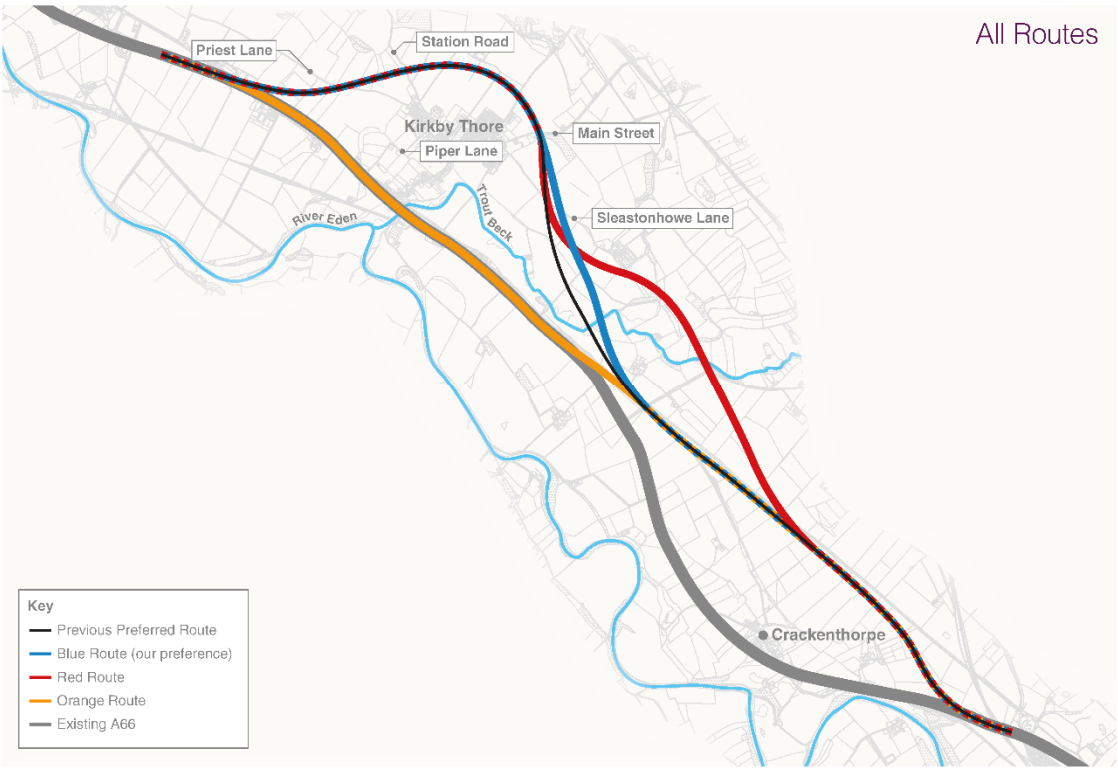


Figure 9 Alignment alternatives presented for Temple Sowerby to Appleby at July 2021 stakeholder engagement events

5.5.76 The engagement event provided additional information for stakeholders to help them understand the alignment alternatives before the Statutory Consultation. It was communicated to attendees that while suggestions would be taken onboard and considered going forward, they would not be reflected in the Statutory Consultation materials.

5.5.77 Attendees were encouraged to participate in the Statutory Consultation and make their comments formally through that channel where they would be reviewed and regard given to them in the final preparation of the application for development consent. Attendees were also advised by the Highways England team that a route preference would be stated at Statutory Consultation.

Alignment alternatives sifting for Statutory Consultation

5.5.78 A further sifting exercise has since been carried out to compare the alignment alternatives for Temple Sowerby to Appleby. Alignments were assessed against engineering, environmental, traffic, economic, stakeholder principles, with commentary on policy conformity. In addition, Highways England's three priorities of Safety, Customer and Delivery were considered crucial to assessing the alignments ahead of Statutory Consultation. Refer to 4.1 for further detail on the assessment process and criteria.

5.5.79 The Blue Route has been identified as the preference to be taken forward to the application for a DCO. The Red and Orange routes have been discounted as a result

of the sifting exercise undertaken for this section of route past Kirkby Thore. Refer below for detail.

Alignment alternatives sifting between Blue and Red Routes

5.5.80 The Blue and Red routes were sifted together first as they were considered directly comparable, both being northern bypasses of the village of Kirkby Thore. This then allowed the resultant preference to be compared against the Orange Route, which was the online alternative presented.

5.5.81 A copy of the assessment matrix for the alignment alternatives sifting exercise undertaken to determine a preference for either the Blue or Red Route can be found in Appendix A.1 and a summary of the matrix is shown below in Table 6.

Table 6 Summary of sifting matrix for comparison between Blue and Red Routes for Penrith to Temple Sowerby

Discipline		**Comparison with base Blue Route**
Engineering		
Highways - Standards Compliance		Worse
Utilities		Better
Geotechnics and Earthworks		Neutral
Structures		Worse
Drainage and Hydrology		Better
Construction Design Management (CDM)		Neutral
Construction Cost		Neutral
Buildability		Neutral
Environment		
Biodiversity	Construction	Neutral
	Operation	Neutral
Road Drainage and Water Environment	Construction	Worse
	Operation	Neutral
Geology, Soils, Contaminated Land and Groundwater	Construction	Neutral
	Operation	Neutral
Noise and Vibration	Construction	Neutral
	Operation	Better
Landscape and Visual	Construction	Neutral
	Operation	Worse
Population and Human Health	Construction	Worse
	Operation	Better
Air Quality	Construction	Neutral
	Operation	Neutral
Material Assets and Waste	Construction	Neutral
	Operation	Neutral
Cultural Heritage	Construction	Better
	Operation	Neutral
Climate	Construction	Worse
	Operation	Neutral

Discipline	Comparison with base Blue Route
Traffic and Economic	
Traffic Volume	Neutral
Journey Time Savings	Neutral
Safety	Neutral
Economy (not modelled with TUBA)	Neutral
Accessibility including WCH Opportunities	Neutral
Stakeholder	
Land Take	Worse
Residential	Worse
Commercial	Worse
Recreation and Leisure	Neutral
Wider Community Issues	Worse

Engineering

5.5.82 From an engineering perspective, the Red Route has a poorer geometry throughout with relaxed design standards for horizontal and vertical curves used for a larger proportion of the scheme length than for the Blue Route. It would also require an additional structure over Keld Syke, which would not be required for the Blue Route. The crossing of Trout Beck would be much more visually intrusive for the Red Route, as the structure would require to be approximately 18m high due to surrounding topography, compared to approximately 7m above existing ground level for the Blue Route. This would also present challenges from a cost and constructability perspective. Since the Red Route is longer than the Blue Route, this has the potential to increase costs further. The Red Route also crosses the geological fault line from Penrith Sandstone to Eden Shales (the formation associated with the gypsum mineworkings, which introduces a higher potential for finding sinkholes along the route, and the risk of dissolution).

5.5.83 However, the Red Route performs better than the Blue Route with regard to effect on utilities, as it is anticipated to have a slightly lesser impact on overhead powerlines.

5.5.84 The Red Route would not require construction of a separate bridge to connect to Long Marton Road as the elevation of the structure is such that Long Marton Road could pass underneath unhindered. For the Blue Route, Long Marton Road would require side road realignment and upgrade works to the junction due to the point where it is crossed. The Blue Route would also require additional drainage for the proposed side road works at Long Marton Road.

Environment

5.5.85 Assessment of environmental criteria for this sifting exercise identified that both the Blue and Red routes are broadly similar for this metric. However, the Red Route does perform worse with regard to landscape and visual impacts as a result of the proposed 18m high Trout Beck Crossing. It would also require development in an area of land currently allocated to future housing. To counter, the Red Route performs better in terms of noise and vibration as it moves the route further away from Kirkby Thore; although closer to Long Marton, fewer receptors are affected.

5.5.86 When flooding and geomorphology factors were assessed, it was determined that there were no significant differentiators between the Blue and Red Routes. Refer to 5.5.96 below in regard to the findings from the assessment work.

5.5.87 The Red Route has less impact on designated heritage assets than the Blue Route, including the Roman Camp near Powis House and Redlands Bank. Further details of the environmental assessment criteria can be found in the PEIR.

Traffic

5.5.88 When traffic and economic factors were assessed, it was determined that there were no significant differentiators between the Blue and Red Routes.

Stakeholder

5.5.89 Considering the impact of each alignment alternative on stakeholders, it was determined that the Red Route presented greater negative impacts in terms of land take, residential, commercial and wider community aspects. It would move the route closer to the village of Long Marton and would affect a number of landowners who were not previously affected by the Preferred Route as it was announced in May 2020, including having a greater effect on a single landowner.

Conclusion

5.5.90 Following the analysis outlined in 5.5.80 through 5.5.89 above, the Red Route that was presented at the July 2021 stakeholder engagement events has been discounted from further consideration ahead of Statutory Consultation in Autumn 2021. Although the Blue and Red Route share many similarities it is clear that by moving further to the east a number of additional landowners would be affected and the effects of the route on Long Marton would be increased. Additionally, whilst the crossing of Trout Beck would be shorter, it would result in a structure which would be much more visible within the landscape due to its increased height and the way the land falls in this area.

Alignment alternatives sifting between Blue and Orange Routes

5.5.91 Once the Red Route had been discounted, it was then possible to compare the Blue Route with the remaining Orange Route.

5.5.92 A copy of the assessment matrix for the alignment alternatives sifting exercise undertaken to determine a preference for either the Blue or Orange Route can be found in Appendix A.2 and a summary of the matrix is shown below in Table 7.

Table 7 Summary of sifting matrix for comparison between Blue and Orange Routes for Penrith to Temple Sowerby

Discipline	**Comparison with base Blue Route**
Engineering	
Highways - Standards Compliance	Better
Utilities	Neutral
Geotechnics and Earthworks	Better
Structures	Neutral
Drainage and Hydrology	Worse
Construction Design Management (CDM)	Neutral
Construction Cost	Neutral
Buildability	Worse

Discipline		Comparison with base Blue Route
Environment		
Biodiversity	Construction	Neutral
	Operation	Neutral
Road Drainage and Water Environment	Construction	Neutral
	Operation	Neutral
Geology, Soils, Contaminated Land and Groundwater	Construction	Neutral
	Operation	Neutral
Noise and Vibration	Construction	Neutral
	Operation	Better
Landscape and Visual	Construction	Neutral
	Operation	Better
Population and Human Health	Construction	Worse
	Operation	Neutral
Air Quality	Construction	Neutral
	Operation	Neutral
Material Assets and Waste	Construction	Better
	Operation	Neutral
Cultural Heritage	Construction	Worse
	Operation	Worse
Climate	Construction	Better
	Operation	Neutral
Traffic and Economic		
Traffic Volume		Better
Journey Time Savings		Better
Safety		Neutral
Economy (not modelled with TUBA)		Better
Accessibility including WCH Opportunities		Neutral
Stakeholder		
Land Take		Worse
Residential		Worse
Commercial		Worse
Recreation and Leisure		Neutral
Wider Community Issues		Neutral

Engineering

5.5.93 Considering the engineering critiera, the Orange Route has a better geometric alignment than the Blue Route. It is expected the mainline would cost less to construct as it is a shorter route with reduced earthworks, however this potential benefit is likely to be offset due to the cost of constructing a more extensive side road network and the acquistion and demolition of some or all of the farm buildings of Bridge End Farm. This shorter mainline route would however lead to journey time savings for users on the dualled A66.

5.5.94 As the Orange Route is much closer to the existing A66 route corridor, it presents buildability challenges due to interactions with existing traffic. However, as noted above, it would keep the new A66 within a corridor already developed for infrastructure.

5.5.95 Both the Blue and Orange routes require a similar length of structure to cross Trout Beck (approximately 400m for Blue and 350m for Orange). However, when considering the drainage and hydrology aspects of each route, the Orange Route would have greater impact on the floodplain. This would likely require mitigation measures to be provided for the Orange Route that would not be required for the Blue Route.

5.5.96 Flooding was raised as an issue during engagement with Natural England, and flood modelling and geomorphological analysis has been carried out for both the Blue and Orange routes during PCF Stage 3 Preliminary Design to assess the impact of proposed structures within and around Trout Beck and its floodplain, and any resultant effects on the River Eden SAC. This analysis has proven that both the Blue and Orange routes are viable, provided appropriate mitigation measures are built into the designs as they develop. Refer to Appendix A.2 for further information.

Environment

5.5.97 The effects on the cultural environment are considered to be significant and are the primary differentiator between the Orange and Blue routes. Although more heritage assets would be affected by the Blue Route, it has been determined that these impacts can be mitigated and that during operation, benefits will be brought to these assets due to reduction in traffic noise and visibility of the A66 affecting and improving the setting of these assets. Whilst there is a risk that the longer offline construction afforded by the Blue Route may present greater potential for encountering undiscovered archaeology, this must be weighed against the known impact of harm likely to be caused by the Orange Route. Further details of the environmental assessment criteria can be found in the PEIR.

5.5.98 The Orange Route would require significant works within the Kirkby Thore Roman Fort and Associated Vicus Scheduled Ancient Monument, with the potential for substantial harm to be caused to the designated heritage site that it may not be possible to mitigate. From a planning policy perspective, the impacts of proposed developments on the significance of designated heritage assets must adhere to strict conditions and constraints, and require clear and convincing justification. Paragraph 5.131 of the NNNPS states that, once lost, heritage assets cannot be replaced and their loss has a cultural, environmental, economic and social impact. Substantial harm to or loss of Scheduled Monuments should be “wholly exceptional”. Refer below for further detail.

Traffic

5.5.99 Traffic assessment indicated that the Orange Route would have marginal benefits in terms of traffic flow on the A66 mainline at Kirkby Thore and journey time savings. However, there were no significant differences for safety or accessibility.

Stakeholder

5.5.100 Considering the impact of each alignment alternative on stakeholders, it was determined that the Orange Route presented greater negative impacts. Although it does not affect the gypsum mineworkings and operations there, it does affect a number of landowners who were not previously affected by the Preferred Route as it was announced in May 2020. Most notably, it would require the acquistion and demolition of some or all of the farm buildings of Bridge End Farm, at significant

disruption to this business and cost to the scheme. A number of concerns have also been raised during stakeholder engagement, including at the July 2021 events, in relation to provision of suitable access to properties at the west end of the Orange Route where it is proposed to stop up the A66.

Conclusion

5.5.101 Given the impact the Orange Route would have on the Kirkby Thore Roman Fort and Associated Vicus Scheduled Ancient Monument, the application for development consent would therefore have to demonstrate exceptional circumstances in order to put forward the Orange Route alternative for Examination. This would require a case for the scheme to be made that potential substantial harm or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm.

5.5.102 Route alternatives proposed must be in conformity with the policy tests of paragraph 5.133 of the NNNPS, as set out below:

> *"5.133 Where the proposed development will lead to substantial harm or total loss of significance of a designated heritage asset, the Secretary of State should refuse consent unless it can be demonstrated that the substantial harm or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm, or alternatively that all of the following apply:*
>
> - *The nature of the heritage asset prevents all reasonable uses of the site; and*
> - *No viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and*
> - *Conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible; and*
> - *The harm or loss is outweighed by the benefit of bringing the sit back into use."*

5.5.103 In the situation where a proposed development would 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.

5.5.104 As an alternative alignment exists in the Blue Route, it is considered that the Orange Route is likely not to be in accordance with national policy and therefore there is a risk that a DCO application including the Orange Route would not be likely to secure a grant of consent.

5.5.105 This sifting exercise therefore discounted the Orange Route that was presented at the July 2021 stakeholder engagement events from further consideration ahead of Statutory Consultation in Autumn 2021.

Statutory Consultation Autumn 2021

5.5.106 Plans and profiles for the proposals taken forward to Statutory Consultation in Autumn 2021, as well as alternatives assessed and discounted during PCF Stage 3 Preliminary Design, can be found in Volume 2 of the Route Development Report.

5.5.107 As outlined above, Temple Sowerby to Appleby is one of the schemes where further consideration of alternative alignment routes has occurred, in order to minimise the potential impact on the River Eden Special Area of Conservation and to ensure that there is no impact on the integrity of the SAC which would conflict with National Policy.

5.5.108 The Preferred Route alignment announced in Spring 2020 is no longer under consideration and is therefore not described below. Instead the alignment alternative being presented at Statutory Consultation in Autumn 2021, the Blue Route is summarised.

5.5.109 The Blue Route is a developed version of the route that was included in the Preferred Route Announcement and will comprise a new offline bypass around the north of Kirkby Thore, a new bypass to the north of Crackenthorpe, and a number of new junctions and improvements.

5.5.110 Design development since the Preferred Route Announcement has not altered the proposed route from the western end of the village to the junction at Kirkby Thore village. As the route travels south-east the alignment has moved approximately 100m east. Moving the route alignment reduces the length of affected floodplain at the Trout Beck crossing from 850m to around 400m. This alignment route will cross Trout Beck at a more perpendicular angle than the route indicated at the Preferred Route Announcement, with a shorter overall length of structure required and reduced subsequent impact on the SAC.

5.5.111 Temple Sowerby Bypass Junction will provide connections between the existing A66 and the local road network. A short section of road will connect from Temple Sowerby Bypass Junction to the existing A66, allowing access for local traffic and other road users from Temple Sowerby to Crackenthorpe and beyond.

5.5.112 A new junction will be provided at Main Street to the north-east of Kirkby Thore. Main Street will pass over the proposed A66 alignment on a bridge structure. This junction will maintain the key local connection onto the A66 and has the additional benefit of providing access to businesses and hauliers to the north of the village. This will contribute to a reduction in the number of HGV movements through Kirkby Thore.

5.5.113 New merge and diverge lanes will enable users to safely join and leave the A66 in both directions. New bridge structures for both Station Road and Sleastonhowe Lane will enable access over and under the A66 respectively. A diversion will lead from Priest Lane to Station Road to maintain local traffic access.

5.5.114 A new multi-span viaduct will be provided for the crossing over Trout Beck and its associated floodplain. The design of this viaduct will be informed by detailed design, flood modelling and the Habitats Regulations Assessment, which is ongoing. Work to date has proven that a viable solution for the Blue Route exists.

5.5.115 A new bridge will be provided over the new A66 at Long Marton Road close to Powis House. This will maintain connectivity between Bowdon and Long Marton and will also allow traffic to access the existing A66 to travel east or west where traffic levels will be considerably reduced leading to a safer junction. This reduction in traffic levels, confirmed through modelling and concerns over substandard vertical geometry and impacts on the Scheduled Ancient Monument Roman Camp, led to the change of the solution from a junction to an overbridge.

5.5.116 Recently completed archaeological survey works indicate that the extents of the Roman Camp at Redlands Bank may be more extensive than its designation would imply, and it is anticipated that further refinement and development of the route at this point will be required post-consultation to address this issue. This work will be

undertaken as part of the Environmental Satement and reported in the DCO application.

5.5.117 At Crackenthorpe a new junction on the westbound carriageway of the new A66 alignment will provide left on/left off access. The junction will link to the previous A66 alignment and the B6542 and provide access to both Crackenthorpe and Appleby. New merge and diverge lanes will enable users to safely join and leave the A66.

5.5.118 Provision of an additional left-on junction to the eastbound carriageway at the existing Appleby Bypass junction will make better use of the existing infrastructure. This, together with the proposed Crackenthorpe junction, will provide all-movement access to the A66 west of Appleby.

5.5.119 The proposed route, like all alternative alignments considered throughout PCF Stage 3 Preliminary Design, currently has an impact on part of the Fair Hill site at Appleby which is the field used for the annual Appleby Horse Fair. While this is a relatively small land take, designed to facilitate a safer junction arrangement, the project team is aware of the impacts this might have on the Fair site and work is ongoing to develop junction proposals at this location, prior to application for development consent, to mitigate this impact. A key element of this work is continuing engagement with the Gypsy, Roma and Traveller communities as well as local communities and local authorities.

5.6 Appleby to Brough

Description of existing scheme

5.6.1 The A66 between Appleby and Brough includes an approximately 8km section of single carriageway with local access junctions at Sandford, Moor House Lane, Hayber Lane, Warcop, Toddygill, Flitholme and Great Musgrave.

5.6.2 This section of the route follows the alignment of the Roman Road, with a carriageway width varying between 7.3m and 9.3m. This variation in carriageway width, particularly between the B6259 and Brough, makes for an inconsistent driving experience and thus creates safety issues.

5.6.3 The junctions along this section of the route vary in layout and present further safety issues, with vehicles attempting to join the main highway which is a single lane operating at a higher speed. Sandford and Warcop junctions comprise ghost islands, and there are no specific facilities provided at Moor House Lane, Hayber Lane, Toddygill, Flitholme and Langrigg junctions.

5.6.4 Drivers can also find themselves in a vulnerable position when attempting to slow and leave the A66, especially when turning right. Changes in speed limits also create potential accident spots and as such the speed limit has already been locally lowered from 60mph to 50mph to mitigate this.

5.6.5 The route of the A66 between Appleby and Brough is generally located within agricultural land bounded by a Ministry of Defence (MoD) training camp and firing range to the north. The MoD also retains its headquarters in the village of Warcop and as such requires frequent access across the A66 between these two sites. A P-Loop on the A66 assists with MoD access to the site for westbound articulated vehicles accessing the firing range access at Fell Lane.

5.6.6 The A66 along this route follows the southern edge of the North Pennines Area of Outstanding Natural Beauty from Moor House Lane all the way to Brough in the east.

The AONB also contains the North Pennines UNESCO Global Geopark, an internationally recongised site of outstanding geological heritage.

5.6.7 This section of the A66 carries approximately 14,600 vehicles per day, 30% of which are heavy goods vehicles.

Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection

5.6.8 At PCF Stage 1 Option Identification, seven options were considered. Four were for the western section of the route, and three were for the eastern section. One of each of these options would therefore be required to complete the route. Further information can be found in the PCF Stage 1 Technical Appraisal Report.

5.6.9 Following further analysis, three of the western options and two of the eastern options were discounted and therefore not taken forward to public consultation in Summer 2019. Reasons for this included among others, potential construction complexity, undulating geometry of the existing route preventing significant re-use and negative impacts on Scheduled Ancient Monuments, the North Pennines Area of Outstanding Natural Beauty and the Eden Valley railway line. For those options requiring significant incursion into the AONB, it was noted that these would be difficult to justify where there are alternative options with potentially lesser impact on the AONB. Detail on this appraisal process can be found in the PCF Stage 1 Technical Appraisal Report.

5.6.10 A single option was therefore taken forward to PCF Stage 2 Option Selection, combining the remaining western and eastern options as outlined below. Refer to the PCF Stage 2 Scheme Assessment Report for further detail.

5.6.11 It was proposed that between the Appleby Bypass and Wildboar Hill, the route would utilise as much of the existing A66 as possible for eastbound traffic. For westbound traffic, it was proposed to construct a new carriageway adjacent and to the south of the existing carriageway. It was noted that due to the need for a high embankment along this proposed route, there was the potential to severely adversely affect a group of properties at Sandford which presented the potential need to compensate or purchase these buildings.

5.6.12 From Wildboar Hill, it was proposed that the route would leave the line of the existing A66 to pass behind Wheatsheaf Farm and cross the MoD sports field, remaining close to but south of the A66 before re-joining the dual carriageway at Brough Bypass. Constructing the new carriageway to the south would increase the distance between the North Pennines AONB and the A66 and facilitate use of the old A66 during the majority of the construction works.

5.6.13 Culverts would be required for existing watercourse crossings including Cringle Beck, Hayber Beck, Moor Beck and Lowgill Beck.

5.6.14 It was proposed that all access to the route from the local road network be provided with a junction at Warcop, with potential for limited access at Sandford, Flitholme and Langrigg. This would be a compact grade-separated junction with an underbridge beneath the proposed A66 to connect the village of Warcop to the old A66.

5.6.15 In addition, it was proposed to retain portions of the existing A66 for local traffic, MoD traffic and non-motorised users between Moor House Lane and Turks Head.

5.6.16 It was proposed that three left on/left off junctions be provided to the south of the A66 to connect small hamlets to the south with the A66. To the north of the proposed A66,

there would be a new section of single carriageway provided from Turks Head to connect with the existing local road network of Brough village to the east.

5.6.17 Four small accesses would be provided to the north and south of the A66 providing access to individual farms, residential buildings, Café Sixty Six and agricultural land.

Public consultation Summer 2019

5.6.18 A single option was presented at public consultation in Summer 2019. This option was known as Option I for the purposes of consultation.

5.6.19 Option I proposed to widen the current carriageway between Café Sixty Six and Wildboar Hill, allowing it to be utilised as the eastbound carriageway. It was proposed to construct a new westbound carriageway directly to the south of the current A66.

5.6.20 Between Wildboar Hill and the Brough Bypass, it was proposed that a completely new dual carriageway would be constructed directly to the south of the current A66. The existing road would then be used for local access and pedestrians, walkers, cyclists and horse riders.

5.6.21 New culverts would divert streams under the road at Cringle Beck, Hayber Beck, Moor Beck and Lowgill Beck. New junctions and a bridge would provide access from the new road to Warcop.

5.6.22 Access to the proposed route from local roads would be limited to junctions at Sandford, Warcop, Flitholme, and Langrigg, which would make this section much less accident-prone. The existing A66 between Moor House Lane and Turks Head would become part of the county road network for safer local access to nearby villages, especially for walkers, cyclists and horse-riders.

5.6.23 Option I proposed to minimise the impact on the Area of Outstanding Natural Beauty to the north of the current A66 and provide continued access for local communities during construction.

5.6.24 It was proposed that a new dual carriageway would connect back into the existing A66 at the Brough Bypass.

5.6.25 The PCF Stage 2 Scheme Assessment Report noted that although the proposed Option I received positive public support at consultation, feedback was identified that resulted in further route development ahead of the Preferred Route Announcement.

5.6.26 There were concerns from the public regarding additional traffic to local side roads, specifically from Warcop Primary School. As such, it was proposed to upgrade the westbound-only junction at Sandford to an all-movement junction, thus minimising pressure on local roads.

Preferred Route Announcement May 2020

5.6.27 The Preferred Route Announcement of May 2020 concluded that since Option I was the only viable route proposed for the Appleby to Brough section of the A66 at that time, it was therefore the one that would be taken forward to PCF Stage 3 Preliminary Design.

PCF Stage 3 Preliminary Design

5.6.28 At PCF Stage 3 Preliminary Design, these proposals have been developed further for Statutory Consultation in Autumn 2021 and are as outlined below. This is part of natural design development that occurs when new data and analysis supplements previously available information, for example the outcomes of surveys and further

stakeholder engagement. In addition, the PCF Stage 2 Option Selection work has been revisited to review whether the announced Preferred Route addresses legislative and policy requirements.

5.6.29 Figure 10 summarises the development of the scheme during PCF Stage 3 with respect of alignment alternatives assessment, detailed in the sub-sections that follow.

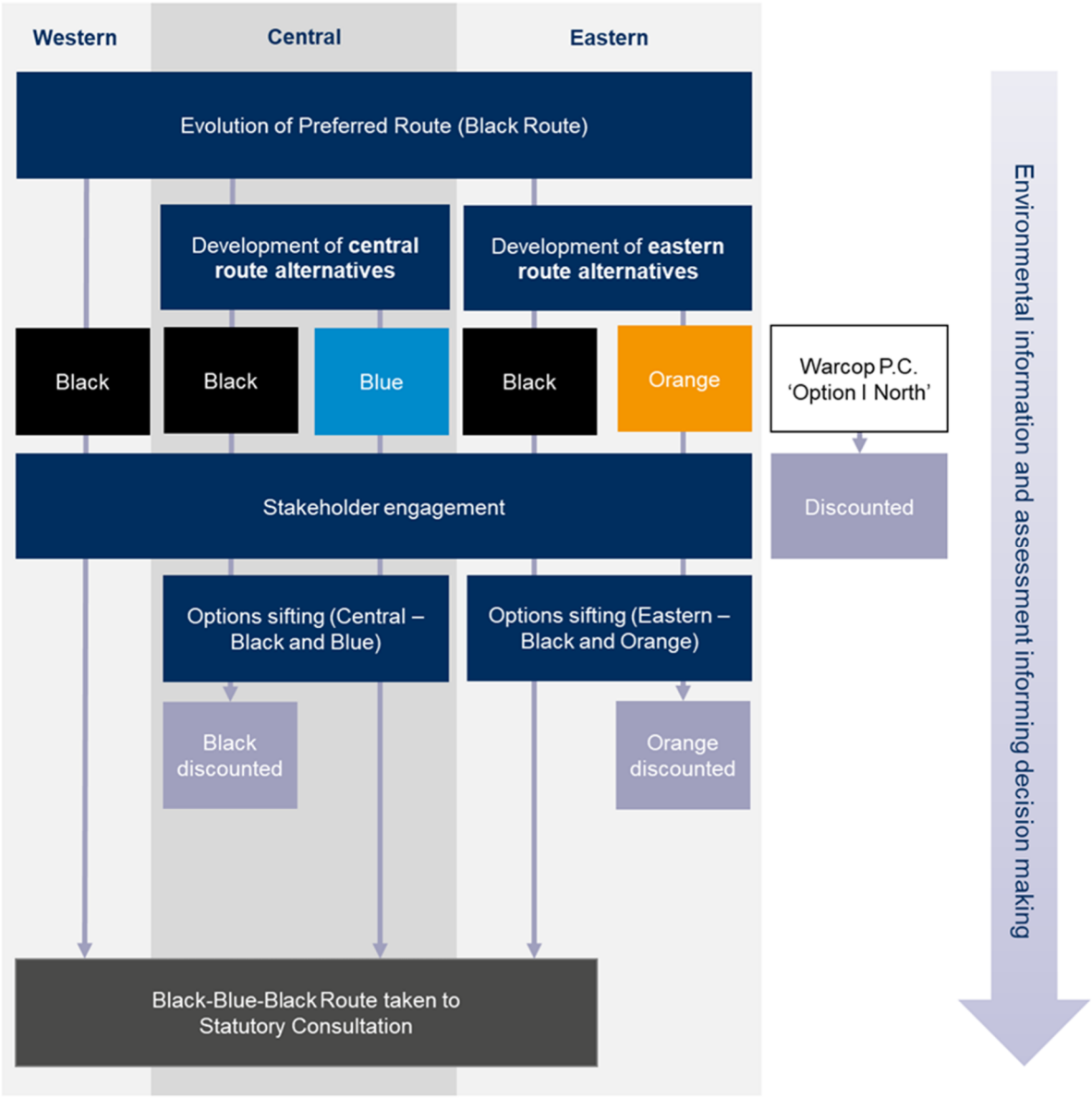


Figure 10 PCF Stage 3 scheme development summary for Appleby to Brough

5.6.30 For Appleby to Brough, design development work has been undertaken to ensure that the route taken forward minimises the impact of and potential damage to the North Pennines Area of Outstanding Natural Beauty, which is protected as a nationally designated site by legislation and policy. There are two key sets of policy tests to be addressed for such developments; notably those applicable to developments within the boundary of such an area, and those applicable to developments outside such areas but that have an impact on them.

5.6.31 For development proposed within nationally designated areas, paragraph 5.151 of the NNNPS outlines the policy tests as follows:

"The Secretary of State should refuse development consent in these areas except in exceptional circumstances and where it can be demonstrated that it is in the public interest. Consideration of such applications should include an assessment of:

- *The need for the development, including in terms of any national considerations, and the impact of consenting, or not consenting it, upon the local economy;*
- *The cost of, and scope for, developing elsewhere, outside the designated area, or meeting the need for it in some other way; and*
- *Any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated."*

5.6.32 Paragraph 5.152 goes on to state:

"There is a strong presumption against any significant road widening or the building of new roads…in…Areas of Outstanding Natural Beauty, unless it can be shown that there are compelling reasons for the new or enhanced capacity and with any benefits outweighing the costs very significantly. Planning of the Strategic Road Network should encourage routes that avoid…Areas of Outstanding Natural Beauty."

5.6.33 For development proposed outside nationally designated areas which might affect them, paragraphs 5.154 and 5.155 of the NNNPS apply. Paragraph 5.154 states:

"The duty to have regard to the purposes of nationally designated areas also applies when considering applications for projects outside the boundaries of these areas which may have impacts within them. The aim should be to avoid compromising the purposes of designation and such projects should be designed sensitively given the various siting, operational and other relevant constraints…"

5.6.34 Paragraph 5.155 goes on to state:

"The fact that a proposed project will be visible from within a designated area should not in itself be a reason for refusing consent."

Development of Preferred Route

5.6.35 Between Appleby and Brough, the Black Route developed from the Preferred Route announced in May 2020. This route comprises upgrading an 8km section of carriageway from single to dual carriageway between Coupland Beck and Brough. For the dualled section to be viable, junction improvements will be required to enable access on and off the A66 to improve user safety and reduce congestion.

5.6.36 This led to the development of three junction proposals, at Sandford, Warcop and Langrigg.

5.6.37 At Sandford, the junction was further developed with regard to feedback received following the announcement of the Preferred Route, as outlined in 5.6.27 above. In addition, the further design development sought to improve connectivity between local footpaths and bridleways by providing a route over the new A66. This would have the added benefit of improving the link between Great Ormside, Sandford and the North Pennines AONB.

5.6.38 Therefore, at Sandford (B6259):

- A new all-movement junction on the A66 was proposed approximately 1km west from its junction with the B6259.
- The junction was designed to connect to the B6259 for Sandford and Warcop and to provide access to the new A66 for farms and land on the southern side of the A66 and to Café Sixty Six and land on the northern side of the A66.
- It was proposed to provide a new structure over the new A66.

5.6.39 At Warcop:

- It was proposed to provide junctions on the westbound and eastbound carriageways to facilitate access to the A66 in both directions. This would also provide access to Warcop village and the old A66 in order to maintain access to the local road network.
- On the A66 eastbound carriageway a new left on/left off junction was proposed to join to the existing A66 and provide access to Warcop village and properties and land to the north of the existing A66.
- On the A66 westbound carriageway a new left on/left off priority junction was proposed to join the road into Warcop village. This junction would be screened by the existing Eden Valley railway embankment to reduce potential visual impacts.
- It was proposed to elevate the A66 in this location above existing ground level and provide a new structure under the A66 to improve the connection between local footpaths and link Warcop, Dogber Tarn and the North Pennines AONB.

5.6.40 At Langrigg:

- It was proposed to maintain access to Langrigg through a left-only junction with diverge and merge lanes on the westbound A66 carriageway to allow users to leave and join safely.
- A new local road was proposed on the south side of the A66 to connect Flitholme to Broomrigg. This would allow Flitholme residents access to the new A66 westbound at Langrigg left-only junction.

5.6.41 These proposals were presented to the public at a virtual engagement event in November 2020 as part of the Winter 2020 Project Update. An extract from the brochure produced for this event is shown in Figure 11 below.

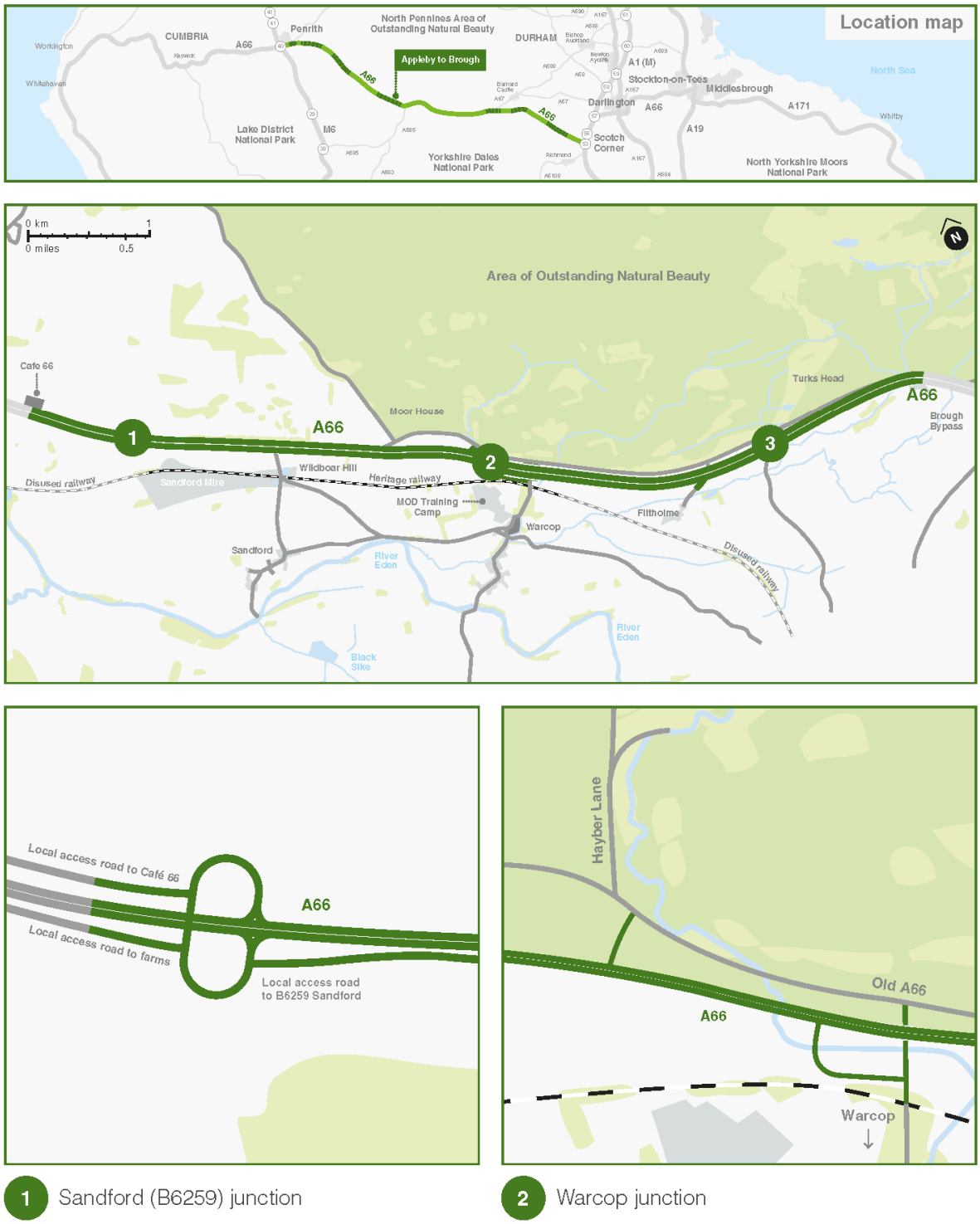


Figure 11 Winter 2020 Project Update extract for Appleby to Brough

5.6.42 Over this same period from Summer to Winter 2020, the alignment of the Preferred Route was further developed. This was informed by the findings of assessments and surveys, and a detailed review of policy requirements relevant to Areas of Outstanding Natural Beauty.

5.6.43 This route was designed to remain outside the AONB as much as possible, however through design development it became apparent that the eastern tie-in cannot be constructed as part of the Preferred Route, and local access cannot be maintained, without some limited construction within the AONB.

Development of alignment alternatives

Development of Preferred Route – Black Route

5.6.44 As Preliminary Design progressed following the Project Update of Winter 2020, the Black Route was developed further as outlined below and shown in Figure 12.

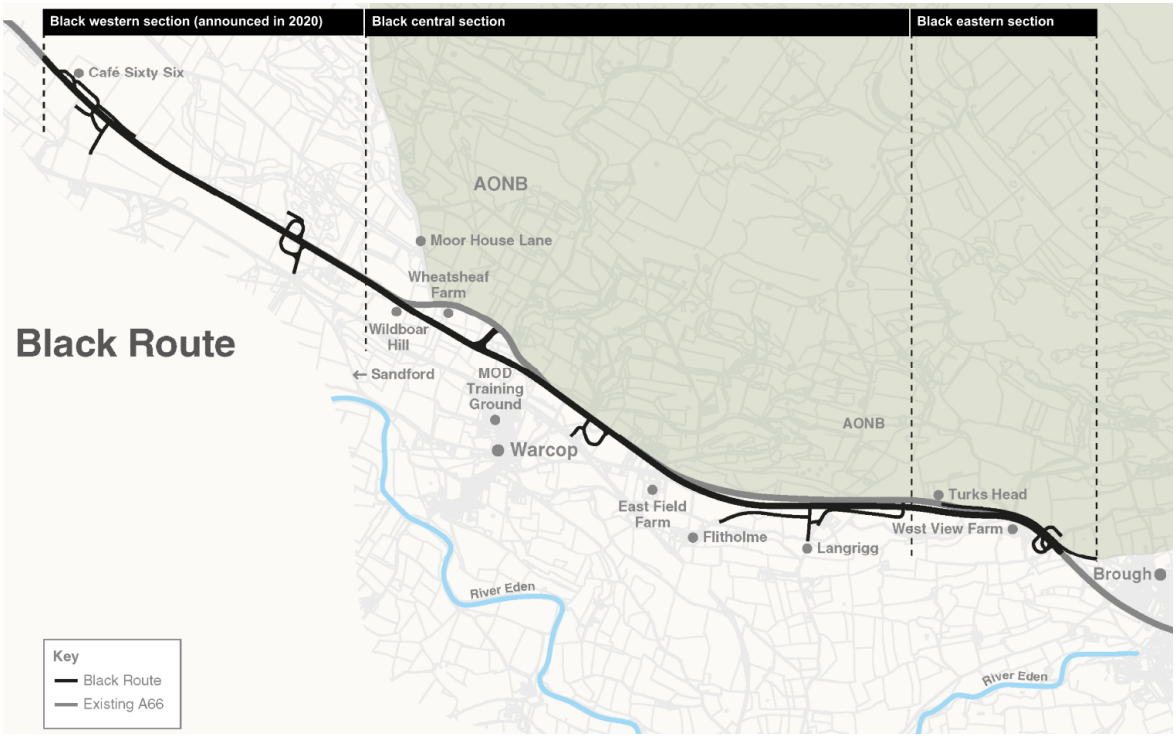


Figure 12 Development of announced Preferred Route for Appleby to Brough - Black Route

Black Route western section alignment

5.6.45 The western section alignment presented in the Preferred Route Announcement of May 2020 was outwith the extents of the AONB and therefore it was not proposed to deviate from the principles as set out in the PRA. This section was therefore only subject to minor design refinement as follows:

- The western section of the route, starting from Coupland Beck comprises 2.6km of online widening with a new westbound carriageway to the south of the existing carriageway.
- An eastbound diverge and merge will be provided at Café Sixty Six to provide access to the new eastbound A66 carriageway that matches the existing. It is proposed that a replacement underpass be constructed to serve both New Hall Farm and Far Bank End, with a left on/left off junction proposed on the westbound carriageway. Access tracks will link the underpass with each carriageway, providing access to the A66 in all directions for farms, properties and land at this location.

- A new grade-separated junction is proposed to be provided at Sandford, with a diverge and merge on both carriageways. An underbridge will be provided under the new A66 to connect to the B6259 and provide access to MoD and agricultural land in the north. This arrangement reduces the required footprint of the junction and associated land take.

5.6.46 No alternatives have been proposed to the alignment for this section of the route. Therefore, the original Preferred Route announced with the refinements set out above will be presented at Statutory Consultation in Autumn 2021 for the western section of the Appleby to Brough scheme.

5.6.47 It is recognised however that there has been some feedback from members of the local community about these proposals that queries why the route has been widened to the south of the existing A66 and not to the north. Engagement around this issue is ongoing and stakeholders have been encouraged to participate in the Statutory Consultation in Autumn 2021 and make their comments formally where they will be reviewed and regard given to them in the final preparation of the application for development consent.

Black Route central section alignment

5.6.48 The central section alignment presented in the Preferred Route Announcement of May 2020 was refined as follows:

- From Sandford this route will generally follow an alignment to the south of the existing A66 diverting south from the line of the old A66 at Wildboar Hill.
- An underpass will be provided to allow access to agricultural land and drainage ponds at Wheatsheaf Farm. A new structure crossing Moor Beck will be provided, which will also be used to convey an existing footpath under the new A66.
- New junctions will be provided at Warcop on the westbound and eastbound carriageways to facilitate access to the A66 in both directions and providing access to the village of Warcop and the de-trunked A66. These junctions will maintain access to the village of Warcop, MoD facilities, side roads, properties and land to the north and south of the A66 via a new underbridge located to the east of Moor Beck bridge.
- It is proposed that these left on/left off priority junctions are designed to utilise existing side road connections where possible.
- From East Field Farm, the route continues to the south of the existing A66. A new junction will be provided at Langrigg, close to its current location. Movements will be limited by providing a left-only T-junction with appropriate diverge and merge tapers on the westbound carriageway only.
- A new local road to the south of the new A66 alignment will link the village of Flitholme with Langrigg, providing access to the westbound A66 and the local road network. This local road is linked to Langrigg by a staggered cross-roads. This junction also links to a new local road to the south of the A66 heading east to a new overbridge provided opposite The Gatehouse and connecting to the existing A66 near Turks Head.
- As this route proposed to utilise land that currently hosts the annual Brough Hill Fair, provision of an alternative site for this community event would have to be sought.

5.6.49 However, a review of the extents of the North Pennines AONB showed that there were elements of this proposed central section alignment that would require

development within the boundary of the designated site. As such, it was determined that alternative alignments should be investigated to ascertain whether the AONB could be avoided entirely, thereby aligning the route more fully with the starting point for new roads in AONB in the NNNPS.

Black Route eastern section alignment

5.6.50 The eastern section alignment presented in the Preferred Route Announcement of May 2020 was refined as follows:

- An overbridge is proposed at Gate House, from which it is proposed that the route continues to follow an alignment to the south of the existing A66 before tying into Brough Bypass near West View Farm.
- A new farm accommodation underpass will be provided to the west of West View Farm for agricultural vehicle and livestock use only. This will be constructed under the new A66 and local road.
- An accommodation overbridge will also be provided for agricultural use, walkers, cyclists and horse riders to the east of West View Farm, providing access to land on the north side of the A66 and maintaining footpath and bridleway connectivity. Further analysis at PCF Stage 3 noted that this will encroach into the AONB (refer to 5.6.52 onward).
- To the north of the new dual carriageway, the old A66 will be used for access to the local road network, west to Warcop or east to Brough. A new local road will be provided to the north from Turks Head into Brough; further analysis at PCF Stage 3 Preliminary Design noted that this will encroach into the AONB (refer to 5.6.52 onward).
- A left-only T-junction with appropriate diverge and merge tapers on the westbound carriageway is proposed to provide access to properties, farm and land on the south side of the new dual carriageway. Eastbound local movements to Brough will be via the accommodation bridge to join with the local road into Brough.
- It is proposed that the de-trunked sections of the existing A66 will maintain access into the AONB for walkers, cyclists and horse riders.

5.6.51 As with the central section of the developed Preferred Route, the eastern section of the developed Preferred Route also encroached into the North Pennines AONB. This eastern incursion was more significant than the central incursion however as it became clear that the tie in between the proposed A66 and the existing carriageway could not be constructed without encroaching into the AONB, alternative alignments were therefore investigated for the eastern section of the scheme, to ascertain whether the AONB could be avoided entirely so as to align the route more fully with the starting point for new roads in AONB in the NNNPS.

Design development of alignment alternatives

5.6.52 The current alignment of the A66 forms the southern boundary of the AONB designation, between Moor House Lane in the west and Brough in the east.

5.6.53 Throughout PCF Stages 1 and 2, a core principle adopted for the Appleby to Brough scheme was the aim to develop a route that could be constructed outwith the North Pennines AONB, in accordance with the Section 104(3) of the Planning Act 2008 and the NNNPS. Following a detailed design review from both an environmental and engineering perspective however, it was determined that the developed Preferred Route for the Appleby to Brough scheme could not be constructed without land take

within the North Pennines AONB designated area at the eastern tie-in (associated with a private access and local access road).

5.6.54 From a planning policy perspective, as outlined in the NNNPS (refer to 5.6.30 through 5.6.34 above), there is a starting presumption against development of new roads within an AONB.

5.6.55 Due to the policy challenges outlined above, the design team continued to investigate alternative route alignments that could either remain completely outside the AONB thus avoiding any direct impact, and that could minimise potential compromise of the purposes of the designation of the AONB as a direct result of the scheme. This design development resulted in alternatives as outlined in 5.6.57 and 5.6.58 below.

5.6.56 The western section of the route remained as the developed Preferred Route design as outlined in 5.6.45 above. No alternative alignment was developed for this section as the developed Preferred Route did not present an incursion into the AONB or present potential for significant impacts on its setting.

5.6.57 The eastern alignment alternative was developed following review of proposed tie ins with the existing A66. During Preliminary Design it was confirmed that it would not be possible to tie the proposed new A66 into the existing without encroaching into the AONB, which would present a significant consenting challenge if viable alternative alignments with less harm to the AONB and lower overall environmental impact were available. There were also issues presented when trying to provide local road access to Brough. This alignment alternative became known as the Orange Route and sought to avoid any direct impact on the AONB.

5.6.58 The central alignment alternative was developed as a result of initial work on the eastern section. Simultaneously, feedback from stakeholders in regard to concerns about the proximity of the route to East Field Farm and Warcop village led to consideration of an alignment that coincided and overlapped with the fringes and edge of the AONB. This alignment alternative became known as the Blue Route.

Design development of eastern section alignment alternative – Orange Route

5.6.59 During early review of the Preferred Route that was announced in May 2020, it was identified that the local connection road from the de-trunked A66 into Brough is located within the North Pennines AONB towards the eastern end of the scheme.

5.6.60 Given this would result in direct development within part of the AONB, a design exercise was undertaken to identify alternative alignments that would reduce or avoid direct impact on the AONB at the eastern end of the scheme. These are summarised below.

Alignment alternative with removal of local road in AONB

5.6.61 A design was developed that tied the new A66 dual carriageway alignment into the existing A66 dual carriageway kerb line which is also the AONB boundary, avoiding "significant road widening or the building of new roads" within the AONB, in line with paragraph 5.152 of the NNNPS. However, some associated works would still be required in the AONB within the existing highway verge e.g., vehicle restraint systems (VRS), drainage, earthworks, etc. in order for this design to work.

5.6.62 This alignment alternative would reduce direct impact on the AONB but does not allow the existing de-trunked A66 to be used as a local road connection for the villages of Warcop and Flitholme, and there will be no local road connectivity to the East and Brough for WCHs. For example, all local traffic would have to join A66 dual carriageway at Warcop to travel to the East and Brough.

5.6.63 Further analysis of this alternative identified the following disadvantages:

- No local road connectivity from Warcop to Brough.
- Highway alignment that was not to current standards, requiring approval of a number of departures from standard.
- Closure of existing gaps in the central reserve, reducing crossing opportunities for land/property owners. This will result in the requirement for an alternative method of crossing the A66.
- Restriction in the number of Private Means of Access (PMA) off the A66 westbound carriageway.
- Closure of (quarry) access track to north of A66 (off eastbound carriageway).
- Lack of Public Right of Way (PRoW) connectivity.

5.6.64 As such, this alignment alternative has not been developed further and was not taken forward to a sifting review.

Alignment alternative outside of the AONB

5.6.65 Considering the importance of local road connectivity and providing a connection between the de-trunked A66 from Warcop and the west to Brough and the east for local road traffic and WCHs, an alignment alternative was developed that was entirely outside the AONB.

5.6.66 This alternative takes the new A66 dual carriageway from a point near to Turks Head on an alternative alignment to the south of West View Farm and connects back into the existing A66 dual carriageway near to Musgrave Lane Overbridge.

5.6.67 This alternative will allow the de-trunked A66 to become the local road connection to Brough Main Street and will allow the existing north and south movements from properties on the south side of the old A66 to be maintained.

5.6.68 This alternative will require the acquisition of one residential property and will impact the operation of West View Farm considerably.

5.6.69 This alternative has no encroachment directly into the AONB compared with the announced Preferred Route, which encroaches in to the AONB over a length of approximately 1150m averaging approximately 35m in width. There are some localised areas associated with the announced Preferred Route where the encroachment is greater, up to 85m in width.

5.6.70 In discussion with local stakeholders, including landowners, parish councils and Statutory Bodies it is recognised that this alignment alternative has very limited support. However, given it does not encroach directly into the AONB and also provided the desired connectivity for the scheme, it was taken forward to a sifting review as an alignment alternative (Orange Route) for the eastern section of the scheme.

Design development of central section alignment alternative – Blue Route

5.6.71 As outlined in 5.6.58, an alignment alternative has been developed for the central section of the route. The development of the central section also took into account stakeholder concerns raised, particularly from the village of Warcop, during engagement for this scheme and to explore the potential for a route further from the village of Warcop and with lower visual and noise impact on nearby residents and businesses. Its development is described below.

Alignment alternative at East Field Farm

5.6.72 During landowner engagement in Autumn 2020, concerns were raised by the owners of East Field Farm about the proximity of the proposed new A66 carriageway to the dairy farm. These concerns included noise, air quality, safety, biosecurity and general disturbance issues. Site visits confirmed that the proposed Preferred Route Alignment at this point would have been approximately 10m from the edge of the existing Silage Clamp building to the edge of the A66 westbound carriageway.

5.6.73 Consequently, the design team reviewed the alignment at this location and were able to realign the new carriageway shown in the PRA, slightly north in order to increase the distance from the corner of the Silage Clamp building to the edge of the new carriageway to approximately 15m.

5.6.74 In late December 2020, further engagement with landowners and Warcop Parish Council led to consideration of a route in the central section slightly north of the existing A66, within the AONB and MoD land. This would result in a direct impact on the AONB and residential properties in this location and the potential for the route to be considered to be substantially in conflict with national policy. It would also result in considerable disruption for the MoD and their active training ranges. The A66 design team have developed an alternative alignment with lower impact on the AONB and on the MoD operations, which we consider is in accordance with national policy. The principle of this alternative is to move the new A66 dual carriageway further north away from Warcop village and East Field Farm whilst also providing the opportunity to lower the level of the road. This alternative places the new eastbound carriageway of the A66 over the existing A66 and places the new westbound carriageway of the A66 to the south of the existing. The result is an increased distance of approximately 30m from the Silage Clamp Building at East Field Farm to the edge of the new carriageway.

5.6.75 This alternative alignment requires the replacement of the local road and this will need to be constructed parallel to the new A66 within the AONB and MoD training camp, resulting in a direct impact on the AONB and MoD. However, with this alternative it has also been possible to reduce the approximately 8m high embankment and lower the new A66 and local road to be predominantly “at grade” on a reduced embankment at similar levels to the existing. This will reduce the visual impact on the AONB and its setting, reduce the amount of imported fill material required and reduce the impact on the MoD training camp.

5.6.76 This alternative encroaches in to the AONB over a length of approximately 1400m averaging approximately 30m in width. There are localised areas where the encroachment is greater, up to 200m in width.

5.6.77 An alignment alternative was considered that followed the same alignment but was on an embankment similar to that shown in the Preferred Route Announcement. This alternative was discounted as it had a direct impact on the AONB and would have had the same visual impact as the Black Route, as well as increased impact on the MoD training camp.

5.6.78 An overbridge with embankments will be required to take the local road and westbound junction connection up and over the new A66 to connect with the local road on the north side, providing access to the local road network and MoD training camp.

Development of route through MoD property

5.6.79 The westbound and eastbound junctions at Warcop have been designed with appropriate merges, diverges and connections with local roads that will allow the MoD

Heavy Equipment Transporter (HET) access and egress from the training camp from and to the new A66. A number of accesses into the MoD training camp, maintenance compound and residential properties on the northern side of the A66 will be provided off the new road. An area of the MoD tank storage and filling station compound will be lost with the new local road provision so an existing MoD compound area to the east will be upgraded and extended to ensure conformity with the NNNPS. Paragraph 5.54 states:

"…It is important that new national networks infrastructure does not significantly impede or compromise the safe and effective use of any defence assets."

5.6.80 By extending the encroachment of the local road into the MoD training camp on the north side of the old A66 further to the east, an opportunity to provide an underpass at Flitholme has been presented. This full height underpass will allow Flitholme residents access to the local road network. It is proposed that this underpass and road from Flitholme will be connected to Langrigg via a new local road, allowing residents to access the local road network, also.

5.6.81 This new length of detrunked A66 and underpass to Flitholme will result in removal of an area of planting to the north of the old A66 that screens MoD facilities and as such further engagement with the MoD was sought for the proposals. The outcome of this engagement was the proposal to provide additional planting in an area of grass to the south of Brough Hill to mitigate both additional incursion into the AONB for the Flitholme underpass and provide additional screening to the MoD facilities.

Provision of alternative site for Brough Hill Fair

5.6.82 As with the Black Route through the central section of the Appleby to Brough scheme, development of the Blue Route also gave rise to the need to identify an alternative site for the Brough Hill Fair, held on the last weekend of September every year. The existing location, a field owned by the MoD and tenanted by the owners of East Field Farm will not be viable following construction of the proposed A66, which requires this land. The existing site is approximately 5.4 acres, is relatively flat and level, has access off the existing A66 and is outwith both the AONB and the MoD training facilities.

5.6.83 Considerations and requirements for alternative sites were established as follows, that the new site must:

- In its final provision, be a grass field, relatively flat and level to match the existing site.
- Be of similar provision to the existing circa 5.4 acre site.
- Have safe access off the old de-trunked A66 'local road', not the proposed new, dualled A66.
- Be within the scheme extents of Appleby to Brough.
- Be outside the MoD training range and camp.
- Be outside the designated Area of Outstanding Natural Beauty.
- Be as close as practicable to the existing site given the historical and cultural association of Brough Hill Fair to Brough Hill.

5.6.84 A site of approximately 5.4 acres has been identified, which will be available after construction of the proposed Blue Route. This site is to the north of East Field Farm,

is relatively flat and level and has safe access off the old A66. The site combines part of the old Brough Hill Fair site with an area currently owned by the MoD and used for visiting troops and cadets to camp in. It is not within the bounds of the AONB, nor the active MoD training range.

5.6.85 Stakeholder engagement has been ongoing as the design has developed and interested and affected parties have been encouraged to participate in the Statutory Consultation to make their comments formally through that channel where they will be reviewed and regard given to them in the final preparation of the application for development consent.

Warcop junction

5.6.86 It is proposed to provide junctions on both the westbound and eastbound carriageways of the A66 at Warcop, to allow access to the A66 in both directions. It will also provide access to Warcop village and the old A66, maintaining access to the local road network.

5.6.87 On the A66 eastbound carriageway a new left on/left off junction will be provided joining to the existing A66. This will provide access to Warcop Village, properties and land north of the existing A66.

5.6.88 On the A66 westbound carriageway a new left on/left off priority junction will be provided joining the road into Warcop village. The A66 will be predominantly at similar levels to existing ground level in this location and a new structure will be provided over the A66 to improve the connection between local footpaths and linking Warcop, Dogber Tarn and the North Pennines AONB.

Stakeholder engagement during alignment alternative development

5.6.89 There has been engagement with the MoD, Warcop Parish Council, local landowners and Statutory Bodies on the Blue Route alignment alternative. All have been given the opportunity to comment and engagement has shown there is support for this alternative when compared with the Preferred Route design announced in May 2020. As such, the Blue Route will be presented at Statutory Consultation in Autumn 2021, and all stakeholders have been encouraged to participate in the Statutory Consultation and make their comments formally through that channel.

Presentation of route alignment alternatives at July 2021 stakeholder engagement events

5.6.90 As there has been significant design development during PCF Stage 3 Preliminary Design for this section of the A66 between Appleby and Brough, further stakeholder engagement events were held during July 2021 to gather feedback from interested and affected parties on how the design was developing at that point. These sessions included in-person drop-in sessions at Warcop Parish Hall with the opportunity for stakeholders to book an appointment to experience a SoundLab (virtual listening tool) simulation of the proposals.

5.6.91 These events were held to present the four route alignment alternatives that had been developed to that point, each presenting a different combination of alternatives for the western, central and eastern sections of the route.

5.6.92 The route combinations were as shown in Table 8 below.

Table 8 Appleby to Brough route alternatives presented at stakeholder engagement events, July 2021

	Western Section	Central Section	Eastern Section
Route One	Black	Black	Black
Route Two	Black	Blue	Black
Route Three	Black	Black	Orange
Route Four	Black	Blue	Orange

5.6.93 The development of these alignment alternatives is presented above and the combinations discussed were as follows in Figure 13 below.

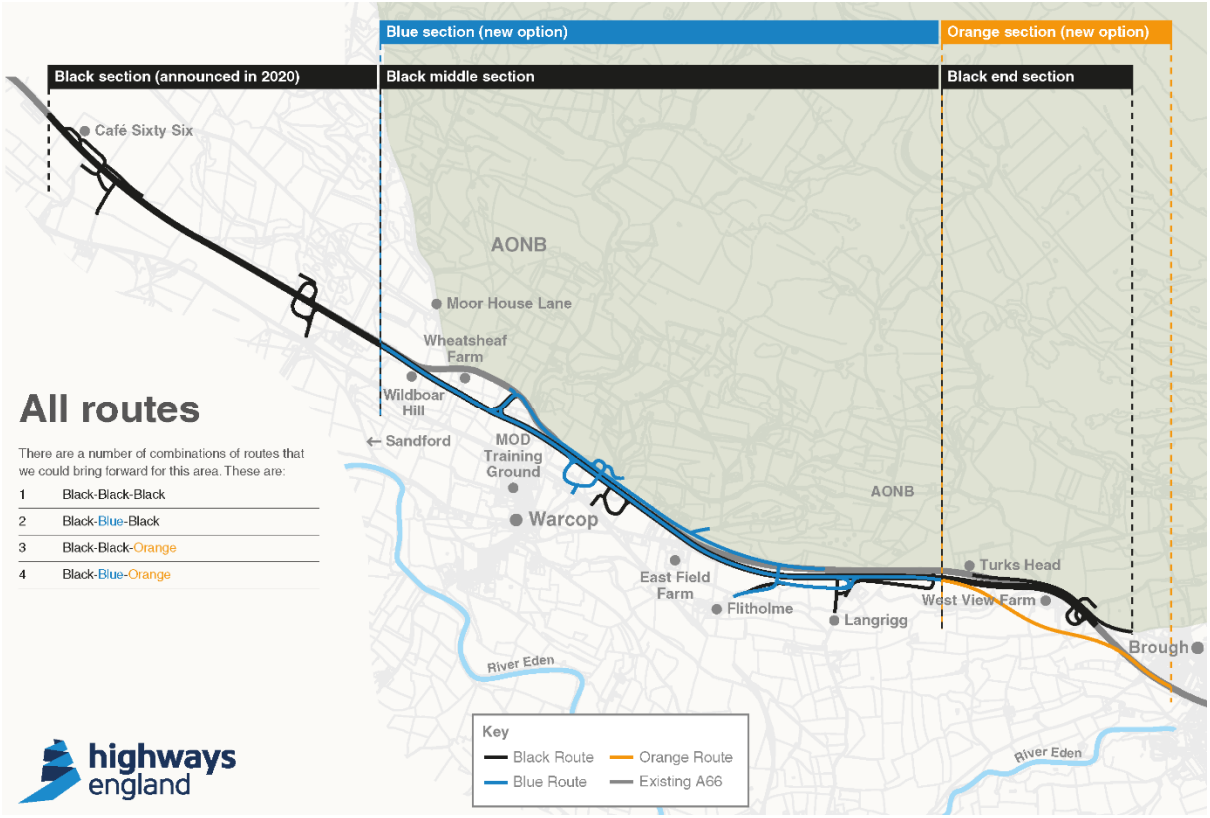


Figure 13 Alignment alternatives presented for Appleby to Brough at July 2021 stakeholder engagement events

5.6.94 The engagement event provided additional information for stakeholders to help them understand the alignment alternatives before the Statutory Consultation. It was communicated to attendees that while suggestions would be taken onboard and considered going forward, they would not be reflected in the Statutory Consultation materials.

5.6.95 Attendees were encouraged to participate in the Statutory Consultation and make their comments formally through that channel where they would be reviewed and regard given to them in the final preparation of the application for development consent. Attendees were also advised by the Highways England team that a route preference would be stated at Statutory Consultation.

Alignment alternatives sifting for Statutory Consultation

5.6.96 A sifting exercise has been carried out to compare the developed Preferred Route (Black) and alternative alignments for both the eastern (Orange) and central (Blue) sections of the route from Appleby to Brough. Alignments were assessed against engineering, environmental, traffic, economic, stakeholder principles, with commentary on policy conformity. In addition, Highways England's three priorities of Safety, Customer and Delivery were considered crucial to assessing the alignments ahead of Statutory Consultation. Refer to 4.1 for further detail on the assessment process and criteria.

5.6.97 In consideration throughout the Route Development Report the design team has had regard to the need to be in conformity with national planning policy as the project is developed, assessed, consulted on and prepared for development consent application. In this regard, the starting considerations in relation to the policy tests for development within or in the setting of the AONB have been set out. In this context, the main assessment requirements from paragraph 5.151 of the NNNPS have been considered, namely:

- *"the need for the development, including in terms of any national considerations, and the impact of consenting, or not consenting it, upon the local economy;*
- *the cost of, and scope for, developing elsewhere, outside the designated area, or meeting the need for it in some other way; and*
- *any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated."*

5.6.98 Having assessed the alternative route alignments for this scheme:

- Central section alignment – Black Route to the south of the existing A66 (outside the AONB) and the Blue Route (the preference) online with a local road connection to the north of the existing A66 (the local road is within the AONB).
- Eastern section alignment – Black Route (the preference) online with a local road connection and junction within the AONB and the Orange Route to the south of the current A66 alignment (outside of the AONB).

5.6.99 Within the PEIR it is identified that there is scope to develop the scheme outside the designated area (to be in full conformity with the second requirement) of paragraph 5.151 of the NNNPS. The alternative alignments outside the AONB are the Black Route within the central section and the Orange Route within the eastern section, as described above.

5.6.100 There are currently no significant differences in the construction cost estimates for the central section route alignments, although there is a cost difference in favour of the Black Route (compared to the Orange Route) for the eastern section.

5.6.101 From the assessments of the routes there are detrimental effects on the environment, landscape and recreational opportunities associated with both the Black Route within the central section and Orange Route within the eastern section, both wholly outside the AONB, which in combination outweigh any positive impacts for these routes (when compared to the routes with some incursion in the AONB). These considerations in combination provide the starting basis of the exceptional

circumstances for development of the routes partly within the AONB. The initial differing effects of the route alternatives in relation to environment, landscape and recreational opportunities which contribute to the aforementioned conclusion on the preferred alignments (Blue Route in the central section and Black Route in the eastern section) are set out below.

Alternatives sifting between Orange and Black Routes for eastern section alignment

5.6.102 A copy of the assessment matrix for the Appleby to Brough eastern section alignment alternatives sifting exercise can be found in Appendix A.3 and a summary of the matrix is shown below in Table 9. This assessment compared the Black Route with the Orange Route.

Table 9 Summary of sifting matrix for comparison between Orange and Black Routes for eastern section alignment of Temple Sowerby to Appleby

Discipline		Comparison with base Black Route
Engineering		
Highways - Standards Compliance		Neutral
Utilities		Neutral
Geotechnics and Earthworks		Worse
Structures		Worse
Drainage and Hydrology		Neutral
Construction Design Management (CDM)		Neutral
Construction Cost		Worse
Buildability		Better
Environment		
Biodiversity	Construction	Worse
	Operation	Worse
Road Drainage and Water Environment	Construction	Worse
	Operation	Worse
Geology, Soils, Contaminated Land and Groundwater	Construction	Better
	Operation	Neutral
Noise and Vibration	Construction	Neutral
	Operation	Worse
Landscape and Visual	Construction	Neutral
	Operation	Worse
Population and Human Health	Construction	Worse
	Operation	Neutral
Air Quality	Construction	Neutral
	Operation	Neutral
Material Assets and Waste	Construction	Neutral
	Operation	Neutral
Cultural Heritage	Construction	Neutral
	Operation	Neutral
Climate	Construction	Worse
	Operation	Neutral

Discipline	Comparison with base Black Route
Traffic and Economic	
Traffic Volume	Neutral
Journey Time Savings	Neutral
Safety	Neutral
Economy (not modelled with TUBA)	Neutral
Accessibility including WCH Opportunities	Neutral
Stakeholder	
Land Take	Better
Residential	Worse
Commercial	Worse
Recreation and Leisure	Neutral
Wider Community Issues	Worse

Engineering

5.6.103 Considering the engineering criteria, the Orange Route generally performed worse than the Black Route. The Orange Route would require a large structure over Low Gill Beck to span both the Beck and its floodplain, whereas a culvert extension would be required for the Black Route. This would increase costs for the Orange Route, primarily for the reasons below:

- Increased earthworks, increased land take and the need to import fill.
- A larger structure required over Low Gill Beck to span the beck and floodplain compared to culvert extension in the Black route.
- Increased length of new dual carriageway construction of approximately 500m to tie back into Brough Bypass by Musgrave Lane Overbridge.
- Costs including social and business impacts associated with acquiring Mains House and impacts on West View Dairy Farm.

5.6.104 Highways standards compliance, utilities, drainage and hydrology and CDM criteria were considered as having little to differentiate the schemes.

5.6.105 However, it was considered that the Orange Route would likely be easier to build despite the increased structures complexity over the Low Gill Beck as it can be built 'offline', keeping the old A66 open during works and only impacting road users to complete the tie-in to Brough Bypass.

Environment

5.6.106 The Orange Route presents significant environmental challenges, with the majority of criteria assessed returning a worse result for the Orange Route than the Black Route. Although some of these impacts may be reduced through further design development, it is not expected that this will be to the extent which would lead to an improvement over either the existing situation (current operational A66) or that proposed by development of the Black Route (developed Preferred Route).

5.6.107 The greater number of watercourse crossings proposed for the Orange Route could adversely affect the biodiversity of these features, and increase habitat fragmentation. Lowgill Beck is hydrologically linked to the River Eden so there is an

inherent risk to species present in the watercourse; this may also have a resultant effect on the SAC designation.

5.6.108 Further details of the environmental assessment criteria can be found in the PEIR.

Traffic

5.6.109 There is little to differentiate the routes when considering traffic and economics, for example traffic volume, journey time savings, safety and economy. From an accessibility perspective, a number of Public Rights of Way are severed by the Orange Route and blocked by the Black Route, but diversions via underpasses and overbridges are provided in both routes to ensure connectivity is maintained.

Stakeholder

5.6.110 From a stakeholder perspective, the Black Route generally performs better than the Orange Route. Although the Orange Route would require no land take from the AONB, the Black Route would require encroachment into the AONB on its boundary. However, the Black Route does not require the acquisition or demolition of residential properties to facilitate its construction, nor the increased agricultural land take required for development of the Orange Route. It is expected that the Orange Route would have a greater impact on the local community through this additional land take of agricultural, commercial and residential properties, as well as the severance of Public Rights of Way.

Exceptional circumstances

Effects on the Environment

5.6.111 For the eastern section alignment, the Black Route is better in relation to:

- Biodiversity (during construction and operation):
    - Construction impacts of the Black Route will be largely similar to those of the Orange Route with a number of exceptions including potential for greater impacts to additional watercourse crossing of Lowgill Beck, increased loss of riparian habitat, increased loss of woodland and increased risk of impact of habitats that have potential to support protected species.
    - During operation, the Orange Route will result in additional watercourse crossings compared to the Black Route, which increases the risk of impacts to the watercourses in the area and would result in increased habitat fragmentation.
- Noise and Vibration (during operation):
    - Compared to the Black Route, the Orange Route has more residential receptors at risk of experiencing adverse noise impact, more receptors expected to experience a beneficial effect from noise, and a greater number of PRoWs being at risk of adverse noise impact.
- Water environment (during operation):
    - The Black Route would result in an extension to the structure which crosses Low Gill Beck where it is already constrained by the A66. The Orange Route requires a new crossing of Lowgill Beck which leads to the potential for impacts to this watercourse as a result of potential constraint of the floodplain and impacts of construction related run off affecting water quality. The Orange Route is also located within a high-risk areas for fluvial flooding.

- Climate:
    - Greenhouse gas modelling has indicated that the Orange Route has the potential to lead to increased greenhouse gas emissions compared to the Black Route.
- Wider community and local economy (including population and human health):
    - The Orange Route will have a greater impact on the local population through additional land take of agricultural, commercial, and residential property, as well as the severance of PRoWs. A residential property would need to be demolished for the Orange Route. The increased land take from West View Farm will affect future expansion plans and would affect farm productivity due to loss of productive land.

5.6.112 In considering the above environmental matters in favour of the Black Route, account also needs to be taken of where the Orange Route may be better than the Black Route, in relation to the following criteria:

- Geology, soils, contaminated land and groundwater:
    - The Orange Route sits to the south of the North Pennines UNESCO Global Geopark, the border of which follows that of the AONB and avoids any direct impact on it.

5.6.113 In giving consideration to the effects on the environment overall the Black Route is clearly preferred to the alternative Orange Route.

Landscape and visual impacts(operations)

5.6.114 During operation, the principal features of the Orange Route, which contribute to its greater visual and landscape impact when compared with the Black Route are:

- The Orange Route alignment would introduce a large embankment required to take the route alignment to the south of West View Farm and enable construction of a structure over Low Gill Beck and an underpass under new A66 to accommodate livestock, agricultural vehicles and WCH users.
- The Orange Route will be through open countryside and will introduce a new infrastructure corridor within this area. In contrast the improvements online (with the Black Route) will involve work to or alongside the existing A66.

5.6.115 The Orange Route will result in permanent loss of trees, woodland and hedges and alteration of field pattern and size, with a much lower extent of impact with respect to these features for the Black Route.

5.6.116 The impacts on the setting of the AONB for the Orange Route will be considerable albeit in a limited area. There will also be considerable impacts on landscape character of the Broad Valleys sub-type. The Orange Route alternative will be a very noticeable feature in views from the wider public rights of way network in this area and a notable influence on views from Brough Castle.

5.6.117 Overall the impacts are considered to be greater with the Orange Route alternative due to the scale of the offline section and the impacts on landscape character, setting of the AONB and impacts on visual amenity. With regard to landscape and visual impacts the Black Route is preferred to the alternative Orange Route.

Recreational opportunities

5.6.118 There are no notable differences between the Black and Orange routes in relation to recreational opportunities. A number of Public Rights of Way are affected by both

routes, but diversions via underpasses and overbridges in both routes ensure connectivity maintained so Neutral impact.

Conclusion

5.6.119 The sifting exercise, set out above, concluded that for the eastern section of the Appleby to Brough scheme, the Black Route was preferred over the Orange Route. An initial assessment of the route alignments against the policy considerations of the NNNPS (paragraph 5.151) has been undertaken. As set out above, this assessment supports the case for exceptional circumstances for the incursion of the Preferred Route alignment (the Black Route) into the AONB. Further work will be undertaken, informed by the feedback received during Statutory Consultation, to build on this case so that the full exceptional circumstances case can be part of the application for development consent.

Alternatives sifting between Blue and Black Routes for central section alignment

5.6.120 A copy of the assessment matrix for the Appleby to Brough eastern section alignment alternatives sifting exercise can be found in Appendix A.4 and a summary of the matrix is shown below in Table 10. This assessment compared the Black Route with the Blue Route.

Table 10 Summary of sifting matrix for comparison between Blue and Black Routes for central section alignment of Temple Sowerby to Appleby

Discipline		**Comparison with base Black Route**
Engineering		
Highways - Standards Compliance		Neutral
Utilities		Neutral
Geotechnics and Earthworks		Better
Geo-Environmental		Worse
Structures		Worse
Drainage and Hydrology		Better
Construction Design Management (CDM)		Neutral
Construction cost		Neutral
Buildability		Neutral
Environment		
Biodiversity	Construction	Worse
	Operation	Worse
Road drainage and water environment	Construction	Better
	Operation	Better
Geology, soils, contaminated land and groundwater	Construction	Neutral
	Operation	Neutral
Noise and vibration	Construction	Neutral
	Operation	Better
Landscape & Visual	Construction	Neutral
	Operation	Neutral
Population & Human Health	Construction	Worse
	Operation	Better

Discipline		Comparison with base Black Route
Air quality	Construction	Neutral
	Operation	Neutral
Material assets and waste	Construction	Neutral
	Operation	Neutral
Cultural Heritage	Construction	Worse
	Operation	Neutral
Climate	Construction	Neutral
	Operation	Neutral
Traffic and Economic assessment		
Traffic volume		Neutral
Journey Time Savings		Neutral
Safety		Better
Economy (not modelled with TUBA)		Neutral
Accessibility including WCH opportunities		Better
Stakeholder		
Land take		Neutral
Residential		Worse
Commercial		Better
Recreation and leisure		Neutral
Wider community issues		Better

Engineering

5.6.121 The Blue Route presented a number of improvements over the Black Route when considering the engineering criteria used for the sifting exercises. There would be reduced earthworks and material import, which would contribute to cost savings, carbon reductions and vehicle movements and associated congestion during construction of the scheme. This is possible as the Blue Route reduces a circa 8m high embankment that was proposed as part of the Black Route. The Blue Route also has a lesser impact on the floodplain past Warcop village, although there may be some associated impact on agricultural land take for provision of drainage ponds.

5.6.122 However, from a geo-environmental perspective there is a significant risk of increased contamination in soil and groundwater for the Blue Route, given its proximity to the Warcop depot and other MoD and agricultural land uses to the north of the existing A66. However, this may be mitigated through remediation of any contaminated ground prior to works starting.

5.6.123 The Blue Route would require an additional structure when compared to the Black Route. The majority of other engineering criteria showed no clear differentiation between the two routes.

Environment

5.6.124 The environmental assessment of these alignments was complex, with some disciplines noting a preference for one route whilst others were negatively impacted by it. Most disciplines returned a neutral assessment as there were not sufficient

differentiators between the routes for there to be a clear preference. However, there was a clear preference for the Blue Route in terms of its visual impact and impact on the AONB. Further details on the implications of impact on the AONB are provided below.

5.6.125 The impacts of the Blue Route on biodiversity would be largely similar to those of the Black Route with a number of key exceptions which on balance would make the Blue Route the least preferable of the two alignments. These exceptions include, but are not limited to, additional watercourse crossings, loss of woodland and negative impacts on Sandford Mire County Wildlife Site. It is expected however that the majority of these significant impacts could be mitigated through further design and that biodiversity should not therefore be a driving factor in the decision to present one route over the other.

5.6.126 The Blue Route does impact additional heritage features when compared to the Black Route. This includes a feature known as Platform Earthworks to the north of the existing A66, just east of the existing MoD site.

5.6.127 When considering road drainage and water environment, the Blue Route is preferred over the Black Route as it sits further north of the floodplain of Cringle Beck, therefore reducing potential impacts on this floodplain. This also facilitates more opportunity to reduce the risk of construction related impacts on the watercourse.

5.6.128 Further details of the environmental assessment criteria can be found in the PEIR.

Traffic

5.6.129 The Blue Route presents overall greater benefits than the Black Route when traffic is assessed, although it should be noted that there were no significant differences in relation to traffic volume or journey time savings. The Blue Route offers an improvement in accessibility and provision of WCH facilities over the Black Route. For the Black Route, to allow Flitholme residents access to the old A66 it was necessary to construct a staggered crossroads and new local road from Langrigg to Gatehouse on the south side of the new A66, with an overbridge to connect to the old A66. This increased land take and impact on residents and raised objections during stakeholder engagement. The Blue Route provides a development of this proposal at Langrigg, with an underpass for Flitholme connected to the old A66, which removes the need for the staggered crossroads and overbridge arrangement.

Stakeholder

5.6.130 Stakeholder benefits of the Blue Route over the Black Route include commercial benefits for farmers and business owners, the actioning of feedback received through ongoing engagement and provision of replacement facilities for both the MoD and the Brough Hill Fair. However, it should be noted that the Blue Route does impact a number of receptors not previously affected by the Black Route although there are fewer residential receptors at risk of experiencing adverse noise impact.

Exceptional circumstances

Effects on the environment

5.6.131 For the central section alignment, the Blue Route is better in relation to:

- Noise (during operation):
    - Fewer residential receptors at risk of experiencing adverse noise impact.
    - More receptors expected to experience a beneficial effect from noise.
- Water environment (during construction):

- The Blue Route sits at a greater distance to the north of the floodplain of Cringle Beck reducing the risk of impacts on the floodplain.
- The increased distance of the Blue Route from Cringle Beck also allows for greater opportunity to reduce the risk of construction related impacts and pathway to the watercourse.

- Wider community and local economy (including population and human health):
  - From a human health perspective, the Blue Route has fewer residential receptors at risk of experiencing adverse noise impact and more receptors expected to experience a beneficial effect from noise.
  - For Brough Hill Fair, annually held by the traveller community, the Blue Route enables what is left of the existing Brough Hill Fair field and an area currently owned by the MoD and used for visiting troops and cadets to camp in, to be used as a replacement site. It would provide an area similar to the existing site that is lost to the scheme and in addition allows for improved facilities. The Black Route does not allow or enable this and an alternative site will be required to be found that is not near the existing nor of suitable provision. There is not yet any identified alternative location or landowner and user agreement for an alternative site away from its current location.
  - The Blue Route is preferred as it moves further to the north away from West View Diary Farm onto the north side of the existing A66. This has a number of benefits for the farm business ranging from biosecurity, reduced potential disturbance to livestock and reduced potential for vehicle accident strikes. The Blue Route moves the edge of the new A66 to approximately 30m from the edge of the farm buildings, an improvement on the circa 15m in the Black Route.
  - There is one negative population and human health consideration associated with the Blue Route arising from the requirement for land take from residential receptors during construction which isn't required in the Black Route. Overall, the positive community benefits following construction, associated with the greater distance of the route from residential properties outweigh this negative effect.

5.6.132 In considering the above environmental matters in favour of the Blue Route, account also needs to be taken of where the Black Route may be better than the Blue Route, in relation to the following criteria:

- Biodiversity:
  - Construction impacts of the Blue Route overall will be largely similar to those of the Black. However, in the preliminary environmental information there are a number of specific exceptions which are identified including two additional watercourse crossings which will increase the potential for impacts to the watercourse and increase loss of 500m of woodland, with the potential loss of a number of other priority habitats and the protected species supported by them.
- Cultural heritage:
  - An additional heritage feature, known as Platform Earthworks to the north of the existing A66 just east of the existing MoD site, is potentially impacted as a result of the Blue Route compared to the Black.

5.6.133 In giving consideration to the effects on the environment taken together, the Blue Route is preferred to the alternative Black Route.

Landscape and visual impacts

5.6.134 Regarding landscape and visual impacts, the principal features of the Blue Route, which contribute to its preference compared with the Black Route are:

- The Blue Route road is on a much lower embankment than the Black Route which is on an 8m embankment. Therefore, visual impact associated with the Blue Route is lower and setting impact on the AONB is also lower when compared with the Black Route.
- The road associated with the Blue Route would result in development within an existing road corridor on land that is already disturbed which will reduce its visual and landscape impact compared with the Black Route.
- With this Blue Route, encroachment into the AONB is kept to the edge of the AONB bordering the existing A66 highway, in an area that is also already impacted and in part characterised by MoD infrastructure.
- Encroachment into the AONB is for a local road only with the Blue Route, which would be designed to be incorporated and embedded into the landscape and more appropriate to the AONB.

5.6.135 In addition, there is the potential to mitigate the Blue Route, thereby reducing its overall impact on the purposes and setting of the AONB. These opportunities do not exist to the same extent for the Black Route.

5.6.136 The Blue Route also facilitates the removal of an MoD compound providing an opportunity for restoration of previously developed land in the AONB.

5.6.137 With regard to landscape and visual impacts, following consideration of the potential for moderation (through incorporation of mitigation) of impacts the Blue Route is preferred to the alternative Black Route.

Recreational opportunities

5.6.138 The construction impacts of the Blue Route overall will be largely similar to those of the Black. However, there are some specific additional opportunities relating to the Blue Route and accessibility including:

- There would be adverse impacts on walking, cycling and horse-riding network with the Black Route, that would not arise from the Blue Route, including:
    - To enable Flitholme residents to maintain access to the old A66 for the Black Route it would be necessary to include the construction of a staggered crossroads and new local road from Langrigg to Gatehouse on the south side of new A66, with an overbridge to connect to the old A66. This would result in increased land take and impact on residents at Langrigg.
    - An existing footpath past East Field Farm would be stopped up in the Black Route, However, in the Blue Route a diversion to Flitholme Lane can be provided so the new underpass can be used to gain access to routes north of the old A66.

5.6.139 In giving consideration to recreational opportunities, the Blue Route is preferred to the alternative Black Route.

Conclusion

5.6.140 The sifting exercise, set out above, concluded that for the central section of the Appleby to Brough scheme, the Blue Route was preferred over the Black Route. An initial assessment of the route alignments against the policy considerations of the NNNPS (paragraph 5.151) has been undertaken. As set out above, the assessment supports the case for exceptional circumstances for the incursion of the Preferred Route alignment (the Blue Route) into the AONB. Further work will be undertaken, informed by the feedback received during Statutory Consultation, to build on this case so that the full exceptional circumstances case can be part of the application for development consent.

Warcop Parish Council Proposed Route 'Option I North'

5.6.141 Throughout PCF Stage 3, design development has included consideration of stakeholder proposals through engagement. During PCF Stages 1 and 2, Warcop Parish Council (WPC) suggested a potential route for the new A66. This has again been suggested at PCF Stage 3 Preliminary Design and proposed that the new A66 go further to the north of existing A66 and Warcop village, through the MoD ranges and facilities, and through the North Pennines Area of Outstanding Natural Beauty. Warcop Parish Council proposed that this route would reduce the perceived potential negative impacts of the A66 scheme on homes and businesses.

5.6.142 Warcop Parish Council have also conducted a petition, for which the majority of respondents show support for their proposed route. The A66 team have been engaging with Warcop Parish Council throughout the preliminary design process and have notified the Council that their proposed route will not conform with national planning policy and therefore could not be presented at Statutory Consultation or ultimately as part of the Development Consent Order application.

5.6.143 As 'Option I North' contains a significant incursion into the AONB, it is highly unlikely that it would be granted consent at DCO application.

5.6.144 In addition, the position of Natural England must be considered. They are a key stakeholder for the A66 scheme and a publicly-funded statutory nature conservation body. Feedback has been received from Natural England and reiterates that a route with a significant incursion into the AONB where there are clear feasible alternatives would be unlikely to be supported in the context of the NNNPS.

5.6.145 This explanation was set out in a letter to Warcop Parish Council in March 2021. The rationale and logic presented in that letter is unchanged and as such the suggestion has not been considered further at PCF Stage 3 Preliminary Design.

5.6.146 In addition to the policy considerations outlined above, there have also been concerns raised by the MoD regarding the impact of the proposed Warcop Parish Council northern route on their training facilities and ranges. Land take within MoD property must be by agreement as per paragraph 135 of the Planning Act 2008, with development proposals in conformity with the NNNPS as outlined in 5.6.79 above.

Statutory Consultation Autumn 2021

5.6.147 Plans and profiles for the proposals taken forward to Statutory Consultation in Autumn 2021, as well as alternatives assessed and discounted during PCF Stage 3 Preliminary Design, can be found in Volume 2 of the Route Development Report.

5.6.148 As outlined above, Appleby to Brough is one of the schemes where further consideration of alternative alignment routes has occurred in response to stakeholder

feedback and to consider further minimising the potential impact on the North Pennines AONB located to the north of the existing A66.

5.6.149 The developed Preferred Route alignment is being presented for the western and eastern parts of the route. However, this has been combined with an alternative alignment (the Blue alternative central route) to produce a new route combination as shown in Table 11.

Table 11 Appleby to Brough - route combination taken to Statutory Consultation in Autumn 2021

Café Sixty Six to Wheatsheaf Farm	Wheatsheaf Farm to Turks Head	Turks Head to Brough
Western Section	Central Section	Eastern Section
Black Route	Blue Route	Black Route

5.6.150 The Route as developed for Statutory Consultation in Autumn 2021 is summarised below.

5.6.151 From the end of the existing Appleby Bypass (near Café Sixty Six) to a point west of Wildboar Hill, it is proposed to use the existing A66 as the eastbound carriageway and build a new westbound carriageway to the south. A new junction will be provided at the B6259 at Sandford to provide access to and from both the eastbound and westbound carriageways.

5.6.152 The new dual carriageway will continue in a south-easterly direction, deviating from the line of the existing A66 near Moor House Lane, running through Wheatsheaf Farm. The route will be predominantly elevated through this section. From East Field Farm, the new A66 will continue to follow a line to the south of the old A66 to tie in to Brough Bypass, near West View Farm.

5.6.153 The old existing A66 will be used for local journeys between Moor House Lane and Turks Head. To provide a connection to Brough and the eastern end of the scheme, it is proposed to build a new section of local road that runs parallel to the north of the new A66 to connect to Brough Main Street.

5.6.154 Between Wheatsheaf Farm and Turks Head, it is proposed to move the new A66 further away from the community of Warcop compared to the current Preferred Route as announced in May 2020. This will be achieved by using the old A66 as the new eastbound carriageway to the south rather than building both new carriageways to the south. This results in the route being around 15m further north than the current Preferred Route.

5.6.155 It is proposed that between Wheatsheaf Farm and Turks Head, the route will follow the line of the existing A66. It is also proposed that a new road for local journeys will be constructed to the north of the new A66. Part of this new local road will result in minor encroachment into the boundary of the AONB. It is also recognised that some residents and businesses to the north of the existing A66, previously unaffected by the Preferred Route may now be impacted by these proposals.

5.6.156 It is proposed to lower the new A66 to be on a smaller embankment closer to existing ground levels around Warcop, with access to the MoD training camp and local road to the north crossing over the top of the new road. Constructing this route closer to existing ground level will significantly reduce the visual impact of the route. The highway network will be moved further north away from Warcop village, but the new local road will encroach further in to the AONB and will require demolition of one of

the MoD training camp facilities whilst impacting the other compound into which the lost compound will be located.

5.6.157 A new local road is also proposed to provide connection between Flitholme and Langrigg, with a westbound-only junction at Langrigg. Another new local road is proposed at Turks Head to connect Langrigg to the old A66 via a new overbridge.

5.6.158 It is proposed to provide new track connections, including an overbridge to cross the new A66, for local access to Brough for land and property owners at the eastern end of the scheme.

5.6.159 As the Preferred Route alignment will require incursions into the AONB initial assessments of the alignment against the policy considerations of the NNNPS (paragraph 5.151) have been undertaken, as set out above. The assessment supports the case for exceptional circumstances for the incursion of the Preferred Route alignment into the AONB. Further work will be undertaken, informed by the feedback received during Statutory Consultation, to build on this case so that the full exceptional circumstances case can be part of the application for development consent.

5.7 Bowes Bypass

Description of existing scheme

5.7.1 Bowes Bypass is an approximately 3km single carriageway section of the A66 between dual carriageway sections to the west and east. A key feature of this section is the junction with the A67 which is currently only accessible to traffic to and from the west.

5.7.2 Eastbound traffic approaching is often not aware that one lane at this junction is utilised for the A67, which reduces capacity along this section of the route. It also leads to dangerous lane changes and slowing traffic on the A66, which both present significant safety issues. The westbound carriageway is a single lane with a taper merge from the A67 merging just before Clint Lane overbridge.

5.7.3 Between the A67 and Stone Bridge Farm, the A66 is two-lane single carriageway. A short system of double white lines exists to prohibit overtaking through the length of Bowes Interchange where the carriageway alignment curves to the right. At the end of the double white lines the carriageway has a section of broken central hatched marking through to the dual carriageway section east of the Bowes Bypass. The existing road features VRS, traffic signs and parapet fences in the verges.

5.7.4 With the exception of A67 Bowes Interchange, this section of the A66 includes a series of private means of access together with both used and disused gated field accesses located in the north and south verges. Between Bowes Interchange and the at-grade junction to Bowes village, Bowes Hall Underpass and Mirekeld Underpass provide grade-separated access for farm traffic and livestock across the A66 thereby resulting, in some cases, in redundant field accesses. At Bowes Junction, the A66 central hatching is omitted over the extents of the junction. Seven gated field accesses exist between Bowes Interchange and the section of dual carriageway located 0.65km east of Bowes Junction.

5.7.5 Other features along this section of the A66 include a lay-by on the westbound carriageway which has several substandard features such as short merge and diverge taper lengths and a short stacking length.

5.7.6 There is one crossing route for WCH across the A66 at this section of the route, which takes the form of an at-grade PRoW crossing located midway between Bowes Interchange and Bowes Junction. This crossing facility currently has a flag-post sign in the south verge only; the verge to the north is overgrown and consequently no flag-post is visible. There is no evidence to suggest significant use of this WCH route. It is likely that its close proximity to the Pennine Way and Walney to Wear WCH routes, which pass through Bowes village and over the A66 via Clint Lane bridge at Bowes, make this a less attractive route for long-distance walking. There is one bus-stop lay-by westbound on the A66 near Clint Lane Bridge, and another eastbound on the Bowes Interchange eastbound off-slip. No footways or paved WCH facilities exist throughout this section of the A66.

5.7.7 This section of the A66 carries approximately 16,300 vehicles per day, 24% of which are heavy goods vehicles.

Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection

5.7.8 At PCF Stage 1 Option Identification, a single option was identified for consideration to improve the A66 at Bowes Bypass. This option proposed online dualling to the north of the existing A66, including east-facing slip roads at the A67 Junction. Further information can be found in the PCF Stage 1 Technical Appraisal Report.

5.7.9 At PCF Stage 2 Option Selection, this option was developed further ahead of being taken to public consultation in Summer 2019, as summarised below. Further information can be found in the PCF Stage 2 Scheme Assessment Report.

5.7.10 Following assessment of the as-built drawings for the existing Clint Bridge, it was proposed to provide a new two-lane dual carriageway through the bridge area, with narrow shoulders, 3.5m wide lanes and concrete barriers so that the existing structure could be retained. It was acknowledged that this reduction in cross section provision would require further discussion and agreement with Highways England's Safety, Engineering and Standards (SES) team and a formal departure from standard application would be required for this.

5.7.11 It was proposed to utilise the existing A66 carriageway as the westbound carriageway, with the westbound merge slip road retained. For the westbound carriageway, it was proposed to retain the existing accommodation bridge and road bridge however, for the eastbound carriageway, new structures would be required. It was proposed to offset the eastbound carriageway from the westbound carriageway near the existing road underbridge so that desirable minimum stopping sight distance can be maintained.

5.7.12 It was proposed to realign the eastbound diverge and offset it to the north of the existing alignment, with two new east-facing slip roads proposed to the east of the existing road underpass. The eastbound merge slip road would start to the north-east on the A67 and the westbound diverge slip road would terminate to the south-east of the local road connecting the A67 with the village of Bowes.

5.7.13 It was proposed that the farm buildings directly to the north-east of the existing A67 junction would be demolished as part of the works. In addition the existing accommodation underpass that served these buildings would be backfilled or blocked off. Further to the east, the existing farm accommodation underpass was proposed to be extended under the new eastbound carriageway with the existing underpass under the westbound carriageway retained. It was expected that Low Broats Farm would require demolition as the existing residential building is directly in the path of

the proposed eastbound carriageway and the remaining barns and outbuildings would become redundant and also subject to demolition.

5.7.14 This option also proposed that the existing eastern end of The Street, that currently provides the connection from Bowes to the eastbound A66 and the westbound connection from the A66 into Bowes, be stopped up. It was proposed that the new east-facing slip roads would provide that connection.

Public consultation Summer 2019

5.7.15 The single option developed throughout PCF Stages 1 and 2 based on the above description and was presented at public consultation in Summer 2019 as Option J.

5.7.16 The PCF Stage 2 Scheme Assessment Report stated that there were no post-consultation design changes to the options proposed.

Preferred Route Announcement May 2020

5.7.17 The Preferred Route Announcement of May 2020 concluded that since the option presented at public consultation was the only viable route proposed for the Bowes Bypass section of the A66 at that time, it was therefore the one that would be taken forward to PCF Stage 3 Preliminary Design.

PCF Stage 3 Preliminary Design

5.7.18 At PCF Stage 3 Preliminary Design, these proposals have been developed further for Statutory Consultation in Autumn 2021 and are as outlined below. This is part of natural design development that occurs when new data and analysis supplements previously available information, for example the outcomes of surveys and further stakeholder engagement.

5.7.19 As part of the review undertaken during PCF Stage 3 it was confirmed that the announced Preferred Route alignment for the Bowes Bypass scheme had a minor encroachment into the North Pennines Area of Outstanding Natural Beauty at the western tie-in. Along a length of approximately 80m, the carriageway encroaches into the AONB by a maximum of 1.8m. This results from the AONB boundary being tight to the existing edge of carriageway and overlapping existing road verge at the western extent of the scheme and the widening proposed to achieve two lanes in both directions pushing this carriageway edge further southwards.

5.7.20 Given this slight incursion into the AONB with the Preferred Route for the Bowes Bypass scheme, the main assessment requirements from paragraph 5.151 of the NNNPS have been considered, namely:

- *"the need for the development, including in terms of any national considerations, and the impact of consenting, or not consenting it, upon the local economy;*
- *the cost of, and scope for, developing elsewhere, outside the designated area, or meeting the need for it in some other way; and*
- *any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated."*

5.7.21 There is potential to develop the scheme outside the designated area. This alignment alternative moves the proposed dual carriageway alignment approximately 4m to the north at its maximum between Clint Lane Bridge and the western scheme extent so that the southern kerb line matches the existing kerbline over the extent of the AONB. Construction to minimise the impact on the AONB is likely to be more costly and more complex, due to the requirement for approximately 3,500m^3 of additional earthworks compared to the Preferred Route.

5.7.22 This work would also require diversion of existing utilities outwith the proposed road construction. The shift in horizontal alignment would require additional land and new road construction, resulting in more traffic management phases to complete the works, potentially adding several weeks to the construction programme. This increase in complexity and programme would increase operative time on the road network and cause more disruption to road users. This alternative has then been compared to the developed Preferred Route. The findings of this assessment are set out in Table 3-3 Bowes Bypass of PEIR Chapter 3: Alternatives.

5.7.23 The principal findings from this assessment are that the alternative route outside the AONB has increased impacts upon deciduous woodland and additional agricultural land requirements in comparison with the Preferred Route design. The change associated with development of the Preferred Route within the AONB will be too small to affect key qualities and purposes of the designation and overall the environmental impacts of the alternative outside the AONB are greater.

5.7.24 In conclusion, in relation to the policy tests of paragraph 5.151 of the NNNPS there are exceptional circumstances for development of part of the route within the AONB. This will involve minimal works within the AONB, as the works largely affect land within the existing highways boundary. There would be greater environmental effects and costs associated with the alternative route alignment outwith the AONB.

5.7.25 A departure from standard for a reduced cross section through the existing Clint Lane Bridge structure is required in order to retain the existing structure in-situ. The design team are currently progressing this which may lead to design development following Statutory Consultation. This may include a reduced carriageway cross section to retain the existing structure or if the departure from standard is not approved then this may require a replacement, wider, structure to be considered.

Statutory Consultation Autumn 2021

5.7.26 Plans and profiles for the proposals taken forward to Statutory Consultation in Autumn 2021 can be found in Volume 2 of the Route Development Report.

5.7.27 The route of the A66 around Bowes will closely follow the existing road alignment to the north of the village, with a new adjacent eastbound carriageway to the north. The existing carriageway will be changed to carry westbound traffic. It is currently proposed that the new eastbound carriageway will be constructed to the north of the existing road, transitioning to the existing dual carriageway to the western and eastern scheme extents. However, this is subject to ongoing discussions with SES regarding retention of the existing Clint Lane Bridge structure and as such may be developed further post-consultation.

5.7.28 It is proposed that at the junction with the A67, a new underbridge will carry the proposed eastbound carriageway. A new eastbound on-slip and westbound off-slip is proposed to accommodate traffic travelling to and from the east. These will provide access to and from the A67 and Bowes village. Some derelict buildings at the junction and a barn structure will require demolition. The A67 will be widened to the east to

create a staggered junction and a right-turn lane for the eastbound on-slip. The existing eastbound off-slip will be realigned to the north to make way for the new eastbound A66 carriageway. The existing westbound on-slip will have minor improvements made to create a safer merge.

5.7.29 Existing access from Bowes to the A66 via the Roman Road known as The Street and locally as Low Road, will be stopped up. The upgraded grade-separated Bowes Junction will provide safer access to the A66 for local traffic.

5.7.30 A new overpass bridge will be constructed to ensure Stone Bridge Farm, Mid Low Fields Farm and High Broats Farm have continued access to the A66 via the improved junction at the A67.

5.7.31 The existing westbound lay-by will be relocated to the east of Stone Bridge Farm to make way for the new westbound off-slip.

5.7.32 Due to weight restrictions on the bridge over the River Tees, this route will still not permit HGV access into Barnard Castle and HGVs will continue to access Barnard Castle via the A66 at Rokeby.

5.8 Cross Lanes to Rokeby

Description of existing scheme

5.8.1 Between Cross Lanes and Rokeby, there is a section of single carriageway approximately 3km long, which sits between dual carriageway to the west and east. The carriageway is generally straight throughout with the exception of the right-hand curve at the eastern extents, where the link transitions into the dual carriageway section at Rokeby Junction. The carriageway generally has narrow lanes throughout.

5.8.2 There are two at-grade junctions at each end of this section, and several private means of access directly onto the A66. These numerous access points present considerable safety risks due to the resultant mix of fast- and slow-moving vehicles. This can be a contributing factor to road accidents along this section of the route and to mitigate this, it is proposed to dual this section to provide a consistent road standard throughout the scheme.

5.8.3 As well as several private means of access along this section of the route, there are both used and disused gated field accesses located in the north and south verges; seven gated field accesses exist along this short section of single carriageway alone.

5.8.4 Other features along this section of the A66 include lay-bys. They are immediately west of Street Side Farm and between Tutta Beck and Rokeby Grange access junctions. Lay-bys exist in the north and south verges for eastbound and westbound users respectively. These lay-bys generally display several substandard features such as short merge and diverge taper lengths and short stacking lengths.

5.8.5 There are three routes for WCH which take the form of Public Rights of Way. Only one of these crosses the A66. Two public footpaths are associated with the Tutta Beck Farm Junction; both start in the northern verge and head north towards Dowson's Gill. One crosses the A66 at Church Plantation in a north/south orientation. Currently, all three PRoW have flag-post signs in one verge only, likely due to the opposite verge being overgrown. There is no evidence to suggest significant use of the WCH routes near Tutta Beck Farm. However, the cross-carriageway route at Church Plantation is accessed through the churchyard gates and heads north ot the Teesdale Way WCH route. No footways, paved WCH facilities or bus-stop lay-bys exist within the scheme extents.

5.8.6 This section of the A66 carries approximately 16,900 vehicles per day, 27% of which are heavy goods vehicles.

Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection

5.8.7 At PCF Stage 1 Option Identification, three options were identified for consideration to improve the A66 between Cross Lanes and Rokeby. Each of these sought to widen the existing A66 to the south. Further information can be found in the PCF Stage 1 Technical Appraisal Report.

5.8.8 At PCF Stage 2 Option Selection, the option that proposed an offline diversion to the north to avoid the Old Rectory was discounted as it would result in the direct, permanent loss of an area of woodland adjacent to the existing A66 that forms part of the Rokeby Registered Park and Garden. The remaining two shortlisted options were therefore developed further for public consultation in Summer 2019. Their key principles are detailed in the PCF Stage 2 Scheme Assessment Report.

Public consultation Summer 2019

5.8.9 The options presented at public consultation in Summer 2019 were Option K and Option L. For this scheme, a new westbound carriageway was proposed to the south of the current A66 between the B6277 junction at Cross Lanes and Rokeby, after which the two options exist around the St Mary's Church buildings.

5.8.10 Option K proposed to divert both carriageways to the south of the Old Rectory and St Mary's Church before re-joining the existing road at Rokeby. A new junction would be provided for access to Moorhouse Lane, the B6277 for Barnard Castle, Cross Lanes Organic Farm and the listed building Cross Lanes. This option would require the construction of two new culverts to accommodate Tutta Beck at Cross Lanes. A new junction west of St Mary's Church was proposed to allow access to the original A66 and Rokeby.

5.8.11 Option L is similar to Option K but proposed the new westbound carriageway be constructed next to the current carriageway. This would mean that some buildings to the south of the current A66 would require demolition. This option would retain local access at Rokeby Junction for eastbound traffic. Westbound traffic would be required to use Cross Lanes junction and the B6277 for access to Barnard Castle.

5.8.12 The PCF Stage 2 Scheme Assessment Report stated that there were no post-consultation design changes to the options proposed.

Preferred Route Announcement May 2020

5.8.13 The Preferred Route Announcement of May 2020 concluded that Option K, the southern bypass, was the preferred route to be taken forward to PCF Stage 3 Preliminary Design.

5.8.14 Option K was considered to have the least impact on the setting of the listed St Mary's Church, nor require demolition of the Old Rectory buildings. This option would also improve access to the listed church and allow HGVs to easily travel in both directions on the A66 via the proposed new all-movement junction.

PCF Stage 3 Preliminary Design

5.8.15 At PCF Stage 3 Preliminary Design, the proposals at Cross Lanes and Rokeby junctions have been developed further for Statutory Consultation in Autumn 2021 and

are as outlined below. This is part of natural design development that occurs when new data and analysis supplements previously available information, for example the outcomes of surveys and further stakeholder engagement.

5.8.16 Figure 14 summarises the development of the scheme during PCF Stage 3 with respect of alignment alternatives assessment, detailed in the sub-sections that follow.

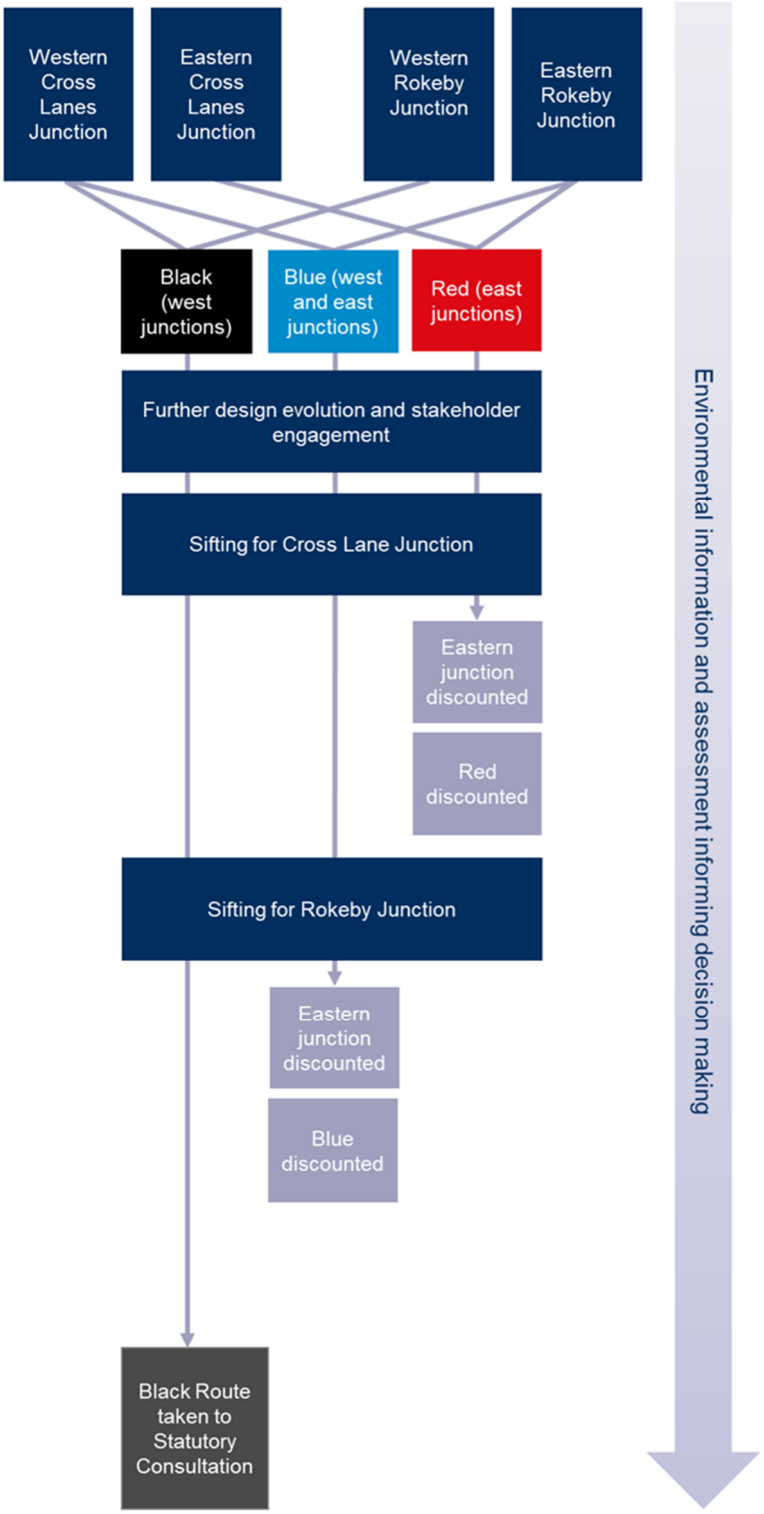


Figure 14 PCF Stage 3 scheme development summary for Cross Lanes to Rokeby

5.8.17 Early in PCF Stage 3 Preliminary Design, a detailed assessment of the PCF Stage 2 Option Selection design was carried out. This assessment covered aspects of the highway design such as validation against the latest standards, junction design and review of proposed connections.

5.8.18 In addition, since announcement of the Preferred Route in May 2020, several environmental and ecological studies have been conducted to develop the route and to explore how to further minimise the overall impact of the project, where possible. Regular meetings with landowners and members of the local community have also taken place, including a virtual engagement event in November 2020 and an in-person drop-in engagement session held in The Witham Community Arts Centre in August 2021.

5.8.19 This led the design team to consider alternatives for the junctions at Cross Lanes and Rokeby, the development of which is outlined below.

Development of junctions proposals from Preferred Route Announcement

5.8.20 The Preferred Route Announcement of May 2020 stated that a new junction would be provided for access to Moorhouse Lane, the B6277 for Barnard Castle, Cross Lanes Organic Farm and the listed building Cross Lanes, making access safer and easier for these destinations. In addition, a new junction west of St Mary's Church was proposed to allow access to the original A66 and Rokeby.

5.8.21 Early PCF Stage 3 Preliminary Design at Cross Lanes led to the following:

- It was proposed to remove the existing junctions which provide access to the B6277, Moorhouse Lane and Cross Lanes Organic Farm to eliminate the need for right turn manoeuvres.
- It was proposed that access to these roads would instead be via a new overbridge and road connecting the B6277 and Moorhouse Lane.
- New slip roads connecting into this new road would be provided to allow users to safely join and leave the A66 in both directions.

5.8.22 At Rokeby:

- It was proposed to provide a new junction to the west of St Mary's Church, giving access to the existing A66 and Rokeby. The junction would cross above the A66 via a new overbridge.
- New merge and diverge lanes would be provided which would allow users to safely join and leave the A66 in both directions.
- Following the completion of the new A66 alignment south of the Old Rectory and St Mary's Church, the existing A66 would be detrunked between the new junction and Barnard Castle Road to maintain access to properties and the existing HGV route to Barnard Castle.

5.8.23 These proposals were presented to the public at a virtual engagement event in November 2020 as part of the Winter 2020 Project Update. An extract from the brochure produced for this event is shown in Figure 15 below.

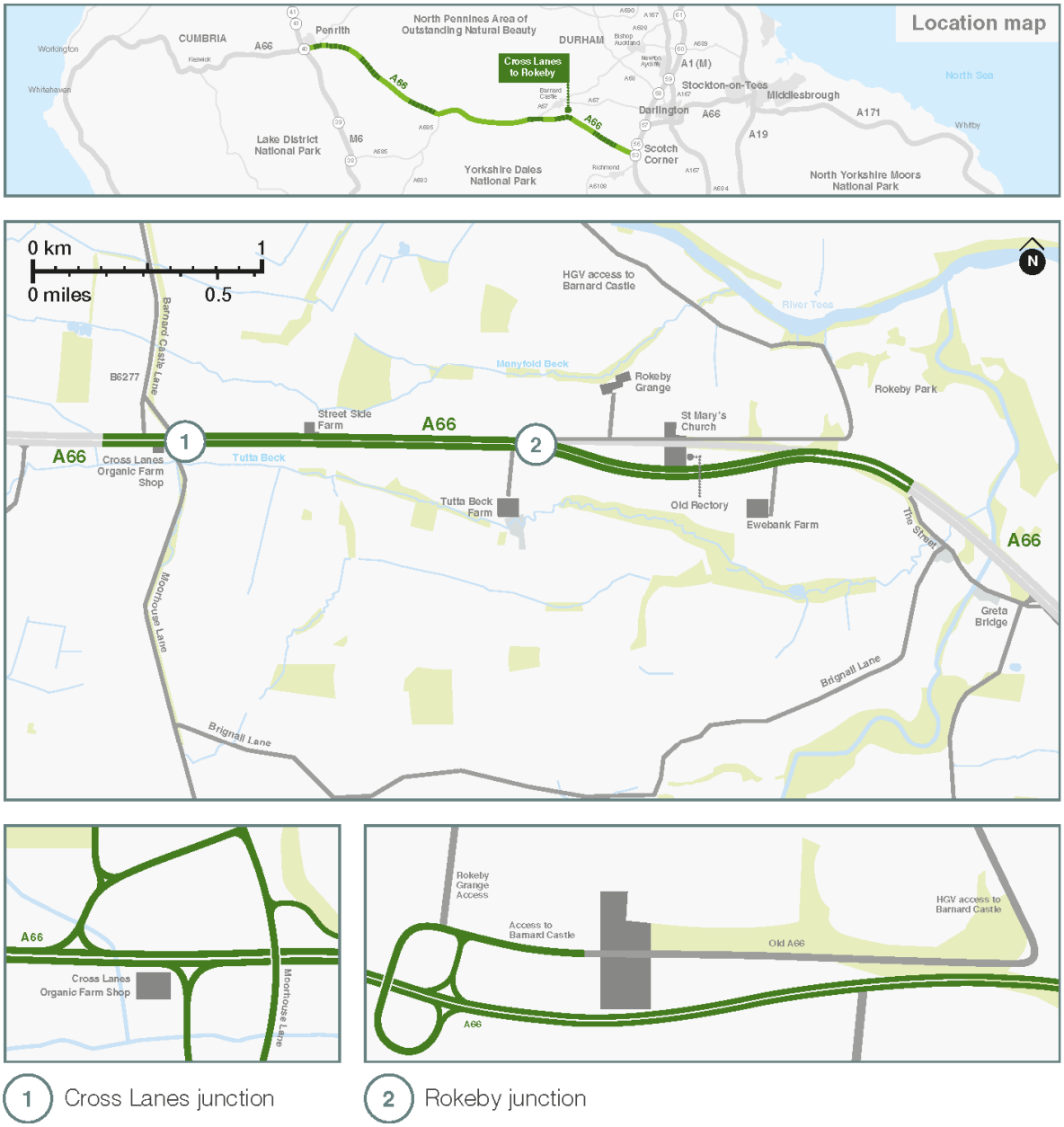


Figure 15 Winter 2020 Project Update extract for Cross Lanes to Rokeby

Development of junctions following Winter 2020 Project Update

5.8.24 As Preliminary Design progressed following the Project Update of Winter 2020, it was noted that the proposed junction at Cross Lanes required the use of non-compliant hard-strip and central reserve widths on the mainline around a key junction location, which would have required a departure from standard, whilst the proposed slip road layout and dualling moved the live edge of carriageway to within 2.7m of the farmhouse at its narrowest point, previously 4.9m.

5.8.25 The footprint of the Moorhouse Lane realignment was significant and the farmhouse and the cottage opposite the farm shop became landlocked between the dual carriageway and junction slip roads.

5.8.26 The westbound on-slip road encroached into the Cross Lane farm shop and there were also constructability and cost implications with the PCF2 design.

5.8.27 The design team determined that moving the junctions to the eastern side of the Moorhouse Lane realignment would reduce the impacts on the local receptors. It would also allow for a more compliant mainline cross-section width.

5.8.28 As such, the proposed junction arrangement at Cross Lanes, including Moorhouse Lane developed to a compact grade-separated junction with loops. Priority junctions for both westbound and eastbound traffic were relocated east of Moorhouse Lane. It was proposed that the B6277 Moorhouse Lane be realigned to connect to the junction overbridge to help maintain and improve access to the B6277 for Barnard Castle, Cross Lanes Organic Farm Shop and Café, the Grade II listed Cross Lanes Farmhouse and other local farms and residential properties.

Design development of Cross Lanes junction alternatives

5.8.29 The design team continued to develop the junction proposal for Cross Lanes as described above and shown below in Figure 16. As Preliminary Design progressed, this came to be known as the baseline junction for Cross Lanes.

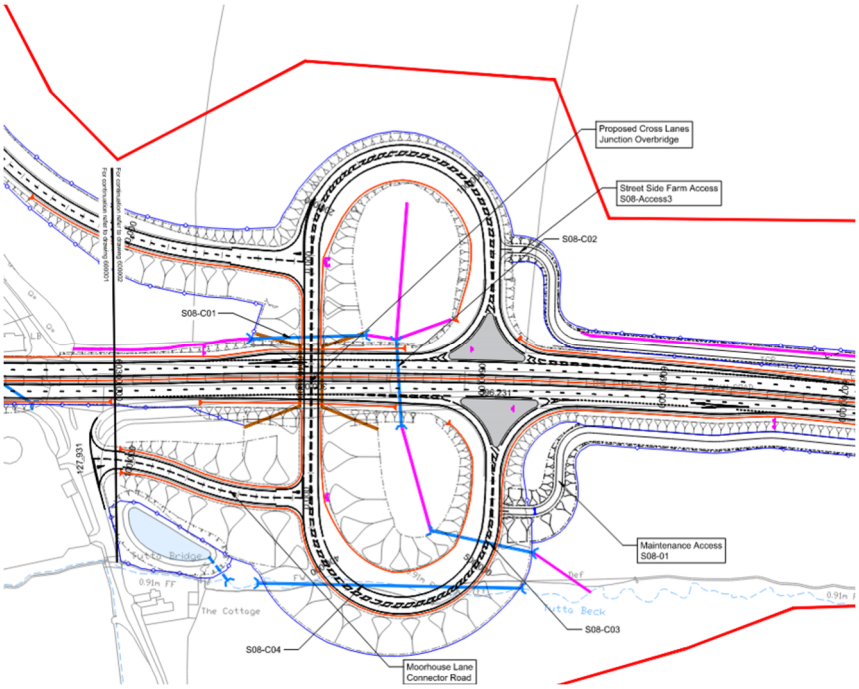


Figure 16 Baseline eastern junction for Cross Lanes

5.8.30 Preliminary traffic modelling showed that the proposals for Cross Lanes and Rokeby Junctions may encourage more traffic (cars and light goods vehicles) to use the B6277 to access Barnard Castle, as the proposals at Rokeby would result in a longer route for traffic coming from the east, which would ordinarily travel by Barnard Castle Road to access the town. As the B6277 route is not suitable for HGV traffic in Barnard Castle, given the 7.5 tonne weight limit on an existing bridge structure along the route, HGVs accessing Barnard Castle and to the east would still utilise Barnard Castle Road.

5.8.31 This analysis corroborated feedback that had been received from local stakeholders following the Preferred Route Announcement and the commencement of PCF Stage

3. This feedback noted concerns about the potential for increased traffic on the B6277 due to the junction locations. Concerns were also raised in regard to the safety of the Rutherford Lane and Moorhouse Lane, both in terms of pedestrian/cyclist and vehicular movements.

5.8.32 In particular the WCH focus group for the scheme informed the design team that Rutherford Lane to the B6277 Moorhouse Lane is a popular route for walkers and cyclists. This route currently crosses the existing A66 on a right-left stagger, with no formal crossing facilities.

5.8.33 The junctions are located on a gradient and at a point where the dual carriageway to the west has just formed whilst the eastbound carriageway has just reduced from two lanes to one. This means that there is a tendency for drivers heading westbound to accelerate as they are passing Rutherford Lane whilst in the eastbound direction drivers have often made a last-ditch attempt to overtake before the single carriageway forms, meaning that speeds can be higher here. Previous solutions did not seek to change the principles of the junction in regard to the right-left stagger, leaving the gap in the central reserve open.

5.8.34 Local landowner concerns were raised regarding the visual impact of the proposed overbridge and embankments on nearby properties and on potential land take associated with the junction layout (however acknowledging they and additional landowners would be potentially impacted with an alternative).

5.8.35 Following a review of these concerns and other stakeholder feedback, an alternative proposal was developed for Cross Lanes that moved the junction to the west of the existing Cross Lanes priority junction. This alternative has been developed to concept stage and it is expected the layout will be further refined following Statutory Consultation. However, following preliminary design development it was shown to have the potential to afford several benefits over the baseline junction originally developed following the PRA and Winter 2020 Project Update. Refer to Figure 17 for a plan of the proposal, known as the alternative junction for Cross Lanes.

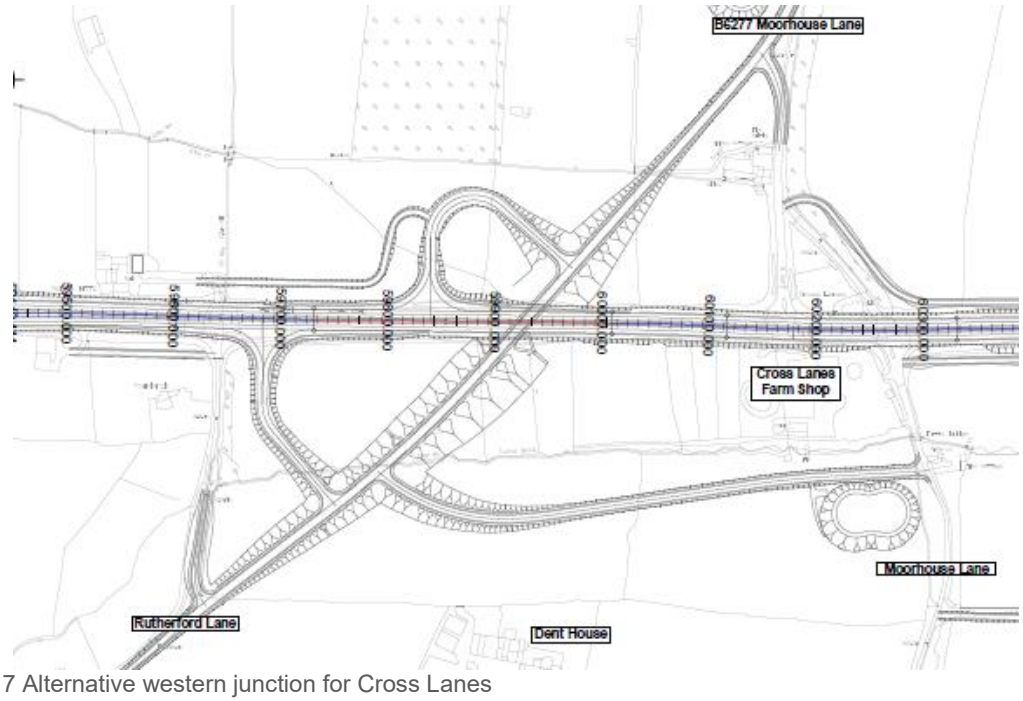


Figure 17 Alternative western junction for Cross Lanes

5.8.36 The alternative junction proposes a compact grade-separated junction, with a link road connecting Rutherford Lane in the south with the B6277 Moorhouse Lane in the north. This alternative junction has more conventional turning movements than the baseline junction, which will contribute to safety improvements for the scheme. It is intended that all movements be retained between the A66, Rutherford Lane and Moorhouse Lane.

5.8.37 The link from Rutherford Land to the B6277 in the alternative junction provides a more direct, shorter and safer crossing of the A66 which reduces severance created by the A66 and significantly improves connectivity for vulnerable non-motorised users compared to the baseline junction. The same movement is not provided in the baseline junction as cyclists and horse-riders travelling from Rutherford Lane towards the B6277 will need to cross an existing gap in the central reservation, travel eastbound along the A66 and then join the stopped-up B6277 at Cross Lanes.

5.8.38 Further potential benefits afforded by this alternative include the potential to remove the existing central reserve opening and two direct accesses onto the A66 at the scheme extents. The removal of the central reserve opening removes the conflict and significantly improves the safety and operation of this part of the network. The accesses are re-routed to the alternative junction, which improves the standard of the A66 at this point in the scheme, whilst providing safer access onto and off the A66 for local properties.

5.8.39 The alternative junction also seeks to reduce the visual impact of the junction overbridge at nearby properties as the distance from the alternative bridge location to properties has increased. There is also more opportunity for visual mitigation such as screening and planting.

5.8.40 Although the alternative junction reduces the impact of the scheme on arable farming land, it is acknowledged that other landowners will still be impacted by the development and engagement is ongoing to mitigate these impacts where possible.

5.8.41 The alternative junction takes more land than the baseline junction, meaning more habitats and agricultural land are affected and it would have a bigger impact on the existing landscape. It is expected, though, that this could be reduced through further design to make the junction smaller.

Design development of Rokeby junction alternatives

5.8.42 At Rokeby, the baseline junction developed from that which was presented at the Winter 2020 Project Update. This proposal is situated to the west of St Mary's Church.

5.8.43 Following stakeholder engagement and review of new data and analysis to supplement previously available information, the proposed junction was changed such that it is now proposed to cross the A66 via a new underbridge rather than an overbridge. This significantly reduced the visual impact of the junction on the surrounding environment, particularly the setting of the historic buildings nearby, such as St Mary's Church and the Old Rectory.

5.8.44 In order to accommodate the underbridge, the mainline was raised on to a small embankment, particularly to the west of the junction. Whilst this slightly increases the visual impact of the mainline it was considered that the removal of the overbridge was of greater importance to the setting of St Mary's Church. This alternative was discussed in principle with Historic England who provided positive feedback. Refer to Figure 18 below.

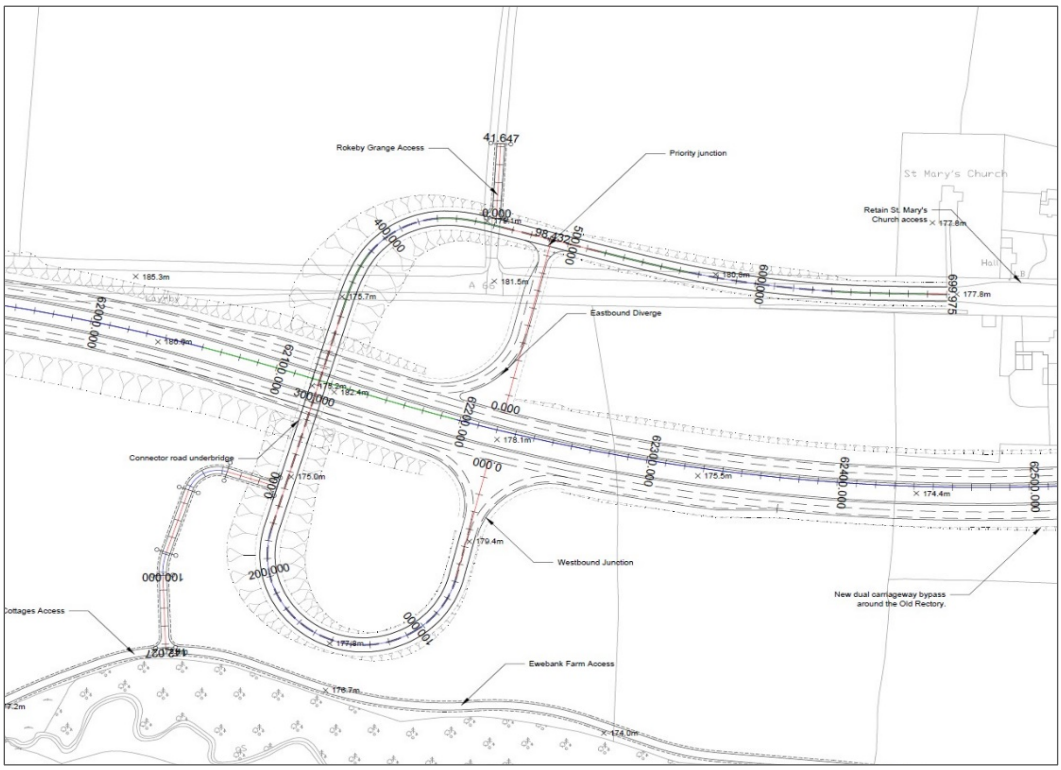


Figure 18 Baseline western junction for Rokeby

5.8.45 As noted above, early PCF Stage 3 feedback, particularly from the landowner and the local authority, queried why Rokeby Junction was located to the west of St Mary's Church in the Preferred Route Announcement. Community Liaison Group meetings and other engagement activities demonstrated support for an alternative closer to the existing Rokeby Junction location, and thus an alternative to the east of St Mary's Church was developed. In addition, concerns were raised about the impact of HGVs using the de-trunked section of the A66 proposed past St Mary's Church, effectively having to double back on themselves, passing the Church twice.

5.8.46 It was also made clear that there were local concerns that the junction location announced as part of the Preferred Route in May 2020 would have negative impacts on existing arable farmland, and a consequent commercial impact on tenanted properties.

5.8.47 Following these discussions, interrogation of the updated traffic modelling showed that there was in relative terms, traffic transfer from Barnard Castle Road to the B6277 Moorhouse Lane, due to the proximity of the proposed junctions and the upgrading of the A66 to dual carriageway throughout (based on the Preferred Route Announcement). Increasing the distance between Cross Lanes and Rokeby junctions would partially address this shift in traffic to alleviate some concerns, although the attractiveness of the A66 as a dual carriageway influences a change in driver route choice.

5.8.48 From a WCH perspective, the western Rokeby junction solution would cause an increase (approximately 2km) in route distance for those users travelling from east of Rokeby (Greta Bridge) to Barnard Castle Road, as they would have to travel west to

the proposed junction and then back east along the detrunked section of A66 to link to the C165 Barnard Castle Road.

5.8.49 An alternative junction was developed to determine the feasibility of a junction located closer to Rokeby which would make the C165 route more attractive given its shorter distance from the A66 to Barnard Castle, compared to the B6277 route. This alternative was assessed in comparison to the baseline junction. To test this a compact grade-separated junction to the east of St Mary's Church and west of the existing Rokeby junction was developed. The compact connector road directly impacts the Registered Park and Garden, crossing at its narrowest point, during construction and operation. The compact connector road passes beneath the proposed alignment of the A66, the de-trunked A66 and the Registered Park and Garden in an underpass.

5.8.50 This alternative is as shown in Figure 19 below.

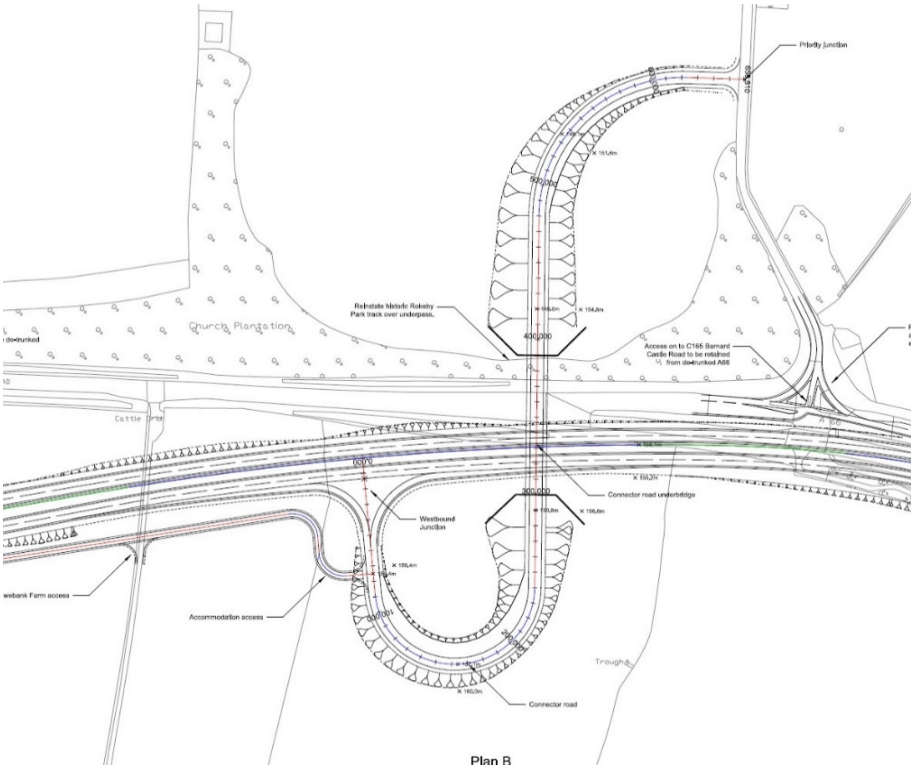


Figure 19 Alternative eastern junction for Rokeby

5.8.51 The Rokeby eastern junction alternative does however have a direct impact on the Registered Park and Garden at Rokeby. It is intended that an underpass arrangement here would have the least visual impact compared with an overbridge solution for crossing the Registered Park and Garden, and in addition the crossing would be at the shortest point practicable.

Presentation of junctions alternatives at August 2021 stakeholder engagement event

5.8.52 Traffic modelling highlighted that these junctions need to be considered together because the location of the junctions can affect how traffic uses the local roads. Of the four potential combinations of junction alternatives, three were considered viable

and one discounted due to the potential transfer of the majority of traffic from Rokeby to Cross Lanes, as shown in Table 12 below.

Table 12 Junction combinations presented at August 2021 stakeholder engagement event

Cross Lanes	Rokeby	Viable	Route Colour
West	West	Yes	Black
West	East	Yes	Blue
East	West	No	N/A
East	East	Yes	Red

5.8.53 The traffic modelling outputs for the three technically viable junction combinations are shown in Table 13 below.

Table 13 Sample traffic modelling output for B6277 Moorhouse Lane and C165 Barnard Castle Road

	Northbound		Southbound	
B6266 Moorhouse Lane				
Existing (2015 AADT vpd)	121		124	
Do Minimum (2046 AADT vpd)	389		217	
Do Something - PCF Stage 2 (2046 AADT vpd)	2022	+1633 COMPARED TO DO MINIMUM	1248	+1031 COMPARED TO DO MINIMUM
Do Something - Black Option (2046 AADT vpd)	929	-1093 COMPARED TO PCF STAGE 2	400	-848 COMPARED TO PCF STAGE 2
Do Something - Red Option (2046 AADT vpd)	916	-1106 COMPARED TO PCF STAGE 2	665	-583 COMPARED TO PCF STAGE 2
Do Something - Blue Option (2046 AADT vpd)	662	-1360 COMPARED TO PCF STAGE 2	585	-663 COMPARED TO PCF STAGE 2

	Northbound		Southbound	
C165 Barnard Castle Road				
Existing (2015 AADT vpd)	1384		1637	
Do Minimum (2046 AADT vpd)	1754		2162	
Do Something - PCF Stage 2 (2046 AADT vpd)	183	-1571 COMPARED TO DO MINIMUM	1083	-1079 COMPARED TO DO MINIMUM
Do Something - Black Option (2046 AADT vpd)	1122	+939 COMPARED TO PCF STAGE 2	1970	+887 COMPARED TO PCF STAGE 2
Do Something - Red Option (2046 AADT vpd)	1189	+1006 COMPARED TO PCF STAGE 2	1710	+627 COMPARED TO PCF STAGE 2
Do Something - Blue Option (2046 AADT vpd)	1609	+1426 COMPARED TO PCF STAGE 2	1783	+700 COMPARED TO PCF STAGE 2

5.8.54 As there has been significant design development during PCF Stage 3 Preliminary Design for this section of the A66 between Cross Lanes and Rokeby, a further stakeholder engagement event was held in August 2021 to gather feedback from interested and affected parties on how the design was developing at that point. This session was an in-person drop-in session at The Witham in Barnard Castle.

5.8.55 The three technically viable junction combinations for Cross Lanes and Rokeby as identified in Table 12 above were presented at the event as illustrated in Figure 20, Figure 21 and Figure 22 below.

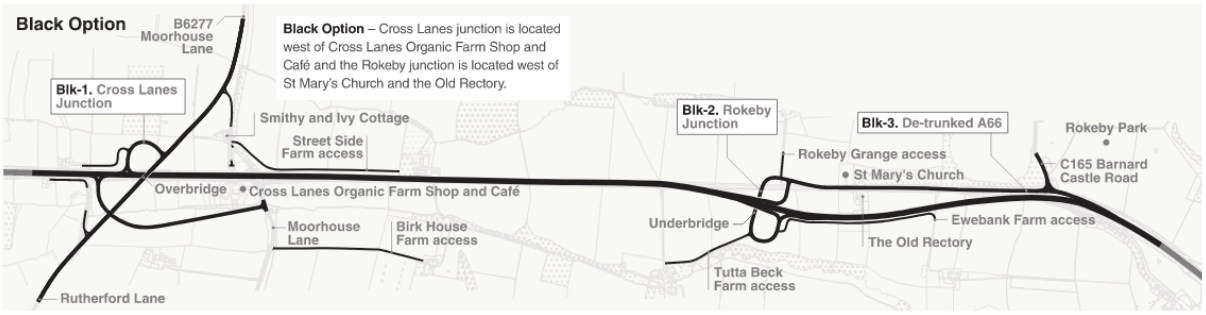


Figure 20 Cross Lanes to Rokeby Black Option: Cross Lanes western junction and Rokeby western junction

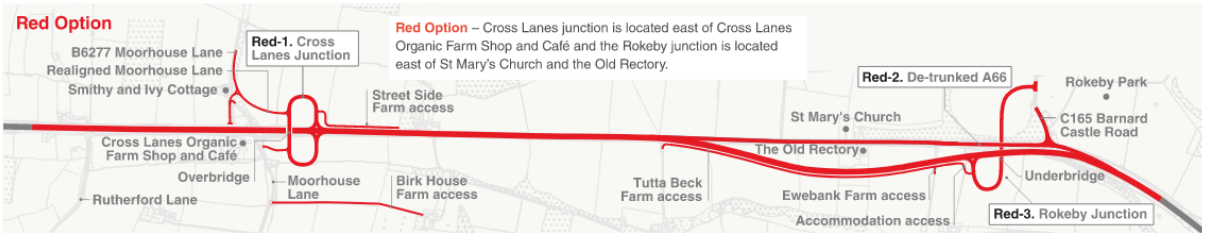


Figure 21 Cross Lanes to Rokeby Red Option: Cross Lanes eastern junction and Rokeby eastern junction

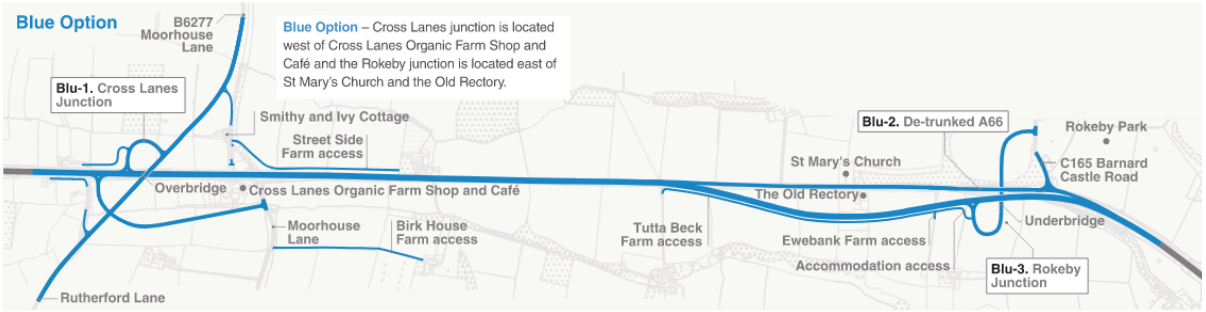


Figure 22 Cross Lanes to Rokeby Blue Option: Cross Lanes western junction and Rokeby eastern junction

5.8.56 The engagement event allowed the project team to explain the development behind the junction alternatives under consideration to stakeholders to help them understand the alternatives before the Statutory Consultation. It was communicated to attendees that while suggestions would be taken onboard and considered going forward, they would not be reflected in the Statutory Consultation materials.

5.8.57 Attendees were encouraged to participate in the Statutory Consultation and make their comments formally through that channel where they would be reviewed and regard given to them in the final preparation of the application for development consent. Attendees were also advised by the Highways England team that a route preference would be stated at Statutory Consultation.

Alternatives sifting for Statutory Consultation

5.8.58 A sifting exercise was carried out to compare the proposed alternative against the baseline for each of Cross Lanes and Rokeby junctions. They were compared using engineering, environmental, traffic, economic, stakeholder principles with commentary on policy conformity. In addition, Highways England's three priorities of Safety, Customer and Delivery were considered crucial to assessing the alternatives ahead of Statutory Consultation. Refer to 4.1 for further detail on the assessment process and criteria.

5.8.59 Both the Red and Blue Route Options have been discounted as a result of the sifting exercise undertaken for each junction. The reasons for these decisions are set out below.

Alternative sifting for Cross Lanes junction

5.8.60 A copy of the assessment matrix for the Cross Lanes junction alternatives sifting exercise can be found in Appendix A.5 and a summary of the matrix is shown below in Table 14.

Table 14 Summary of sifting matrix for Cross Lanes junction – eastern baseline and western alternative

Discipline		**Comparison with baseline**
Engineering		
Highways - Standards Compliance		Better
Utilities		Neutral
Geotechnics and Earthworks		Worse
Structures		Worse
Drainage and Hydrology		Worse
Construction Design Management (CDM)		Worse
Construction Cost		Worse
Buildability		Neutral
Environment		
Biodiversity	Construction	Worse
	Operation	Worse
Road Drainage and Water Environment	Construction	Worse
	Operation	Worse
Geology, Soils, Contaminated Land and Groundwater	Construction	Worse
	Operation	Worse
Noise and Vibration	Construction	Worse
	Operation	Worse
Landscape and Visual	Construction	Neutral
	Operation	Worse
Population and Human Health	Construction	Worse
	Operation	Worse
Air Quality	Construction	Neutral
	Operation	Neutral

Discipline		Comparison with baseline
Material Assets and Waste	Construction	Neutral
	Operation	Neutral
Cultural Heritage	Construction	Worse
	Operation	Worse
Climate	Construction	Worse
	Operation	Worse
Traffic and Economic		
Traffic Volume		Better
Journey Time Savings		Better
Safety		Better
Economy (not modelled with TUBA)		Neutral
Accessibility including WCH Opportunities		Better
Stakeholder		
Land take		Worse
Residential		Neutral
Commercial		Neutral
Wider Community Issues		Better

Engineering

5.8.61 The alternative junction, situated to the west of Cross Lanes provides a more direct link between Rutherford Lane and the B6277 Moorhouse Lane, which is a busier local route, in comparison with the baseline junction that connects Moorhouse Lane north and south. From a safety perspective the alternative junction removes the existing at-grade right-left stagger across the A66 which is the predominant local movement (for both vehicular traffic and walkers, cyclists and horse-riders) and is inherently unsafe. This is a significant benefit over the baseline junction, which leaves this junction unchanged.

5.8.62 The design standards for the alternative junction are the same as the baseline junction. No departures from standard are required for either proposal, although the alternative does remove two additional direct accesses from the A66, re-routing these to the proposed alternative junction which improves safety and the standard of the A66. This is a significant benefit over the baseline junction.

5.8.63 The span of the alternative structure is approximately 55m and on a high skew when compared to the baseline junction of 40m on a 90-degree crossing. The alternative junction will result in a larger quantum of earthworks, mostly additional fill (circa 29%), with a similar percentage increase in extent. The additional structure length and larger footprint results in further impacts for drainage, CDM and cost, which is considered worse overall than the baseline junction.

5.8.64 The alternative junction arrangement has the potential to be refined to minimise engineering footprint and extent of earthworks. This may also reduce the structure length and skew which introduces the option of an integral structure, comparable to the baseline junction.

5.8.65 Therefore, the assessment in regard to drainage impact, cost and CDM impacts are considered comparable to the baseline junction. The baseline junction is as compact a footprint as it can be and offers little scope for further refinement.

5.8.66 Although the alternative junction bridge length is longer, the embankments are slightly lower in height and there is more flexibility for traffic management, therefore buildability impacts are considered similar to the baseline junction. However, considering the design refinements that can be made to the structure length, buildability would be considered better for the alternative junction than the baseline.

Environment

5.8.67 The assessments for air quality and materials, assets and waste presented similar results for both the baseline and alternative junctions therefore these have not been considered to have a significant impact on the preference of one proposal over the other. In terms of biodiversity, two more watercourses are impacted for the alternative junction than the baseline junction. This could be considered a worsening of the baseline situation, however with appropriate post-consultation development such as through ecological design at the watercourse crossings, the impacts would be considered neutral compared to the baseline.

5.8.68 For road drainage and the water environment, geology, contaminated land and ground water, noise and vibration and population and human health, the larger footprint of the alternative junction results in it being considered worse when compared to the baseline junction. This reflects an increase in the number of watercourses impacted, an increase in the number of receptors impacted such as agricultural holdings, and increased earthworks requirements. It is expected that these impacts will reduce as the footprint of the alternative junction is refined following post-consultation design development, to a comparable level against the baseline junction.

5.8.69 In terms of cultural heritage, the impact on buried archaeological remains would be greater for the alternative junction compared to the baseline junction due to the larger footprint. The Grade II listed Dent House Farmhouse would be increased to a moderate adverse effect, as the connecting road for the alternative junction would be considerably closer and constitute a more substantial change to views and the surrounding landscape of the farmhouse. However, the permanent adverse effect on Cross Lanes Farmhouse would be a lower magnitude of impact as the road to the west would be set back from the building and the overbridge would be replaced by a slip-lane junction for the alternative junction arrangement.

5.8.70 It is acknowledged that some of the environmental aspects of the alternative junction are worse than for the baseline junction. However, most of the alternative junction impacts are considered marginally worse than the baseline junction and there is a high probability that these impacts can be reduced through refinement of the design footprint. There are no environmental impacts highlighted that are felt to be prohibitive or outside the normal scope of a typical highway project.

5.8.71 Further details of the environmental assessment criteria can be found in the PEIR.

Traffic

5.8.72 The alternative junction is considered better than the baseline junction from a traffic perspective. This is due to:

- Locating the Cross Lanes junction to the west of the existing junction, which results in more westbound vehicles on the A66 choosing to use the Rokeby junction, and not Cross Lanes. The proximity of the baseline junction to Rokeby

induces traffic transfer to Cross Lanes/B6277 Moorhouse Lane, which is not favoured by Durham County Council and local residents.

- The alternative junction is located such that Rutherford Lane and the B6277 Moorhouse Lane are linked. This route carries more local vehicular movements and WCH traffic, compared to the baseline junction.
- The link from Rutherford Land to the B6277 provides a more direct, shorter and safer crossing of the A66 which reduces severance created by the A66 and significantly improves connectivity for vulnerable non-vehicular users compared to the baseline design.

Stakeholder

5.8.73 Six new landowners are impacted by the alternative junction proposals– two associated with new private means of access, and four associated with loss of agricultural land. The residential properties at North Bitts and Punder Gill are adjacent to the alternative junction compared to the baseline junction (350m away). However safer access to and from the A66 is provided by linking the property accesses to the alternative junction and removing their current direct accesses on to the A66.

5.8.74 Feedback from the owners of Cross Lanes Farm Shop suggests the alternative junction is preferred, with the exception that the access road to Moorhouse Lane be placed to the north of the shop adjacent to the A66. This would be a betterment to them in terms of visual impact on views to the south from the premises. The business owner perception is that the alternative junction has the potential to capture westbound passing trade compared to the baseline junction, as views of the café from the dual carriageway will be obstructed by the baseline structure. Other landowners have commented on the potential loss of arable land.

5.8.75 The impact on new landowners from the alternative junction is considered balanced against improvements to accesses and reducing impact on properties at Cross Lanes. Post-consultation design refinement may lead to land take being reduced but the number of landowners impacts will be similar, therefore the overall impacts still considered neutral, compared to the baseline junction.

5.8.76 The alternative junction is preferred by Durham County Council, Local Councillors, and representatives of the Community Liaison Group on the basis that it improves the safety of the junctions whilst minimising impacts on the local road network and increasing WCH provision. Notwithstanding the direct impact on affected landowners, the overall impact is considered better in the wider community as it has the potential to benefit more stakeholders.

Conclusion

5.8.77 In summary, the alternative junction is favoured primarily for the significant safety improvements, traffic movement and WCH improvements it offers, whilst acknowledging that engineering and environmental impacts can be reduced through further refinement of the layout and environmental design. The alternative junction complies more favourably with Highways England priorities of Safety, Customer and Delivery.

5.8.78 As such, the western alternative junction will be presented at Statutory Consultation in Autumn 2021 as the preference for Cross Lanes junction.

Alternatives sifting for Rokeby junction

5.8.79 A copy of the assessment matrix for the Rokeby junction alternatives sifting exercise can be found in Appendix A.6 and a summary of the matrix is shown below in Table 15.

Table 15 Summary of sifting matrix for Rokeby junction – western baseline and eastern alternative

Discipline		Comparison with baseline
Engineering		
Highways - Standards Compliance		Neutral
Utilities		Better
Geotechnics and Earthworks		Better
Structures		Worse
Drainage and Hydrology		Better
Construction Design Management (CDM)		Worse
Construction Cost		Neutral
Buildability		Neutral
Environment		
Biodiversity	Construction	Neutral
	Operation	Neutral
Road Drainage and Water Environment	Construction	Better
	Operation	Neutral
Geology, Soils, Contaminated Land and Groundwater	Construction	Neutral
	Operation	Worse
Noise and Vibration	Construction	Worse
	Operation	Worse
Landscape and Visual	Construction	Worse
	Operation	Worse
Population and Human Health	Construction	Worse
	Operation	Neutral
Air Quality	Construction	Neutral
	Operation	Neutral
Material Assets and Waste	Construction	Neutral
	Operation	Neutral
Cultural Heritage	Construction	Worse
	Operation	Worse
Climate	Construction	Neutral
	Operation	Better
Traffic and Economic		
Traffic Volume		Better
Journey Time Savings		Better
Safety		Better

Discipline	Comparison with baseline
Economy (not modelled with TUBA)	Neutral
Accessibility including WCH Opportunities	Better
Stakeholder	
Land Take	Neutral
Residential	Better
Commercial	Better
Wider Community Issues	Neutral

Engineering

5.8.80 The alternative eastern junction locates the proposed Rokeby Junction closer to the site of the existing at-grade crossing, which better maintains current traffic distribution between the C165 Barnard Castle Road and B6277 Moorhouse Lane when compared to the baseline junction. This removes the need for westbound vehicles travelling to or from Barnard Castle to undertake an additional 2.5km U-turn route associated with the baseline junction, which increases the journey time into Barnard Castle. This reduction in traffic on the B6277 Moorhouse Lane is considered safer for walkers, cyclists and horse-riders whilst also providing a better point of crossing for pedestrians and cyclists from Greta Bridge.

5.8.81 When considering highways standards compliance, there is little to differentiate between the baseline western and alternative eastern Rokeby junctions assessed. Both would require an application for a departure from standards for the retention of the existing eastbound merge onto the A66. Similarly, there is little differentiating the baseline and alternative junctions when considering construction cost and buildability. Whilst there would be some additional complexity and cost associated with the structure for the alternative eastern junction, this is counterbalanced by the ability to construct more of the junction offline and the increased cut generated by the alternative proposal reducing the deficit of fill material for the wider scheme.

5.8.82 The alternative eastern junction is better in terms of utilities as it affords the opportunity to retain utilities that the baseline western junction would need to divert. The alternative junction is also better for geotechnics as it provides a more favourable earthworks balance. However, the increased work within cut and a longer, more costly structure for the alternative proposal results in the baseline junction being considered better for both CDM and structures.

5.8.83 From a drainage perspective, the alternative eastern junction is considered better, as whilst it would introduce an additional pond and outfall, it has the significant benefit of not introducing a trapped cutting as present in the baseline western junction design. The alternative junction manages to maintain falls such that water can escape the underpass in the event of any drainage blockages on the local road.

Environment

5.8.84 When assessing the biodiversity, air quality and waste topics, there is little to differentiate between the baseline western and alternative eastern Rokeby junctions. However, the landscape, visual, and noise impacts of the eastern alternative junction

are considered to be worse than for the western baseline junction. For noise, this results from an increase in the number of properties impacted by the alternative junction compared to the baseline. The eastern alternative junction is also worse for geology impacts due to the increased land take, although it should be noted that this increase is very minor at 3%.

5.8.85 There would also be a worse impact on population and human health during construction of the eastern alternative junction as it intersects an additional footpath which is considered to be of medium value. During operation, there is little differentiating the junctions from a population and human health perspective as both would provide an alternative and safer means of crossing the A66.

5.8.86 For road drainage, the eastern alternative junction is considered to be better than the western baseline junction during the construction phase due to the works being undertaken further away from Tutta Beck and the resultant reduction in risk of negatively impacting water quality. The operational impact on climate change is considered better for the eastern alternative junction due to the ability for the junction drainage to flow freely, therefore avoiding the risk of the underpass flooding which is present in the baseline junction.

5.8.87 Rokeby Park and Gardens is a Grade II* Registered Park and Garden. The eastern alternative junction would result in fragmentation of Rokeby Park and introduce traffic to a nationally designated heritage asset, leading to harm of that asset. Consequently, the eastern alternative junction is assessed as worse during both construction and operation when compared to the western baseline junction. The eastern alternative junction will also negatively impact upon the setting of the Registered Park and Garden both during construction and operation and therefore has a greater impact on landscape character than the western baseline junction.

5.8.88 Further details of the environmental assessment criteria can be found in the PEIR.

Traffic

5.8.89 Regarding traffic, modelling has confirmed the eastern alternative junction is considered better than the western baseline junction due to the primary flow remaining on the C165 Barnard Castle Road. This improves journey times, minimises change at The Sills and Barnard Castle Bridge. The location of the eastern alternative junction is considered better for walkers and cyclists travelling to and from Greta Bridge when compared to the western baseline junction as it provides a more direct route on the likely preferred more direct line and avoids the diversion present in the baseline junction. However, the eastern alternative junction does result in a further diversion for walkers using the Public Rights of Way north and west of St Mary's Church.

Stakeholder

5.8.90 The eastern alternative junction requires a marginally larger area of land take compared to the western baseline junction. However, the singular landowner affected by both junctions, favours the eastern alternative junction due to the impact on the number and considered value of the affected land parcels. The western baseline junction would also introduce a greater degree of severance on their land between the realigned A66 and the Ancient Woodland adjacent to Tutta Beck.

5.8.91 The eastern alternative junction is similarly favoured by Local Councillors, Durham County Council and the General Public who attended the August 2021 stakeholder engagement event, primarily for the traffic and safety reasons cited in 5.8.89 above. However, Historic England do not support the eastern alternative junction due to the

preliminarily assessed impacts on St Mary's Church and the Registered Park and Garden.

Conclusion

5.8.92 In summary, although the eastern alternative junction is favoured for traffic, some engineering disciplines and many stakeholders, it does not conform to national planning policy.

5.8.93 The principal consideration in the presented preference for the western junction is the impact on the Grade II* Registered Park and Garden at Rokeby Park. The eastern junction will create harm to the Grade II* Registered Park and Garden at Rokeby Park. Whilst impacts on some key views of the eastern junction could be mitigated through careful landform design and reinstatement, the impacts cannot be completely avoided as the eastern junction would still lead to additional fragmentation of the site. National policy requires a very strong justification for any harm to a nationally designated asset, and evidence to show that there is not a viable alternative. The western junction is not anticipated to lead to harm to the RPG.

5.8.94 In terms of national planning policy, paragraph 5.131 of the NNNPS states that:

> *"Once lost, heritage assets cannot be replaced and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. Given that heritage assets are irreplaceable, harm or loss affecting any designated heritage asset should require clear and convincing justification…Substantial harm to or loss of designated assets of the highest significance, including…grade I and II* Registered Parks and Gardens should be wholly exceptional."*

5.8.95 If there is substantial harm to the Rokeby Park heritage asset the DCO application would need to set out exceptional circumstances for the Rokeby east junction alternative. These exceptional circumstances would need to be demonstrated in terms of substantial public benefits which outweigh any harm or loss, or alternatively other strict criteria apply as set out in paragraph 5.133 of the NNNPS:

> *"5.133 Where the proposed development will lead to substantial harm or total loss of significance of a designated heritage asset, the Secretary of State should refuse consent unless it can be demonstrated that the substantial harm or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm, or alternatively that all of the following apply:*
>
> - *The nature of the heritage asset prevents all reasonable uses of the site; and*
> - *No viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and*
> - *Conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible; and*
> - *The harm or loss is outweighed by the benefit of bringing the sit back into use."*

5.8.96 In the situation where a proposed development would lead to a harmful impact on the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal, in accordance with paragraph 5.132 of the NNNPS.

5.8.97 As an alternative junction location and layout exists, it is considered that the eastern junction alternative at Rokeby is likely to be regarded as not to conform to national policy and therefore there is a risk that for this scheme, a DCO application including the alternative eastern Rokeby junction would not be likely to secure a grant of consent.

5.8.98 As such, the western Rokeby junction will be presented at Statutory Consultation in Autumn 2021 as part of the Black Route. Consultees are encouraged to participate in the Statutory Consultation and make their comments formally through that channel where they will be reviewed and regard given to them in the final preparation of the application for development consent. For this reason, the land required to implement the eastern junction at Rokeby will be included in the proposed draft Development Consent Order boundary and views will be sought regarding any wider public and traffic benefits of this junction during the consultation.

Statutory Consultation Autumn 2021

5.8.99 Plans and profiles for the proposals taken forward to Statutory Consultation in Autumn 2021, as well as alternatives assessed and discounted during PCF Stage 3 Preliminary Design, can be found in Volume 2 of the Route Development Report.

5.8.100 As outlined above, Cross Lanes to Rokeby is one of the schemes where further consideration of alternative junctions has occurred to further assess and minimise the potential impacts upon landowners, heritage assets and to improve traffic movements in the area.

5.8.101 The Preferred Route Announcement alignment still applies for this scheme however, this has been combined with further developed junction junctions to produce the presented route, known as the Black Option, i.e., a junction to the west at Cross Lanes and a junction to the west at Rokeby.

5.8.102 It is proposed that this route will mostly follow the existing alignment, with a new adjacent westbound carriageway constructed to the south between the B6277 junction at Cross Lanes and the existing Tutta Beck Cottage access. Both carriageways will then be routed to the south of the Old Rectory and St Mary's Church, re-joining the existing A66 at Rokeby.

5.8.103 At Cross Lanes, it is proposed to remove the existing junctions which provide access to the B6277 Moorhouse Lane and Cross Lanes Organic Farm and Café. The removal of these junctions will remove the need for right-turn manoeuvres.

5.8.104 For this junction, a compact grade-separated junction on the A66, west of the existing Cross Lanes junction is proposed. The B6277 Moorhouse Lane and Rutherford Lane will be linked via a structure over the A66. This will help to maintain and improve access to the B6277 (Moorhouse Lane) for Barnard Castle, Cross Lanes Organic Farm Shop and Café, the Grade II listed Cross Lanes Farmhouse, and other local farms and residential properties.

5.8.105 At Rokeby, it is proposed to remove the existing junction and replace it with a compact grade-separated junction west of St Mary's Church and the Old Rectory. This junction would be an underpass arrangement and would avoid direct impact on the Registered Park and Garden and the Old Rectory and therefore removes the potential risk of the scheme not being consented based on non-conformity with planning policy.

5.8.106 This junction will provide access to Barnard Castle Road for all westbound traffic and diverging eastbound traffic via the old A66, which will form part of the local road network. Eastbound merging traffic will join the A66 via a slip road at the existing Rokeby Junction with the C165 Barnard Castle Road. This junction would maintain HGV access to Barnard Castle.

5.8.107 As outlined above, the project team will continue to consult and listen to justifications as to why the Black Route should not be progressed. For this reason, the land required to implement the eastern junction at Rokeby will be included in the proposed draft Development Consent Order boundary and views will be sought regarding any wider public and traffic benefits of this junction during the consultation that may lead to the team reconsidering the preference expressed.

5.9 Stephen Bank to Carkin Moor

Description of existing scheme

5.9.1 This section of the A66 extends from Browson Bank Farm in the west to Carkin Moor in the east, where the next length of dual carriageway is introduced. Along this section of the route is just over 6km of single carriageway, and whilst it closely follows the alignment of the Roman Road and is therefore relatively straight, the road rises and falls in areas causing visibility issues and forcing heavy goods vehicles to accelerate to navigate steep inclines.

5.9.2 There are multiple access points along this section of the route, where vehicles are attempting to join a single lane carriageway on which traffic is travelling at high speeds. Drivers can also find themselves in a vulnerable position when attempting to slow and leave the A66, especially when turning right.

5.9.3 Of these access points, five are major/minor junctions and seven are private residential or commercial accesses. Two of the major/minor junctions have been provided with ghost island right turns to improve safety for vehicles leaving the A66. However, these features result in frequent vehicle manoeuvres to and from the A66, thereby increasing accident risk.

5.9.4 This single carriageway section of the A66 is generally narrow in cross section, with narrow edge strips and verges. This results in insufficient run-off areas, should a vehicle leave the carriageway. Other potential collision hazards include trees, shrubs, telegraph poles, buildings and drystone walls along the verges.

5.9.5 Other features along this section of the A66 include lay-bys which generally display several substandard features such as short merge and diverge taper lengths and short stacking lengths. The carriageway passes through the site of a Scheduled Ancient Monument, a Roman Fort and prehistoric enclosed settlement approximately 400m west of Carkin Moor Farm.

5.9.6 There are three WCH routes crossing the A66 along this section of the route. A bridleway is located on the north verge near Browson Bank Farm, crossing the A66 in the vicinity of Dick Scot Lane. Currently, this crossing facility has no flag-post signs or corral. Two further WCH routes cross the A66, one being a public footpath in the vicinity of Fox Hall Junction and the other a bridleway near Mainsgill Farm. No footways, paved WCH facilities or bus-stop lay-bys exist throughout this section of the A66.

5.9.7 This section of the A66 carries approximately 17,100 vehicles per day, 27% of which are heavy goods vehicles.

Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection

5.9.8 At PCF Stage 1 Option Identification, five options were identified for consideration to improve the A66 between Stephen Bank and Carkin Moor. Each of these sought to widen the existing A66 to the south. Further information can be found in the PCF Stage 1 Technical Appraisal Report.

5.9.9 At PCF Stage 2 Option Selection, four of these five options were discounted and therefore not taken forward to public consultation in Summer 2019. Reasons for this included among others:

- Lower standard geometry requirements to avoid existing properties.
- Additional land take or other more significant direct impacts on the Scheduled Ancient Monument.
- Use of existing sections of the A66 unsuitable for inclusion in the permanent works.

5.9.10 However, following options appraisal, two further alternative options were developed. Details of each of these options and their development can be found in the PCF Stage 2 Scheme Assessment Report.

Public consultation Summer 2019

5.9.11 The options presented at public consultation in Summer 2019 were therefore Options M, N and O. For all, it is proposed that the current A66 is dualled between Stephen Bank and West Layton, broadly following the line of the existing road. From West Layton, there were then three different options that considered the impact on Foxhall, Mainsgill Farm and the Carkin Moor Scheduled Ancient Monument.

5.9.12 Option M proposed a new dual carriageway to the south of the existing A66 and the properties at Foxhall and Mainsgill Farm, after West Layton. It would re-join the A66 at Carkin Moor Farm, beyond the Scheduled Ancient Monument. A new junction and bridge were proposed at New Lane to provide access to the new A66 for several properties and the villages of East Layton, West Layton and Ravensworth. Several underpasses would be created to maintain land access and public rights of way.

5.9.13 Option N proposed a new dual carriageway to the north of the existing A66 and the properties at Foxhall and Mainsgill Farm, after West Layton. It would re-join the A66 at Carkin Moor Farm. As the new dual carriageway would be expected to re-join the A66 just after Mainsgill Farm it would therefore require the widening of the road through the Scheduled Ancient Monument. A new junction and bridge were proposed on Moor Lane to provide safe and easy access to the old A66 for the villages of East Layton, West Layton and Ravensworth and the Mainsgill Farm shop.

5.9.14 Option O followed the same route as Option M as far as New Lane, where it diverted north to avoid Mainsgill Farm Shop. A new eastbound junction was proposed at Foxhall to provide local access to the old A66 and West Layton. New Lane would be realigned to connect with the new A66, providing access for Ravensworth. The proposed route would continue in a northerly direction to a new junction at Moor Lane which would provide access to Mainsgill Farm and the old A66. As the new dual carriageway would be expected to re-join the A66 just after Mainsgill Farm it would therefore require the widening of the road through the Scheduled Ancient Monument.

Preferred Route Announcement May 2020

5.9.15 The Preferred Route Announcement of May 2020 concluded that Option N, the northern bypass, would be the option taken forward to PCF Stage 3 Preliminary Design.

5.9.16 Option N was preferred as it maintained the line of the A66 through the Scheduled Ancient Monument at Carkin Moor, reducing potential additional impacts on this designated heritage asset. It also presented better options for utilising the de-trunked section of the A66 to allow safe and easy access to local villages and facilities, such as Ravensworth and the Fox Hall Inn.

5.9.17 However, the PCF Stage 2 Scheme Assessment Report stated that following feedback from the public, it was agreed that access to West Layton on Option N would be problematic. Consequently, it was proposed to add an additional structure to connect Collier Lane to the de-trunked A66 network, thus maintaining access provisions.

PCF Stage 3 Preliminary Design

5.9.18 At PCF Stage 3 Preliminary Design, these proposals have been developed further for Statutory Consultation in Autumn 2021 and are as outlined below. This is part of natural design development that occurs when new data and analysis supplements previously available information, for example the outcomes of surveys and further stakeholder engagement.

5.9.19 Examination of the interaction of the proposed A66 over the watercourse to the east of Mainsgill indicated a requirement to raise the proposed A66 mainline alignment to obtain sufficient vertical clearance over this watercourse to allow it to be culverted beneath the new offline section. This amendment to the vertical geometry of the carriageway reduced the level difference that could feasibly be achieved at Moor Lane in order to provide the required headroom and structural clearances to allow the proposed mainline to pass under Moor Lane as proposed in the PRA.

5.9.20 As such, the grade separation announced in May 2020 has been reversed and it is now proposed that Moor Lane is lowered, with the A66 mainline passing over instead of passing under this local road. This allows adequate clearance to the watercourse mentioned above, whilst still allowing the compact grade-separated geometry to be maintained. Lowering Moor Lane in this manner also brings the added benefit of reducing the visual impact of the grade-separated junction on the surrounding areas.

5.9.21 Following consultation with stakeholders including community representatives and local businesses, this junction has also been moved to the west of the existing Moor Lane. This improves on the earlier proposals between Moor Lane and Mainsgill Farm Shop by providing better separation between the two proposed staggered junctions. This relocation also brings the added benefit of discouraging the use of Moor Lane for through traffic as a result of adequate separation between the two proposed staggered junctions.

5.9.22 A review of the junction proposals at Collier Lane was also conducted. This determined that there could be significant savings in imported fill volumes, and an improvement with respect to potential visual impacts of the scheme on its surroundings, if the grade separation was also reversed here. As such, it is now proposed that the A66 mainline passes in cutting beneath Collier Lane.

5.9.23 Stakeholder engagement has been key to developing the route between Stephen Bank and Carkin Moor. Advice has been sought from Historic England to support

development of the route in relation to the Scheduled Ancient Monument. The A66 mainline alignment here has been raised as it passes through the cutting adjacent to the site. This minimises the amount of excavation required to accommodate the proposed retaining wall to the south of the alignment and therefore reduces impacts on the Scheduled Ancient Monument itself.

5.9.24 WCH access will be improved along the scheme through provision of a new underpass suitable for horse-riders, beneath the A66 mainline adjacent to the existing junction of Warrener Lane and the A66. In addition, two previously unconnected bridleways will be linked through the new grade-separated junction at Moor Lane, with safety further improved as a consequence of re-routing the southern path to the west of Mainsgill Farm.

5.9.25 Review of the previous design for a left on/left off junction at Warrener Lane noted that such an arrangement may encourage drivers to make dangerous U-turn manoeuvres at the junction to the east, where there was still a gap in the central reserve. It is proposed to close this central reserve gap and provide a new link road to connect Warrener Lane with the existing A66 in the vicinity of Mainsgill Farm, allowing safer connections between the A66 and local roads.

5.9.26 In addition, two new lay-bys are proposed within the scheme extents. It is proposed that one will serve the eastbound carriageway and one will serve the westbound carriageway. Both lay-bys will have geometry in line with current design standards and include 60m parking provision.

Statutory Consultation Autumn 2021

5.9.27 Plans and profiles for the proposals taken forward to Statutory Consultation in Autumn 2021 can be found in Volume 2 of the Route Development Report.

5.9.28 The preliminary design presented at Statutory Consultation in Autumn 2021 will show the new dual carriageway to the north of the old A66 and the properties at Fox Hall and Mainsgill Farm. The new A66 would then re-join the old A66 to the east of Mainsgill Farm.

5.9.29 This proposal will improve safety and ease congestion by widening and dualling the A66 through Carkin Moor Scheduled Ancient Monument to Carkin Moor Farm. The proposed A66 will be raised as it passes through the cutting adjacent to the Carkin Moor SAM to minimise the amount of excavation required to accommodate the proposed retaining walls to the north and south of the alignment and reduce any impact on the Scheduled Ancient Monument itself.

5.9.30 It is proposed that the old detrunked A66 to the south of the proposed new A66 route will be used for local road access. This will provide access to Dick Scot Lane, Old Dunsa Bank and Mainsgill Farm Shop. A new underpass will be provided to the north of Dick Scot Lane to allow for access to land north of the proposed A66.

5.9.31 An overbridge link from Collier Lane to the detrunked A66 will be provided. The grade separation at Collier Lane has the proposed A66 passing beneath Collier Lane in cutting, reducing the amount of imported fill material required for the scheme in addition to reducing the visual impact on the landscape.

5.9.32 As part of the upgrade works between Stephen Bank and Carkin Moor, a new compact grade-separated junction is proposed to the west of Moor Lane to provide safer access to the detrunked A66, the villages of East Layton, West Layton, Ravensworth, and Mainsgill Farm Shop.

5.9.33 It is proposed that the southern section of Moor Lane be realigned and connected to the proposed compact grade-separated junction. There is an existing bridleway north of the A66, to the east of Mainsgill Farm and another separate bridleway south of the A66, through Mainsgill Farm. It is proposed to connect these routes via a diversion on the northern side, to cross under the proposed A66 via the new junction to then follow the western boundary of Mainsgill Farm. The existing bridleway through Mainsgill Farm will be stopped up.

5.9.34 The existing right turn from the A66 on to Warrener Lane will be closed and removed. Traffic will join the A66 via a new link road to Moor Lane junction.

5.10 A1(M) Junction 53 Scotch Corner

Description of existing scheme

5.10.1 The A1(M) Junction 53 at Scotch Corner is an existing grade-separated roundabout junction to the south of Darlington. It is a signalised roundabout serving the A1(M), A66, A6055 and Middleton Tyas Lane, which provides access to the Scotch Corner Motorway Services area.

5.10.2 The A1(M) passes under the roundabout with southbound access via on- and off-sliproads to the roundabout. Northbound access to the A1(M) is via an off-slip to the roundabout with the northbound on-slip located off a new roundabout on the A6055 to the north.

Outcomes of PCF Stage 1 Option Development and PCF Stage 2 Option Selection

5.10.3 At PCF Stage 1 Option Identification, a preliminary assessment of the junction indicated that it was likely the operational capacity of the existing junction would be exceeded following full dualling of the A66. This reflects improvements to the A66 making it a more attractive route for users, resulting in an increase in traffic at the major junctions to access it. This increase in traffic would likely lead to greater congestion and tailbacks on the junction approaches if circulation were not improved. Further information can be found in the PCF Stage 1 Technical Appraisal Report.

5.10.4 At PCF Stage 2 Option Selection, a traffic model was assembled that included the Scotch Corner roundabout, the A6055/A1(M) roundabout north of Scotch Corner, the Barracks Bank roundabout south of Scotch Corner and the access road leading to the Scotch Corner Motorway Services area. It also included the junction improvement changes recently made as part of the A1 Leeming to Barton scheme. This model was developed to provide a suitable representation of the operation of Scotch Corner, including the interaction between the peripheral roundabouts and Scotch Corner Services. Refer to the PCF Stage 2 Scheme Assessment Report for further detail.

5.10.5 The key junctions included in the modelled network are forecast to operate within capacity. However, the Middleton Tyas junction is forecast to operate over-capacity in 2043. It was noted in the Scheme Assessment Report that there was limited information available on the use of the Motorway Services in the future for the purposes of this modelling work. PCF Stage 2 Option Selection concluded that the existing layout at Scotch Corner is forecast to have sufficient capacity to accommodate forecast traffic growth beyond 2046, which is the project design year.

5.10.6 However, it was acknowledged that further analysis would be required at PCF Stage 3 following the announcement of the Preferred Route and design development elsewhere on the route, to accommodate the interdependency of the junction and the

A66. As such, these initial modelling outcomes were not presented at public consultation in 2019 in detail due to the uncertainty and need for preliminary design of the wider route to be considered.

Public consultation Summer 2019

5.10.7 The modelling outlined above was excluded from the non-statutory consultation held in Summer 2019, as its focus was to seek views on the Preferred Route options for each section of the A66. Consultation material noted that high-level capacity assessments had been carried out that confirmed the existing junction would not provide adequate capacity in its current form once the A66 project is built. Figure 23 below was included in consultation material to indicate the parts of the junction likely to be impacted by works though it was noted that further traffic analysis would be required to support preliminary design.

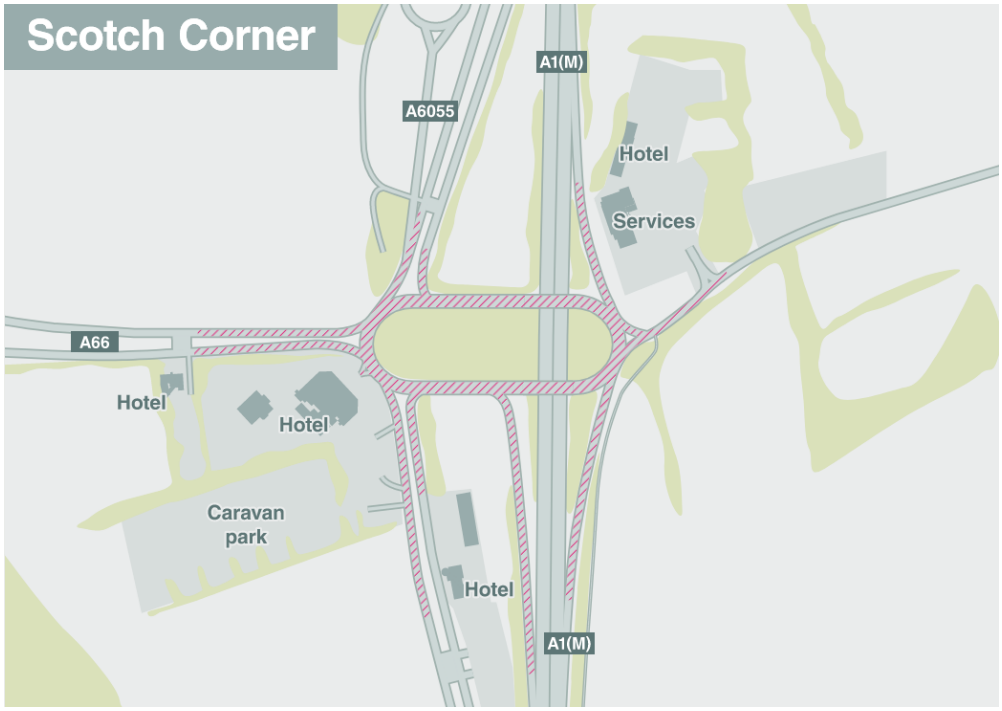


Figure 23 A1(M) Junction 53 Scotch Corner as shown at public consultation Summer 2019

Preferred Route Announcement May 2020

5.10.8 The Preferred Route Announcement of May 2020 did not explicitly reference proposals for A1(M) Junction 53 Scotch Corner. As with other junctions along the route, proposals were to be progressed once a Preferred Route had been selected and developed.

PCF Stage 3 Preliminary Design

5.10.9 At PCF Stage 3 Preliminary Design, a review of the development of the traffic model during PCF Stage 2 was undertaken to:

- Confirm the conclusions reached at the end of PCF Stage 2.
- Identify and undertake any further sensitivity testing that would be required to validate the PCF Stage 2 conclusion.

- Identify any potential improvement works required at Scotch Corner as a result of dualling the A66 and compare against the feasibility design layout produced during PCF Stage 2.

5.10.10 This review concluded that there will be a significant increase in traffic flows on the A66 approach to A1(M) Junction 53 as a result of the proposed upgrades to the A66. Although this increase can be accommodated within the existing design, potential issues have been identified at the Middleton Tyas arm of the junction. It is anticipated that traffic from the Middleton Tyas arm, including from the existing motorway services, will be unable to easily gain access to the roundabout at the priority approach.

5.10.11 A sensitivity test was undertaken to understand the potential impact of a possible development that is at pre-application stage within the north-west quadrant of the junction. No additional negative impacts were identified other than those already noted for the Middleton Tyas Arm.

5.10.12 Collison data was analysed, and feedback was sought from Highways England Operations Directorate, the Driver and Vehicles Standards Agency and North Yorkshire Police. No significant operational improvements were identified, although observations were made regarding potential signage and road marking improvements for the A1(M) northbound off-ramp. For further detail, refer to the Local Traffic Report provided at Statutory Consultation.

5.10.13 In line with the outcomes of this traffic modelling and stakeholder engagement, it is proposed to widen the approach to the existing Scotch Corner Roundabout from Middleton Tyas Lane from one lane to two lanes. It is proposed to move the kerbline to the south, into the verge to accommodate the additional carriageway width required. Reconfiguration of the lane markings on the eastern side of the roundabout is also proposed to improve the interaction of the A1(M) southbound off-ramp, the roundabout circulatory and Middleton Tyas Lane.

5.10.14 Relocation of an existing bus stop, signage and lighting columns will be required to accommodate the above.

5.10.15 An additional lane will be accommodated within the existing carriageway extents on the northern bridged section of the circulatory carriageway. The southern verge will be narrowed to accommodate this.

Statutory Consultation Autumn 2021

5.10.16 Plans and profiles for the proposals taken forward to Statutory Consultation in Autumn 2021 can be found in Volume 2 of the Route Development Report.

5.10.17 The preliminary design presented at Statutory Consultation in Autumn 2021 will show the existing Middleton Tyas Lane approach to the A1(M) Junction 53 at Scotch Corner roundabout widened from one lane to two lanes. This will result in better access to the roundabout at this priority approach.

5.10.18 In addition, it is proposed to alter road markings and kerbs on the circulatory carriageway to provide three lanes on the existing northern bridge structure to improve operational capacity.

5.10.19 A section of footway, a bus stop, some signage and lighting columns will require relocation to the back of the widened carriageway to accommodate these works, and road markings will be required to tie in with existing.

6. Abbreviation list

Table 16 Abbreviations

Term	Definition
AONB	Area of Outstanding Natural Beauty
CCC	Cumbria County Council
CDM	Construction Design and Management
CMS	Construction Method Statement
DCC	Durham County Council
DCO	Development Consent Order
DfT	Department for Transport
DIPs	Delivery Integration Partners
EAR	Environmental Assessment Report
EDC	Eden District Council
EIA	Environmental Impact Assessment
ES	Environmental Statement
HET	Heavy Equipment Transporter
HGV	Heavy Goods Vehicle
HRA	Habitats Regulations Assessment
km	Kilometre
MoD	Ministry of Defence
NNNPS	National Networks National Policy Statement
NSIP	Nationally Significant Infrastructure Project
NTPRSS	Northern Trans-Pennines Routes Strategic Study
NYCC	North Yorkshire County Council
PCF	Project Control Framework
PEIR	Preliminary Environmental Information Report
PMA	Private Means of Access
PRA	Preferred Route Announcement
PRoW	Public Right of Way
RDC	Richmondshire District Council
RIS	Road Investment Strategy
RPG	Registered Park and Garden
SAC	Special Area of Conservation
SAM	Scheduled Ancient Monument
SAR	Scheme Assessment Report
SES	Safety, Engineering and Standards
SPA	Special Protection Area
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
TAR	Technical Appraisal Report
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VRS	Vehicle Restraint System
WCH	Walking, Cycling and Horse riding / Walkers, Cyclists and Horse-riders
WPC	Warcop Parish Council

7. Glossary

Table 17 Glossary of terms

Term	Definition
(The) Act	The Planning Act 2008
Annual average daily traffic (AADT)	The total volume of vehicle traffic of a motorway or road for a year divided by 365 days.
Applicant	Highways England
Application	This refers to an application for a Development Consent Order. An application consists of a series of documents and plans which are submitted to the Planning Inspectorate and published on its website.
Appraisal	A process that looks at the worth of a course of action.
Area of Outstanding Natural Beauty (AONB)	An area of countryside considered to have significant landscape value.
Assessment	A process by which information about effects of a proposed plan, project or intervention is collected, assessed and used to inform decision-making.
Baseline environment	The environment as it appears (or would appear) immediately prior to the implementation of the project together with any known or foreseeable future changes that will take place before completion of the project.
Biodiversity	The variety of life forms, the different plants animals and microorganisms, the genes they contain and the ecosystems they form.
Consent	A statutory permission given to an applicant by a statutory authority, such as the local planning authority or the Secretary of State, that allows a development to be carried out within a specific area of land.
Consultation	A process by which regulatory authorities, statutory and non-statutory bodies are approached for information and opinions regarding a development proposal.
Design Manual for Roads and Bridges (DMRB)	A set of documents that provide a comprehensive manual system which accommodates all current standards, advice notes and other published documents relating to the design, assessment and operation of trunk roads.
Development Consent Order (DCO)	The means of obtaining permission for developments categorised as nationally significant infrastructure projects.
Effect	Term used to express the consequence of an impact (expressed as the 'significance of effect'), which is determined by correlating the magnitude of the impact to the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria. For example, land clearing during construction results in habitat loss (impact), the effect of which is the significance of the habitat loss on the ecological resource.
Enhancement	A measure that is over and above what is required to mitigate the adverse effects of a project.

Term	Definition
Environmental assessment	A method and a process by which information about environmental effects is collected, assessed and used to inform decision-making.
Environmental Assessment Report	Documents the findings of an Environmental Assessment.
Environmental designation	A defined area which is protected by legislation that is threatened by change from manmade and natural influences (for example Ramsar sites, Sites of Special Scientific Interest and Special Areas of Conservation).
Environmental Impact Assessment (EIA)	A statutory process by which the environmental impact of certain planned projects must be assessed through an EIA before a formal decision to proceed can be made.
Examination stage	The formal, legal process governed by the Planning Act 2008 and related legislation. The examination stage is operated and led by the Planning Inspectorate on behalf of the Secretary of State.
Examining authority	The person(s) appointed by the Secretary of State to assess the DCO application and make a recommendation to the Secretary of State.
Flood zones	Flood Zones refer to the probability of river and sea flooding. They are available to view on the Environment Agency's website.
Geodiversity	The diversity of rocks, fossils, minerals and soils, landforms and geological processes that constitute the topography, landscape and the underlying structure of the Earth.
Ground investigation	To obtain information on the physical properties of soil and rock around a site.
Grade-separated junction	Roads crossing the carriageway pass at a different level, so as not to disrupt the flow of traffic. Slip roads connect the carriageway to the junction.
Impact	Change that is caused by an action (for example land clearing (action) during construction which results in habitat loss (impact)).
Legislation	A law or set of laws proposed by a government and given force/made official by a parliament.
Listed building	A structure which has been placed on the Statutory List of Buildings of Special Architectural or Historic Interest to protect its architectural and historic interest.
Mitigation	Measures including any process, activity, or design to avoid, reduce, remedy or compensate for negative environmental impacts or effects of a development.
Mitigation measures	Methods employed to avoid, reduce, remedy or compensate for significant adverse impacts of development proposals.

Term	Definition
Monitoring	A continuing assessment of the performance of the project, including mitigation measures. This determines if effects occur as predicted or if operations remain within acceptable limits, and if mitigation measures are as effective as predicted.
National Networks National Policy Statement 2014 (NN NPS)	A national policy document issued by the government which sets out the government's objectives and the need for the development of nationally significant infrastructure projects on road and rail networks in England. It is also known as National Policy Statement for National Networks. The NN NPS is the basis for the examination of a Development Consent Order application by the Planning Inspectorate and decisions by the Secretary of State. It was adopted as national policy by the UK Parliament in March 2015.
Nationally Significant Infrastructure Project (NSIP)	Large scale developments which require a type of consent known as 'development consent' under procedures governed by the Planning Act 2008.
Operational	The functioning of a project on completion of construction.
Phase 1 Habitat Survey	Recognised standard methodology for collating information on the habitat structure of a particular site.
Planning Act 2008 (as amended)	Act of Parliament which sets out the statutory requirements and planning application process for nationally significant infrastructure projects, such as energy, water, transport and waste. Applications for Development Consent Order are submitted following the processes set out in the Planning Act. The Act has subsequently been amended.
Planning Inspectorate	The government agency responsible for operating the planning process for nationally significant infrastructure projects and for examining applications for development consent under the Planning Act 2008, on behalf of the Secretary of State.
Preliminary design	The design on which the application for development consent is based.
Programme	A series of steps that have been identified or series of projects that are linked by dependency.
Receptor	A defined individual environmental feature usually associated with population, fauna and flora that has potential to be affected by a project.
Registered Parks and Gardens	Parks and gardens listed on a register that includes sites of particular historic importance and of special historic interest in England. The main purpose of the register is to celebrate designed landscapes of note and to encourage appropriate protection.
Regulations	Official rules or acts to control something, generally made in relation to legislation.

Term	Definition
Scoping	The process of identifying the issues to be addressed by the EIA process. It is a method of ensuring that an assessment focuses on the important issues and avoids those that are considered to be not significant.
Secretary of State	The Secretary of State for Transport.
Sensitivity	The extent to which the receiving environment can accept and accommodate change without experiencing adverse effects.
Statutory	Related to legislation or prescribed in law or regulation.
Traffic modelling or forecasting	The process used to estimate the number of vehicles using a specific section of road or defined network of roads.

8. Bibliography

Arcadis Consulting (UK) Limited. (2018) A66 Northern Trans-Pennine Project Technical Appraisal Report. Highways England.

Arcadis Consulting (UK) Limited. (2020) A66 Northern Trans-Pennine Project Scheme Assessment Report. Highways England.

Department for Transport (2014) *National Policy Statement for National Networks*, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data /file/387222/npsnn-print.pdf

Department for Transport (2015), *Road investment strategy: 2015 to 2020*, available at: https://www.gov.uk/government/publications/road-investment-strategy-for-the-2015-to-2020-road-period

Department for Transport (March 2020) *Road investment strategy: 2020 to 2025*, available at: https://www.gov.uk/government/publications/road-investment-strategy-2-ris2-2020-to2025.

Highways England (2018) *The Project Control Framework Handbook (version 4)*

Highways England (2019) *A66 North Trans-Pennine Project Public Consultation Brochure*, available at: https://highwaysengland.citizenspace.com/cip/a66-northern-trans-pennine/supporting_documents/Web%20%20A66%20NTP%20Consultation%20Brochure.pdf

Highways England (2020) *A66 North Trans-Pennine Preferred Route Announcement* available at: https://highwaysengland.citizenspace.com/cip/a66-northern-trans-pennine/results/pra_report_aw_lo_res.pdf

Highways England (2020) *A66 North Trans-Pennine Winter 2020 Project Update Brochure*

Highways England (2021) *A66 North Trans-Pennine Draft Construction Method Statement*

Highways England (2021) *A66 North Trans-Pennine Preliminary Environmental Information Report*

On 20 August 2021, it was announced that Highways England would be changing its name to National Highways. The name change reflects the role of the strategic road network – to connect the nation's regions – and the part it plays in setting Highways standards across the UK.

We have continued this consultation under the Highways England branding to avoid confusion but will be rebranding this project as of 8 November.

The remit of the organisation has not changed and we will continue to operate and maintain England's motorways and A roads.

highways england

A66 Northern Trans-Pennine project

Route development report

Volume 2

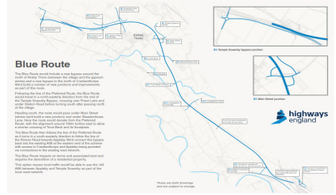
Appendices and Plans and Profiles

CONTENTS

Appendix A	**Sifting matrices**	
Appendix A.1	Temple Sowerby to Appleby - Blue Route versus Red Route sifting matrix	5
Appendix A.2	Temple Sowerby to Appleby - Blue Route versus Orange Route sifting matrix	11
Appendix A.3	Appleby to Brough (Warcop) (Eastern Section) - Black Route versus Orange Route sifting matrix	17
Appendix A.4	Appleby to Brough (Warcop) (Central Section) - Black Route versus Blue Route sifting matrix	22
Appendix A.5	Cross Lanes Junction sifting matrix	27
Appendix A.6	Rokeby Junction sifting matrix	36
Appendix B	**Temple Sowerby to Appleby initial alternatives and sifting**	
Appendix B.1	Map of initial alternatives	44
Appendix B.2	Map of refined alternatives	46
Appendix B.3	Initial sifting matrix summary	59
Appendix C	**Temple Sowerby flood modelling and geomorphological analysis**	**61**
Plans and profiles		**84**

A Sifting matrices

A.1 Temple Sowerby to Appleby - Blue Route versus Red Route sifting matrix

Alternative Option Name	**Temple Sowerby to Appleby - Blue Route Vs Red Route**		
Description	Assessment of Blue Route vs Red Route for the central section of the Temple Sowerby to Appleby scheme. Due to local topography the new Trout Beck crossing is expected to have a height from ground level of approximately 18m. The Red Route seeks to reduce impact on the SAC by crossing Trout Beck and its floodplain at a narrower point than the Blue Route. The Red Route has a similar horizontal alignment to the Blue Route at its west end but it should be noted that the vertical alignments differ. At the east end around Crackenthorpe the route alignments are the same. The Red Route will allow the de-trunked A66 to become the local road connection between Appleby and Temple Sowerby. The Red Route will not require a bridge to be constructed at Powis House on Long Marton Road. The Red Route results in the new A66 being approximately 750m closer to the village of Long Marton.		
Drawing (name and link)			
Drawing Image	Alternative - Red Route	Base - Blue Route	
			
Reason for option consideration	The Red Route was developed following analysis of the Environment Agency flood maps for the area around Trout Beck. It gives a shorter crossing point of the Beck of around 300m rather than the 400m crossing that the Blue Route requires. The Red Route moves the alignment away from known cultural heritage sites close to Kirkby Thore. The route is constrained from moving further to the east because of the Gypsum mine workings.		
Assessment outcome (State the result of the assessment)	The assessment demonstrates that the Blue Route is preferred over the Red Route. The assessment demonstrates that the Blue Route performs better in a number of areas such as highway alignment, population and human health and effects on stakeholders.		
Discipline	**Impacts**	**Comparison of Red Route with base Blue Route**	**Justification**
Engineering			
Highways - Standards Compliance	The Red alignment main line has more relaxed horizontal radii than the Blue Route, which could be considered worse geometry, however it does not have the long straight downhill section towards a relaxed curve that the Blue Route alignment does. While this geometry complies with standards it is not desirable. The Red Route alignment has better geometry consistency throughout its length. The Red Route alignment does not require any works to Long Marton (road) at the crossing point. While the existing road geometry is substandard the scheme does not make this worse. The Blue Route alignment does make the vertical geometry at the Long Marton (road) crossing worse than existing.	Worse	The Red Route alignment has better geometrical consistency and does not make the existing side road geometry worse than existing.
Utilities	Statutory Undertakers C2 utility information is not complete at this time. Based on what we do have, the Red Route will likely have a slightly lesser impact on overhead powerlines.	Better	Overall it is anticipated that the Red Route will have a lesser impact than Blue Route.
Geotechnics and Earthworks	Routes are very similar from a geological and earthworks point of view. However, it should be noted that the Red Route crosses the geological fault line from Penrith Sandstone to Eden Shales, which may introduce a higher potential for finding sinkholes along the route, and the risk of dissolution.	Neutral	There is no evidence to suggest that geotechnics and earthworks is a material factor in determining the Current Preferred Alignment for this scheme.
Structures	Although crossing of Trout Beck is expected to be shorter with the Red Route, the local topography means that the structure will need to be around 18m high causing it to stand out within the landscape. The Red Route will also require an additional structure to cross Keld Syke.	Worse	Less structures required with Blue Route and impacts of Trout Beck Crossing greater with regard to the Red Route due to increased height.
Drainage and Hydrology	The proposed drainage design for both route alignments is likely to be similar. They both require three attenuation ponds and will discharge direct to Trout Beck. As there is no requirement for works to Long Marton (Road) the Red Route alignment does not need any of the drainage, ponds or culverts that the Blue Route alignment needs for the side road. Both alignments will span the full width of the 100 year + Climate change Trout Beck / Keld Syke floodplain with a structure and have minimal impact on flood risk.	Better	The drainage systems for the route alignments are similar, but the Blue Route alignment needs drainage for side roads that the Red Route doesn't affect. Flood risk impact is minimal for both alignment options.
Construction Design Management (CDM)	Both routes are similar with the complexity of the construction works required, CDM implications are neutral.	Neutral	There is no evidence to suggest that CDM is a material factor in determining the Current Preferred Alignment for this scheme.

Construction Cost		Based on main line design models only, the cut / fill earthworks requirements of the Blue and Red Route alignments are similar.	Neutral	There is no evidence to suggest that Construction Cost is a material factor in determining the Current Preferred Alignment for this scheme.
Buildability		Both routes involve greenfield construction away from the existing A66. No significant differences between the two routes.	Neutral	There is no evidence to suggest that buildability is a material factor in determining the Current Preferred Alignment for this scheme.
Environment				
Biodiversity	Construction	Designated Sites: Crosses the Trout Beck (River Eden SAC) approximately 1km upstream from the crossing point of the Blue Route Section 41 . Priority Habitats: rivers and streams (Trout Beck, and Keld Sike , loss and shading impacts, pollution potential) affected. Additional impacts to scattered semi-mature to mature trees Protected/notable species - 1 structures and 8 trees with moderate to high bat roost potential being lost. Red Squirrel habitat loss, Badger squirrel loss. Otter habitat loss and disturbance (may be less so due to proximity of exist dairy business. Loss of water vole habitat. Both routes have the potential to impact aquatic species during construction, including the qualifying species of the SAC (Atlantic salmon, bullhead, lamprey and white clawed crayfish) as both crossing locations provide optimal habitat and a migration route. Habitat loss/disturbance through shading of the river is broadly consistent across both routes, however the Red Route has an additional crossing of a Keld Sike which results in additional habitat loss/disturbance through shading. The Nationally Scarce bryophyte Porella pinnata was recorded in the vicinity of the Red Route.	Neutral	Similar impacts to the Trout Beck tributary which forms a part of the River Eden SAC as the Blue Route alternative. The Red Route crosses at a narrower point in the floodplain of the watercourse, resulting in a shorter crossing structure. Construction impacts to freshwater species are considered to be very similar, with the exception of a potential impact (full assessment of impacts pending) on the Nationally Scarce bryophyte Porella pinnata which was recorded in the vicinity of the Red Route.
	Operation	Designated Sites: Crosses the Trout Beck (River Eden SAC) approximately 1km upstream from the crossing point of the Blue Route Section 41 . Priority Habitats: rivers and streams (Trout Beck, and Keld Sike , loss and shading impacts, pollution potential) affected. Additional impacts to scattered semi-mature to mature trees Protected/notable species - 1 structures and 8 trees with moderate to high bat roost potential being lost. Red Squirrel habitat loss, Badger squirrel loss. Otter habitat loss and disturbance (may be less so due to proximity of exist dairy business. Loss of water vole habitat. Habitat loss/disturbance through shading of the river is broadly consistent across both options, however the Red Route has an additional crossing of a Keld Sike which results in additional habitat loss/disturbance through shading. The Nationally Scarce bryophyte Porella pinnata was recorded in the vicinity of the red option.	Neutral	Similar impacts to the Trout Beck tributary which forms a part of the River Eden SAC as the Blue Route alternative. The Red Route crosses at a narrower point in the floodplain of the watercourse, resulting in a shorter crossing structure. Operation impacts to freshwater species are considered to be very similar, with the exception of a potential impact (full assessment of impacts pending) on the Nationally Scarce bryophyte Porella pinnata which was recorded in the vicinity of the Red Route.
Road Drainage and Water Environment	Construction	Both routes require a new crossing over Trout Beck (a tributary within the River Eden SAC). Red Route also requires crossing of Keld Syke	Worse	Blue has one fewer watercourse crossing. Both wide spans of Trout Beck.
	Operation	Road related run off may impact on surface water quality of surrounding watercourses.	Neutral	Red Route is further from the Rivers Trust channel construction scheme, more potential for d/s re-naturalisation schemes. The Blue and Red Route avoid most of the proposed and existing Gypsum mineworkings but the realignment of main street and its connection to the new A66 does pass over them. We are looking to minimise this as much as possible with our design but it cannot be avoided completely . The rest of the Blue and Red routes avoid the primary deposits of gypsum but there is a risk that small pockets of gypsum could be encountered during construction.
Geology, Soils, Contaminated Land and Groundwater	Construction	Land take required within ALC 2, 3a, 3b. Land take required from soils supporting SAC or SSSI. Exposure of contaminated soil sources that may impact on human health, principal aquifers.	Neutral	There is no evidence to suggest that Geology, soils contaminated land and groundwater are a material factor in determining the Current Preferred Alignment for this scheme.
	Operation	Operationally the potential impacts will be similar between alternative routes.	Neutral	There is no evidence to suggest that Geology, soils contaminated land and groundwater are a material factor in determining the Current Preferred Alignment for this scheme.

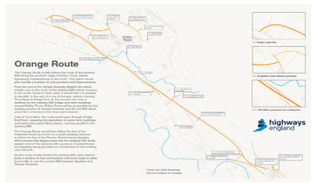
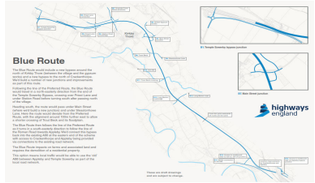
Noise and Vibration	Construction	To inform the comparison assumptions of broad construction activities have been made to broadly determine where there is risk of significant impacts.	Neutral	It is considered that the general construction impacts between the alternatives are broadly similar enough that they would not be considered a factor in selecting a preference.
	Operation	<u>Red Route:</u> 167 residential receptors predicted to experience significant adverse effects 178 residential receptors predicted to experience significant beneficial effects 4 non-residential receptors predicted to experience significant adverse effects 7 non-residential receptors predicted to experience significant beneficial effects <u>Blue Route:</u> 256 residential receptors predicted to experience significant adverse effects 124 residential receptors predicted to experience significant beneficial effects 4 non-residential receptors predicted to experience significant adverse effects 8 non-residential receptors predicted to experience significant beneficial effects	Better	Red Route has over all fewer significant adverse effects and more significant beneficial effects.
Landscape and Visual	Construction	Greater loss of trees. Similar construction between all alternative routes.	Neutral	It is considered that the general construction impacts between the alternative routes are broadly similar enough that they would not be considered a factor in selecting a preference.
	Operation	Impact on landscape character of Trout Beck valley is greater than Blue Route due to the alignment of the route impacting on more rural landscape compared to Blue Route. Scale of the structure required to cross Trout Beck will have impact on the landscape. Greater impact on field pattern. Impact of required detention ponds. Embankment required for Sleastonhowe Lane crossing is a significant earthworks. Two watercourse crossings required compared to one on the Blue Route. Additional impacts on the views from the PRoW 341017 connecting Long Marton to Powis House Impacts on views from the road connecting Long Marton to A66. Crosses the Roman Road and impacts on a number of mature trees and dissects the bridle way that follows the alignment of the Roman Road .	Worse	The key differences in the impact from this alternative are related to the alignment being situated in a more rural landscape and the impacts of the larger structure required to cross the Trout Beck as well as additional impacts on mature trees alongside the Roman Road.
Population and Human Health	Construction	Based on draft DCO boundary: - Blue Route requires direct acquisition and demolition of two residential receptors to accommodate the scheme. Based on draft DCO boundary: - Red Route alternative requires direct acquisition and demolition of one residential receptor to accommodate the scheme, however it also requires an entire area allocated for housing (Townhead)	Worse	Potential requirement for landtake from a housing allocation makes this the less preferable of the alternative routes.
	Operation	From a Human Health perspective as per the Noise and Vibration assessment compared to the blue option the red option has: - fewer residential receptors at risk of experiencing adverse noise impact - greater number of receptors expected to experience a beneficial effect from noise	Better	The impacts are assessed as better for the Red Route as fewer receptors are at risk of experiencing adverse noise impact there are a greater number of properties experiencing a beneficial effect.
Air Quality	Construction	No material differences between these alternatives identified.	Neutral	No material differences between these alternatives identified.
	Operation	<u>Blue Route:</u> Whilst it is likely that a number of sensitive receptors in close proximity to the Red Route will experience a deterioration in air quality compared to the existing situation, no receptors are predicted to experience any significant adverse effects or pollutant concentrations above the AQO. <u>Red Route:</u> It is likely that a number of sensitive receptors in close proximity to the Red Route will experience changes in air quality (both positive and negative due to the shifting alignment), no receptors are predicted to experience any significant adverse effects or pollutant concentrations above the AQO.	Neutral	As no receptors are expected to experience any significant adverse effects or pollutant concentrations above the AQO for either the Blue or the Red Route then this has been assessed as neutral

Material Assets and Waste	Construction	One demolition would be required to facilitate this - Winthorn House. Red Route is a slightly longer route however the estimated carbon cost embedded in the materials required is similar to that of Blue Route.	Neutral	Blue Route requires two residential demolitions - Winthorn, and Dunelm House, both residential properties. Although a detailed calculation has not been undertaken the demolitions are not of a scale to materially affect the waste calculations.
	Operation	No significant differences in impact from a materials and waste perspective.	Neutral	There is no evidence to suggest that Material Assets and Waste is a material factor in determining the Current Preferred Alignment for this scheme.
Cultural Heritage	Construction	<u>Assets adversely affected by Blue Route:</u> Kirkby Thore Roman Fort and Associated Vicus Roman Camp 350m east of Redlands Bank - This impact may remain significant after mitigation Sleastonhowe Lane Enclosure and Dyke Keld Sike Crackenthorpe Dyke <u>Assets adversely affected by Red Route:</u> Sleastonhow Lane Enclosure and Dyke Long Marton Mound Enclosure Troutbeck earthworks and Brandcrook Enclosure Some environmental mitigation would be intrusive	Better	Red Route has less impact on designated heritage assets compared to Blue Route, especially after mitigation has been implemented. Red Route sits outside of the scheduled monument designated land.
	Operation	<u>Assets beneficially affected by Blue Route:</u> Kirkby Thore Roman Fort and Associated Vicus Roman Camp 350m east of Redlands Bank <u>Assets are beneficially affected by Red Route:</u> Kirkby Thore Roman Fort and Associated Vicus Roman Camp 350m east of Redlands Bank	Neutral	Both Blue and Red alternative will have operational benefits on two heritage assets due to reduction in traffic noise and visibility affecting the setting of these assets
Climate	Construction	Green house gas modelling has indicated the Red Route alternative has the potential to lead to approximately 613,835 tCO2e.	Worse	The Red Route alternative gives rise to an increased GHG release compared to the Blue (602,166 tCO2e).
	Operation	Unlikely to be any significant differences in the operational climate impacts between the Red and Blue Route alternatives.	Neutral	There is no evidence to suggest that Climate during the operational phase is a material factor in determining the Current Preferred Alignment for this scheme.
Traffic and Economic				
Traffic Volume		No significant differences.	Neutral	There is no evidence to suggest that Traffic Volume is a material factor in determining the Current Preferred Alignment for this scheme.
Journey Time Savings		No significant differences.	Neutral	There is no evidence to suggest that Journey time savings is a material factor in determining the Current Preferred Alignment for this scheme.
Safety		No significant differences.	Neutral	There is no evidence to suggest that Safety is a material factor in determining the Current Preferred Alignment for this scheme.
Economy (not modelled with TUBA)		No significant differences.	Neutral	There is no evidence to suggest that Economy is a material factor in determining the Current Preferred Alignment for this scheme.
Accessibility including WCH Opportunities		No significant differences.	Neutral	There is no evidence to suggest that Accessibility including WCH Opportunities are a material factor in determining the Current Preferred Alignment for this scheme.
Stakeholder				
Land Take		Will affect landowners who were not previously affected by the Blue Route. Route is closer to British Gypsum mine workings and is longer than Blue Route.	Worse	Red Route has potential for more objections as very different to original preferred route. Affects a number of previously unaffected landowners.
Residential		Greater effect on a single landowner than Blue Route. Takes route further away from Kirkby Thore but closer to Long Marton.	Worse	Feedback has been received via CLG that Long Marton residents are unhappy with the prospect of route moving closer to the village.

Commercial	Closer to British Gypsum mine workings and has greater potential to affect future operations at the mine.	Worse	Route is close to boundary of mineral working site; possible that some encroachment may occur. Route may also affect future aspirations for development of the mineral working site.
Recreation and Leisure	No significant differences.	Neutral	There is no evidence to suggest that Recreation and Leisure is a material factor in determining the Current Preferred Alignment for this scheme.
Wider Community Issues	Moves the route closer to Long Marton by approximately 750m. Results in a circa 18m height structure which will have detrimental effect on views across the valley and the setting.	Worse	Feedback to date indicates that a route closer to Long Marton would be objected to be residents and Parish Council. Visual intrusion of new structure is also an issue.
	Conclusion		
	Although the Blue and Red Route share many similarities it is clear that by moving further to the east a number of additional landowners would be affected and the effects of the route on Long Marton would be increased. Additionally the crossing of Trout Beck although shorter would result in a structure which would be much more visible within the landscape due to its increased height and the way the land falls in this area. The assessment demonstrates that on balance the Blue Route performs better than the Red Route.		

Note: policy considerations are covered as part of the Route Development Report.

A.2 Temple Sowerby to Appleby - Blue Route versus Orange Route sifting matrix

Alternative Option Name	**Temple Sowerby to Appleby - Blue Route Vs Orange Route**		
Description	Assessment of Blue Route vs Orange Route alignment alternatives for the West and Central sections of the Temple Sowerby to Appleby scheme.		
Drawing (name and link)			
Drawing Image	Alternative - Orange Route		Base - Blue Route
			
Reason for option consideration	The Orange Route alignment was developed as an alternative which crossed the Trout Beck at a point where it was already constrained by the existing A66 Bridge at Bridge End. It was considered that this may have an overall lesser effect on the River Eden Special Area of Conservation (SAC) as it already affected by the existing infrastructure in the area. By moving to a more online solution the new A66 is kept within an already developed corridor. However, this route alignment alternative would have more detrimental effects on the cultural heritage sites that are located within the existing A66 corridor.		
Assessment outcome (State the result of the assessment)	The assessment demonstrates that the Blue Route alignment alternative is preferred over the Orange Route alignment. The Blue Route alignment performs better in a number of different areas most notably with regard to drainage and hydrology, cultural heritage and effects on stakeholders.		

Discipline	**Impacts**	**Comparison of Orange Route with base Blue Route**	**Justification**
Engineering			
Highways - Standards Compliance	The Orange Route alignment main line has better quality geometry overall. It has fewer horizontal relaxations and the ones it does have are generally less severe than the Orange Route alignment main line. Vertically, the Orange Route alignment alternative does not have the long steep climb that the Orange Route has and again has fewer relaxations. There are three departures from standard, in relation to visibility, required for both the Blue and Orange Route alignments. The side roads alignments for the Orange Route are also to a higher geometrical standard. Generally, they tie into longer lengths of side road, thus providing more space and opportunity to include alignments to the required standards, with better tie-ins to the existing road alignments. The side roads are also there to serve HGV's, so high standard roads are essential and advisable. In contrast, the side roads on the Orange Route are required to reconnect to existing substandard geometry roads, therefore a number of departures from standard will be required to ensure the new sections are in keeping with the existing and do not cause drivers to increase speeds in locations where it is not safe to do so.	Better	The Orange Route alignment has better geometry and requires fewer relaxations and departures from standard than the Blue Route alignment. In addition the existing side roads for the Orange Route are constructed to a better standard to connect into.
Utilities	Statutory undertakers C2 utility information is not complete at this time. Based on current information, the Orange Route will cross the existing A66 in more places and is likely to have a greater impact on Openreach and water supply assets. However it will have a reduced impact on the public and private infrastructure that serves the British Gypsum plant and less impact on the gas pipelines and overhead power to the north east of Kirkby Thore.	Neutral	Based on currently available information there is no evidence to suggest that utilities are a material factor in determining the Current Preferred Alignment for this scheme.
Geotechnics and Earthworks	Orange Route requires less earthworks to construct and would not have any potential impact on the British Gypsum mine workings. Blue Route is a longer and carries a risk of being impacted by old mine workings.	Better	Orange Route is shorter in length and thus requires less earthworks and is located away from any mineral extraction sites.
Structures	Flood modelling results received so far indicate that a longer structure is likely to be required for the Orange Route than was first envisaged (350m vs 110m). This would lead to a similar length structure being required for both the Blue and the Orange Routes.	Neutral	This has been scored as neutral given that the anticipated lengths and therefore costs of the Trout Beck crossing will be similar for both route alignments.
Drainage and Hydrology	Both route alignments can be adequacy drained to nearby watercourse and suitable water quality treatment can be provided. The Orange Route alignment has a greater impact on the 100 year + CC flood plain and will require mitigation measures to be undertaken that the Blue Route alignment will not. Both alignments will span the full width of the 100 year + Climate change Trout Beck floodplain with a structure and have minimal impact on flood risk.	Worse	The Orange Route alignment has a greater impact on the 100 year + CC flood plain and will require mitigation measures that the Orange Route alignment does not. Flood risk impact is minimal for both alignment options.
Construction Design Management (CDM)	Both options are similar with the complexity of the construction works required so CDM implications are neutral.	Neutral	There is no evidence to suggest that CDM requirements are a material factor in determining the Current Preferred Alignment for this scheme.

Construction Cost		Based on main line models only, the Cut / Fill requirements of the Orange Route alignment are significantly less than the Orange Route alignment. Orange Route (Cut – 331,837m3, Fill – 594,699m3) Orange Route (Cut – 1,392,462m3, Fill – 494,709m3). Orange Route will impact Bridge End Farm requiring additional land purchase and demolition of the existing buildings.	Neutral	Orange Route requires significantly less earthworks to construct the main line but would require increased land costs due to the need to purchase and demolish Bridge End Farm.
Buildability		Orange Route is much closer to the existing A66 and it will be a significant challenge to keep the A66 running during construction, requiring a greater amount of traffic management than the Orange Route.	Worse	The off line nature of the Blue Route means that majority can be built away from the existing A66.
Environment				
Biodiversity	Construction	Designated Sites: Crosses the Trout Beck (River Eden SAC) 50m south of existing A66; Temple Sowerby Moss SSSI Ancient Woodland and Veteran Trees: Losses and disturbance to Chapel Wood Ancient Woodland (AW). Section 41 Priority Habitats: rivers and streams (River Eden at Trout Beck just before confluence with the River Eden, loss and shading impacts, pollution potential) affected. Additional impacts to lowland fen and wet woodland (Temple Sowerby SSSI) habitats of loss and shading are also anticipated. Protected/notable species - 3 structures and 11 trees with moderate to high bat roost potential being lost. Red squirrel habitat loss, Badger squirrel loss. Otter habitat loss and disturbance (may be less so due to proximity of exist dairy business). Loss of water vole habitat. Both options have the potential to impact aquatic species during construction, including the qualifying species of the SAC (Atlantic salmon, bullhead, lamprey and white clawed crayfish) as both crossing locations provide optimal habitat and a migration route. Habitat loss/disturbance through shading of the river is consistent across both routes. The Orange Route has an additional crossing of a ditch (unnamed tributary of Trout Beck) but this considered to be of low conservation value and not significant to the assessment.	Neutral	Similar impacts to the Trout Beck tributary which forms a part of the River Eden SAC as the Blue alternative - whilst Orange Route crosses at an already constrained point, the Orange Route has been designed in such a way that the intention is not to constrain the floodplain or the watercourse itself. Similarly with the Chapel Hill AW. There are greater impact to the Temple Sowerby Moss SSSI as part of Orange Route compared to Orange Route. There are more structures with medium to high bat roost potential are being lost as a result of the Orange Route alternative. Orange Route is predominantly online, resulting in lesser impact to surrounding habitats. Construction impacts to freshwater species are considered to be very similar.
	Operation	Designated Sites: Crosses the Trout Beck (River Eden SAC) 50m south of existing A66; Temple Sowerby Moss SSSI Ancient Woodland and Veteran Trees: Losses and disturbance to Chapel Wood AW. Section 41 . Priority Habitats: rivers and streams (River Eden at Trout Beck just before confluence with the River Eden, loss and shading impacts, pollution potential) affected. Additional impacts to lowland fen and wet woodland (Temple Sowerby SSSI) habitats of loss and shading are also anticipated. Protected/notable species - 18 potential bat crossing points affected. Permanent impact of increased road related disturbance and potential risk to water quality to watercourse Detailed fluvial geomorphology modelling is being undertaken to assess the likely impact of the Orange, Blue and Red Routes on river processes (erosion, deposition, sediment transport etc.) and impact to the SAC (this is currently pending). This modelling will provide evidence that one route alternative is preferred in terms of operations phase impacts on fluvial geomorphological process. However at this stage impact of both route alternatives are considered likely to be similar. The Orange Route would likely result in potentially significant water quality improvements (and indirect benefits for freshwater ecology) during operation through the removal of diffuse and point source pollution sources associated with Bridge End Farm, which would be lost.	Neutral	Similar impacts to the Trout Beck tributary which forms a part of the River Eden SAC as the Blue Route alternative - whilst Orange Route crosses at an already constrained point, the Orange Route has been designed in such a way that the intention is not to constrain the floodplain or the watercourse itself. Similarly with the Chapel Hill AW. There are more structures with medium to high bat roost potential are being lost as a result of the Orange Route alternative, however fewer crossing points affected. Potential operations phase impacts on fluvial geomorphology as a result of each route alternative is currently unknown (modelling is pending). Potentially significant water quality improvements in the SAC associated with the removal of Bridge End Farm under the Orange Route alternative.
Road Drainage and Water Environment	Construction	Requires the crossing of a watercourse which forms a part of the River Eden SAC.	Neutral	Similar construction requirements, crossing SAC. Slightly more interaction with the River Eden itself in high flood event. The Blue Route avoids most of the proposed and existing Gypsum mineworkings but the realignment of main street and its connection to the new A66 does pass over them. We are looking to minimise this as much as possible with our design but it cannot be avoided completely . The rest of the route avoids the primary deposits of gypsum but there is a risk that small pockets of gypsum could be encountered during construction. Similar water course crossings. On balance these potential impacts would be considered equal.
	Operation	There is risk of impacts to water quality as a result of road run off.	Neutral	Similar number of watercourse crossings.
Geology, Soils, Contaminated Land and Groundwater	Construction	Land take required within ALC 2, 3a, 3b. Land take required from soils supporting SAC or SSSI. Exposure of contaminated soil sources that may impact on human health, principal aquifers.	Neutral	There is no evidence to suggest that Geology, soils, contaminated land and groundwater are a material factor in determining the Current Preferred Alignment for this scheme.

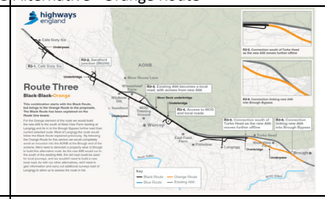
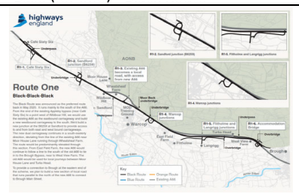
	Operation	Operationally the potential impacts will be similar between route alternatives.	Neutral	There is no evidence to suggest that Geology, soils, contaminated land and groundwater are a material factor in determining the Current Preferred Alignment for this scheme.
Noise and Vibration	Construction	Although a detailed assessment of construction noise has not been undertaken, assumptions of broad construction activities have been made in order to broadly determine where there is risk of significant impacts.	Neutral	Although a detailed assessment of construction noise has not been undertaken, Construction activities assumed to be broadly the same between Blue and Orange therefore broad impacts will be the same and this is therefore not deemed to be a material factor in determining the Current Preferred Alignment for this scheme.
	Operation	<u>Orange Route Alternative:</u> 20 residential receptors predicted to experience significant adverse effects 61 residential receptors predicted to experience significant beneficial effects 3 non-residential receptors predicted to experience significant adverse effects 4 non-residential receptors predicted to experience significant beneficial effects <u>Blue Route Alternative:</u> 256 residential receptors predicted to experience significant adverse effects 124 residential receptors predicted to experience significant beneficial effects 4 non-residential receptors predicted to experience significant adverse effects 8 non-residential receptors predicted to experience significant beneficial effects	Better	Orange Route has overall fewer significant effects than Blue Route and is therefore preferred.
Landscape and Visual	Construction	Similar construction between all route alternatives.	Neutral	There is no evidence to suggest that Landscape and visual effects during the construction phase are a material factor in determining the Current Preferred Alignment for this scheme.
	Operation	Less of an impact to the north west and to the east of Kirkby Thore in terms of loss of field boundaries, field patterns, loss of trees etc. as the new link roads are narrower than the proposed bypass and a longer online section. Greater impact on Priest lane and its surroundings, potential impact on the views from Priest lane towards the AONB to the north. Link roads create more infrastructure to the west of Piper Lane. Impacts on views of open countryside from Piper Lane looking west. Impacts on residents between Spittals Farm and Bridge End Farm will be greater compared to Orange Route alternative.	Better	Assessment work indicates that Orange Route would have a lesser impact on Landscape and less visual intrusion than the Orange Route. Maintaining the route along the existing A66 corridor is beneficial in landscape and visual terms.
Population and Human Health	Construction	Based on draft DCO boundary: Blue Route requires direct acquisition and demolition of two residential receptors to accommodate the scheme. Blue Route potentially requires land take from an area of common land, however further design review will be undertaken to seek retention of this land and therefore, this is not deemed to be significant. Blue Route potentially requires land that the Appleby Horse Fair uses annually, however further design review will be undertaken to seek retention of this land and therefore it is not deemed to be a significant effect. Based on draft DCO boundary: Orange Route requires direct acquisition and demolition of one residential receptor to accommodate the scheme. Orange Route requires approximately 30% of a housing allocation. Orange Route potentially requires a portion of land take from Acorn Bank National Trust site, however further design review to be undertaken to seek retention of this land and therefore it is not deemed significant Orange Route potentially requires land take from an area of common land, however further design review will be undertaken to seek retention of this land and therefore, this is not deemed to be significant. Orange Route potentially requires land take from a recreational ground (Piper Lane), however further design review will be undertaken to seek retention of this land and therefore, this is not deemed to be significant.	Worse	Potential requirement for land take from a housing allocation makes the Orange Route the less preferable of the alternatives.
	Operation	From a Human Health perspective as per the Noise and Vibration assessment compared to the blue option the orange option has: - fewer residential receptors at risk of experiencing adverse noise impact - less receptors expected to experience a beneficial effect from noise	Neutral	The impacts are assessed as neutral as although fewer receptors are at risk of experiencing adverse noise impact there are a greater number of properties experiencing a beneficial effect with regard to the Blue Route

Air Quality	Construction	No material differences between these alternatives identified.	Neutral	No material differences between these alternatives identified.
	Operation	<u>Blue Route alternative:</u> Whilst it is likely that a number of sensitive receptors in close proximity to the Blue Alternative will experience a deterioration in air quality compared to the existing situation, no receptors are predicted to experience any significant adverse effects or pollutant concentrations above the AQO <u>Orange Route alternative:</u> It is likely that a number of sensitive receptors in close proximity to the Orange Route will experience changes in air quality (both positive and negative due to the shifting alignment), no receptors are predicted to experience any significant adverse effects or pollutant concentrations above the AQO.	Neutral	As no receptors are expected to experience any significant adverse effects or pollutant concentrations above the AQO for either the Blue or the Orange Route then this has been assessed as neutral.
Material Assets and Waste	Construction	One demolition would be required to facilitate this - Bridge End Farm. As an online upgrade, the carbon cost of materials is less than for the offline alternatives (155,437 tCO2e for Orange Route compared to 569,065 tCO2e for Blue Route).	Better	Blue Route requires two residential demolitions - Winthorn, and Dunelm House, both residential properties. Although a detailed calculation has not been undertaken the demolitions are not of a scale to materially affect the waste calculations.
	Operation	No significant differences in impact from a materials and waste perspective.	Neutral	There is no evidence to suggest that Material Assets and Waste during the operations phase are a material factor in determining the Current Preferred Alignment for this scheme.
Cultural Heritage	Construction	<u>Assets adversely affected by Blue Route:</u> Kirkby Thore Roman Fort and Associated Vicus Roman Camp 350m east of Redlands Bank - this impact may remain significant after mitigation Sleastonhowe Lane Enclosure and Dyke Keld Sike Crackenthorpe Dyke <u>Assets adversely affected by Orange Route:</u> Kirkby Thore Roman Fort and Associated Vicus - this impact may remain significant after mitigation Roman Camp 350m east of Redlands Bank - this impact may remain significant after mitigation Crackenthorpe Dyke Roman roads - The Street, Maiden Way and Borrowbridge to Kirkby Thore St Giles Chapel Kirkby Thore Station (site of) Possible Romano-British cemetery site	Worse	There are more heritage assets that would be affected by the construction of the Blue Route alternative compared to the Orange Route. Due to the longer offline construction of the Blue Route alignment there is a greater potential for encountering undiscovered archaeology, this does not outweigh the impact to numerous known and designated cultural heritage assets.
	Operation	<u>Assets beneficially affected by Blue Route:</u> Kirkby Thore Roman Fort and Associated Vicus Roman Camp 350m east of Redlands Bank <u>Assets adversely affected by Orange Route:</u> Kirkby Thore Roman Fort and Associated Vicus - this impact may remain significant after mitigation Roman Camp 350m east of Redlands Bank - this impact may remain significant after mitigation	Worse	Orange Route will continue to adversely impact on two cultural heritage assets in operation, while the Blue Route alternative will have operational benefits on two heritage assets due to reduction in traffic noise and visibility affecting the setting of these assets.
Climate	Construction	Green house gas modelling has indicated the Orange Route has the potential to lead to approximately 177,289 tCO2e. New crossing of Trout Beck would have a similar length to that required for the Blue Route. Orange route is however approximately 1km shorter than the Blue Route meaning less material will be required during construction.	Better	The Orange Route gives rise to a reduced GHG release compared to the Blue Route (602,166 tCO2e).
	Operation	Unlikely to be any significant differences in the operational climate impacts between the Orange and Blue Route alternatives.	Neutral	The impacts would be the same as the Blue Route.
Traffic and Economic				
Traffic Volume		The Orange Route leads to a marginal increase (circa 300 AADT vpd or around 1%) in flow on the A66 mainline at Kirkby Thore.	Better	Traffic modelling work indicates an increase.
Journey Time Savings		The Orange Route saves around 40 seconds due to its shorter length (280 secs v 320 secs).	Better	Orange Route is shorter in length.
Safety		No significant differences in impact from a safety perspective.	Neutral	There is no evidence to suggest that safety is a material factor in determining the Current Preferred Alignment for this scheme.
Economy (not modelled with TUBA)		Due to traffic flow increases and journey time savings, a small increase in Traffic Economic Efficiency Benefit (£15 million) has been identified.	Better	Modelling work has identified increased benefits associated with Orange Route.

Accessibility including WCH Opportunities	Both routes will ensure that any severed Public Rights of Way (PRoW) are reconnected. Grade separated crossings will be used and length of detrunked A66 which will be same for both options provides local access.	Neutral	There is no evidence to suggest that Accessibility is a material factor in determining the Current Preferred Alignment for this scheme.
Stakeholder			
Land Take	Orange Route affects a number of landowners who were previously unaffected.	Worse	Additional Landowners affected by Orange Route.
Residential	Demolition of Bridge End Farm. Route is closer to a number of properties.	Worse	Demolition required.
Commercial	The Orange Route will have a greater effect on British Gypsum as junction at Main Street is removed and HGVs will need to travel further to gain access. Businesses along Orange Route effected including Bridge End Farm, Bridge Inn and Low Moor Caravan Park.	Worse	Larger negative effects on a number of businesses along the Orange Route.
Recreation and Leisure	No significant impacts.	Neutral	There is no evidence to suggest that Recreation and Leisure is a material factor in determining the Current Preferred Alignment for this scheme.
Wider Community Issues	No significant impacts.	Neutral	There is no evidence to suggest that Wider Community issues are a material factor in determining the Current Preferred Alignment for this scheme.
	Conclusion		
	The assessment demonstrates that the Blue Route alignment alternative is preferred over the Orange Route alignment. The Blue Route alignment performs better in a number of different areas most notably with regard to drainage and hydrology, cultural heritage and effects on stakeholders. Given the impact the Orange Route would have on the Kirkby Thore Roman Fort and Associated Vicus Scheduled Ancient Monument, would be a need to demonstrate exceptional circumstances in order to put forward the Orange Route alternative for examination. This would require a case for the scheme to be made that potential substantial harm or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm.		

Note: policy considerations are covered as part of the Route Development Report.

A.3 Appleby to Brough (Warcop) (Eastern Section) - Black Route versus Orange Route sifting matrix

Alternative route Name	**Appleby to Brough - Eastern Section - Black Route Vs Orange Route**
Description	Assessment of Black Route vs Orange Route for the eastern section of the Appleby to Brough scheme. The Orange Route seeks to avoid any direct impact on the Area of Outstanding Natural Beauty (AONB) and takes the new A66 dual carriageway from a point near to Turks Head on an alternative alignment to the south of West View Farm and connects back into the existing A66 dual carriageway near to Musgrave Lane overbridge. The Orange Route will allow the de-trunked A66 to become the local road connection to Brough Main Street and will allow the existing north and south movements from properties on the south side of the old A66 to be maintained. The Orange Route will require the acquisition of one residential property and will impact West View Farm considerably. In discussion with local stakeholders, including landowners, Parish Councils and Statutory Bodies this route has limited support. However, it will be taken forward to Statutory Consultation in Autumn 2021 as alternative route for the eastern section of the scheme.
Drawing (name and link)	
Drawing Image	Alternative - Orange Route  Base (for info) - Black Route 
Reason for route consideration	The Black Route was designed to remain outside the AONB as much as possible, however through design development it has become apparent that the eastern tie-in cannot be constructed and local access cannot be maintained without some construction being carried out within the AONB. The setting impact on the AONB of a new route to the south of the existing A66 has also been considered further at this stage. This work has led to a review of the route alignment to determine whether there are alternatives that either remain completely outside the AONB, thus avoiding any direct impact, and that could minimise impact on the setting impact on the AONB as a result of the scheme.
Assessment outcome (State the result of the assessment)	The Black Route is preferred over the Orange Route. The Black Route is deemed to be better than the Orange Route in 10 of the discipline areas assessed, worse in only 3 areas and Neutral in the remaining 25 areas. The assessment demonstrates there are detrimental effects on the environment, landscape and recreational opportunities associated with the Orange Route (wholly outside the AoNB), which in combination outweigh any positive impacts for these routes (when compared to the routes with some incursion in the AONB). These considerations in combination provide the basis of the exceptional circumstances for development of the routes within the AONB.

Discipline	**Impacts**	**Comparison of Orange Route with base Black Route**	**Justification**
Engineering			
Highways - Standards Compliance	Both the Black and Orange Routes can be constructed in accordance with the current design standards.	Neutral	There is no evidence to suggest that Highways Standards compliance is a material factor in determining the Current Preferred Alignment for this scheme.
Utilities	Both the Black and Orange Routes can be constructed without major disruption to any Statutory Undertakers utilities.	Neutral	There is no evidence to suggest that utilities is a material factor in determining the Current Preferred Alignment for this scheme.
Geotechnics and Earthworks	There will be increased earthworks by adopting the Orange Route as a large embankment will be required to take the route alignment to the south of West View Farm and enable construction of a structure over Low Gill Beck and an underpass under new A66 to accommodate livestock, agricultural vehicles and WCH users.	Worse	Earthworks requirement is less for the Black Route.
Structures	Greater structures complexity and size. A large structure over Low Gill Beck is required to span the beck and floodplain compared to the provision of simple accommodation structures for the Black Route.	Worse	Within Black Route two structures are required (farm underpass and accommodation overbridge) Within Orange Route two structures are required (and farm underpass and Low Gill Beck overbridge) However a larger structure is required over Low Gill Beck to span the beck and floodplain.
Drainage and Hydrology	Both routes require a number of drainage attenuation ponds to be constructed, impact is considered Neutral.	Neutral	There is no evidence to suggest that drainage is a material factor in determining the Current Preferred Alignment for this scheme.
Construction Design Management (CDM)	Both routes similar with the complexity of the construction works required so CDM implications are Neutral.	Neutral	There is no evidence to suggest that CDM is a material factor in determining the Current Preferred Alignment for this scheme.
Construction Cost	Increased cost impact. It is assumed that costs for the Orange Route will be greater as longer in length by approximately 500m. Additional earthworks will be required as well as the need for a larger structure to cross Low Gill Beck and floodplain. Land costs will also increase with Orange Route being longer in length.	Worse	There will be increased earthworks, increased land take and the need to import fill. A larger structure is required over Low Gill Beck to span beck and floodplain compared to culvert extension in Black Route. Increased length of new dual carriageway construction of approximately 500m to tie back into Brough Bypass by Musgrave Lane overbridge. Cost of acquiring Mains House and considerable impact on West View Dairy Farm.
Buildability	The Orange Route would be easier to build despite the increased structures complexity over the Low Gill Beck as it can be built "off line" keeping the old A66 open to traffic and only impacting road users to complete tie into Brough Bypass.	Better	The Black Route has more works adjacent to the old A66 with the construction of the new dual carriageway, local road, farm access and accommodation bridge which may result in increased road user impact, although not expected.

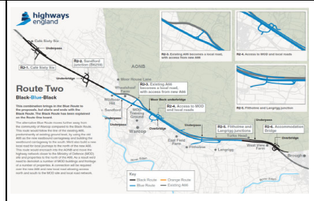
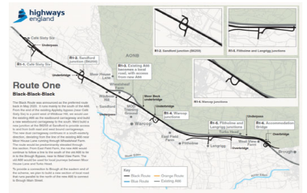
Environment				
Biodiversity	Construction	Designated Sites: North Pennine SPA and SAC is 255m and the River Eden SAC and River Eden tributaries SSSI are 700m south of this scheme. Appleby Fells SSSI is 1.5km north of the eastern end of this scheme and Hellbeck and Swindale Woods SAC and SSSIs are 520m north of this scheme. Sandford Mire CWS is 190m south of this scheme. Scheme passes to the south of the North Pennines Area of Outstanding Natural Beauty (AONB) Ancient Woodland and Veteran Trees: N/A Section 41 . Priority Habitats: Several watercourse crossing required. Habitat loss and damage as a result of scheme construction, including woodland. Protected/notable species - Potential loss of terrestrial habitat for great crested newt; potential loss of suitable habitat for barn owl; loss of a structure with bat roost potential; fragmentation of habitat suitable for badger; impact to highly suitable otter habitat on Lowgill Beck.	Worse	Construction impacts of the Orange Route will be largely similar to those of the Black Route with a number of exceptions which, on balance, make this alternative less preferred than the baseline including: - additional watercourse crossing of Lowgill Beck which will increase the potential for impacts to the watercourse. This watercourse is hydrologically linked to the River Eden to there is a risk to mobile species related to the SAC designation that may be present in the watercourse; - increased degradation of riparian habitat due to crossing of wide river corridor. - increased loss of woodland, reduced loss of a number of other priority habitats. - increased risk of impact to habitat with potential to support protected species such as barn owl, bat, otter, and badger.
	Operation	Orange Route will result in permanent loss of land and habitat fragmentation. Severance of corridors providing commuting routes for species. Shading impacts on watercourses as a result of new watercourse crossings. Anticipated increase in noise and light levels leading to disturbance of species. Increased mortality of some species due to Road Traffic Accidents.	Worse	Additional watercourse crossings compared to the Black Route increases the risk of impacts to the watercourses in the area and increased habitat fragmentation.
Road Drainage and Water Environment	Construction	The Black Route would result in an extension to the structure which crosses Low Gill Beck where it is already constrained by the A66. The Orange Route requires a new crossing of Lowgill Beck which leads to the potential for impacts to this watercourse as a result of potential constraint of the floodplain, and impacts of construction related run off affecting water quality. Alternative is located within Environment Agency Flood Zone 2 and 3, and within high and medium risk areas for pluvial flood risk. Watercourse crossings during construction may result in changing surface water flow rates, which may affect flood risk to downstream receptors; predominantly agricultural land. New crossing of Lowgill Beck may lead to impacts to water quality and hydromorphology. Construction activities in or in close proximity to watercourses pose a potential risk to water quality.	Worse	The Orange Route alternative requires a new crossing of a water course compared to the Black Route which would cross this water course at the point where it is already constrained.
	Operation	No major impacts assuming structures are designed appropriately to minimise impacting floodplains. However, the additional crossings of Lowgill Beck increase the potential for continued impacts to these watercourses, with risk of road run off affecting water quality.	Worse	Additional watercourse crossings compared to the Black Route increases the risk of impacts to the watercourses in the area and increased habitat fragmentation.
Geology, Soils, Contaminated Land and Groundwater	Construction	Orange Route alterative avoids the North Pennines UNESCO Global Geopark, the border of which follows that of the AONB. No known areas of contamination are present.	Better	Orange Route alternative sits to the south of the Geopark designated area and avoids any direct impact on it.
	Operation	Operationally the potential impacts will be similar between alternatives.	Neutral	There is no evidence to suggest that Geology Soils, Contaminated Land and groundwater during operation is a material factor in determining the Current Preferred Alignment for this scheme.
Noise and Vibration	Construction	Although a detailed assessment of construction noise has not been undertaken, assumptions around broad construction activities have been made in order to broadly determine where there is risk of significant impacts.	Neutral	Although a detailed assessment of construction noise has not been undertaken, construction activities assumed to be broadly the same between the Black and Orange Routes therefore broad impacts will be the same.
	Operation	75 residential receptors and 2 non-residential receptors expected to experience significant adverse impacts 9 residential and 1 non-residential receptors expected to experience a significant beneficial impact 31 Public Rights of Way (PRoWs) likely to experience adverse impacts 3 PRoWs likely to experience beneficial impacts	Worse	Compared to the Black Route, there are: - more residential receptors at risk of experiencing adverse noise impact - more receptors expected to experience a beneficial effect from noise - greater number of PRoWs being at risk of adverse noise impact, though there are also more PRoWs that may have beneficial impacts, there are fewer beneficial impacts than there are adverse. On balance, it is considered Black Route is preferred over the Orange Route as the number of receptors likely to experience an adverse impact outweighs the number expected to experience a beneficial impact.

Landscape and Visual	Construction	Landscape and Visual: For both the Orange and the Black Route construction will result in the loss of a woodland on either side of Lowgill Beck and loss of hedges and hedge trees. The Orange Route will lead to an alteration of part of a continuous small scale field pattern that extends south from the existing A66 contrasting with the large, regular fields in the AONB on the north side of the A66 which would be affected by the Black Route.	Neutral	Impacts are considered to be largely the same between Orange and Black Routes.
	Operation	<u>Landscape and Visual:</u> The Orange Route alternative will introduce a large structure and embankment into a small scale landscape. This will not be characteristic of the baseline and will result in permanent loss of trees, woodland and hedges and alteration of field pattern and size. There will also be considerable impacts on landscape character of the Broad Valleys sub-type. The Orange Route alternative will sever PRoW to the south of West View Farm and be a very noticeable feature in views from the PRoW network in this area and a notable influence on views from Brough Castle.	Worse	Overall the impacts are considered to be greater with the Orange Route alternative due to the scale of the offline section and the impacts on landscape character, setting of the AONB and impacts on visual amenity.
Population and Human Health	Construction	Based on indicative DCO boundary: The Black Route will not require any land take or demolitions of residential receptors. The Black Route will not effect any business receptors at the eastern extents of this scheme The Black Route will not require land take from any community assets. The Black Route will sever/interact with a lesser number of PRoW than the Orange Route The Black Route will require land take from a number of key land holdings Based on indicative DCO boundary: The Orange Route alternative will require land take and demolition of one residential receptor - Mains House. The Orange Route alternative will require almost all of Rowan House Housing Allocated Land. The Orange Route alternative will not effect any business receptors at the eastern extents of this scheme. The Orange Route alternative will not require land take from any community assets as the Black Route. The Orange Route alternative will sever/interact with a greater number of PRoW than the Black. The Orange Route alternative will require land take from a number of key land holdings including Heron Farm.	Worse	Comparatively, the Orange Route alternative will have a greater impact on the local population through additional land take of agricultural, commercial, and residential property, as well as the severance of PRoWs.
	Operation	Impacts assumed to be similar for both routes. There may be some impact on the Rowan House residential allocation.	Neutral	There is no evidence to suggest that Human Health and Population during operation is a material factor in determining the Current Preferred Alignment for this scheme.
Air Quality	Construction	Although works required closer to Brough in order to tie-in to existing A66, construction impacts assumed to be generally similar across the project.	Neutral	There is no evidence to suggest that Air Quality is a material factor in determining the Current Preferred Alignment for this scheme.
	Operation	Some sensitive receptors are likely to experience minor changes in air quality both positive and negative.	Neutral	There is no evidence to suggest that Air Quality is a material factor in determining the Current Preferred Alignment for this scheme.
Material Assets and Waste	Construction	The Orange Route requires the demolition of a residence.	Neutral	Although a detailed calculation has not been undertaken the demolitions are not of a scale to materially affect the waste calculations.
	Operation	No significant differences in impact from a materials and waste perspective.	Neutral	There is no evidence to suggest that Material assets and waste is a material factor in determining the Current Preferred Alignment for this scheme.
Cultural Heritage	Construction	No heritage features would be directly impacted by the Orange Route alternative.	Neutral	There is no evidence to suggest that Cultural Heritage is a material factor in determining the Current Preferred Alignment for this scheme.
	Operation	No heritage features would be directly impacted by the Orange Route alternative.	Neutral	There is no evidence to suggest that Cultural Heritage is a material factor in determining the Current Preferred Alignment for this scheme.
Climate	Construction	Green house gas modelling has indicated route alternatives utilising the Orange alternative has the potential to lead to increased green house gas emissions compared to route routes that do not utilise the Orange alternative , Black-Black-Orange (232,833 tCO2e) and Black-Blue-Orange (239,355).	Worse	The Orange Route gives rise to an increased GHG release compared to the Black Route. Black-Black-Black (205,094 tCO2e).

	Operation	Unlikely to be any significant differences in the operational climate impacts between the Orange and Black Route alternatives.	Neutral	The impacts would be the same as the Black Route.
Traffic and Economic				
Traffic Volume		No Significant differences.	Neutral	There is no evidence to suggest that traffic volume is a material factor in determining the Current Preferred Alignment for this scheme.
Journey Time Savings		Orange route is slightly longer than Black.	Worse	Orange route would involve a slightly longer journey time as route is longer
Safety		No Significant differences.	Neutral	There is no evidence to suggest that Safety is a material factor in determining the Current Preferred Alignment for this scheme.
Economy (not modelled with TUBA)		No Significant differences.	Neutral	There is no evidence to suggest that Economy is a material factor in determining the Current Preferred Alignment for this scheme.
Accessibility including WCH Opportunities		A number of rights of way are severed by Orange Route and blocked by Black Route, but diversions via underpasses and overbridges are included in both routes to ensure connectivity is maintained so Neutral impact.	Neutral	There is no evidence to suggest that Accessibility (including WCH Opportunities) is a material factor in determining the Current Preferred Alignment for this scheme.
Stakeholder				
Land Take		No land take from AONB in Orange Route compared to Black Route.	Better	Black Route results in minor encroachment into AONB
Residential		1 No. residential property (mains House) will need to beacquired and demolished in order to construct Orange Route.	Worse	No properties need to be acquired or demolished with the Black Route.
Commercial		Increased agricultural land take.	Worse	The increased land take from West View farm will affect future expansion plans and will affect farm productivity due to loss of productive land. This could result in a considerable blight claim.
Recreation and Leisure		A number of rights of way are severed by Orange Route and blocked by Black Route, but diversions via underpasses and overbridges in both routes ensure connectivity maintained so Neutral impact.	Neutral	There is no evidence to suggest that recreation and leisure is a material factor in determining the Current Preferred Alignment for this scheme.
Wider Community Issues		When discussing the Orange Route with local stakeholders, including landowners, Parish Council and Statutory Bodies opposition has been encountered.	Worse	Local opposition to the Orange Route.
	Conclusion			
	Black Route results in minor encroachment into AONB. Orange Route is completely outside AONB. Orange Route results in demolition of Mains House. No demolition associated with Black Route. Orange Route requires creation of a new route corridor south of the existing A66. This is deemed to have significant negative effects upon the setting of the AONB in this location and compares poorly in this regard with impact on setting in comparison to the Black Route. Orange Route results in additional agricultural land take. Embankment and larger structure over Low Gill Beck required for the Orange Route From meetings and discussions held to date there seems to be opposition to the Orange Route. The feedback received to date indicates that the Black Route is preferred particularly by affected landowners.			

Note: policy considerations are covered as part of the Route Development Report.

A.4 Appleby to Brough (Warcop) (Central Section) - Black Route versus Blue Route sifting matrix

Alternative Option Name	**Appleby to Brough - Central Section - Black Route Vs Blue Route**
Description	Assessment of Black Route vs Blue Route for the central section of the Appleby to Brough scheme.
Drawing (name and link)	Option 2 (Black-Blue-Black) GAs issued 12-08-21
Drawing Image	Alternative - Blue Route 
	Base (for info) - Black Route 
Reason for option consideration	In late December 2020, a letter was received from a landowner, proposing an alternative route for the new A66 dual carriageway. This proposal positioned it to the north of the existing A66, further encroaching into the Area of Outstanding Natural Beauty (AONB) and Ministry of Defence (MOD) land. Although this alternative proposed has considerably less impact on the AONB than the Warcop Parish Council Northern route, it would result in a direct impact on the AONB and residential properties in this location. It would also result in considerable disruption for the MOD and their training ranges. Some opposition was also raised by Warcop PC with regard to Black Route with regard to its proximity to properties to the south and the height of the proposed embankment which would be around 8m high. Since this proposal letter, the design team have considered the request to move the new A66 further north away from East Field Farm and Warcop village and have developed the alternative proposed Blue Route The concept of minor encroachment into AONB and relocation of MOD facilities to the north has been discussed with Natural England and the MOD. This has not been ruled out and so development of the Blue Route was undertaken as it will result in the route being at a lower level closer to the existing A66 and further away from both properties adjacent to the southern edge of the A66 and Warcop village.
Assessment outcome (State the result of the assessment)	The assessment demonstrates that the Blue Route is preferred over the Black Route. The assessment demonstrates that the Blue Route performs better in a number of areas such as flooding and noise and vibration. More widely, the assessment demonstrates there are detrimental effects on the environment, landscape and recreational opportunities associated with the Black Route (wholly outside the AoNB), which in combination outweigh any positive impacts for these routes (when compared to the routes with some incursion in the AONB). These considerations in combination provide the basis of the exceptional circumstances for development of the routes within the AONB.

Discipline	Impacts	Comparison of Blue Route with base Black Route	Justification
Engineering			
Highways - Standards Compliance	The Blue Route can be built in accordance with current design standards, similar with the Black Route. The westbound and eastbound junctions at Warcop have been designed with appropriate merges, diverges and connections to local roads that will allow the MOD Heavy Equipment Transporter (HET) access and egress from the training camp as well as from and to the new A66.	Neutral	Both routes have been designed to accommodate any identified vehicles that will use the route or the side road junctions including tank transporters and farm vehicles.
Utilities	Both the Black and Blue Routes can be constructed without major disruption to any Statutory Undertakers utilities. Within Blue Route works the electric transformer that serves the MOD compound and ranges will be impacted and need relocation as the new local road will be built over its current location.	Neutral	There is no evidence to suggest that utilities is a material factor in determining the Current Preferred Alignment for this scheme.
Geotechnics and Earthworks	Reduced Earthworks and material import. The Blue Route will be predominantly "at grade", at a level similar to existing ground with a potentially small embankment, less than 2m high, through the floodplain section adjacent to Warcop village. An overbridge with embankments will be required to take the local road and westbound junction connection up and over the new A66 to connect with the local road on the north side. The Black Route will require a larger embankment, circa 8m high. Initial earthworks calculations from the buildability Contractor suggest there is a scheme fill material deficit of 500,00m3 with the Black Route which is reduced to circa 150,000m3 with Blue Route. As well as reducing the amount of imported fill material required it will reduce vehicle movements during construction thus reducing congestion and disruption on A66 and local area.	Better	The Blue Route alternative allows a reduction in height of the embankment included in the Black Route. The Blue Route results in a significant decrease in the requirement for fill material from 500,00m3 to circa 150,000m3.
Geo-environmental	The Blue Route has more of an impact on the MOD facility with a significant risk of increased contamination in soil and groundwater likely to be encountered in the vicinity of Warcop depot and other MOD / agricultural land within the proposed land take area to the north of the existing A66. Presence of underground fuel storage tanks and maintenance workshops also pose a challenge to remove. Risk of UXO / munitions. presence to be investigated /confirmed with MOD records, surveys, etc.	Worse	The Blue Route will introduce a greater land take which is likely to be significantly impacted by hydrocarbons/ solvents / asbestos etc and other contaminants from many years of MOD service and refuelling activities that will require further investigation and remediation prior to construction works commencing. There is also a potential for significant volumes of contaminated soils requiring disposal / remediation off site and for contaminated groundwater to be present, again requiring remediation. Other undisclosed MOD activities on proposed area of land take (landfills/ made ground / dumps / UXO / munitions risk etc.
Structures	Additional structure required. In the Blue Route as we are reducing the embankment height closer to existing levels that reduces the height of the new structure over Moor Beck compared to Black Route, so we will not be able to put WCHs under the structure. An additional reduced height underpass for WCHs will be required to the west of Moor Beck.	Worse	Difference in required structures numbers and form. Black Route requires three structures Moor Beck bridge inc. WCH provision, Warcop underbridge and Gatehouse overbridge. Blue Route requires four structures, reduced height WCH underpass, Moor Beck bridge, Warcop overbridge and Flitholme underbridge.

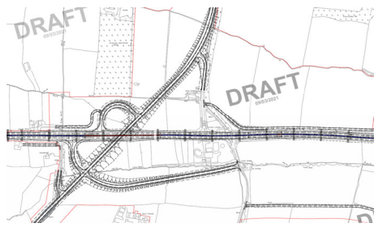
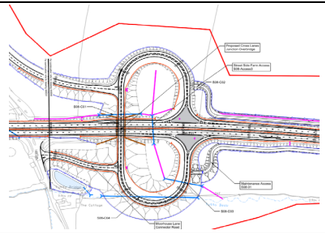
Drainage		Reduced impact on floodplain. Both routes are located in the floodplain east of Warcop village. The Blue Route is designed to be predominantly at grade past Warcop Village on a minimal embankment due to floodplain. This route will reduce loss of floodplain due to construction of larger embankments a spart of the Black Route. Blue Route will require additional drainage attenuation pond.	Better	In Black Route a larger embankment will be required, circa 8m high, resulting in greater loss of floodplain. One additional local crossing of Moor Beck will be required at Warcop Village (these has been reduced from two, as existing Moor beck Bridge can be demolished to reduce crossings in the area). Embankments will be required to provide access route to overbridge over new A66 and local road. Within Blue Route drainage design an additional drainage pond may be required increasing agricultural land take outside of floodplain.
Construction Design Management (CDM)		Both routes are similar with the complexity of the construction works required so CDM implications are Neutral.	Neutral	There is no evidence to suggest that CDM is a material factor in determining the Current Preferred Alignment for this scheme.
Construction Cost		It is assumed that costs will be similar. There will be reductions due to reduced earthworks, reduced land take and the need to import fill. However, additional structure required and in Blue Route the local road will require replacement along with MOD tank compound and filling station.	Neutral	Neutral cost impact as additional works required for Blue Route would be offset by reduction in earthworks required compared to Black Route.
Buildability		There may be a construction duration increase due to the need to rebuild the local road in new location prior to construction of new dual carriageway, as new dual carriageway built over old A66 compared to Black Route where old road is left in place and not disturbed. However construction duration of dual carriageway would be reduced without the need to import so much fill material to construct the embankments.	Neutral	There is no evidence to suggest that buildability is a material factor in determining the Current Preferred Alignment for this scheme.
Environment				
Biodiversity	Construction	Designated Sites: North Pennine SPA and SAC is 255m north and the River Eden SAC and River Eden tributaries SSSI are 700m south of this scheme. Appleby Fells SSSI is 1.5km north of the eastern end of this scheme and Hellbeck and Swindale Woods SAC and SSSIs are 520m north of this scheme. Sandford Mire CWS is 190m south of this scheme. Scheme passes to the south of the North Pennines Area of Outstanding Natural Beauty (AONB) Ancient Woodland and Veteran Trees: N/A Section 41 . Priority Habitats: Several watercourse crossing required - potential for pollution and contamination during construction. Habitat loss and damage as a result of scheme construction, including woodland. Protected/notable species - Potential loss of terrestrial habitat for great crested newt; potential loss of suitable habitat for barn owl.	Worse	Construction of the Blue Route will be largely similar to those of the Black with a number of exceptions which, on balance, make this alterative less preferred than the baseline including: - two additional watercourse crossings which will increase the potential for impacts to the watercourses. These watercourses are hydrologically linked to the River Eden which gives rise to the risk of encountering mobile species related to the SAC designated that may be affected by construction related impacts; - reduced impact on Sandford Mire CWS - significant increase loss of 500m of woodland, reduced loss of a number of other priority habitats and the protected species supported by them - greater impact to suitable barn owl habitat in the removal of vegetation and agricultural structures; - greater impact to GCN through loss of suitable terrestrial habitat - impact to habitat with potential to support otter - potentially reduced construction impact as a result of fewer ponds being required
	Operation	Permanent loss of land and habitat fragmentation. Severance of corridors providing commuting routes for species. Shading impacts on watercourses as a result of new watercourse crossings. Anticipated increase in noise and light levels leading to disturbance of species. Increased mortality of some species due to RTAs.	Worse	Additional watercourse crossings compared to the Black Route increases the risk of impacts to the watercourses in the area.
Road Drainage and Water Environment	Construction	As with Black Route, the Blue Route alternative is located within Environment Agency Flood Zone 2 and 3, and within high and medium risk areas for pluvial flood risk. Watercourse crossings during construction may result in changing surface water flow rates, which may affect flood risk to downstream receptors; predominantly agricultural land Construction activities in or in close proximity to watercourses pose a potential risk to water quality. New watercourse crossings may result in impact to hydro morphology.	Better	Blue Route sits more north of the floodplain of Cringle Beck reducing the risk of impacts on the floodplain. The increased distance of Blue Route from Cringle Beck allows for more opportunity to reduce the risk of construction related impacts to the watercourse. On balance, Blue Route is preferred and provides benefit.
	Operation	New crossings of Moor Beck and the confluence of Moor Beck and East Sike increases the potential for continued impacts to these watercourses as a result of road run off affecting water quality.	Better	There may be increased operational impacts to the hydro morphology of Moor Beck and East Sike, however the Blue alternative sits further from the Cringle Beck floodplain, reducing the potential for long term constraint of the floodplain.
Geology, Soils, Contaminated Land and Groundwater	Construction	Requires construction within the area designated as the North Pennines UNESCO Geopark No known areas of contaminated ground are affected by the Blue Alignment, however there is some risk of unknown contamination related to the MOD land.	Neutral	Potential impact on the North Pennines UNESCO Geopark designation are largely similar to the baseline as both require some construction within its designated area. Baseline does not impact on any known areas of contamination and so impact is considered the same across both.
	Operation	Risk of impact to the groundwater through continued operation and operation of road drainage.	Neutral	This impact is considered the same across the Blue and the Black Route alternatives.
Noise and Vibration	Construction	Although a detailed assessment of construction noise has not been undertaken, assumptions around broad construction activities have been made in order to broadly determine where there is risk of significant impacts.	Neutral	Although a detailed assessment of construction noise has not been undertaken, construction activities assumed to be broadly the same between Black and Blue Routes therefore broad impacts will be the same.
	Operation	42 residential receptors expected to experience significant adverse impacts 7 residential and 2 non-residential receptors expected to experience a significant beneficial impact 31 Public Rights of Way (PRoWs) are expected to experience significant adverse effects.	Better	Compared to the Black alternative, there are: - fewer residential receptors at risk of experiencing adverse noise impact - more receptors expected to experience a beneficial effect from noise - greater number of PRoWs being at risk of adverse noise impact

Landscape and Visual	Construction	<u>Landscape and Visual:</u> The Blue Route has a smaller embankment east of Wheat Sheaf Farm albeit still of notable scale and is largely at grade to Toddygill Bridge. There is a different junction arrangement at Fell Lane compared to the Black Route. Visual impacts will be less than for the Black Route alternative. <u>AONB:</u> The north side of the junction will involve removal of an MOD compound in the AONB to accommodate the junction and earthworks, resulting in direct impacts on the AONB. To the east of the junction there will be a side road that encroaches into the AONB and will result in the removal of the southern part of a woodland.	Neutral	While physical impacts on the AONB will be less with the Black Route, the impacts on setting will be considerable albeit in a limited area. Conversely while the impacts of the Blue Route on setting of the AONB will be less than those of the Black Route, the physical impacts will be greater and when impacts on setting are also considered the comparison with Black Route is neutral.
	Operation	<u>AONB:</u> The Blue Route will introduce a large embankment in the vicinity of Wheat Sheaf Farm which will affect the setting of the AONB in a limited area. Traffic using the scheme will be elevated above existing ground level and will impinge upon views towards the AONB from a more limited area than with Black Route. The new junction at Fell Lane will result in permanent impacts on the AONB albeit displacing the MOD compound. In addition to the mainline impacts on setting of the AONB and permanent change to landscape character there will be permanent impacts on the AONB from the new link road.	Neutral	On balance there are equally significant potential impacts as a result of both the Black and the Blue Routes, though they affect different receptors.
Population and Human Health	Construction	The Black Route will not require any land take from residential receptors. The Black Route will require land take from 2 business receptors - Taylor & Braithewaite, and Apple Tree Barn. The Black Route will require land take from community receptors - including the direct acquisition of Warcop Playing Field (MOD) and Great North Air Helipad. The Black Route will sever/interact with numerous PRoWs. The key agricultural land holdings (known at this time) are affected by all options The Blue Route will require land take from two residential properties - Toddygill Hall and East Field. The Blue Route will require land take from 2 business receptors - Taylor & Braithewaite, and Apple Tree Barn. The Blue Route will require land take from community receptors - including the direct acquisition of Warcop Playing Field (MOD) and Great North Air Helipad. This option requires more land take from MOD Training Establishment than the Black Route. The Blue Route will severe/interact with numerous PRoW The key agricultural land holdings (known at this time) are affected by all options	Worse	Compared to the Black Route, the Blue Route will have a greater impact on local residents including the requirement for land take from residential receptors which isn't required in the Black Route. Blue Route will also require additional land take from the MOD Training establishment compared to the Black Route.
	Operation	The requirement to relocate the MoD Playing Field and MoD Helipad to the south of the existing A66 would be required under both the blue and Black Routes. From a Human Health perspective as per the Noise and Vibration assessment compared to the black option the blue option has: - fewer residential receptors at risk of experiencing adverse noise impact - more receptors expected to experience a beneficial effect from noise - a greater number of PRoWs being at risk of adverse noise impact	Better	The requirement to relocate the MoD Playing Field and MoD Helipad to the south of the existing A66 would be required under both the blue and Black Routes. From a Human Health perspective it is considered that the Blue option is a preferred alternative to the Black as a result of the improvement as outlined in the Noise and Vibration assessment.
Air Quality	Construction	Whilst the route is situated further from the village of Warcop compared to the Black Route, construction impacts assumed to be generally similar across the project.	Neutral	There are unlikely to be differences in the impacts between Black and Blue Routes.
	Operation	Some sensitive receptors are likely to experience minor changes in air quality both positive and negative.	Neutral	There are unlikely to be differences in the impacts between Black and Blue Routes.
Material Assets and Waste	Construction	Two structures would need to be demolished in order to enable the construction of the Blue Route: an existing retaining wall, and Toddygill Bridge.	Neutral	The Black alternative also requires two structures to be demolished, including the retaining wall, though the Black Route alternative requires the demolition of an existing underpass. Although a detailed calculation has not been undertaken the demolitions are not of a scale to materially affect the waste calculations.
	Operation	No significant differences in impact from a materials assets and waste perspective.	Neutral	There is no evidence to suggest that Material assets and waste is a material factor in determining the Current Preferred Alignment for this scheme.
Cultural Heritage	Construction	There are direct impacts to an additional heritage feature known as Platform Earthworks to the north of the existing A66 just east of the existing MOD site as a result of the Blue Route.	Worse	Additional heritage features are potentially impacted as a result of the Blue Route compared to the Black Route.
	Operation	No difference	Neutral	There is no evidence to suggest that Cultural heritage is a material factor in determining the Current Preferred Alignment for this scheme.
Climate	Construction	Green house gas modelling has indicated route alternatives utilising the Blue alternative has the potential to lead to higher modelled green house gas emissions.	Neutral	Both of the modelled routes utilising the Blue Route have a higher modelled tCO2e than the Black Route however in the context of the scheme, this is not considered a significant enough difference to be of concern. This number will be refined as the scheme progresses and construction detail is finalised.
	Operation	Unlikely to be any significant differences in the operational climate impacts between the Blue and Black Routes	Neutral	Unlikely to be any significant differences in the operational climate impacts between the Blue and Black Routes.

Traffic and Economic			
Traffic Volume	No significant differences	Neutral	There is no evidence to suggest that Traffic Volume is a material factor in determining the Current Preferred Alignment for this scheme.
Journey Time Savings	No significant differences	Neutral	There is no evidence to suggest that Journey Time Savings is a material factor in determining the Current Preferred Alignment for this scheme.
Safety	Blue Route will be quicker to build and moves route away from Farm Buildings.	Better	Blue Route has positive impact.
Economy (not modelled with TUBA)	No significant differences	Neutral	There is no evidence to suggest that Economy is a material factor in determining the Current Preferred Alignment for this scheme.
Accessibility including WCH Opportunities	Underpass for Flitholme connected to old A66 provided, this results in removal of local road from Langrigg to Gatehouse and associated overbridge. WCH Provision is provided to ensure any severed footpaths are connected under the new A66. Footpath 372/020 is not stopped up. Bridleway diversion for 350/021 similar to proposed diversion for Black Route so neutral impact.	Better	In Black Route, in order to allow Flitholme residents to old A66 it was necessary to construct a "staggered crossroads" and new local road from Langrigg to Gatehouse on south side of new A66 with an overbridge to connect to old A66 resulting in increased land take and impact on residents at Langrigg (Inc. Thompsons). In Black Route, An existing footpath (372/020) past East Field Farm would be stopped up in Black Route, However, in Blue Route we can provide a diversion to Flitholme Lane so the new underpass can be used to gain access to routes north of the old A66.
Stakeholder			
Land Take	The Blue Route is on a much less embankment than the Black Route and agricultural land take will be reduced, but we encroach into the MOD land on north side to build local road and are required to replace the MOD tank and refuelling compound so overall land take will be similar. Majority of land lost is used for agriculture and is of lower grade and mainly grazing via tenancy	Neutral	Land take from MOD is by agreement, so land costs less, but costs of relocating compound will be borne by pro
Residential	Land take from 2 No residential properties (Toddygill Hall and East Field gate) on north side of A66 and these object to the Blue Route. Concerns have been raised by the owners and occupiers of East Field Farm regarding the location of the Brough Hill Fair into what is left of the MOD bivvy site due to proximity.	Worse	No land take from residential properties in Black Route (In the Black Route, the Bivvy site would not be big enough so would have to be relocated elsewhere).
Commercial	East Field Farm - Mr Heron promoted the suggestion of the new A66 moving further to the north away from the farm onto the north side of the existing for a number of issues ranging from biosecurity to vehicle accident strikes. The Blue Route moves the edge of the new A66 to approximately 30m from the edge of the farm buildings, an improvement on the circa 15m in the Black Route.	Better	Blue Route results in reduced effects on farm operations
Recreation and Leisure	In Black and Blue Routes the MOD playing field is lost. In both options we have agreed a replacement location with MOD onto another one of their fields, so this is a neutral impact.	Neutral	The existing MOD playing field location means it is wet and often not able to be used for periods. The existing is also adjacent to A66 and alternative location is closer to the village, shielded by Eden Valley Railway so will be a better location.
Wider Community Issues	Brough Hill Fair - Blue Route allows what is left of the MOD Bivvy site and existing Brough Hill Fair Field to be used as replacement site and provide and area to match the existing that is lost to the scheme. The Black Route does not allow this and an alternative site will be required to be found that is not near the existing and we do not yet have any landowner agreement for an alternative site away from it's current location. Langrigg junction (Thompsons and Hughes supported by Warcop PC) We are able to provide underpass for Flitholme connected to old A66 provided, this results in removal of local road from Langrigg to Gatehouse and associated overbridge and staggered crossroads at Langrigg.	Better	There is agreement from the MOD to use what is left of the Bivvy Site in combination with the remainder of the existing Fair site for the Blue Route. Discussions have taken place with a traveller representative, and as long as an appropriate amount of land good access and facilities can be provided in the relocated and reconfigured Brough Hill Fair site this should be workable, subject to further detail. By comparison the Black Route does not provide adequate land to accommodate the Brough Hill Fair in this location. Residents at Langrigg (Thompsons/Hughes) have objected to the Black Route which in order to allow Flitholme residents to old A66 it was necessary to construct a "staggered crossroads" and new local road from Langrigg to Gatehouse on south side of new A66 with an overbridge to connect to old A66 resulting in increased land take and impact on residents.
	Conclusion		
	Black Route results in A66 being on a circa 8m embankment through this section. Blue Route results in much lower embankment of around 2m with sections at grade. Black Route therefore results in greater loss of floodplain. Blue Route is further north and results in minor encroachments into AONB and MOD land. Blue Route moves route further away from Eastfield Farm and Warcop Village. Blue Route is better in terms of Noise and Vibration as more receptors are expected to experience a beneficial effect from noise. Blue Route results in extensive works to MOD assets including moving fuel filling station and tank storage sheds. Assets are amalgamated into one location rather than two and old dilapidated buildings are removed. Results in improved views post construction. Black Route maintains existing A66 as a local road. Blue Route requires construction of new local access road as A66 is used as eastbound carriageway. Blue Route results in need to take land from residential properties on the north side of the A66.		

Note: policy considerations are covered as part of the Route Development Report.

A.5 Cross Lanes Junction sifting matrix

Alternative Name	**Cross Lanes Alternative Layout**		
Description	Compact grade separated junction. Proposed link road connecting Rutherford Lane (south) and the B6277 Moorhouse Lane (north). Located west of the existing Cross Lanes priority junction. All movements are retained between the A66, Rutherford Lane and Moorhouse Lane. It should be noted that the alternative layout has been developed to concept stage and that the layout can be further refined. For the purposes of assessment, the alternative layout as shown has been directly compared to the baseline option.		
Drawing (name and link)	HE565627-AMY-HML-S08-SK-CH-000010.pdf		
Drawing Image	Alternative		baseline (for info)
			
Reason for option consideration	Local stakeholder concerns about potential for increased traffic on the B6277 due to the junction upgrade – this perceived increase in traffic was then validated by the traffic models. Addresses WCH focus group safety concerns which suggested that Rutherford lane to the B6277 is a popular route for walking/cycling and the route has to cross the existing A66 on a left right stagger with no formal crossing facilities. Potential to remove an existing central reserve opening and an additional two direct accesses onto the A66 at the scheme extents. Address landowner concerns on the impact on arable land - however acknowledging they and also additional landowners would be potentially impacted with an alternative option. Reduce the visual impact of the junction overbridge on nearby properties.		
Assessment outcome (State the result of the assessment)	Alternative option is preferred. The alternative option is favoured for traffic, safety and WCH improvements, whilst acknowledging that engineering and environmental impacts can be reduced through further design refinement of the layout. The alternative complies more favourably with Highways England Imperatives of Safety, Customer Service and delivering the Road Investment Strategy.		
Suggested improvements (State any possible improvements or variations of the option that may have resulted from the assessment)	Amend horizontal geometry to allow structure to be reduced in length and skew reduced. Refinement of footprint of the alternative option to reduce extent of earthworks. Refinement of landscape integration and design. Further work on access to Moorhouse Lane and Cross Lanes Organic Farm shop - proposal to move access road to the north of the shop.		
Discipline	**Impacts**	**Comparison with baseline option**	**Justification**
Engineering			
Highways - Standards Compliance	The alternative junction extends the scheme extents further to the west to facilitate the proposed link road connecting Rutherford Lane to the B6277. The alternate design improves links across the A66 corridor for all road users and prevents users from crossing the A66 at grade, improving driver safety. Access is provided to and from the A66 via new compact loop slip roads A crossroad is shown where the south compact connector road meets the proposed link road. This may introduce conflicts between road users particularly if a large proportion of the traffic flow on the minor road is a cross movement.	Better	The design standards for the alternative option are the same as the baseline option. No departures from standard are required. Two additional direct accesses are removed from the A66, re-routing to the alternative junction which improves the standard of the A66. A refinement of the proposed layout would see the cross roads on the south side of the junction replaced with a stagger junction. The alternative option has more conventional turning movements than the baseline option - in the baseline option the priority junction where the proposed B6277 meets the compact connector road may introduce conflicts between users with varying destinations. It is possible to refine the horizontal alignment of the link from Rutherford Lane to the B6277 Moorhouse Lane by incorporating desirable minimum horizontal curvature or including the link as part of the compact junction. This would allow the bridge to be straightened, reducing the skew, and resulting in a comparable length of structure as the baseline option. Relaxations in horizontal alignment can be introduced assuming stopping sight distance is not reduced. The baseline junction is as compact a footprint as it can be.
Utilities	The western junction option will impact on BT Openreach, water mains and overhead electricity cables	Neutral	The impact to services and diversion length are likely to be similar for both the baseline and alternative option.
Geotechnics and Earthworks	Historical borehole records available in the BGS website do not provide sufficient coverage to inform the assessment of ground conditions in this area, with only shallow information available for the current alignment of the A66. Depth to bedrock is unknown. **Earthworks** Alternative option bulk quantities Area – 58,080m2 Cut – 1,360m3 Fill – 130,510m3	Worse	In comparison to the baseline option, the alternative option will result in a larger quantum of earthworks, mostly additional fill (circa 29%), with a similar percentage increase in extent. Not enough information is yet available to assess the ground conditions at the alternative structure location. Preliminary ground investigation planned to inform the assessment of ground conditions and preliminary foundation design already undertaken. This doesn't cover the alternative junction location. The revised junction is also positioned outside the area covered in the PSSR. An additional desktop review of existing information needs to be undertaken. An increase in earthworks quantum and extent, the lack of GI data on geo hotspots or unfavourable ground conditions means the impact is considered worse compared to the baseline.

Structures	Clear span 55m (avoids the need to span over slip road) Construction fully online, (single carriageway in each direction is a significant constraint in terms of TM). Multiple span structure, closed likely to be most efficient. High skew span. Potential for further refinement to reduce impact.	Worse	The span is approximately 55m and on a high skew when compared to the baseline option of 40m on a 90deg crossing. Similar to the baseline option, the alternative option will require online construction. However there is more available carriageway space than the baseline option so traffic management not as constrained. Likely to be a multiple span structure, compared to a single span structure in the baseline option. The length and skew dictates that bearings are required to accommodate movement (rather than integral like the baseline option), therefore more onerous maintenance requirements.
Drainage and Hydrology	Due to the nature of the junction crossing numerous watercourses in multiple locations, one additional outfall has been identified below: - North section of Moorhouse Lane discharging into Manyfold Beck. It should also be noted that all outfalls may require retention basins in order to satisfy water quality requirements irrespective of storage requirements. This will become clearer once updated HEWRAT assessments have been undertaken. A similar number and total length of culverts are required when compared to the baseline. Significant increase in cut off ditches There is an increase in area of high surface water flood risk located along Tutta Beck, within the extents of the new junction when compared to the baseline.	Worse	<u>Outfall Location:</u> One additional outfall is required, which would be into Manyfold Beck to the north of the scheme due to the need for an additional attenuation pond to collect run-off from the realigned B6277 to the north of the A66. <u>Surface Water Storage Details:</u> One additional pond required to the northern extent of the realigned B6277. <u>Culverts:</u> A similar number and total length of culverts are required when compared to the baseline. <u>Cut off ditches:</u> Significant increase in cut off ditches (approx. 1km) to intercept overland flows around the Eastbound connector road, the Cross Lanes Link Road and the section of Moorhouse Lane located south of the A66 mainline. In the baseline option the northern side of A66 mainline and western side of Moorhouse Lane requires ditches to incept overland flows. It should be noted that this length of cut of drains could be reduced through design refinement and the relocation of the Moorhouse Lane link road <u>Flooding Impacts:</u> Both junction options are located in an area at risk from high surface water flooding which will potentially impact culvert design and may require additional flood mitigation measures. Considering the additional outfall, retention pond and increase in cut off drainage, the alternative is considered marginally worse.
Construction Design Management (CDM)	Potential increase in construction risk due to bridge structure span/skew and complexity. Increase in overall construction boundary, resulting in additional works and exposure to risk. Potential increase in maintenance requirements (structure bearings).	Worse	Structure clear span is greater than baseline option (approx. 15m) - however there is opportunity to reduce this length of structure similar to the baseline option. The overall footprint of the scheme is greater by approx. 29% which could be refined, reducing extent of earthworks. Additional ongoing maintenance associated with the structure bearings - however opportunity to reduce length and make structure integral. Operational benefits with the removal of direct accesses and left right stagger from Rutherford Lane to B6277 Moorhouse Lane.
Construction Cost	Increased construction costs associated with the additional cut/excavation, longer structure and larger footprint.	Worse	The additional larger footprint, structure length and total excavation would have a negative impact on costs, compared to the baseline.
Buildability	Reduction in fill requirements and large embankments. Increase in bridge structure span and complexity. Increased number of side road connection points.	Neutral	Increase in complexity due to from of structure (multi-span) associated with the alternative option Potential reduction in fill requirements of the approach roads, negating the need for larger embankments to form the junction Increase in bridge span noted however there is potential opportunity to reduce in length and straighten the structure resulting in similar level of complexity compared to the baseline option. More options with traffic management due to the increased carriageway width available (existing dual/ transition section) and construction durations would be similar to the baseline option. Sterile zones within the footprint could be utilised for basins or environmental mitigation however footprint could be refined. The alternative proposal has significantly more side roads to connect to existing road points Although the bridge length is longer, the embankments are slightly reduced in height and more options for traffic management, therefore the overall impact is considered Neutral compared to the Baseline.

Environment				
Biodiversity	Construction	Increased impact on watercourses. Increased impact on woodland priority habitat. Increased impact on Protected/notable species.	Worse	Designated Sites: No internationally designated sites within 2km of this option. One nationally designated site is located within 2km - Kilmond Scar SSSI located approximately 1.6km to the west. Marginally closer than baseline option. Ancient Woodland and Veteran Trees: Thorsgill Wood located approx. 0.7km north, Mill Wood approx. 1.3km south west, Jack Wood approx. 1.7km east. Neutral. Section 41 . Priority Habitats: Loss of approx. 190m of watercourse - As with the baseline, unnamed tributaries of Tutta beck are impacted by this option. Punder Gill, (2 crossing points) additional to the baseline. Also additional to the baseline option, impacts on Punder Gill due to construction of new road alongside approx. 530m of the watercourse. Additional watercourse Manyfold Back also impacted by this option. Direct loss of approximately 330m of hedgerow. Less than the baseline option. Direct loss of deciduous woodland priority habitat. Other habitats - additional loss of approximately 40m of watercourse at new crossing (NZ04831395) in comparison with the baseline option. Additional losses of woodland and trees in comparison with the baseline option. Protected/notable species - larger impacts associated with impacts on watercourses (otter, water vole, bats, fish, birds, invertebrates, macrophytes) and woodland/hedgerow species (bats, red squirrel, badger, breeding birds). A worsening in comparison with the baseline. Potential for amphibians including great crested newts due to waterbodies located approx. 330m to north. The proposed crossing of Punder Gill is 4km upstream of a known salmon river. A slight improvement on the baseline as the main junction is located upstream in comparison with the baseline, the Moorhouse land south link does however also impact the river. Due to larger footprint, the impact of the Alternative Option is considered worse on watercourses, trees and protected species than the Baseline Option.
	Operation	Increased permanent impacts associated with operation upon designated sites, ancient woodland and veteran trees, Section 41 priority habitats and other habitats. Increased impacts upon watercourses.	Worse	Permanent loss of land and habitat fragmentation, a minor worsening in comparison with the baseline option. Severance of corridors providing commuting routes for species, a minor worsening in comparison with the baseline option. Shading impacts on watercourses as a result of new watercourse crossings, a minor worsening in comparison with the baseline option. Mitigation required to include use of fencing/appropriate design to allow safe crossing and reduce risk of RTAs. All other impacts reflect those included in the baseline option: Anticipated increase in noise and light levels leading to disturbance of species. Increased mortality of some species due to RTAs. Overall minor worsening anticipated due to increased impacts on watercourses.
Road Drainage and Water Environment	Construction	Increased impact on surface water and ground water during construction	Worse	<u>Surface Water and Flood Risk:</u> As with the baseline option, although this option is located within EA Flood Zone 1, this is due to the watercourses crossed having catchments below 3km² and therefore not being included in flood zone modelling. It is likely there is a flood risk in close proximity to watercourses which are crossed (to be confirmed following hydraulic modelling). Watercourse crossings for this option include: - Unnamed Tributary of Punder Gill 8.1 crossed to the north of existing A66 - Unnamed Tributary of Manyfold Beck 8.1 crossed to the north of existing A66 - Punder Gill crossed by proposed cross road junction and embankment and on Rutherford Lane - Crossing of Unnamed Tributary of Tutta Beck 8.1 and Tutta Beck at Tutta Bridge - The Unnamed Tributary of Tutta Beck 8.1 and Unnamed Tributary of Tutta Beck 8.2 are crossed by the side road from Moorhouse Lane A minor worsening in comparison with the baseline option. Watercourse crossings during construction may result in changing surface water flow rates, which may affect flood risk to downstream receptors; predominantly agricultural land and a number of properties for the affected watercourses Construction activities in or in close proximity to watercourses pose a potential risk to water quality. This includes the proposed side road in close proximity, to the south at Tutta Beck Construction impacts associated with the proposed long culvert beneath an offline crossroad at Punder Gill would likely require compensation elsewhere in the form of culvert removal, potentially requiring additions to the development boundary. There may also be adverse impacts as a result of this culvert on biodiversity within the water environment. Due to a larger number of watercourse crossings, this option is considered to pose a greater construction risk to surface water elements than the baseline option. <u>Groundwater:</u> The alternative option has a larger footprint than the baseline option presenting an additional risk to groundwater quality during construction. alternative option lies closer to groundwater seepage approximately 35m northwest of the junction. There is potential for water quality impacts to the seepage during construction.

	Operation	Increased impact on surface water and ground water during operation	Worse	<u>Surface Water and Flood Risk:</u> The alternative option includes the following watercourse crossings: - Unnamed Tributary of Punder Gill 8.1 crossed to the north of existing A66 - Unnamed Tributary of Manyfold Beck 8.1 crossed to the north of existing A66 - Proposed cross road junction and embankment on Punder Gill - Additional crossing of Punder Gill on Rutherford Lane - Proposed side road in close proximity, to the south to Tutta Beck - Crossing of Unnamed Tributary of Tutta Beck 8.1 and Tutta Beck at Tutta Bridge - Side Road from Moorhouse Lane crosses Unnamed Tributary of Tutta Beck 8.1 and Unnamed Tributary of Tutta Beck 8.2 A minor worsening in comparison with the baseline option. Operational impacts associated with this scheme include those associated with the long culvert beneath an offline crossroad at Punder Gill. This would likely require compensation elsewhere in the form of culvert removal, potentially requiring additions to the development boundary. There may also be adverse impacts as a result of this culvert on biodiversity within the water environment. There is a potential that drainage pond locations for this alternative option may directly affect Punder Gill / Tutta Beck (as for the original option). The potential operational flood risk will be informed by hydraulic modelling of affected watercourses and which will inform flow rates and additional storage requirements. The greater increase in impermeable surfaces than for the original option will likely result in greater compensation / storage requirements. This option has a greater area of offline road and would likely therefore require additional treatment measures to be incorporated into the drainage system in order to pass the HEWRAT assessment. This would likely increasing space requirements for the drainage features. Due to additional watercourse crossings and a greater additional requirements for flood and surface water quality mitigation measures, this option is considered less favourable than the baseline option with respect to operational impacts on surface water. Lessening of watercourse crossings would be more favourable. Mitigation would be explored to ensure that environmental effects are acceptable. <u>Groundwater:</u> The alternative option has a larger footprint than the baseline alternative option is likely to have a larger reduction in recharge.
Geology, Soils, Contaminated Land and Groundwater	Construction	Increased loss of agricultural soil resource. Increased impacts upon contaminated land, surface water and groundwater during construction.	Worse	The alternative option does not present any additional contaminant risks during the construction phase. Potential sources highlighted under the baseline alternative option are still present under alternative option. The proposed northeast to southwest running embankment located to the northeast of the current alignment intersects a drainage channel which spurs off from the Manyfold Beck. The overbridge and northeast to southwest embankment located to the south of the current alignment intercepts Tutta Beck. However, as for the baseline option, subject to Environmental Permitting Regulations being followed, there is not considered to be an increase in risk to controlled waters. This option includes a larger road footprint than at baseline, therefore there is a potential for a increase in the loss of agricultural land. If the land required for construction increases over that allowed at baseline, then there is a potential for temporary loss of a greater amount of agricultural land than at baseline.
	Operation	Increased loss of agricultural soil resource. Increased impacts upon contaminated land, surface water and groundwater during operation.	Worse	The alternative option does not present any additional contaminant risks during the construction phase. Potential sources highlighted under baseline are still present under alternative option. The proposed northeast to southwest running embankment located to the northeast of the current alignment intersects a drainage channel which spurs off from the Manyfold Beck. The overbridge and northeast to southwest embankment located to the south of the current alignment intercepts the Tutta Beck. However, as for the baseline option, subject to Environmental Permitting Regulations being followed, there is not considered to be an increase in risk to controlled waters. This option includes a larger road footprint than at baseline, therefore there is a potential for an increase in the permanent loss of agricultural land.
Noise and Vibration	Construction	Increased effects at noise sensitive receptors during construction.	Worse	There is potential for construction noise and vibration impacts to result in significant effects at the same four residential receptors identified for the Baseline option since there are construction works in close proximity to these receptors, although the magnitude may be reduced as there is increased distance between the alternative and the receptors. Additionally, there is one residential receptor named Poundergill on Rutherford Lane and one named Dent House Farm which have the potential to be subject to significant effects as a result of the construction of the alternative. The Cross Lanes Organic Farm shop also has the potential to experience significant effects arising from construction works of the alternative. To the north of the A66, on the west side of the B277 there are approximately 7 Public Rights of Way which may be temporarily impacted by the construction of the alternative. This number is comparable to that identified for the baseline alternative option therefore is not a differentiator. Any potential significant effects will be mitigated and minimised by the use of Best Practicable Means contained within the project Construction Environmental Management Plan or Code of Construction Practice. In conclusion, the operation of alternative option has the potential to impact two more receptors than the baseline. Although impacts are reduced on the other properties noted in the baseline the alternative is considered a minor worsening due to the additional properties impacted.
	Operation	Increased effects at noise sensitive receptors during operation.	Worse	There is potential for the operation of alternative option to result in significant effects at the same receptors identified for the baseline option, although the magnitude of impact is likely to be reduced as the distance from the scheme to the receptor in average is larger. However, alternative option is likely to impact 2 more residential receptor named Punder Gill located on Rutherford Lane and Dent House Farm which the baseline option does not impact. There are approximately seven Public Right of Way to the west side of the B6277 with the potential to be subject to significant affects. This number is comparable to that identified for the baseline alternative option therefore is not a differentiator. With regards to indirect effects identified to the north of the A66 alongside the B6277 towards Barnard Castle, the number of receptors potentially impacted by the operation of the scheme are the same to those identified for the baseline option. In conclusion, the operation of alternative option has the potential to impact two more receptors than the baseline. Although impacts are reduced on the other properties noted in the baseline the alternative is considered a minor worsening due to the additional properties impacted.

Landscape and Visual	Construction	Increased impacts in relation to landscape and visual effects during construction.	Neutral	Landscape effects: Similarly to the baseline scenario this option would have a localised impact on landscape character, very similar to the baseline scenario. The construction will have a temporary, short term and reversible nature of effect. The alteration to the junction will be of small scale and would not change the characteristic of wider landscape character areas. Locally however the option would contribute to the expansion of the A66 corridor through provision of more prominent access links and expansion of road infrastructure pattern and introduction of the overbridge. Overall landscape effects during construction would be very similar to the baseline scenario. Visual effects: These would be very similar to the baseline scenario. Construction would significantly affect residential properties located close to the junction: The Smithy, Cross Lanes, Tutta Bridge, The Cottage and Street Side Farm but also North Butts and Punder Gill. These effects will be temporary, short term and reversible and the change to the views would be of similar scale to the baseline scenario.
	Operation	Increased impacts in relation to landscape and visual effects during operation.	Worse	Landscape effects: This option would retain an existing tree belt along the B6277 and will alter slightly more of the existing landscape pattern in comparison to the baseline option. The introduction of earthworks and overbridge, amount of vegetation loss, severance of lanes and field boundaries is greater than the baseline option. This would widen the projects influence in the area and change the perception of this area in the landscape as the junction would be more prominent than the baseline option. Overall, it is considered that the alternative option is likely to have slightly more significant effects in comparison to the baseline option. Visual effects: Similarly visual receptors located close to the junction will be most significantly affected. In addition, residential receptors at Punder Gill and Dent House will be significantly affected in operation but the effects on Street Side Farm and Cross Lanes Cottage will be less significant in comparison to the baseline scenario. Although some residual significant effects will persist, they will reduce in comparison to the construction through the introduction of environmental design measures. Visually this option would affect the views slightly more than baseline option, affecting overall views from greater number and length of PRoWs.
Population and Human Health	Construction	Increased impacts upon agricultural land holdings, community, business and residential receptors, Public Rights of Way/WCH and human health during construction.	Worse	Agricultural land holdings: Construction will require some agricultural land take (grade unknown) on the northern and southern side of the A66. The amount of land take required is considered to be greater in comparison to the baseline option. Community, Business and Residential Receptors: The alignment runs within close proximity to three residential receptors and one business receptor where land take may be required during construction. No demolitions are likely. This section of the alignment does not intersect any open space, sports/recreational buildings or land, including playing fields. Public Rights of Way/WCH: The alignment intersects two PRoW; one to the north of the A66 and another to the south. Construction impacts on these two routes will be likely during construction.
	Operation	Increased impacts upon agricultural land holdings, community, business and residential receptors, Public Rights of Way/WCH and human health during operation.	Worse	Agricultural land holdings: Potential to sever/divert access to agricultural holdings on northern and southern side of A66 due to new junction. Area of land take from agricultural land and severance is slightly greater than the baseline option. Community, Business and Residential Receptors: No operational impacts on community , business or residential receptors during operation. Public Rights of Way/WCH: The alignment intersects two PRoW; one to the north of the A66 and another to the south. During operation there is potential for both PRoW to be permanently altered /diverted to accommodate the route.
Air Quality	Construction	Similar impact	Neutral	Dust and fine particulate matter (PM10) rising from the construction of Scheme 8 alternative option is unlikely to result in significant adverse effects at the receptors located close to the western side of alternative option at the junction of Rutherford Lane and the A66. Any potential significant effects would be mitigated by the use of Best Practicable Means contained within a Construction Environmental Management Plan.
	Operation	Similar impact	Neutral	The implementation of Scheme 8 alternative option is unlikely to result in a significant adverse effect at the two receptors on the western side of alternative option at the junction of Rutherford Lane and the A66. No change in traffic flow is anticipated.
Material Assets and Waste	Construction	Similar impact	Neutral	Longer bridge proposed in comparison with the baseline. The alternative option is not located in a MSA or a peat resource. The recycled content estimate for alternative option is currently unknown. The project aims to achieve that construction materials will have a recycled content target of at least 31%. The recycled rate estimate for alternative option is currently unknown. It is unlikely a significant effect will be identified as there are currently no major sources of contamination in Scheme 8. The project aims to achieve at least 90% material recovery of non-hazardous CDW. The alternative option has the potential to generate CDW which may affect the capacity of waste management infrastructure in Study Area 2 (comprising waste infrastructure in the regions of the North East). However there is currently adequate waste infrastructure capacity for inert, non-hazardous and hazardous landfill in Study Area 2. The alternative option has the potential to generate CDW which may require disposal outside Study Area 2. However this is unlikely as there is currently adequate waste infrastructure capacity and CDW will not need to be exported outside Study Area 2.
	Operation	Scoped out	Neutral	Material resource use and waste generation is expected to be very small during operation therefore these aspects have been scoped out of the assessment.

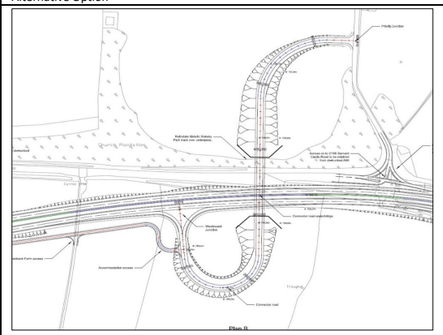
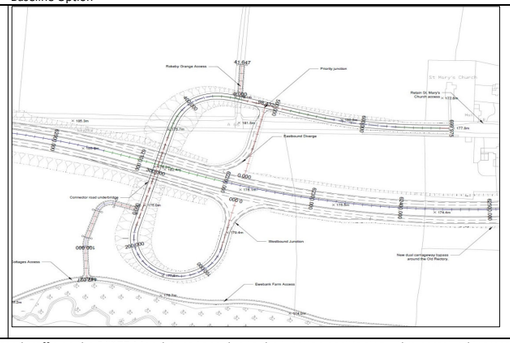
Cultural Heritage	Construction	Increased impacts upon heritage assets including setting and directly. Increased impacts upon buried archaeology during construction.	Worse	The alternative option would require a greater footprint beyond the area of the existing road corridor than the baseline option, resulting in greater impacts to buried archaeological remains (both known and unknown) and impacts resulting from changes to the setting of heritage assets which are more severe than the baseline. Considering impacts to non-designated heritage resources, these would include the removal of areas of medieval and post-medieval ridge and furrow present within the fields to the north and south of the current road, along with other features identified from aerial photography and lidar, mostly of low or negligible value. One key exception to this is a ring ditch, which could represent a prehistoric roundhouse or barrow (burial mound). These archaeological remains would be removed, resulting in a significant adverse effect on the ring ditch and a slight adverse effect on the others. Previously unrecorded archaeological remains could also be affected. The effect on the Grade II listed Dent House Farmhouse would be increased to a moderate adverse effect, as the connecting road would be considerably closer and constitute a more substantial change to views and the surrounding landscape of the farmhouse. The permanent adverse effect on Cross Lanes Farmhouse would be a lower magnitude of impact as the road to the west would be set back from the building and the over bridge would be replaced by a slip-lane junction. However, this would remain as a moderate adverse significance of effect. The impact to the Castle Farmhouse, the Barn 40m east of the Castle Farmhouse and the listed milestone would remain the same.
	Operation	Increased impacts upon heritage assets including setting and directly. Increased impacts upon buried archaeology during operation.	Worse	The alternative option would have the same effects as the baseline on all heritage resources with the exception of Dent House Farmhouse, where there would be an additional slight adverse effect resulting from the increased amount of traffic visible in views from the building.
Climate	Construction	Increased impacts upon greenhouse gas emissions and impacts upon climate change resilience during construction.	Worse	The alternative option presents a significant change in the proposed design, i.e. the revised design significantly increases the footprint of development. Therefore the revised design is anticipated to have an effect on the climate assessment and anticipated climate impacts, when considered against the baseline. The NNNPS sets out that the Secretary of State will consider the effectiveness of such mitigation measures in order to ensure that, in relation to design and construction, the carbon footprint is not unnecessarily high. The proposed changes will increase the carbon footprint significantly on this scheme. It significantly increases the development boundary and increases the scale of damage to soils and vegetation which will lead to further carbon emissions.
	Operation	Increased impacts upon greenhouse gas emissions and impacts upon climate change resilience during operation.	Worse	The proposed changes increase the scale of development against the baseline. This will result in higher maintenance requirements e.g. refurbishment/replacement of pavement. The significant increase in the development boundary is also likely to have an increased effect on ongoing land use, GHG emissions/sequestration each year during the lifetime of the infrastructure, resulting in a greater carbon impact over the lifetime of the project.
Traffic and Economic				
Traffic Volume		Alternative Junction options is located to the west of the existing junction and increases the distance to either or the Rokeby junction options. Neutral impact on the local traffic network compared to baseline (the Preferred route had a detrimental impact on the local road network)	Better	For context; the traffic model shows vehicles travelling eastbound on the A66 tend to leave at the Bowes/A67 junction. By locating the junction to the west of the existing junction, this shows the primary flow of westbound vehicles on the A66 choose to use the Rokeby junction, and not Cross Lanes. The proximity of the baseline junction to Rokeby indues traffic transfer to Cross Lanes/ B6277 Moorhouse Lane, which is not favoured by the Council and local residents. The alternative junction is sited to link Rutherford Lane/ B6277 Moorhouse Lane which carries more local vehicular movements and non-motorised traffic, compared to the baseline option.
Journey Time Savings		Small overall increase in amount of journey time savings.	Better	Traffic travels on a more direct route between A66 East and Barnard Castle. Less potential for delay on Barnard Castle Bridge.
Safety		Neutral safety impact on the A66 Improved safety for walkers, cyclists and horse riders.	Better	Both the baseline and alternative option improve safety on the A66 due to the removal of the existing central reserve gap, replaced by a grade separated junction, stopping traffic turning right across other flows. However the alternative removes two additional direct accesses onto the A66, improving safety for A66 traffic. Therefore, impact considered better. For context for walkers, cyclists and horse riders: - The B6277 Moorhouse Lane is used by cyclists as part of a known local route to/from 'The Stang'. - The C165 Barnard Castle Road is used by cyclists as part of a known local route to/from Greta Bridge, feedback from the walkers, cyclists and horse riding focus group suggests the B6277 Moorhouse Lane route is the greater used route. - There are no official bridleways in the area, however some horse riding is expected on local roads. The eastern location of the baseline option influences a proportion of traffic to switch the Cross Lanes junction. The northern end of the B6277 Moorhouse Lane is surrounded by residential properties and there is a nearby primary school. Due to greater number of potential origins and destinations in the vicinity of the B6277 Moorhouse Lane, it is expected that there will be more walkers, cyclists and horse riders on the route to/from Barnard Castle. The alternative junction reduces this transfer of traffic due to its location, resulting in the primary flow of vehicles to/from Barnard Castle is via the C165 Barnard Castle Road. It is considered that safety is improved for walkers, cyclists and horse riders.
Economy (not modelled with TUBA)		Negligible impact	Neutral	The change in design impacts a relatively low traffic volume, so any impacts would be expected to be negligible.
Accessibility including WCH Opportunities		Direct link from Rutherford Lane to the B6277 Moorhouse Lane via a new overbridge Removal of direct access on the A66	Better	The link from Rutherford Lane to the B6277 provides a more direct, shorter and safer crossing of the A66 which reduces severance created by the A66 and significantly improves connectivity for vulnerable non-motorised users compared to the baseline design. The same movement is not provided in the baseline option as cyclists and horse riders travelling from Rutherford Lane towards the B6277 will need to cross an existing gap in the central reservation, travel eastbound along the A66 and then join the stopped-up B6277 at Cross Lanes. Design year two-way traffic flows are 34,863 AADT. Travelling along a dual carriageway with 70mph traffic will be uncomfortable and dangerous for cyclists and horse riders. There is not a formal crossing provision in the central reserve A link from Rutherford Lane to Moorhouse Lane south of the A66 in the baseline option would result in an additional 700m distance compared to the alternative. Two additional direct accesses onto the A66 are directed to the alternative junction allowing safer access to and from the A66 for these property owners. More opportunity to link with PRoWs

Stakeholder			
Land Take	Increase in land take required	Worse	The alternative option footprint is larger than the baseline and as such has a greater impact on landtake. Footprint can be refined through design development compared to the baseline option.
Residential	New landowners impacted Residential properties at Cross Lanes junction impacted by both options. Residential properties at North Bitts and Punder Gill are impacted by the alternative option.	Neutral	5 new landowners impacted - 3 associated with new PMAs, 2 associated with loss of agricultural land The residential properties at North Bitts and Punder Gill are adjacent to the alternative junction compared to the baseline option (350m away). However safer access to and from the A66 is provided by linking the property accesses to the alternative junction and removing direct accesses on the A66. No blight impacts compared to baseline option (Carter property) The impact on new landowners is considered balanced against improvements to accesses and reducing impact on properties at Cross Lanes.
Commercial	Access impact on local business Cross Lanes Farm shop Impact on farm businesses	Neutral	Feedback from the owners of Cross Lanes Farm Shop suggest the alternative is preferred, with the exception that the access road to Moorhouse Lane be placed to the north of the shop adjacent to the A66. This would be an improvement to them as the current layout of the alternative option has a greater visual impact on views to the south from the premises. The alternative option is considered to be better as it has the potential to capture westbound passing trade compared to the baseline option. This is due to the perception that the cafe will be hidden by the baseline structure. Impact on arable land is reduced for the impacted landowner in the baseline option. However new landowners are now impacted by the alternative. The impact on new landowners is considered to balance out any reduced impact on the landowner affected by the baseline option and any potential improvement for the farm shop. Therefore the overall impact is considered to be neutral.
Wider Community Issues	Feedback received from Durham County Council, Local Councillors, Community Liaison Group and local residents	Better	Alternative option is preferred by Durham County Council, Local Councillors and the Community Liaison Group on the basis that it minimise impacts on the local road network. Alternative option was preferred by the majority of attendees to the Public Information Event held to update the general public on scheme progress. Notwithstanding the direct impact on affected landowners, the overall impact is considered better to more stakeholders
	Conclusion		
	Engineering The alternative option, situated to the west of Cross Lanes provides a more direct link between Rutherford Lane and the B6277 Moorhouse Lane, which is a busier local route, in comparison with the baseline option that connects Moorhouse Lane north and south. The alternative option removes an existing at-grade right left stagger across the A66 which is the predominant local movement (for both vehicular and non-motorised users) and is inherently unsafe. This is a significant benefit over the baseline option. The design standards for the alternative option are the same as the baseline option. No departures from standard are required. Two additional direct accesses are removed from the A66, re-routing to the alternative junction which improves the standard of the A66. This is a significant benefit over the baseline option. The span of the alternative structure is approximately 55m and on a high skew when compared to the baseline option of 40m on a 90deg crossing. This is a worsening compared to the baseline in the pre-mitigation assessment. The alternative option will result in a larger quantum of earthworks, mostly additional fill (circa 29%), with a similar percentage increase in extent. The additional structure length and larger footprint results in further impacts for drainage, CDM and cost, which is considered worse overall than the baseline The alternative option has the potential to be refined to minimise engineering footprint and extent of earthworks. This will also reduce the structure length and skew which introduces the option of an integral structure, comparable to the baseline option. The design refinements may be achieved by: -shifting the southern link from the proposed junction to Moorhouse lane to the north of Cross Lanes farm shop and parallel to the A66; -refining the horizontal alignment of the link from Rutherford Lane to the B6277 Moorhouse Lane by incorporating desirable minimum horizontal curvature or including the link as part of the compact junction; -minimising tie in lengths to existing roads: -drainage basins to utilise land sterilised by the layout. By incorporating the design refinements above, the drainage impact, extent of earthworks (not necessarily the quantum and the amount of fill required as there are more road connections to tie in compared to the baseline), cost and CDM impacts are considered comparable to the baseline option. The baseline junction is as compact a footprint as it can be and offers little scope for further refinement. Although the bridge length is longer in the alternative option, the embankments are slightly lower in height and there is more flexibility for traffic management, therefore buildability impacts are considered similar to the baseline. However, considering the design refinements that can be made to the structure length, buildability would be considered comparable to the baseline option. Environment Air quality and Materials (construction) are similar for both the baseline and alternative option. In terms of biodiversity, impacts would remain upon a larger number of watercourses in in the alternative option compared with the baseline (two more) which would be considered worse, however with appropriate mitigation impacts through ecological design at the watercourse crossings, the impacts would be considered neutral compared to the baseline. The larger footprint associated with the alternative has a worse impact on Road Drainage and Water, Geology, Soils and Contaminated Land and Population and Human Health compared to the baseline. This is reflected in a larger number of water courses impacted, larger impact on agricultural holdings and increased carbon and climate impacts associated with longer structure, and increased extent of earthworks. However, there is potential that these impacts can be reduced by a refined footprint (refinements detailed above). In terms of cultural heritage, the impact on buried archaeological remains would be increased compared to the baseline due to the larger footprint. The Grade II listed Dent House Farmhouse would be increased to a moderate adverse effect, as the connecting road would be considerably closer and constitute a more substantial change to views and the surrounding landscape of the farmhouse. The permanent adverse effect on Cross Lanes Farmhouse would be a lower magnitude of impact as the road to the west would be set back from the building and the over bridge would be replaced by a slip-lane junction. Overall, the alternative option is worse for cultural heritage. Amendment to the Moorhouse lane south link would lessen impacts upon buried archaeology, Dent House Farm and Cross Lanes, and the reduction of the proposed footprint would lessen impacts upon the non-designated heritage assets.		

	It is acknowledged that some of the environmental topics have indicated that the impact of the alternative option is worse than the baseline option. However, under some of the topic headings, these impacts are marginally worse than the baseline option and there is a high probability that these impacts can be reduced through refinement of the design footprint, resulting in a comparable impact with the baseline. There are no environmental impacts highlighted that are felt to be prohibitive or outside the normal scope of a typical highway project. Traffic The alternative option is considered better than the baseline from a traffic assessment perspective. This is due to: -locating the junction to the west of the existing junction results in more westbound vehicles on the A66 choosing to use the Rokeby junction, and not Cross Lanes. The proximity of the baseline junction to Rokeby indues traffic transfer to Cross Lanes/ B6277 Moorhouse Lane, which is not favoured by Durham County Council and local residents. -The alternative junction is sited to link Rutherford Lane/ B6277 Moorhouse lane which carries more local vehicular movements and non-motorised traffic, compared to the baseline option. -The link from Rutherford Land to the B6277 provides a more direct, shorter and safer crossing of the A66 which reduces severance created by the A66 and significantly improves connectivity for vulnerable non-motorised users compared to the baseline design. Stakeholder Five new landowners are impacted with the alternative option - three associated with new PMAs, and two associated with loss of agricultural land. The residential properties at North Bitts and Punder Gill are adjacent to the alternative junction compared to the baseline option (350m away). However safer access to and from the A66 is provided by linking the property accesses to the alternative junction and removing direct accesses on the A66. There are no blight impacts compared to baseline option. Feedback from the owners of Cross Lanes Farm Shop suggest the alternative is preferred, with the exception that the access road to Moorhouse Lane be placed to the north of the shop adjacent to the A66. This would be an improvement to them in terms of visual impact on views to the south from the premises. The Farm Shop owner perception is that the alternative option has the potential to capture westbound passing trade compared to the baseline option, as views of the cafe from the dual carriageway will be obstructed by the baseline structure. Other landowners have commented on the potential loss of arable land. The impact on new landowners is considered balanced against improvements to accesses and reducing impact on properties at Cross Lanes. Design refinement may potentially reduce the footprint of the alternative option, but the number of landowners impacts will be similar, therefore the overall impacts still considered neutral, compared to the baseline. The alternative option is preferred by Durham County Council, Local Councillors, and representatives of the Community Liaison Group on the basis that it minimise impacts on the local road network and increases WCH provision. Notwithstanding the direct impact on affected landowners, the overall impact is considered better in the wider community as it has the potential to benefit more stakeholders. In summary, the alternative option is favoured for traffic, safety and NMU improvements, whilst acknowledging that engineering and environmental impacts can be reduced through further refinement of the layout and environmental mitigation. The alternative complies more favourably with Highways England Imperatives of Safety, Customer Service and delivering the Road Investment Strategy.

Note: policy considerations are covered as part of the Route Development Report.

A.6 Rokeby Junction sifting matrix

Alternative Option Name	**Rokeby Alternative Layout (Option D)**
Description	Compact grade separated junction located further east when compared to the Baseline Option. The compact connector road directly impacts the Registered Park and Garden (RP&G), crossing at its narrowest point. The compact connector road passes beneath the proposed alignment of the A66, the de-trunked A66 and the RP&G to minimise impact.
Drawing (name and link)	HE565627-AMY-HML-S08-SK-CH-000016.pdf
Drawing Image	Alternative Option  Baseline Option 
Reason for option consideration	Local stakeholder concerns (residents, Councillors and Durham County Council) about potential for increased traffic on the B6277 Moorhouse Lane due to the junction positioning – this perceived increase in traffic was then validated by the traffic models. Some landowner and local stakeholder preference for a junction closer to the location of the existing junction between the A66 and the C165 Barnard Castle Road, due to a 2km diversion of the Baseline Option. Receipt of a formal report from a landowner who had objections to the Baseline Option.
Assessment outcome (State the result of the assessment)	The alternative option is not considered to comply with national planning policy due to its impact on the Registered Park and Garden (RPG). The RPG is granted significant importance and protection in planning policy and any negative impacts will only be accepted in exceptional circumstances where sufficient evidence can be provided to demonstrate that the negative impacts of the works are outweighed by the positives and that no viable alternative solutions are viable. Although strong stakeholder and community support has been shown for the alternative option, at this stage it is not considered that there is sufficiently robust evidence to justify the impacts on the RPG and therefore there is a significant risk that the alternative option would be deemed not comply with national policy by the Planning Inspectorate.
Suggested improvements (State any possible improvements or variations of the option that may have resulted from the assessment)	Design development to introduce an environmental bund to screen the connector road from view and a green bridge to reconnect the RP&G. Refinement of the connector road alignment to avoid cutting down a mature tree alongside C165 Barnard Castle Road and to achieve a greater planting depth for a 'green bridge' allowing more planting options.

Discipline	Impacts	Comparison with base option	Justification
Engineering			
Highways - Standards Compliance	Similar requirements for Departures from Standard and/or relaxations.	Neutral	The eastbound merge design includes Departures from Standard. However, the junction layout and departures are consistent for the Baseline Option and the Alternative Option. The Alternative Option westbound diverge (inc. taper) is located on the inside of the curve (CD123 5.17). It is important to note, at the location of the westbound diverge the curve radii is 2040m. This is considered a near straight with less impact on visibility than smaller radii. Where the minor road is on the inside of a curve, the diverging lane can adversely affect visibility for drivers emerging from the minor road. The Alternative Option eastbound diverge layout is non-standard. Although not considered a departure, the slip road ties-in to the proposed de-trunked A66 and does not terminate with a junction as per standard layouts demonstrated in DMRB. The parallel arrangement of the slip road may promote higher speeds for vehicles exiting the A66 due to the long straight and emission of a terminating junction. Careful consideration of the final layout is required where the slip road meets the de-trunked A66 (slip road cross-section to single two lane carriageway) and how this interacts with existing private accesses. This risk could be mitigated subject to further design development. The Baseline Option eastbound diverge is also located on the inside of the curve. Technically a departure from standard, however the eastbound merge is displaced and visibility of merging traffic is not impacted by the taper and auxiliary lane of diverging traffic. The Baseline Option eastbound diverge layout is more inline with conventional diverge arrangements. However, the length of connector road from the eastbound diverge to the priority junction is less than typically found, this may result in queuing back to the mainline during peak traffic flows. Positives and negatives are present for both options, overall the options are considered balanced. Therefore a neutral score has been submitted.
Utilities	Reduced number of diversions or protective works	Better	The majority of utility diversions are a result of the A66 mainline diversion, which remains consistent for both options. There are some additional openreach cables impacted by the north section of the Baseline Option (serving Rokeby Grange). Some of which could potentially be retained for the Alternative Option.
Geotechnics and Earthworks	Increase in bulk earthworks Favourable/unfavourable ground conditions at structures unresolved	Better	There is a general increase in bulk earthworks, however the increase is of cut. This scheme has a earthworks deficit and therefore increased cut material will result in a cost saving. Therefore it is considered to be better. (See figures below). Baseline Option (with western alternative junction at Cross Lanes) Cut: 66,105m³ Fill: 196,529m³ Net: *130,424m³ imported fill required Alternative Option (with western alternative junction at Cross Lanes) Cut: 99,262m³ Fill: 193,205m³ Net: *93,942m³ imported fill required - this saves circa. 36,000m³ *presuming all cut is suitable Limited information on the Baseline Option is available due to accessibility issues during Preliminary Ground Investigation (GI). Therefore, GI information considered to be the same for both options. 2021 preliminary ground investigation provides very limited information at the eastern junction location. - No historical records available on British Geological Survey (BGS) website. - Depth to rockhead unknown. - Additional ground investigation requirements for the Alternative Option likely to be marginally greater than the Baseline option. - Potential for seepage through cuttings at underbridge if shallow groundwater present; however common in both options. Due to the overall increase in cut volume helping the scheme cut/fill balance, the impact is considered to be better.

Structures		Increased structure length Increased durability issues due to increased structure length Neutral structure complexity	Worse	The length (approx. 80m) of the Alternative Option underbridge means that it is in effect a short tunnel, therefore increased construction and cost. Potential durability issues with buried joints - twice as many as baseline due to increased length over the Baseline Option. Simple box structure likely to be most efficient structural form, same as Baseline Option. Standard structural solution, same as Baseline Option. Due to the length, lighting will be required. Drainage will need to control water pressures and risk of inundation - same as Baseline Option. North section will require excavation through historic park which might limit construction flexibility. Due to increased overall length, cost, potential durability issues, additional lighting and potentially limited construction flexibility, the Alternative Option is considered to be worse than the Baseline Option.
Drainage and Hydrology		Increase in attenuation required Neutral impact for watercourse realignment Increase in number of culverts Increase in cut off drains	Better	<u>Outfall Location:</u> The Alternative Option requires one additional outfall to the two already required for the Baseline Option, this is to the North of the A66, discharging into a tributary of the River Tees. <u>Surface Water Storage/Attenuation:</u> The Alternative Option will require an additional attenuation basin located within the agricultural field adjacent to the River Tees, one more basin than the Baseline Option. Therefore impact considered to be worse. <u>Watercourse realignment:</u> Neither option require watercourse realignment - impact considered to be neutral. <u>Culverts:</u> A greater number of culverts are required for the Baseline Option to convey overland drainage from the North of the A66 to the South and discharge into Tutta Beck. The Baseline Option underpass will increase depths of pipes. This will likely impact on the outfall into Tutta Beck, and may require construction works within the Ancient Woodland. Deep culverts will introduce H&S risks. The Alternative Option requires a min. of two culverts under Barnard Castle Road. Due to the greater number of culverts, depths of pipes, impacts on the Ancient Woodland at Tutta Beck; the impact is considered to be better. <u>Cut off drains:</u> The Alternative Option has additional length of cut off ditches when compared to the Baseline Option. This is considered to be worse. <u>Flooding impacts:</u> Government Flood Maps For Planning suggest minimal design impact for both options. In the event of drainage collection units failing, the vertical alignment of the Alternative Option facilitates overland flows. The Baseline Option has a risk of potential flooding in the underpass due to presence of a low point. Impact considered to be better. Although the Alternative Option requires an additional attenuation basin and outfall compared to the Baseline Option; the resilience created by the vertical alignment of the Alternative Option creating overland flows, and the removal of deep construction within the Ancient Woodland at Tutta Beck, the impact is considered better.
Construction Design Management (CDM)		Increase in Construction Risk Increase in Operation/ Maintenance Risk	Worse	Increased construction risk relating to the additional cut required to construct the Alternative Option when compared to the Baseline Option. The structure (underbridge) required to pass beneath the proposed A66 alignment, existing A66 corridor and church plantation area is of greater length when compared to the Baseline Option, this increases construction risk. The compact connector road for the Alternative Option has a continuous fall from the westbound priority junction to the intersection with Barnard Castle Road. This creates overland drainage route in the event the proposed drainage collection units fail during operation. Due to the increased construction risks associated with increased cut and structure length, the overall impact is considered worse.
Construction Cost		Similar cost	Neutral	The additional structure length and total excavation would have a negative impact on costs. The scheme wide, together with the Baseline Option, cut/fill balance indicates a large deficit of fill material. Material won due to increased cut of the Alternative Option would be a benefit to the other areas of the scheme and reduce material import and the associated cost.
Buildability		Less complex construction Increased phasing Less Traffic Management Reduced imported fill	Neutral	The Alternative Option looks the most straightforward to build with easy material movement routes established. Underpass construction can take place partially offline. Remaining elements will need to be phased once traffic is diverted. Potential for Temporary Works to enable underpass to be completed and maintain A66. No significant increase in level for new road, thus a large fill import is not required. The Alternative Option increases cut, helping to rebalance the earthworks deficit on the scheme, saving costs. Reduced Traffic Management to undertake connections with existing A66. Positives and negatives are present for both options, overall the options are considered balanced. Therefore a neutral score has been submitted.
Environment				
Biodiversity	Construction	Similar impacts during construction upon designated sites, mature trees, Section 41 priority habitats and other habitats. Small improvement on impacts to watercourse	Neutral	<u>Terrestrial:</u> Compared to the Baseline Option, the Alternative Option is considered neutral since similar impacts are anticipated on woodland/arable related habitats and species. A section of the woodland located within the Registered Park and Garden immediately to the north of the proposed underbridge which may include mature trees. The design of the underpass could be of benefit if suitable for use for safe passage of species under the A66, i.e. appropriate lighting design and greening of the underpass. There are also opportunities of creating habitat linkages/connectivity between Church Plantation to the north and Jack Wood to the south (e.g. via additional hedgerow/woodland planting) which is of benefit (Minor Improvement). <u>Freshwater:</u> No watercourse crossings are proposed in this section of the scheme under this option. This option is considered neutral (compared to baseline) from a freshwater ecology perspective. Construction activities in or in close proximity to watercourses pose a potential risk to water quality. The Alternative Option poses lower risk (from a freshwater ecology perspective) compared to the Baseline Option as risk of water quality impacts is reduced to due to the earthworks being further north of the Tutta Beck. However, both options would be constructed in accordance with appropriate construction methods, therefore the impact is considered negligible. Overall impacts in comparison with the Baseline Option are considered to be neutral.
	Operation	Similar impacts during construction upon designated sites, mature trees, section 41 priority habitats and other habitats. Small improvement on impacts to watercourse	Neutral	<u>Terrestrial:</u> Similar disturbance impacts and mitigation requirements for adjacent terrestrial habitats compared to baseline. This option is therefore considered neutral in comparison to the Baseline Option. The opportunity to create connectivity/habitat linkage between Church Plantation to the north and Jack Wood to the south once in operation is considered as a minor benefit in comparison to the Baseline Option. <u>Freshwater:</u> This option is considered neutral (compared to the Baseline Option) from a freshwater ecology perspective. No watercourse crossings are proposed in this section of Scheme 8 under the baseline scenario. Assuming that operational water quality risks will be managed through incorporation of treatment measures within the drainage system (in accordance with LA113), there should be no operations-phase pathway for impact for freshwater habitats (Tutta Beck). Overall impacts in comparison with the Baseline Option are considered to be neutral.

Road Drainage and Water Environment	Construction	Reduced impact on surface water during construction. Similar impact on ground water during construction.	Better	<u>Surface water:</u> Similar to the Baseline Option, the Alternative Option is located within EA Flood Zone 1 for fluvial flooding, however due to the granularity of the flood modelling it is most likely that both options extends into EA Flood Zone 2. No watercourse crossings are proposed. Construction activities in or in close proximity to watercourses pose a potential risk to water quality. In relation to the Baseline Option, the Alternative Option is considered to be a lower risk of water quality impacts to surface watercourses due to the earthworks being further north from the Tutta Beck. Climate change flows (to be determined by modelling) may require compensatory storage being included within the design. <u>Groundwater:</u> Similar to the Baseline, the Alternative Option is located on the Great Limestone Member (Alston Formation), which is a Secondary A aquifer with potential for conduit flow (karst). Similar to the Baseline, the Alternative Option includes an underbridge that will require excavation and this may locally lower groundwater levels during construction, potentially impacting on groundwater quantity and quality. Potential groundwater quality impacts are possible from earthworks. Like the Baseline Option, the Alternative Option includes similar potential for both groundwater quantity and quality impacts. Due to the lower risk to water quality during construction, the Alternative Option is considered to be a minor improvement.
	Operation	Similar impact on surface water and ground water during operation	Neutral	<u>Surface water:</u> Similar to the Baseline Option, the potential operational risk to water quality will be managed through incorporation of treatment measures within the drainage system in accordance with LA113. The potential operational flood risk will be informed by hydraulic modelling of affected watercourses which will inform flow rates and additional storage requirements. <u>Groundwater:</u> Similar to the Baseline, the potential operational risk to water quality will be managed through incorporation of treatment measures within the drainage system in accordance with LA113. The inclusion of an underbridge may locally lower groundwater levels, which will require either groundwater management or sealing for groundwater ingress. There is a similar potential for localised permanent groundwater lowering at the underbridge. Operational effects are considered to be neutral in comparison with the baseline.
Geology, Soils, Contaminated Land and Groundwater	Construction	Slight increase in loss of agricultural soil resource. Neutral impacts upon contaminated land, surface water and groundwater during construction.	Neutral	The Alternative Option has a slightly larger footprint area compared to the Baseline Option, although the difference is small (approx. 3% increase in area). This option could result in a slight increase in the loss of agricultural soils compared to the baseline. No potential contamination sources have been identified within the footprint of the proposed Alternative Option underpass. The underpass may require dewatering during construction which could result in a temporary worsening of groundwater quality locally, although no potential contamination sources have been identified close to the proposed junction location. This is similar to the Baseline Option, where no contamination sources were identified close to the proposed junction. This scheme is located close to a surface water body (Tutta Beck) to the south and there is a risk of pollution caused by runoff/accidental spillage during construction, this risk is smaller than the baseline option. These risks should be managed through good construction practices. Considering the increase in land take and the smaller risk to Tutta Beck the impact is considered neutral in comparison with the baseline.
	Operation	Slight increase in loss of agricultural soil resource during operation	Worse	The Alternative Option has a slightly larger footprint area compared to the Baseline Option, although the difference is small (approx. 3% increase in area). This option could result in a slight increase in the loss of agricultural soils compared to the baseline. No permanent effects relating to contaminated land, surface or groundwater quality have been identified, assuming no permanent dewatering required for the underbridge. Minor worsening in comparison with the baseline due to increased land take.
Noise and Vibration	Construction	Increased effects at noise sensitive receptors during construction.	Worse	As with the Baseline Option Construction noise and vibration impacts associated with the Alternative Option have the potential to result in significant effects at the noise sensitive receptors closest to the scheme. These receptors include The Old Rectory, Tutta Beck Cottage, Keepers house, Tack Room Cottage and the Grove. The new underpass within the Alternative Option will also extend closer to West Lodge, Garden House, Stable Yard Cottage and the Dovecote in the north and Ewebank in the south. Any potential significant effects will be mitigated and minimised by the use of Best Practicable Means contained within the project Construction Environmental Management Plan or Code of Construction Practice. The Alternative Option is considered a minor worsening in comparison with the Baseline option as it is closer to the properties of West Lodge, Garden House, Stable Yard Cottage, Dovecote and Ewebank.
	Operation	Increased effects at noise sensitive receptors during operation.	Worse	Potential significant effects are anticipated both north and south of the A66 carriageway for the Alternative Option, including receptors to the north (The Old Rectory), south (Tutta Beck Cottage and Keepers house) and east (the Grove and Tack Room Cottage). Some beneficial effects are anticipated from the Alternative Option at Schoolhouse, St Mary's Church, and The Old School due to the movement of the junction to the east. The addition of the underpass will result in operational traffic moving closer to the noise sensitive receptors at Ewebank Farm in the south and noise receptors in the north including West Lodge, Garden House, Stable Yard Cottage and the Dovecote. There is the potential for a significant adverse effect at these receptors. The Alternative Option is considered a minor worsening in comparison with the baseline option due to the increase in number of affected receptors. As the design is developed further, noise barriers will be investigated in line with LA 111 which will potentially minimise any identified significant adverse effects.
Landscape and Visual	Construction	Similar impacts in relation to landscape and visual effects during construction.	Worse	<u>Landscape:</u> The majority of the route being constructed off line with the integration of farmers accommodation tracks will result in construction that will require earthworks of a similar scale in comparison to the baseline and the construction works will be in closer proximity to Rokeby Grove and Tack Room Cottage. There would be permanent loss of woodland at Rokeby RPG and permanent alteration of the RPG, topography and land use in the field to the north of the underpass. As with the baseline, there would be additional loss of mature trees in field boundaries to the north of 'Ewebank'. However, the Alternative Option would avoid the loss of mature sycamore trees at Rokeby Grange Farm associated with the Baseline Option, a minor improvement on the Baseline Option. <u>Visual:</u> Construction works will concentrate close to the underbridge location. However the eastward shift of the junction will result in loss of trees and woodland. As with the Baseline Option, construction of the underbridge would require the use of cranes and these would be prominent in views. The construction in this area is likely to be slightly less noticeable in views from footpath adjacent to the church and 'The Rectory' due to screening by vegetation and landform. Construction will affect PRoW 13 that crosses the field in which the northern part of the junction will be located. It will also affect views from the entrance gates to Rokeby Park RPG which is a visitor attraction. Further design development would look to reduce the above impacts through the potential use of environmental bunds to screen the junction from sensitive receptors.
	Operation	Increased impacts in relation to landscape and visual effects during operation.	Worse	<u>Landscape:</u> The Alternative Option will permanently alter landscape in the setting of the RPG and this will result in greater impact on landscape character than the Baseline Option. <u>Visual:</u> While the Alternative Option will result in noticeable change and will affect different receptors to the Baseline Option, it is considered that opportunities for mitigation such as alteration of landform in the field to the north of Church Plantation and additional planting alongside Barnard Castle Road and at the underpass will reduce impacts to a degree by year 15. This option is considered to be a minor worsening in comparison with the Baseline Option.

Population and Human Health	Construction	Similar impacts upon agricultural land holdings, community, business and residential receptors, Public Rights of Way/WCH and human health during construction.	Worse	Agricultural land holdings: The Alternative Option has a slightly larger footprint area compared to the Baseline Option, although the difference is small (approx. 3% increase in area) this does increase agricultural land take (grade unknown). Individual fields will be severed during construction, however this is a smaller number than the Baseline Option. Community, Business and Residential Receptors: Impacts will not differ from the Baseline Option. At this section of the Baseline Option, there are eight residential properties that lie within close proximity to the scheme and access into these properties (with the exception of Rokeby Grange) will likely be disrupted during construction. Public Rights of Way/WCH: The Alternative Option will intersect two PRoW (footpaths - one more than option A) which will be disrupted during construction. Both these routes are deemed to be of medium value and therefore any diversion over 500m would result in a significant effect. It is noted that there is a desire line from Greta Bridge which would be improved in the Alternative Option. Human Health: The option is located in a sparsely populated area. Due to the low number of people exposed to the impacts of the option, no health effects are identified. (Effects on the wellbeing of the occupants of individual properties are considered through the air quality, noise and visual assessments.) This option will not differ from the baseline. Due to the slightly larger footprint and additional footpath which is affected by the Alternative Option, the impact is considered to be a minor worsening.
	Operation	Similar impacts upon agricultural land holdings, community, business and residential receptors, Public Rights of Way/WCH and human health during operation.	Neutral	Agricultural land holdings: Permanent agricultural land take (grade unknown) will be required on the northern and southern side of the existing A66. The addition of the underbridge will link agricultural land on the northern and southern side of the A66 and so severance between land holdings is unlikely. There will be severance of individual fields, however this is a smaller number than the baseline. Community, Business and Residential Receptors: Impacts will not differ from the Baseline Option. There are no operational impacts on any business receptors at this section of the alignment. There will be permanent amendment to access for numerous residential properties and two community assets. Public Rights of Way/WCH: The Alternative Option intersects two PRoW (footpaths - one more than the Baseline Option) however one will be reinstated via the historic Rokeby Park track. Both routes are deemed to be of medium value and therefore any diversion over 500m would result in a significant effect. It is noted that there is a desire line from Greta Bridge which would be improved. Human Health: The option is located in a sparsely populated area. Due to the low number of people exposed to the impacts of the option, no health effects are identified. (Effects on the wellbeing of the occupants of individual properties are considered through the air quality, noise and visual assessments.) This option will not differ from the baseline. The Alternative Option is considered neutral in comparison with the baseline.
Air Quality	Construction	Similar dust and emissions to air and impacts upon human and ecological receptors during construction	Neutral	Similar impacts from emissions to air at isolated properties and the ancient woodland to the south during the construction of the Alternative Option and the Baseline Option, with the implementation of appropriate mitigation measures contained within an approved Construction Environmental Management Plan, no significant effects are likely to occur at identified human or ecological receptors. Air quality should therefore not be a material consideration with regards to the optioneering process for Rokeby Junction.
	Operation	Similar dust and emissions to air and impacts upon human and ecological receptors during Operation	Neutral	Similar impacts from emissions to air at isolated properties during the operational phases of the Alternative Option and the Baseline Option, no significant effects are likely to occur at identified human or ecological receptors. Air quality should therefore not be a material consideration with regards to the optioneering process for Rokeby Junction.
Material Assets and Waste	Construction	Similar impacts from materials for structures, similar land take and earthworks balance	Neutral	The alternative is not located in a MSA or a peat resource. The alternative has the potential to generate CDW which may affect the capacity of waste management. However, there is currently adequate waste infrastructure capacity for inert, non-hazardous and hazardous landfill.
	Operation	Scoped out	Neutral	Scoped out
Cultural Heritage	Construction	Increased impacts upon heritage assets. Similar impacts for potential buried archaeology during construction.	Worse	This option would result in direct impacts to the Registered Park and Garden and introduce major change to the setting of the most sensitive heritage resources within the Rokeby Park group, including the Hall and its grand gate-piers and railings. The road would be constructed as an underpass approached in cutting from the north and south. During construction this would be a major change to the Registered Park and Garden, temporarily severing the parkland connection between the park and Church of St Mary. While this would be reinstated following construction, the new underpass and connector roads would be a substantial change to the setting of the Registered Park and Garden and would alter the way in which the listed buildings along its west and south-western boundary are experienced and viewed on approach. Further, the northern approach to the underpass beneath Church Plantation would be visible in the important panoramic view from West Lodge (Rokeby Park) towards the church. Even if screened by planting, this would cause a sense of enclosure in that view which would also be undesirable. Signage and lighting may be required close to the park wall, which would also be potentially harmful, depending on location and design. Construction is also likely to result in an adverse effect on the group of Grade II listed buildings at the Grove, although these effects will be limited due to existing screening and the fact that the main aspect of the house is looking south. Potential for buried archaeology reflects that of the baseline. There would be an improvement in terms of impacts upon St Mary's Church due to the movement of the junction further east however in balance the impacts upon the RPG cause this option to be worse than the baseline.
	Operation	Increased impacts upon heritage assets.	Worse	This option would result in reduced traffic passing within the vicinity of St Mary's Church due to the movement of the junction further to the east, leading to a potential improvement to the setting of the church, in comparison with the baseline option. Rokeby Park and Gardens is a Grade II* Registered Park and Garden. This option would result in fragmentation of and introduction of traffic to a nationally designated heritage asset, leading to harm of that asset. As stated in the NNNPS substantial harm to or loss of designated assets of the highest significance, including grade I and II* Registered Parks and Gardens should be wholly exceptional.
Climate	Construction	Similar impact on greenhouse gas emissions and impacts upon climate change resilience during construction	Neutral	Green House Gas: The Alternative Option presents a change in the proposed design. The alternative design is expected to represent a similar scale of development compared to the baseline. The Alternative Option will have a direct impact on the Registered Park and Garden, including the removal of trees, however this effect is anticipated to reflect the baseline and carbon emissions associated with land use change during construction are expected to be similar. The NNNPS sets out that the 'Secretary of State will consider the effectiveness of such mitigation measures in order to ensure that, in relation to design and construction, the carbon footprint is not unnecessarily high'. The proposed changes are expected to be neutral in terms of the carbon footprint on this scheme when compared to the Baseline Option. Climate Change Resilience: Climate Change Resilience Assessment is scoped out for construction. There will be neutral impact when compared to the Baseline Option.
	Operation	Reduced impacts upon greenhouse gas emissions climate change resilience during operation (versus option A)	Better	Green House Gas: It is anticipated that the Alternative Option will have a minimal effect on road user emissions compared against the Baseline Option. Maintenance requirements e.g. refurbishment/replacement of pavement and effects on ongoing land use are anticipated to be similar to option A. Therefore, during operation, Green House Gas is considered to be neutral in comparison to the Baseline Option. Climate Change Resilience: The preliminary Climate Change Resilience assessment identified a potential risk for some underpasses to flood, impacting operation. Both the Baseline Option and the Alternative Option involve the construction of an underpass adjacent to the proposed A66 line of route. The climate resilience risk is likely to be improved for this option due to an increased capability of overland flows. This should be considered in conjunction with the flood risk assessment. The overall climate risk for the Alternative Option is considered to be better compared to the Baseline Option. Considering Green House Gas and Climate Change Resilience together, the Alternative Option is considered to have a slightly better effect on operation compared to the Baseline Option due to increased climate resilience.

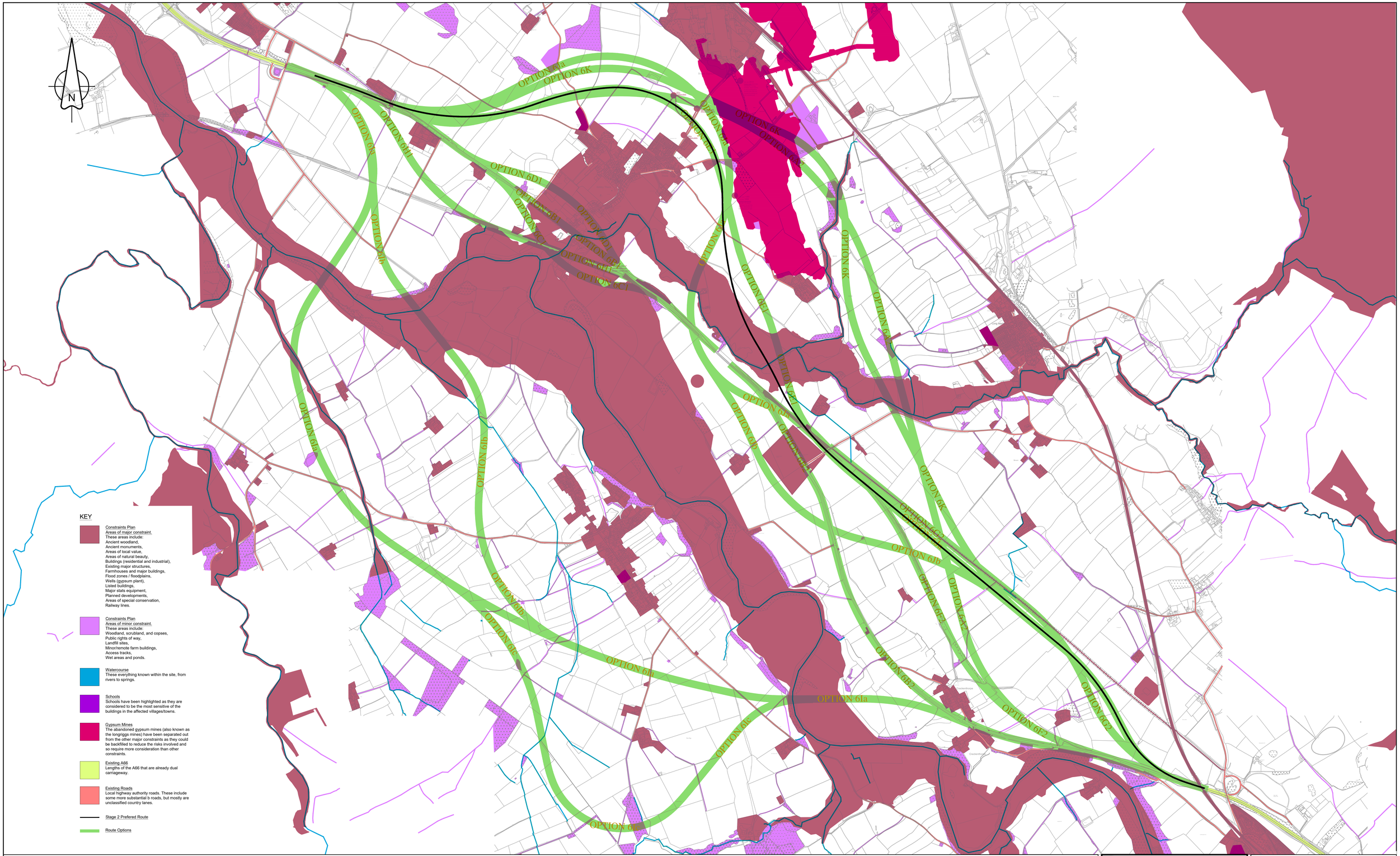
Traffic and Economic			
Traffic Volume	Improved impact on local traffic network	Better	For context; - the traffic model shows vehicles travelling eastbound on the A66 tend to leave at the Bowes/A67 junction. - A Heavy Goods Vehicle (HGV) ban on Barnard Castle Bridge is incorporated into all modelling. The Baseline Option design (Option A/PCF Stage 2) shows the majority of westbound vehicles choosing to use the Cross Lanes junction (B6277 Moorhouse Lane) rather than Rokeby (C165 Barnard Castle Road), due to the increase in journey time resulting from the proposed western location of the junction. This is a switch from the existing scenario where the primary flow is via the Rokeby junction (C165 Barnard Castle Road). This is not favoured by local residents, Councillors and MP's due to the change from the existing situation. Due to the HGV ban the HGV route in either option is via the Rokeby junction and not via Cross Lanes. The Alternative Option shows the primary flow of westbound vehicles on the A66 choosing to use the Rokeby junction, and not Cross Lanes, particularly when paired with the Alternative Option at Cross Lanes. Consequently, This combination of junctions best maintains the current traffic distribution between the C165 Barnard Castle Road and B6277 Moorhouse Lane.
Journey Time Savings	Small Overall increase in amount of journey time savings.	Better	Traffic travels on a more direct route between A66 East and Barnard Castle Less potential for delay on Barnard Castle Bridge
Safety	Neutral safety impact on the A66 Improved safety for walkers, cyclists and horse riders.	Better	Both the Baseline Option and the Alternative Option improve safety on the A66 due to the removal of the existing central reserve gap, replaced by a grade separated junction, stopping traffic turning right across other flows. Therefore, impact considered neutral. For context for walkers, cyclists and horse riders: - The B6277 Moorhouse Lane is used by cyclists as part of a known local route to/from 'The Stang'. - The C165 Barnard Castle Road is used by cyclists as part of a known local route to/from Greta Bridge, feedback from the walkers, cyclists and horse riding focus group suggests the B6277 Moorhouse Lane route is the greater used route. - There are no official bridleways in the area, however some horse riding is expected on local roads. The Alternative Option shows the primary flow of westbound vehicles travelling to/from the A66 choosing to use the Rokeby Junction (C165 Barnard Castle Road), and not Cross Lanes (B6277 Moorhouse Lane) reversing the switch from the PCF Stage 2 design (see Traffic Volume above). The western location of the Baseline Option influences traffic to use the Cross Lanes junction similar to that of the PCF Stage 2 design. The northern end of the B6277 Moorhouse Lane is surrounded by residential properties and there is a nearby primary school. Other than the exception of Rokeby Hall and its group of buildings, there are no residential properties on the C165 Barnard Castle Road. Due to greater number of potential origins and destinations in the vicinity of the B6277 Moorhouse Lane, it is expected that there will be more walkers, cyclists and horse riders on the route to/from Barnard Castle. By ensuring the primary flow of vehicles to/from Barnard Castle is via the C165 Barnard Castle Road, it is considered that safety is improved for walkers, cyclists and horse riders in the Alternative Option.
Economy (not modelled with TUBA)	Negligible Impact	Neutral	The change in design impacts a relatively low traffic volume, so any impacts would be expected to be negligible.
Accessibility including WCH Opportunities	Improvement in connections between communities served by the route	Better	There are multiple PRoWs that currently terminate at the existing A66 highway boundary. It is assumed that users on the PRoWs currently cross the existing single lane carriageway to continue to their destinations. Both options remove at grade crossings and provide safer grade separated crossings. The upgrade to dual carriageway, inclusion of a central reservation and the provision of a grade separated junction in both options will help to prevent future crossings. Therefore, impact considered neutral. Compared to the Baseline Option, the eastern location of the Alternative Option minimises the diversion length for cyclists travelling to/from Greta Bridge but increases the diversion length for walkers using the local footpaths. However, it is considered that there is a greater number of cyclists using the area than walkers. Therefore the location of the Alternative Option is considered better than the baseline as it is best suited to the existing desire lines and flows.
Stakeholder			
Land Take	Marginal increase in land take and overall footprint of the scheme.	Neutral	The engineering land take for both options is similar. Therefore, impact considered neutral.
Residential	Reduced landowner impacts	Better	There is a singular landowner affected by both options, therefore impact considered neutral. Access arrangements to the residents affected by the works in both options are similar, therefore impact considered neutral. In the Alternative Option, the majority of traffic using the junction is to the east, with only a very small volume of traffic using the eastbound diverge and using the proposed de-trunked section of the A66. This change will improve the impact on the residents of the Schoolmasters House at St Mary's Church. Therefore impact considered to be better. Due to the net improvement for the residents of the Schoolmasters House at St Mary's church, the overall impact is considered to be better.
Commercial	Reduced impact on business operation Both options have similar footprints in arable land.	Better	The landowner's view is that the Alternative Option is less commercially damaging and impactful on their tenants than the Baseline Option; primarily due to the complete severance of the agricultural fields south of the Baseline option as a result of its layout and location. Therefore, the Alternative Option is considered to be better.
Wider Community Issues	Feedback received from Durham County Council, Local Councillors, Community Liaison Group and Historic England.	Neutral	The Alternative Option is preferred by Local Councillors and the Community Liaison Group on the basis that it maintains the junction in its existing location and should therefore minimise impacts on the local road network. The Alternative Option was preferred by the majority of attendees to the Public Information Event held to update the general public on scheme progress. The Alternative Option is preferred by Durham County Council. The Baseline Option is preferred by Historic England due to impact on Rokeby Registered Park and Garden. Due to a divided opinion, impact considered neutral.
	Conclusion		
	Engineering The alternative option sites the proposed Rokeby Junction closer to the location of the existing at-grade crossing, which better maintains current traffic distribution between the C165 Barnard Castle Road and B6277 Moorhouse Lane when compared to the baseline option by removing the need for westbound vehicles travelling to/from Barnard Castle to perform a short u-turn, which increases the journey time into Barnard Castle. This reduction in traffic on the B6277 Moorhouse Lane is considered safer for walkers, cyclists and horse riders whilst also providing a more point of crossing for pedestrians and cyclists from Greta Bridge. The alternative option is considered to be neutral for Highways compliance. This is because the design standards for the alternative option are the same as the baseline option and no additional departures from standard are required (both require a departure for the retention of the existing eastbound merge onto the A66). From a Construction Cost and Buildability perspective the alternative option is considered neutral because whilst there is some additional complexity and cost associated with the structure this is counterbalanced by the ability to construct more of the junction offline and the increased cut generated by the alternative option reduces the deficit of fill material. The alternative option is better for Utilities as it affords the option to retain utilities that the baseline option would need to divert. The alternative option is better for Geotechnics as it provides a more favourable earthworks balance. However, the increased work within cut and a longer, more costly structure result in the baseline option being considered better for CDM and Structures. From a Drainage perspective there alternative option is considered better, as whilst it does introduce an additional pond and outfall, it has the significant benefit of not introducing a trapped cutting that is present in the baseline option. The alternative option manages to maintain a fall south to north, which allows water to escape the underpass in the event of any drainage blockages on the local road. Environment The Biodiversity, Air Quality and Waste Topics are assessed as neutral for the alternative option due to having a very similar impact to the baseline option. The Landscape, Visual and Noise impacts are considered to be worse than the Baseline Option. For road drainage the alternative option is considered to be better than the baseline option during the construction phase due to the works being undertaken further away from Tutta Beck and the resultant reduction in risk of negatively impacting water quality. The alternative option is worse for Geology impacts due to the increased land take, although it should be noted that this increase is very minor at 3%. The alternative option has a worse noise impact during both construction and operation due to the increased number of properties impacted by the alternative option when compared to the base line. The Alternative Option will negatively impact upon the setting of the RPG during both construction and operation and therefore has a greater impact on landscape character than the baseline option. There would also be a worse impact on Population and Human Health during construction of the alternative option as it intersects an additional footpath which is considered to be of medium value, during operation it is considered the alternative option would have a neutral impact when compared to the baseline as both would provide an alternative and safer means of crossing the A66. Rokeby Park and Gardens is a Grade II* registered park and garden. The alternative option would result in fragmentation of the RPG and introduce traffic to a nationally designated heritage asset, leading to harm of that asset. Consequently the alternative option is assessed as worse during both construction and operation when compared to the baseline option. It is also noted that that the NNNPS states that substantial harm to, or loss of, designated assets is of the highest significance, and should be wholly exceptional. The operationally impact on Climate Change is considered better for the alternative due the ability for the junction to flow freely, therefore avoiding the risk of the underpass flooding which is present in the baseline option. It should also be noted that through further design development it is considered that the landscape could be reduced in operation when compared to the baseline option through use of earthworks to screen the road when viewing the junction from the north. Planting could also be used across the new structure to reinstate the existing treeline as far as possible. Traffic Regarding Traffic, the Alternative Option is considered better than the Baseline Option due to the primary flow remaining on the C165 Barnard Castle Road, which improves journey times, negates possible issues at The Sills and Barnard Castle Bridge resulting from increased traffic flows, and is safer for walkers and cyclists on the B6277 Moorhouse Lane. It should be noted that these benefits are largely based on anecdotal evidence from stakeholders and consequently are difficult to quantify. The location of the Alternative Option is considered better for walkers and cyclists travelling to/from Greta Bridge when compared to the Baseline Option as it provides a more direct route on the desire line and avoids the diversion present in the baseline option. However, a further diversion for walkers using the PRoW north and west of St Mary's Church. Stakeholder The Alternative Option has a marginally larger area of land take compared to the Baseline Option. However, the singular landowner affected by both options, favours the Alternative Option due to the impact on the number and considered value of the affected land parcels, but also due to the degree of severance created by the Baseline Option on their land between the realigned A66 and the Ancient Woodland adjacent to Tutta Beck. The Alternative Option is favoured by Local Councillors, Durham County Council and the General Public who attended the Public Information Event primarily for the reasons cited in the traffic section above. However, Historic England consider the Alternative Option to be their least favourable option due to the significant impacts on the Registered Park and Garden.		

	Policy Compliance The alternative option is not considered to comply with national planning policy due to it's impact on the Registered Park and Garde. The RPG is granted significant importance and protection in planning policy and any negative impacts will only be accepted in exceptional circumstances where sufficient evidence can be provided to demonstrate that the negative impacts of the works are outweighed by the positives and that no viable alternative solutions are viable. Although strong stakeholder and community support has been shown for the alternative option, at this stage it is not considered that there is sufficiently robust evidence to justify the impacts on the RPG and therefore there is a significant risk that the alternative option would be deemed not comply with national policy by the Planning Inspectorate.

Note: policy considerations are covered as part of the Route Development Report.

B Temple Sowerby to Appleby initial alternatives and sifting

B.1 Map of initial alternatives


N
OPTION 6a
OPTION 6K
OPTION 6K
OPTION 6K

B.2 Map of refined alternatives

DRAFT

[Provided as an appendix to the Route Development Report for information only]

A

B

A66 0405

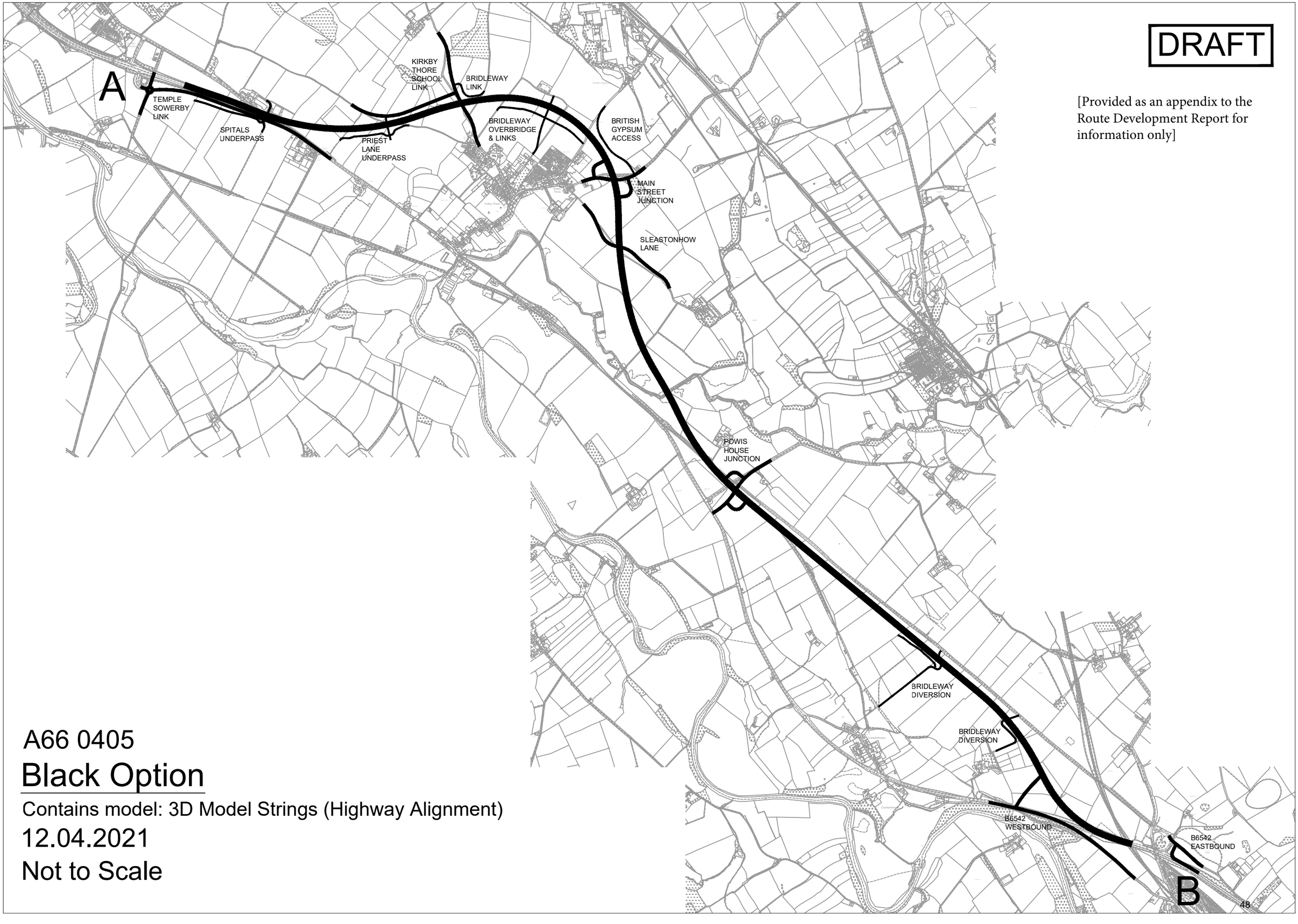
Mainline Options

22.04.2021

Not to Scale

DRAFT

[Provided as an appendix to the Route Development Report for information only]



A66 0405

Black Option

Contains model: 3D Model Strings (Highway Alignment)

12.04.2021

Not to Scale

DRAFT

[Provided as an appendix to the Route Development Report for information only]

A

TEMPLE SOWERBY LINK

SPITALS UNDERPASS

PRIEST LANE UNDERPASS

KIRKBY THORE SCHOOL LINK

BRIDLEWAY LINK

BRIDLEWAY OVERBRIDGE & LINKS

BRITISH GYPSUM ACCESS

MAIN STREET JUNCTION

SLEASTONHOW LANE

Difference between the Black and blue option. Model shows this area only, for full extent see Black option model.

POWIS HOUSE JUNCTION

BRIDLEWAY DIVERSION

BRIDLEWAY DIVERSION

B6542 WESTBOUND

B6542 EASTBOUND

B

A66 0405

Blue Option

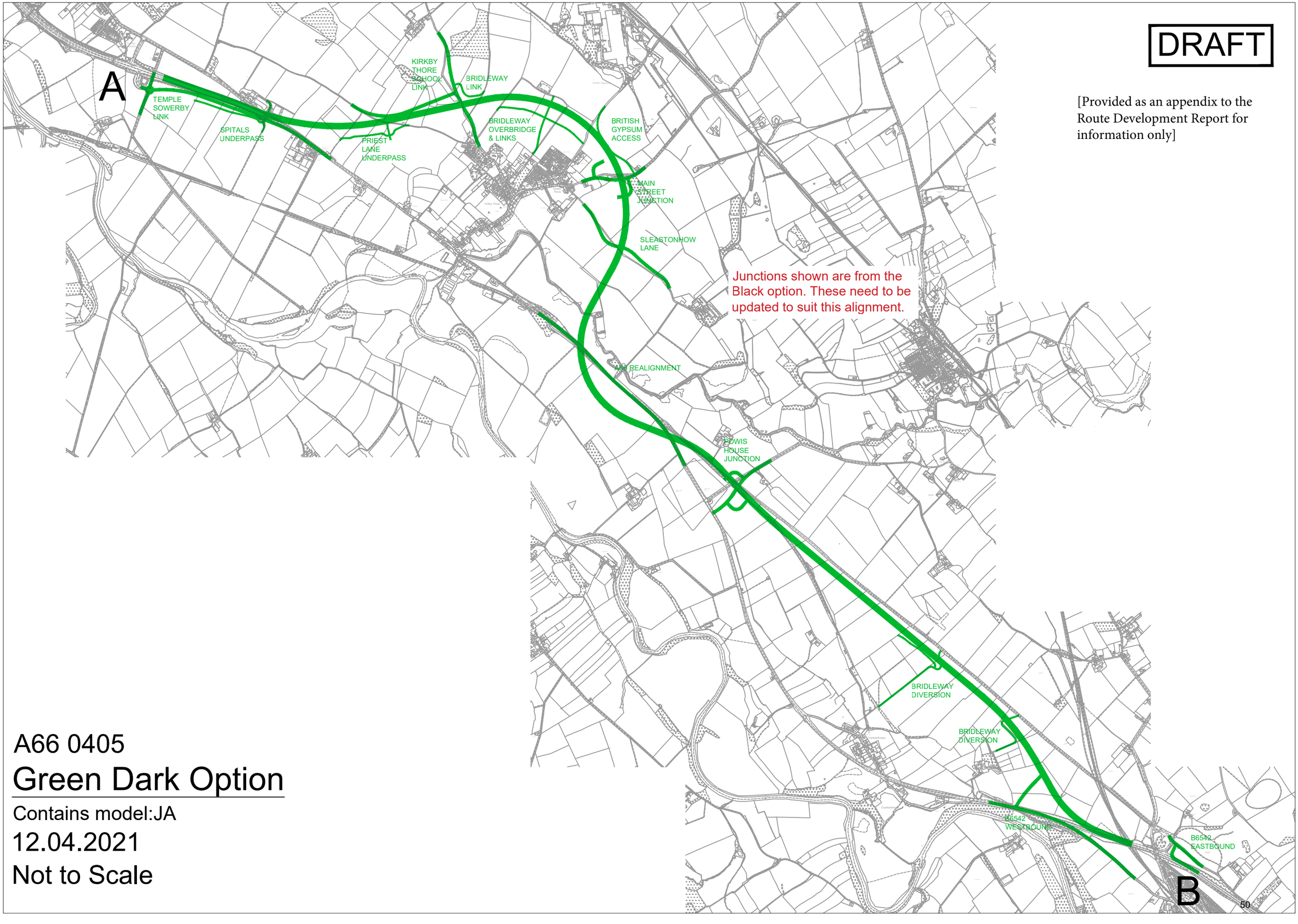
Contains model: Alternative Trout Beck Alignment 3D Model Strings

12.04.2021

Not to Scale

DRAFT

[Provided as an appendix to the Route Development Report for information only]



A66 0405

Green Dark Option

Contains model:JA

12.04.2021

Not to Scale

DRAFT

[Provided as an appendix to the Route Development Report for information only]

A

TEMPLE SOWERBY LINK

SPITALS UNDERPASS

PRIEST LANE UNDERPASS

KIRKBY THORE SCHOOL LINK

BRIDLEWAY LINK

BRIDLEWAY OVERBRIDGE & LINKS

BRITISH GYPSUM ACCESS

MAIN STREET JUNCTION

SLEASTONHOW LANE

Junctions shown are from the Black option. These need to be updated to suit this alignment.

A66 REALIGNMENT

BRIDLEWAY DIVERSION

BRIDLEWAY DIVERSION

B6542 WESTBOUND

B6542 EASTBOUND

B

A66 0405

Green Light Option

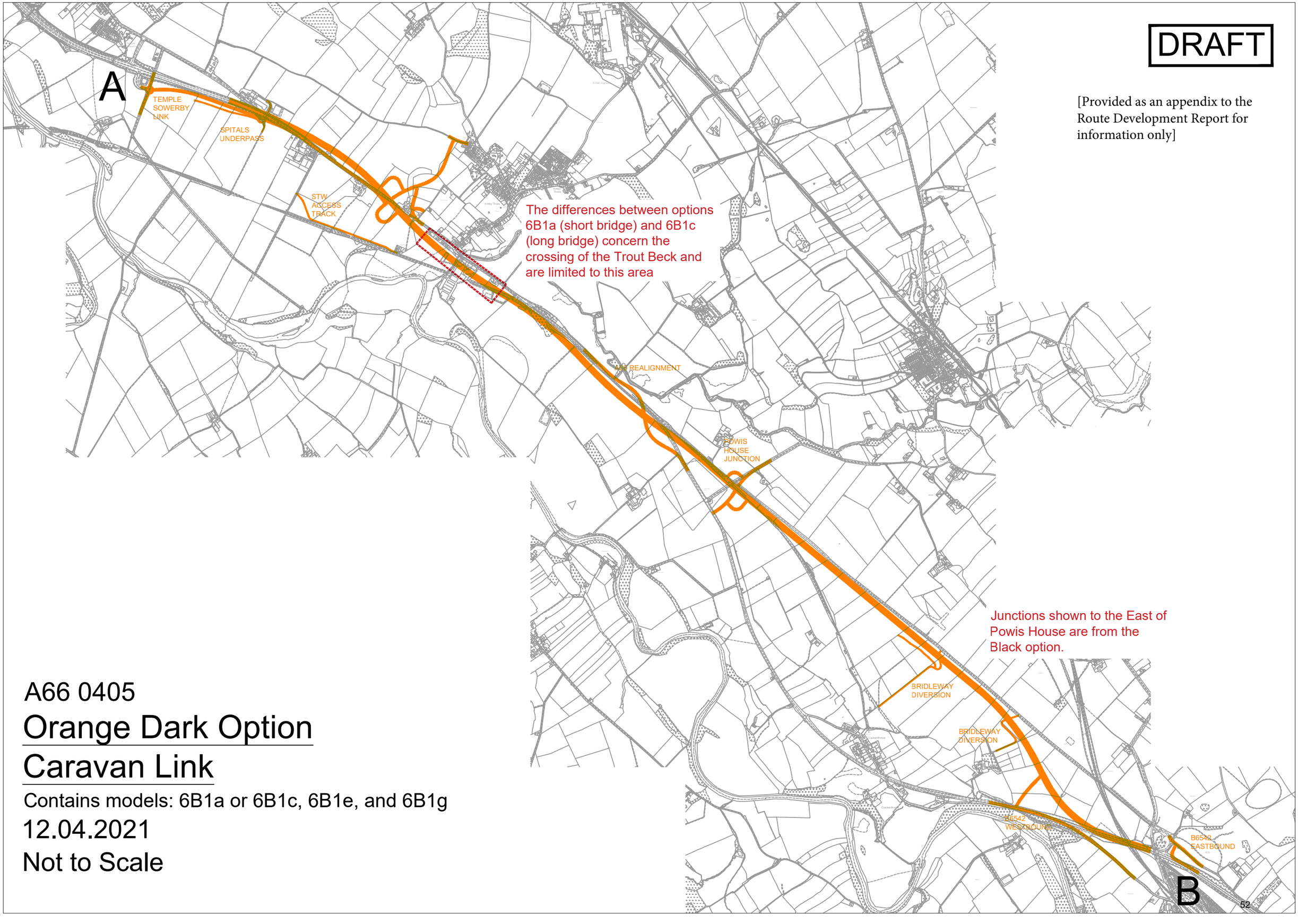
Contains model: JB

12.04.2021

Not to Scale

DRAFT

[Provided as an appendix to the Route Development Report for information only]



A66 0405

Orange Dark Option

Caravan Link

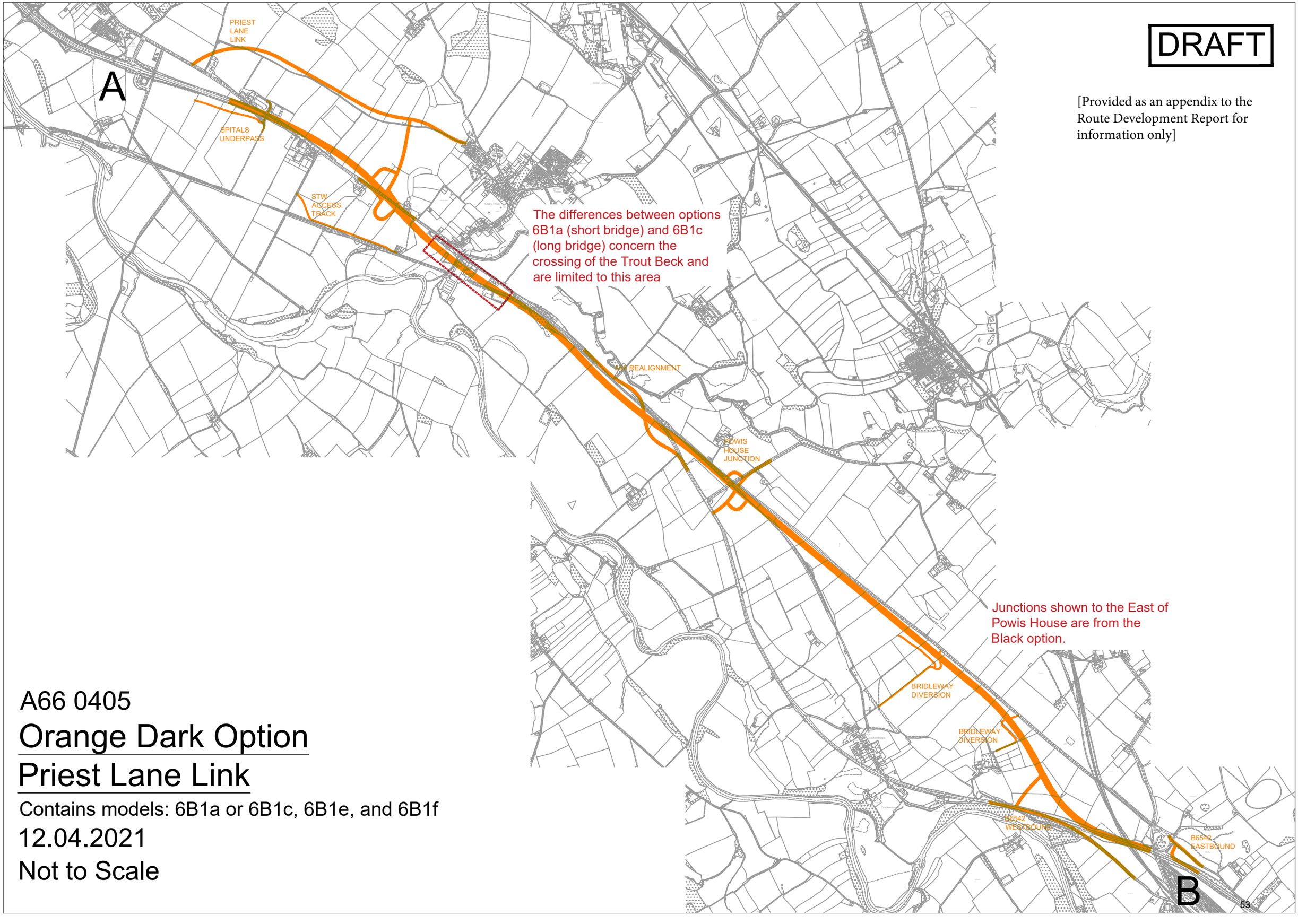
Contains models: 6B1a or 6B1c, 6B1e, and 6B1g

12.04.2021

Not to Scale

DRAFT

[Provided as an appendix to the Route Development Report for information only]



A66 0405

Orange Dark Option

Priest Lane Link

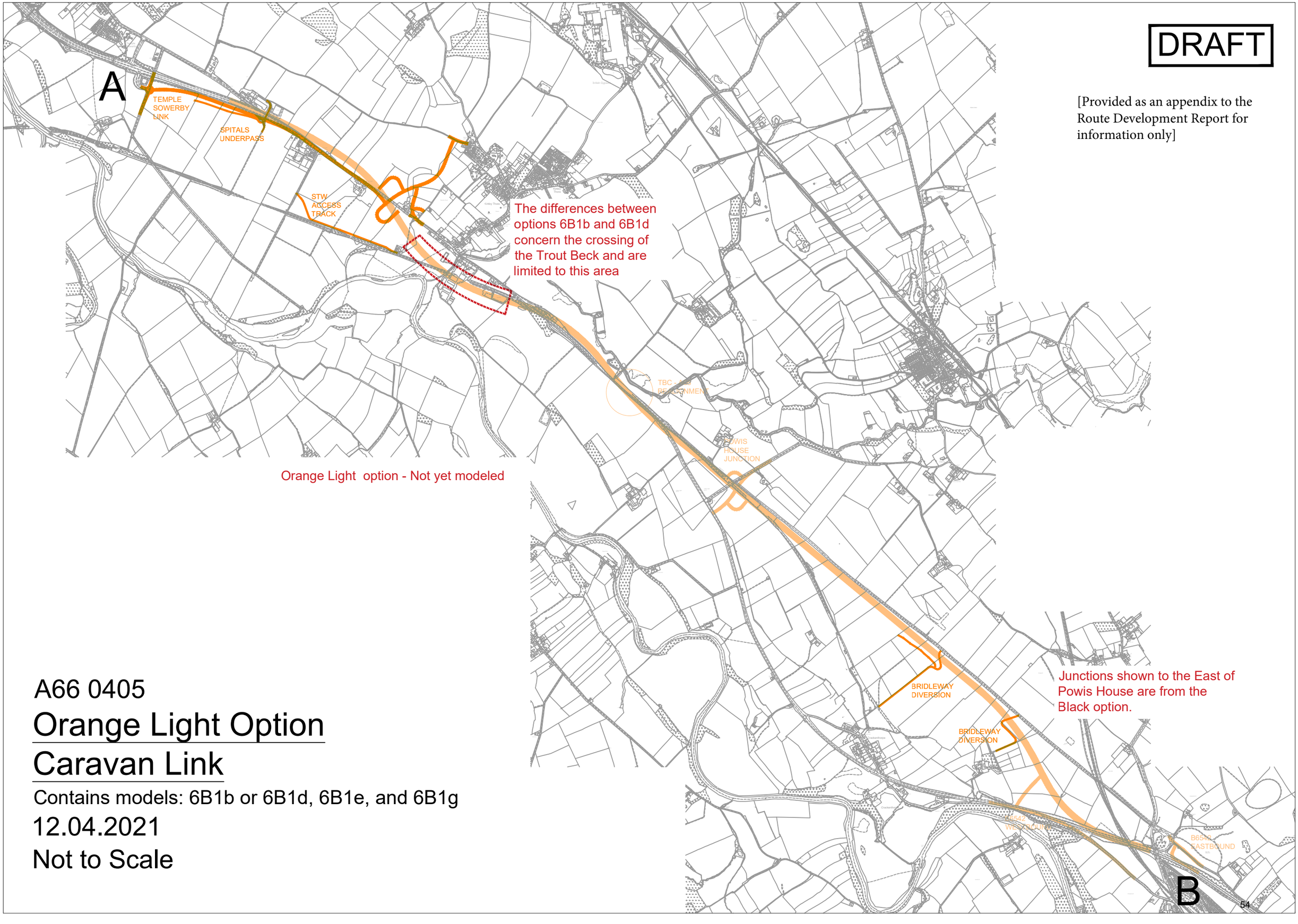
Contains models: 6B1a or 6B1c, 6B1e, and 6B1f

12.04.2021

Not to Scale

DRAFT

[Provided as an appendix to the Route Development Report for information only]



Orange Light option - Not yet modeled

A66 0405

Orange Light Option

Caravan Link

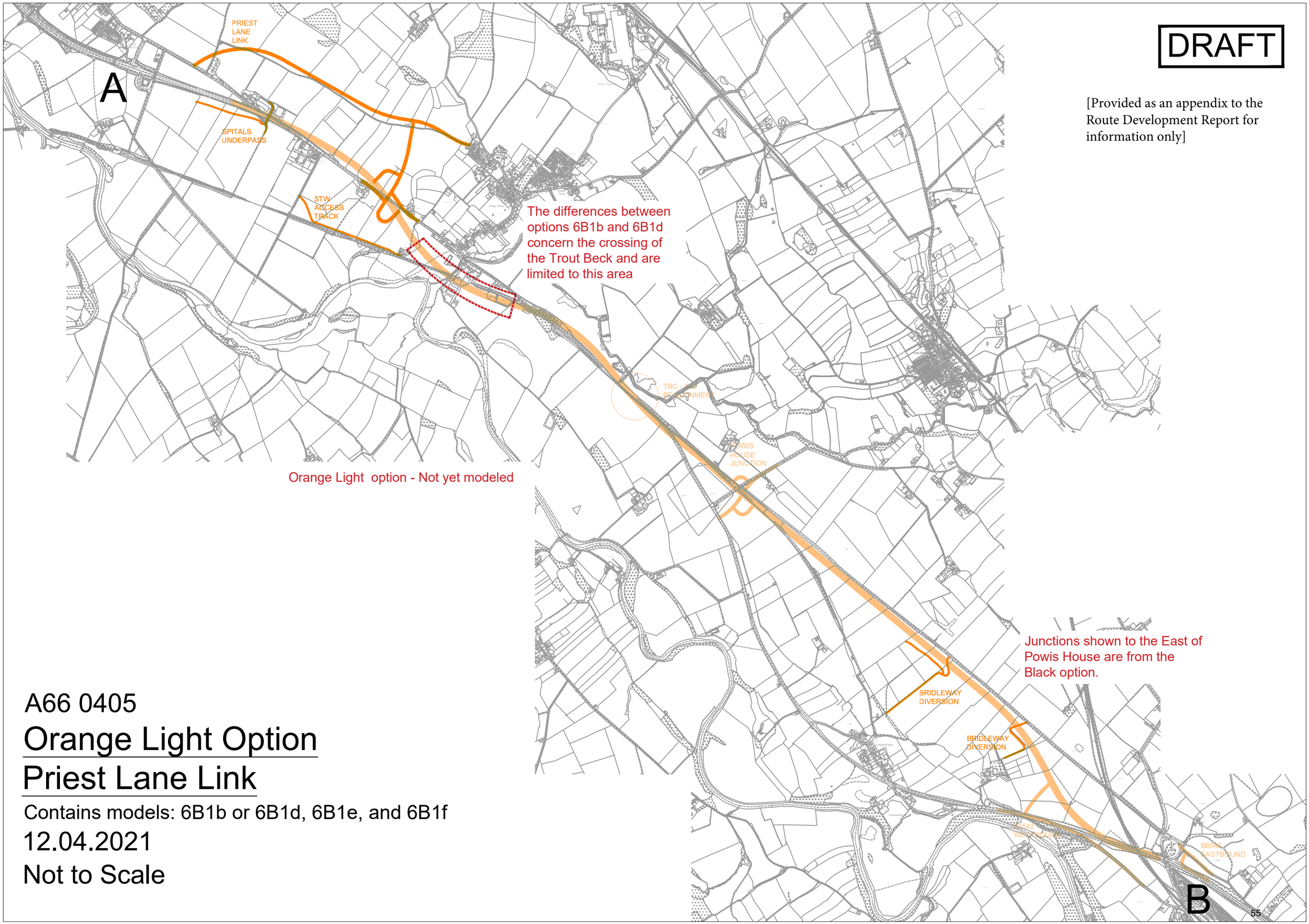
Contains models: 6B1b or 6B1d, 6B1e, and 6B1g

12.04.2021

Not to Scale

DRAFT

[Provided as an appendix to the Route Development Report for information only]



A66 0405

Orange Light Option

Priest Lane Link

Contains models: 6B1b or 6B1d, 6B1e, and 6B1f

12.04.2021

Not to Scale

DRAFT

[Provided as an appendix to the Route Development Report for information only]

A

TEMPLE SOWERBY LINK

SPITALS UNDERPASS

PRIEST LANE UNDERPASS

KIRKBY THORE SCHOOL LINK

BRIDLEWAY LINK

BRIDLEWAY OVERBRIDGE & LINKS

BRITISH GYPSUM ACCESS

MAIN STREET JUNCTION

SLEASTONHOW LANE

TBC - LONG MARTON JUNCTION

BRIDLEWAY DIVERSION

BRIDLEWAY DIVERSION

B6542 WESTBOUND

B6542 EASTBOUND

B

Red option - Not yet modeled

A66 0405

Red Option

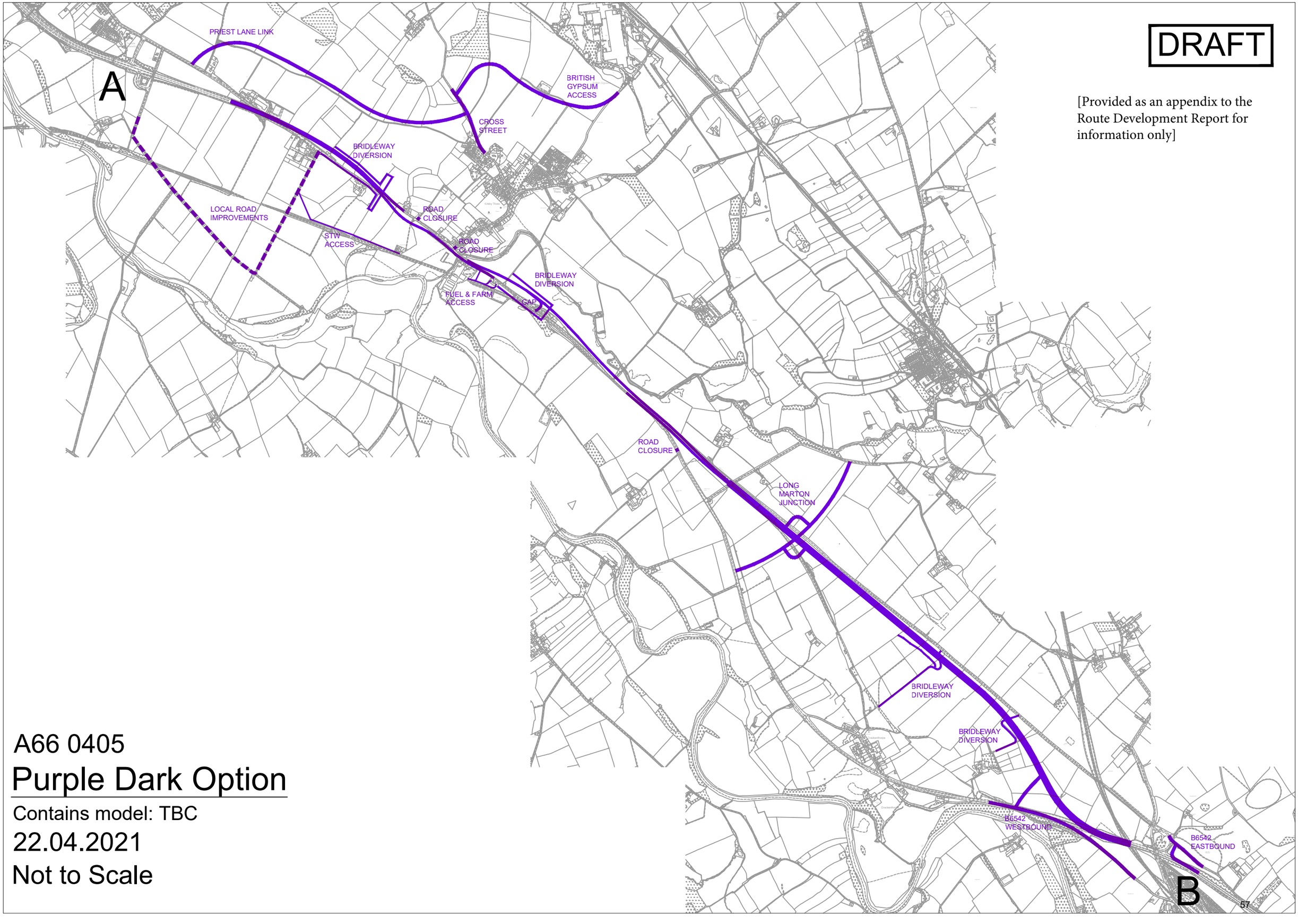
Contains model: TBC

12.04.2021

Not to Scale

DRAFT

[Provided as an appendix to the Route Development Report for information only]



A66 0405

Purple Dark Option

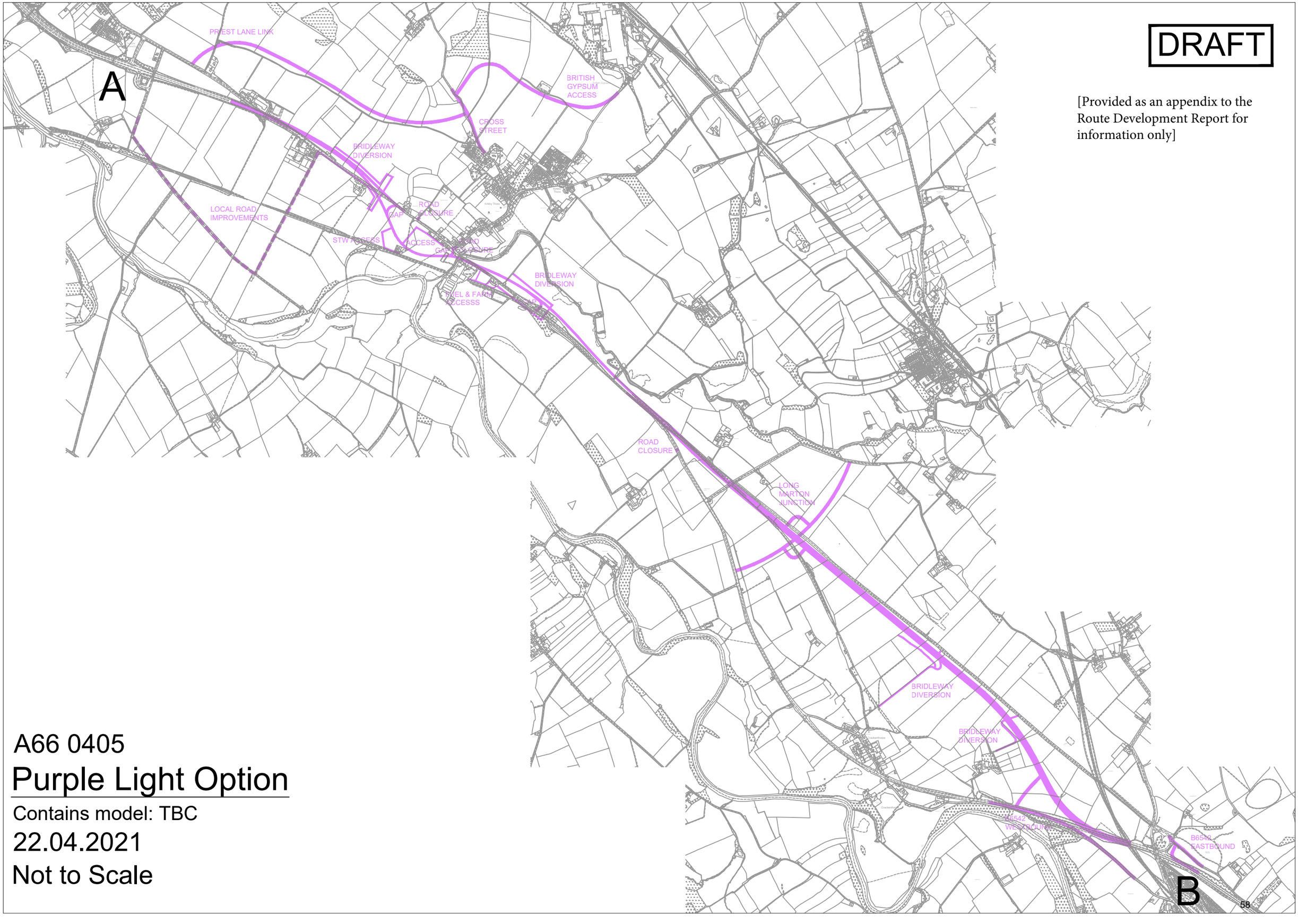
Contains model: TBC

22.04.2021

Not to Scale

DRAFT

[Provided as an appendix to the Route Development Report for information only]



A66 0405

Purple Light Option

Contains model: TBC

22.04.2021

Not to Scale

B.3 Initial sifting matrix summary

Overall	Black (Preferred Route)	Blue	Greeen Dark	Green Light	Red	Orange Dark	Orange Light	Purple	Standard Deviation	Average Score Northern Routes	Average Score Southern Routes
Total Score	-19	-11	-20	-22	-12	-20	-19	-32	6.46	-16.8	-23.7
Rank	3	1	5	7	2	5	3	8		3.6	5.3
Based on Confidence	-5	-2	-6	-7	0	0	-1	-13	4.47	-3.8	-4.9
Rank	5	4	6	7	1	2	3	8		4.6	4.3
Average Score	-0.50	-0.29	-0.53	-0.58	-0.32	-0.53	-0.50	-0.84	0.17	-0.4	-0.6
Rank	3	1	5	7	2	5	3	8		3.6	5.3
Avg Score based on confidence	-0.12	-0.04	-0.17	-0.18	0.00	-0.01	-0.03	-0.35	0.12	-0.1	-0.1
Rank	5	4	6	7	1	2	3	8		4.6	4.3
Quantum of scores											
-3	6	3	4	6	5	6	5	4		4.8	5.0
-2	9	9	11	7	7	6	7	11		8.6	8.0
-1	7	8	9	12	9	10	9	10		9.0	9.7
0	3	5	2	2	3	4	6	5		3.0	5.0
1	4	4	4	3	5	6	5	4		4.0	5.0
2	7	7	5	5	6	4	4	4		6.0	4.0
3	2	2	3	3	3	2	2	0		2.6	1.3

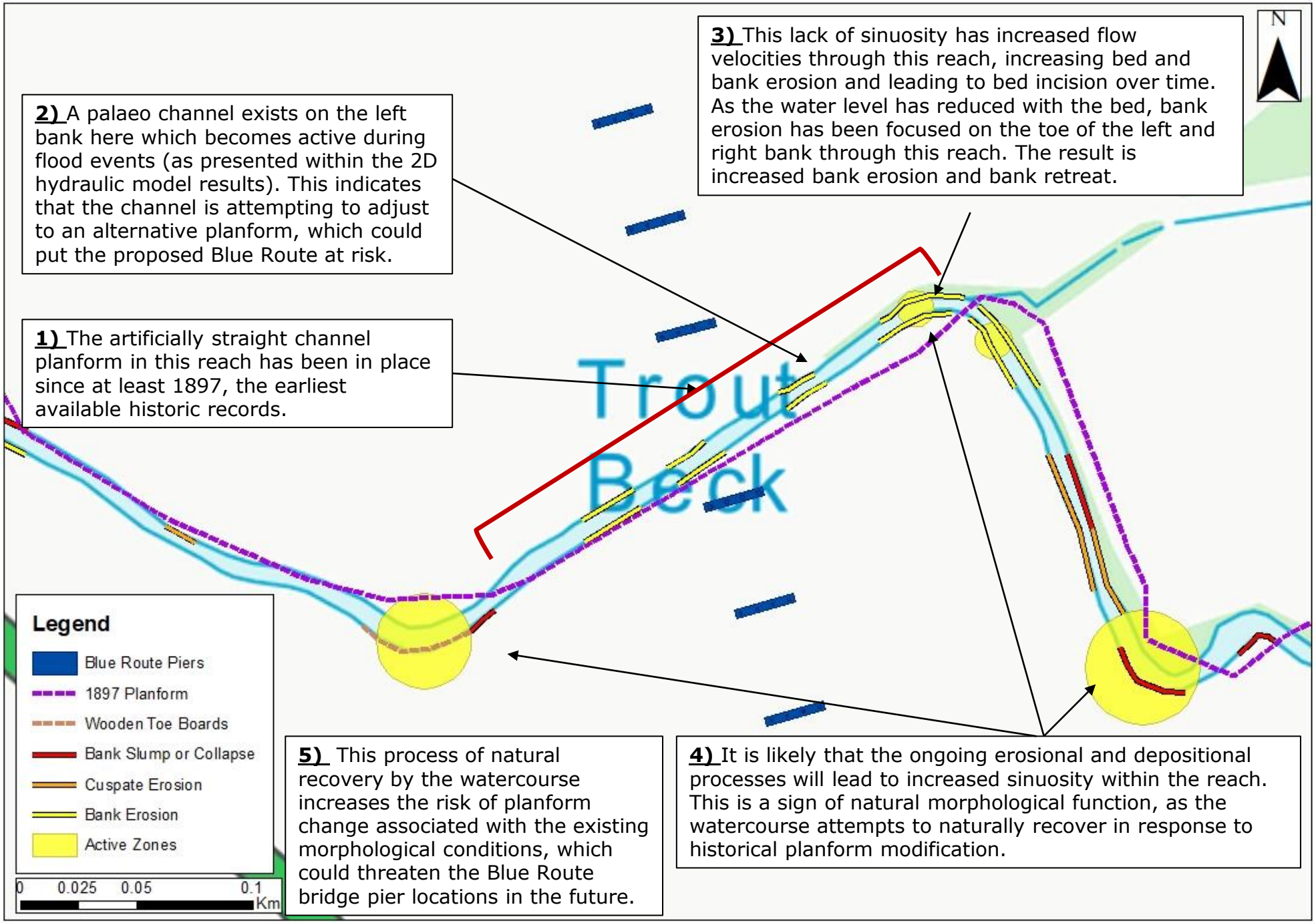
Northern Routes	Black (Preferred Route)	Blue	Greeen Dark	Green Light	Red	Standard Deviation
Total Score	-19	-11	-20	-22	-12	4.97
Rank	3	1	4	5	2	
Based on Confidence	-5	-2	-6	-7	0	2.88
Rank	3	2	4	5	1	
Average Score	-0.50	-0.29	-0.53	-0.58	-0.32	0.13
Rank	3	1	4	5	2	
Avg Score based on confidence	-0.12	-0.04	-0.17	-0.18	0.00	0.08
Rank	3	2	4	5	1	
-3	6	3	4	6	5	
-2	9	9	11	7	7	
-1	7	8	9	12	9	
0	3	5	2	2	3	
1	4	4	4	3	5	
2	7	7	5	5	6	
3	2	2	3	3	3	

Southern Routes	Orange Dark	Orange Light	Purple	Standard Deviation
Total Score	-20	-19	-32	7.23
Rank	2	1	3	
Based on Confidence	0	-1	-13	7.24
Rank	1	2	3	
Average Score	-0.87	-0.83	-1.39	0.31
Rank	2	1	3	
Avg Score based on confidence	-0.02	-0.04	-0.57	0.31
Rank	1	2	3	
Quantum of scores				
-3	6	5	4	
-2	6	7	11	
-1	10	9	10	
0	4	6	5	
1	6	5	4	
2	4	4	4	
3	2	2	0	

C Temple Sowerby flood modelling and geomorphological analysis

Geomorphological Analysis of 1D and 2D Hydraulic Model Results for the A66 Scheme 4 Blue Route and Orange Alternative Route

Analysis of Blue Route Results



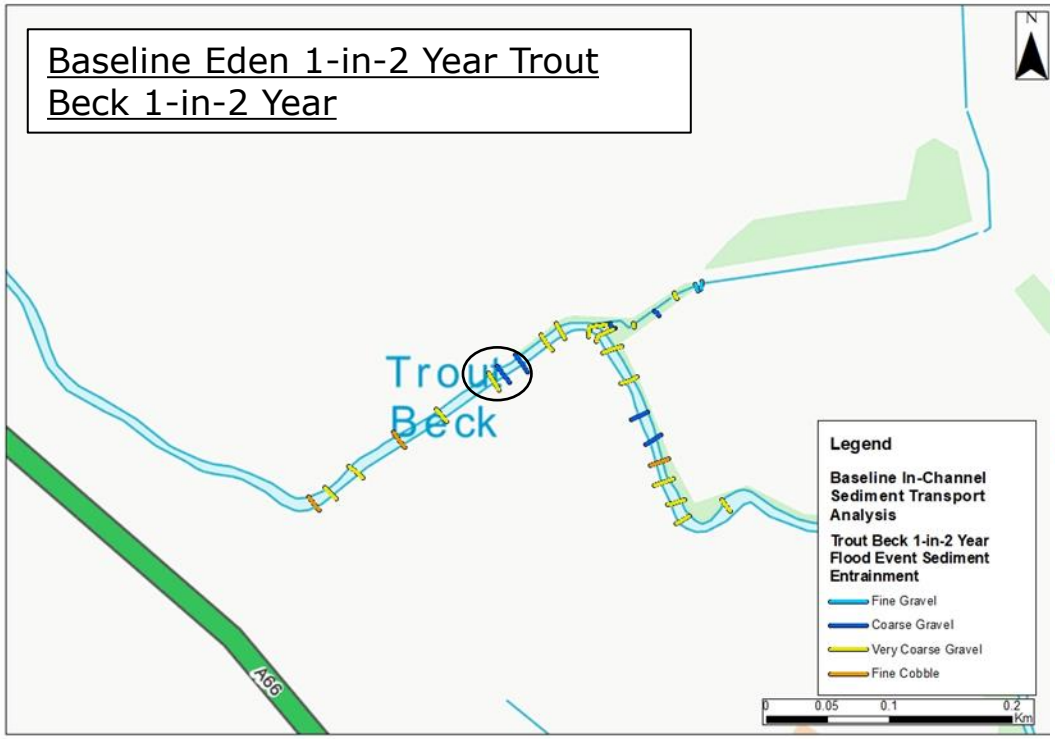
JBA consulting

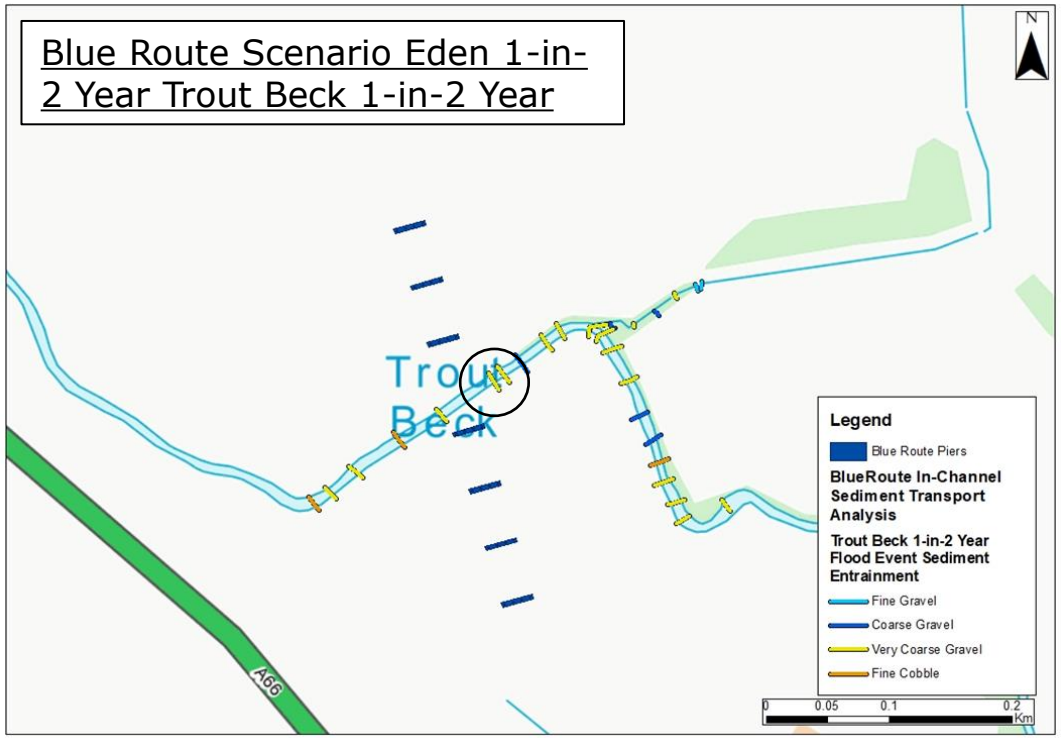
Potential risk posed to the Blue Route due to observed natural channel migration

The impact that the existing geomorphological conditions of the Trout Beck will have on the proposed Blue Route are presented within this figure.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769





Key Changes in Blue Route Scenario Compared to the Baseline

- Increase in the maximum size of sediment that can be entrained (from coarse gravel to very coarse gravel) upstream of the proposed route.

Implications for Riverbed Substrate Composition

- Site observations revealed that the typical bed substrate within the vicinity of the Blue Route piers ranges from gravels to cobbles. The hydraulic model results for this reach indicate that the maximum sediment size that can be entrained ranges between coarse gravels to fine cobbles. Apart from immediately upstream of the proposed route, there is unlikely to be a change to the bed substrate composition within the vicinity of the Blue Route.

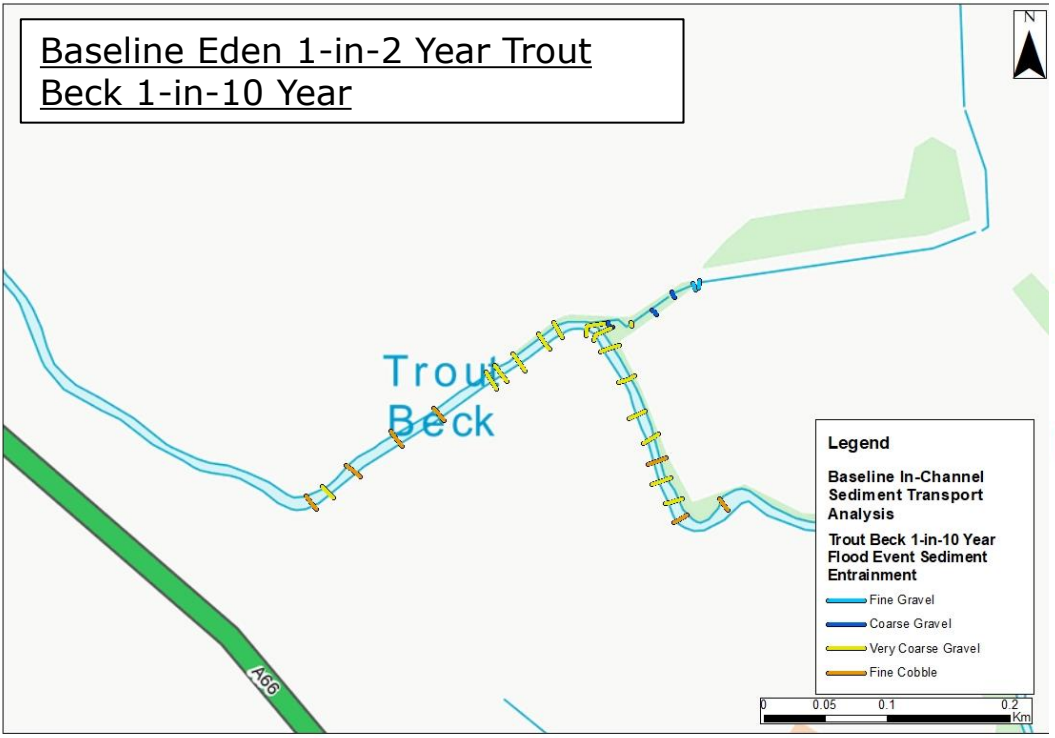
JBA consulting

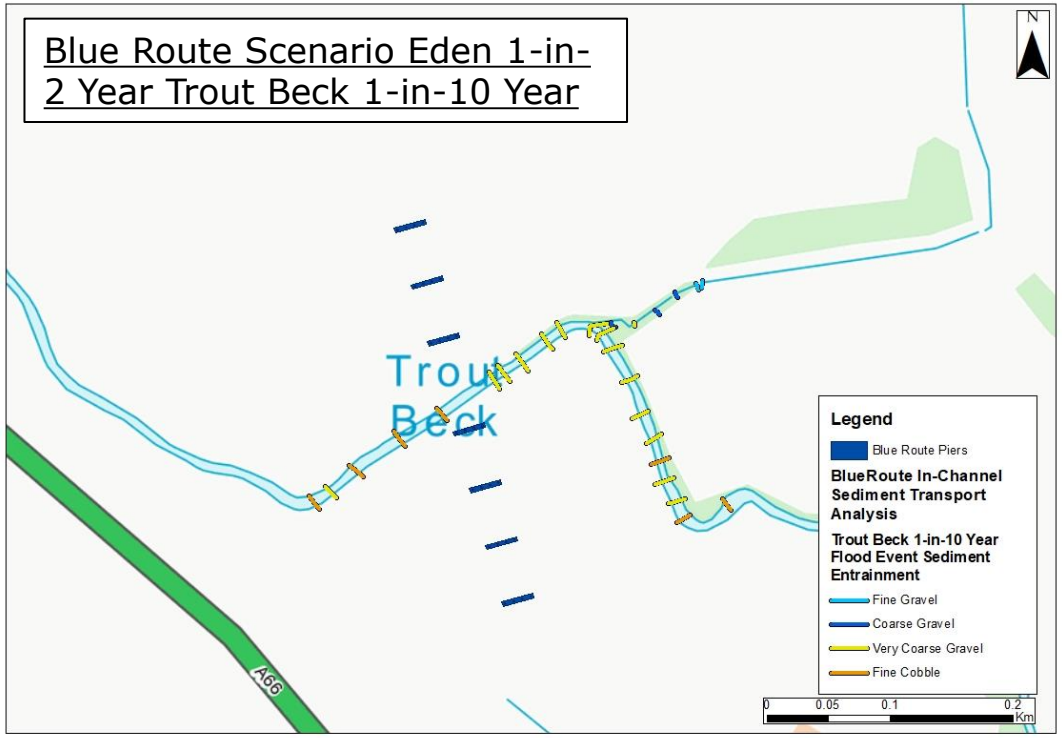
Blue Route: Comparison of hydraulically modelled sediment entrainment size for the Eden 1-in-2 Year and Trout Beck 1-in-2 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the riverbed substrate, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769





Key Changes in Blue Route Scenario Compared to the Baseline

- Negligible.

Implications for Riverbed Substrate Composition

- Site observations revealed that the typical bed substrate within the vicinity of the Blue Route piers ranges from gravels to cobbles. The hydraulic model results for this reach indicate that the maximum sediment size that can be entrained ranges between coarse gravels to fine cobbles. There is negligible change to the maximum sediment size that can be entrained in the Blue Route Scenario compared to the Baseline Scenario. The channel energy increases upstream of the Blue Route, however the change in energy is not significant enough to cause changes to the size of sediment moved on the riverbed. Therefore, there is unlikely to be any change to the bed substrate composition within the vicinity of the Blue Route.

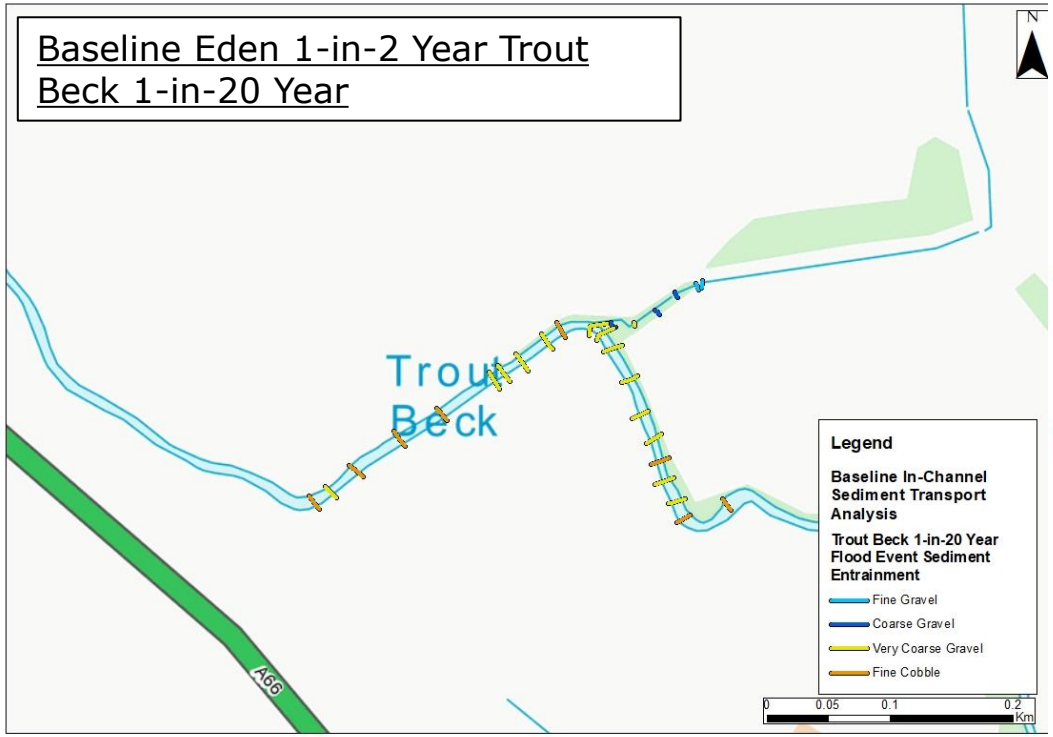
JBA consulting

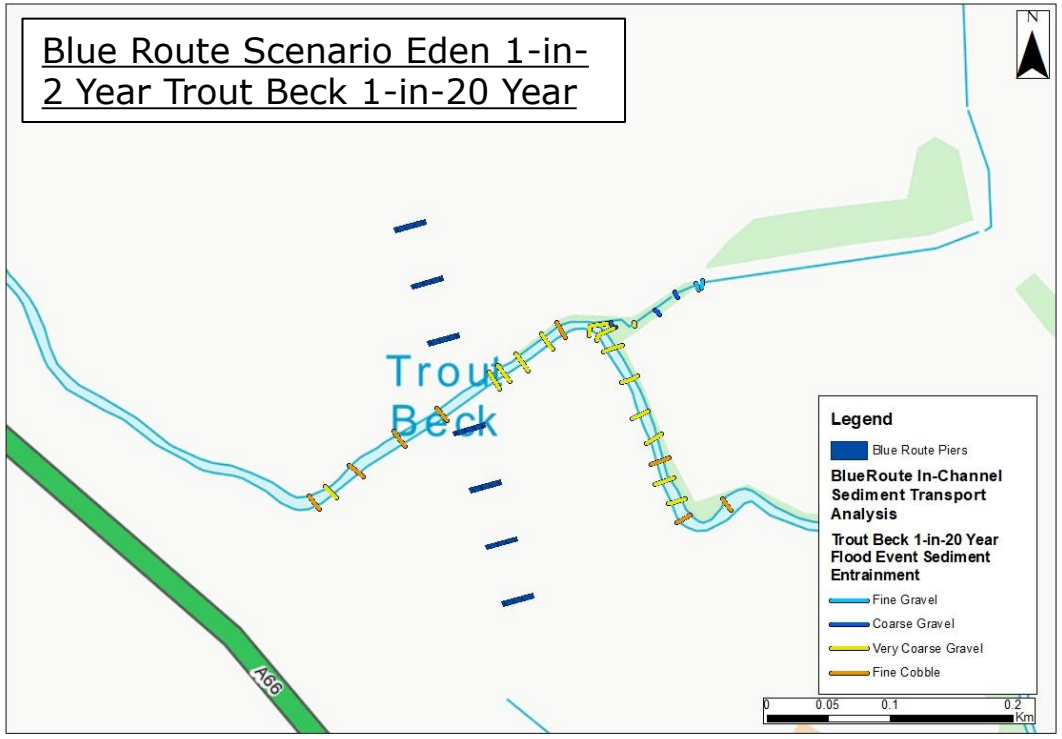
Blue Route: In Channel Sediment Entrainment Comparison for the Eden 1-in-2 Year Trout Beck 1-in-10 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the riverbed substrate, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769





Key Changes in Blue Route Scenario Compared to the Baseline

- Negligible.

Implications for Riverbed Substrate Composition

- Site observations revealed that the typical bed substrate within the vicinity of the Blue Route piers ranges from gravels to cobbles. The hydraulic model results for this reach indicate that the maximum sediment size that can be entrained ranges between coarse gravels to fine cobbles. As there is negligible change to the maximum sediment size that can be entrained in the Blue Route Scenario compared to the Baseline Scenario. The channel energy increases upstream of the Blue Route, however the change in energy is not significant enough to cause changes to the size of sediment moved on the riverbed. Therefore, there is unlikely to be any change to the bed substrate composition within the vicinity of the Blue Route.

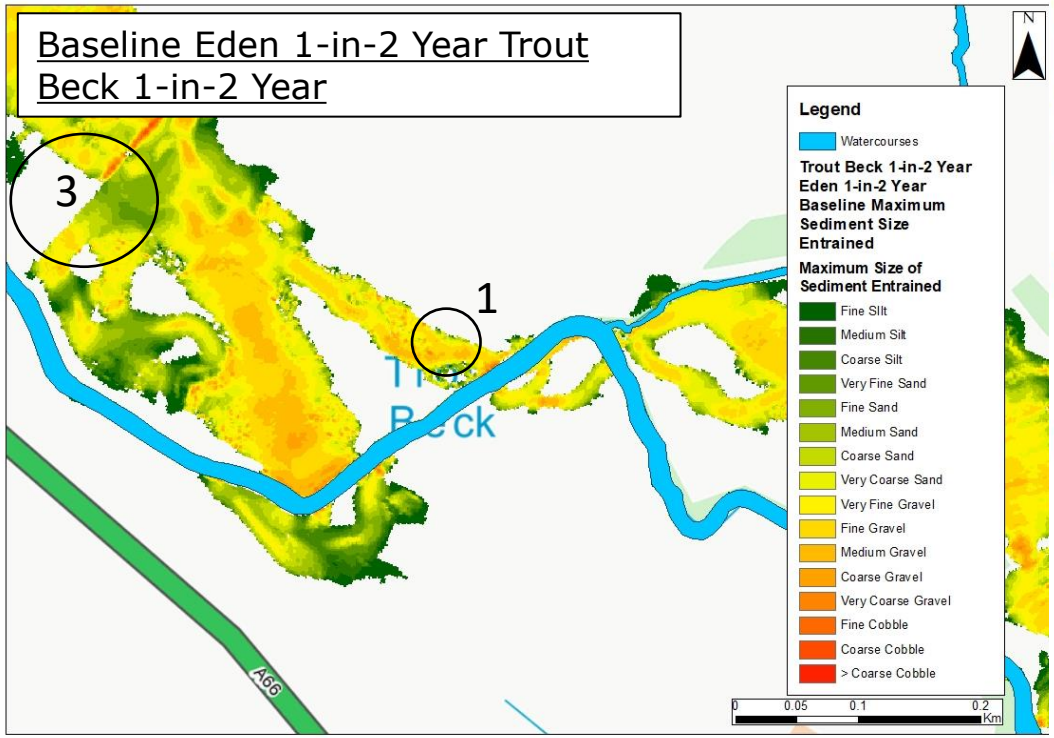
JBA consulting

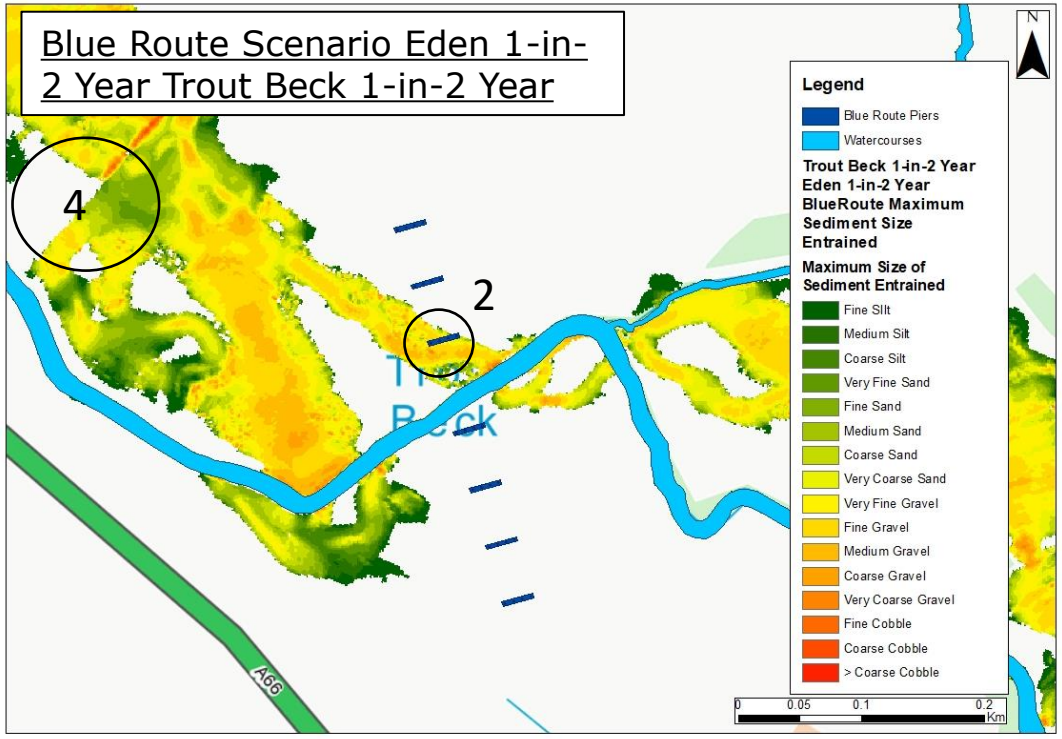
Blue Route: In Channel Sediment Entrainment Comparison for the Eden 1-in-2 Year Trout Beck 1-in-20 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the riverbed substrate, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Preliminary 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769





Key Changes in Blue Route Scenario Compared to the Baseline

- Minor increases in shear stress in the vicinity of the Blue Route piers (identified in circle 1 and 2) have been identified in the Blue Route Scenario compared to the Baseline Scenario, which results in a small increase in the size of material that can be mobilised.
- The out of bank flow route that passes through the Blue Route piers on the right bank of the Trout Beck remains unaffected in the Blue Route Scenario compared to the Baseline Scenario.
- The out of bank flow route on the right bank of the Trout Beck is disrupted by a farm access track (identified in circle 3 and 4). This remains in place in both the baseline and Blue Route Scenario.

Predicted Geomorphological Change

- These changes in the size of sediment that can be entrained are not significant enough to cause changes to the floodplain such as scour.

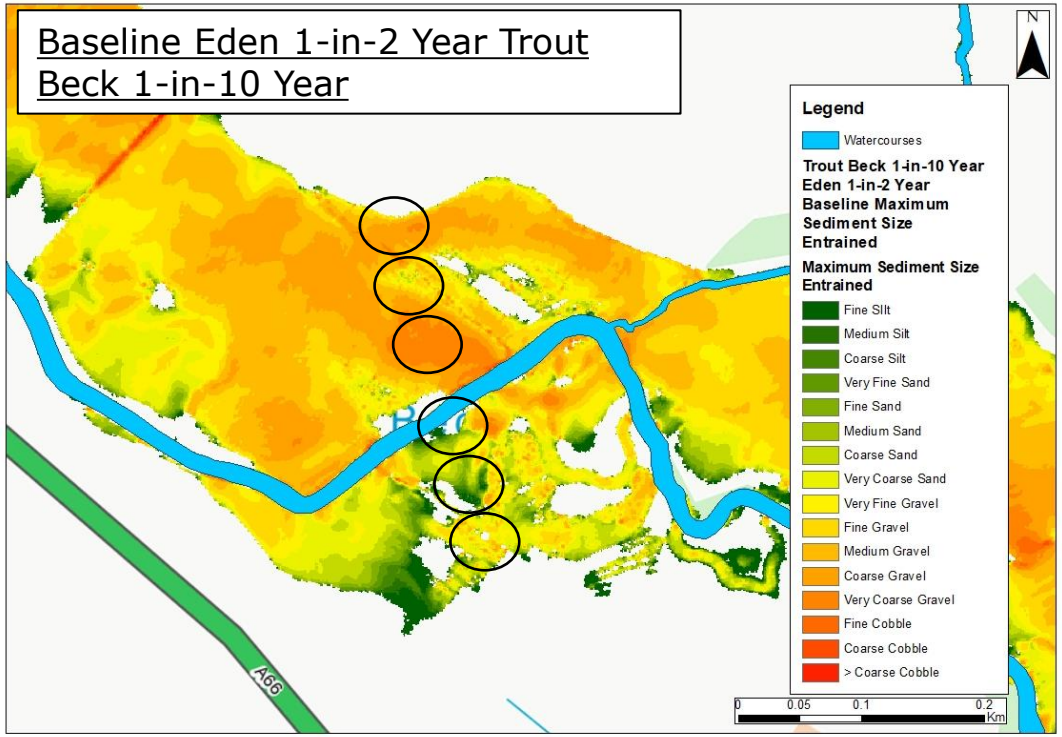
JBA consulting

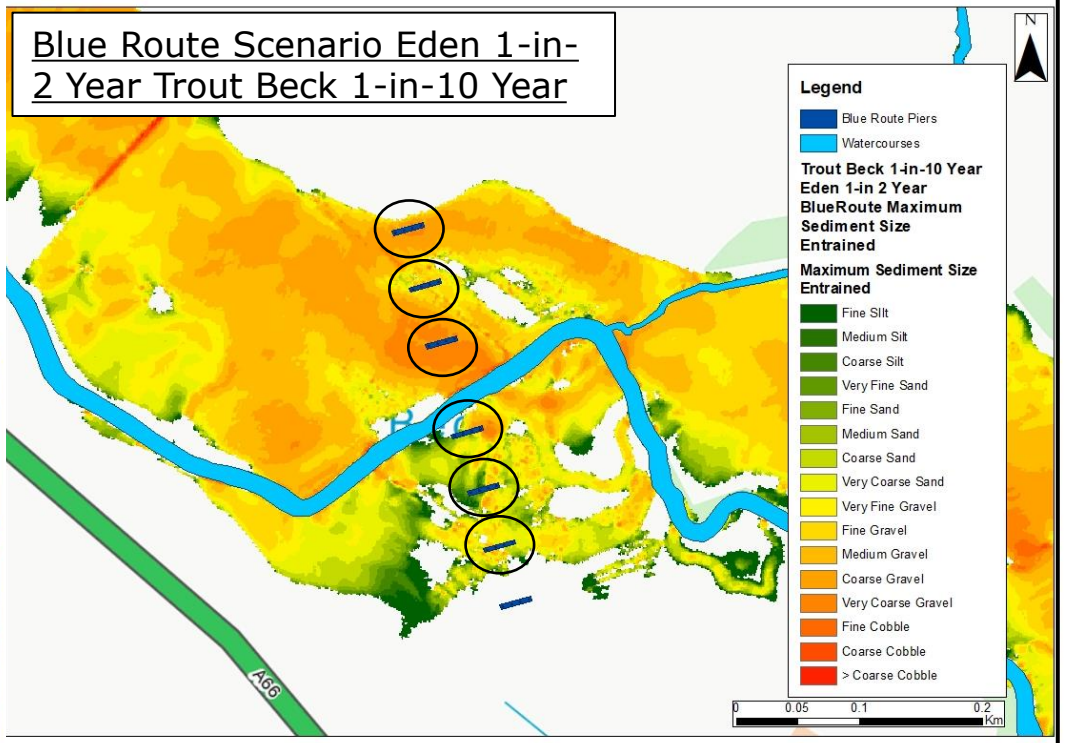
Blue Route: Floodplain Sediment Entrainment Comparison for the Eden 1-in-2 Year Trout Beck 1-in-2 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the material on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769





Key Changes in Blue Route Scenario Compared to the Baseline

- Minor increases in shear stress in the vicinity of the Blue Route piers (identified in the black circles) have been identified in the Blue Route Scenario compared to the Baseline Scenario, which results in a small increase in the size of material that can be mobilised.

Predicted Geomorphological Change

- These changes in the size of sediment that can be entrained are not significant enough to cause changes to the floodplain such as scour.

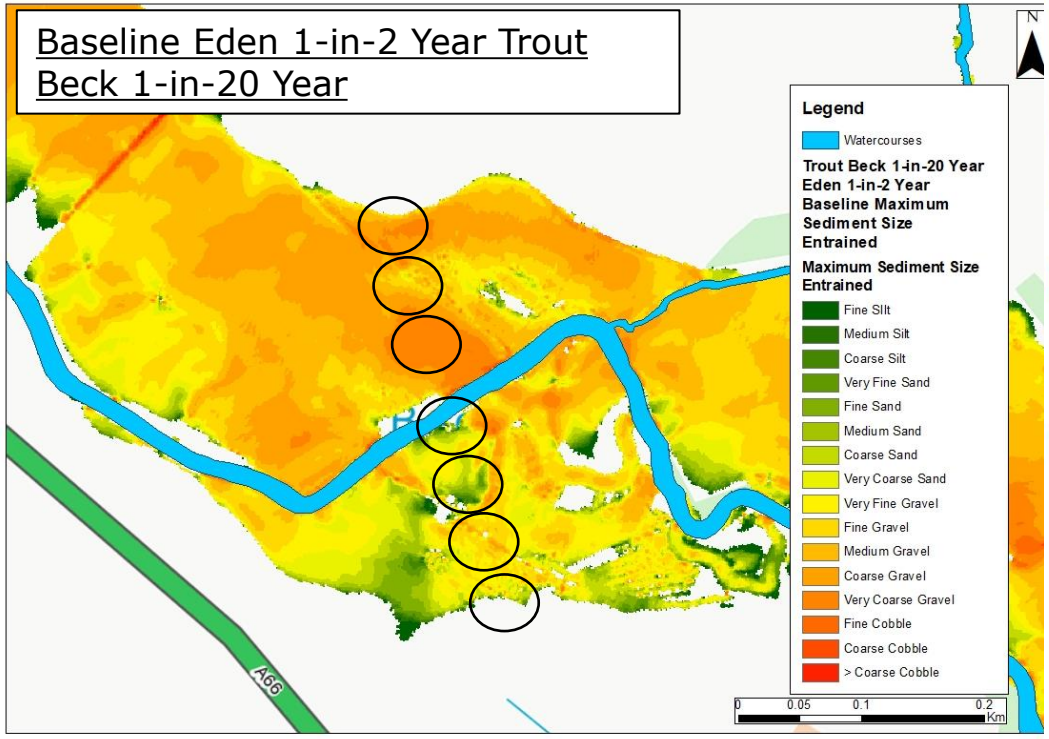
JBA consulting

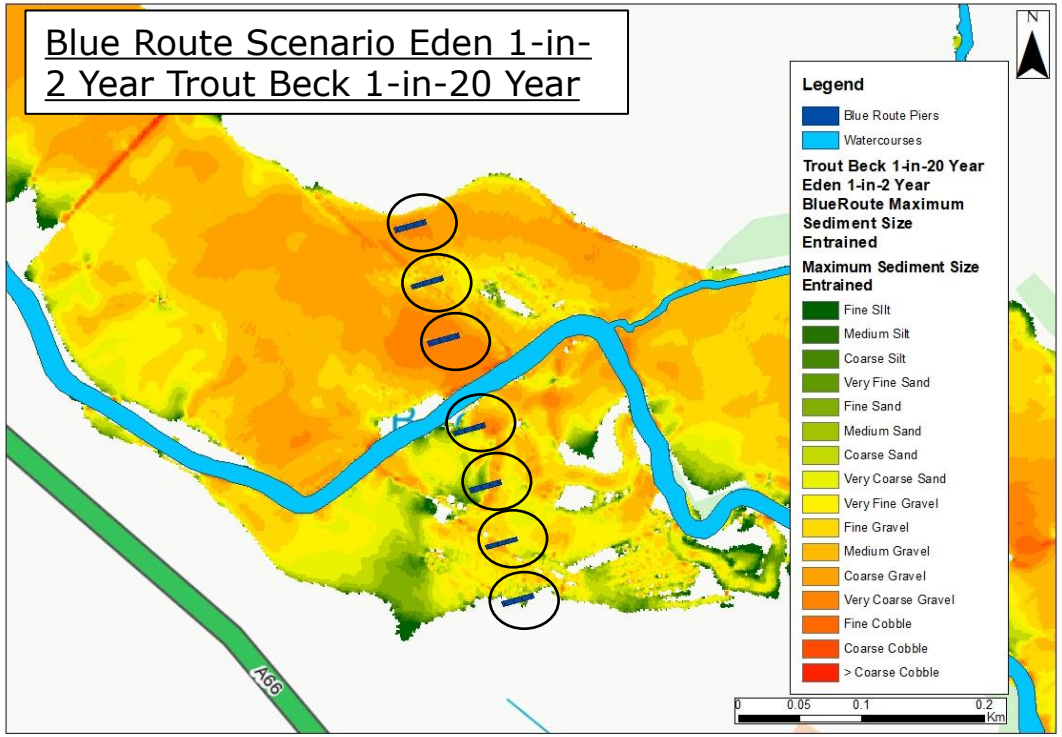
Blue Route: Floodplain Sediment Entrainment Comparison for the Eden 1-in-2 Year Trout Beck 1-in-10 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the material on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769





Key Changes in Blue Route Scenario Compared to the Baseline

- Minor increases in shear stress in the vicinity of the Blue Route piers (identified in the black circles) have been identified in the Blue Route Scenario compared to the Baseline Scenario, which results in a small increase in the size of material that can be mobilised.

Predicted Geomorphological Change

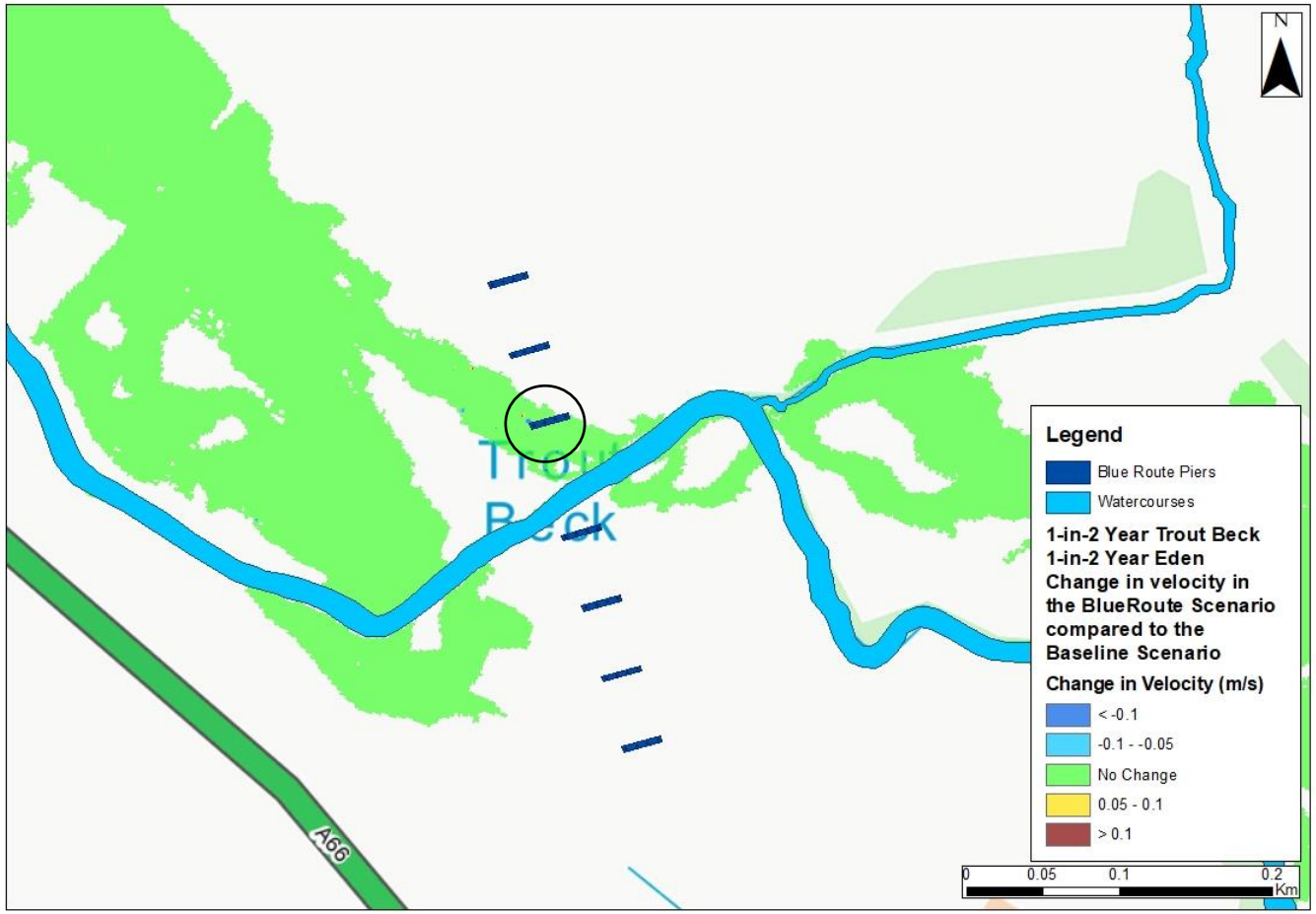
- These changes in the size of sediment that can be entrained are not significant enough to cause changes to the floodplain such as scour.

Blue Route: Floodplain Sediment Entrainment Comparison for the Eden 1-in-2 Year Trout Beck 1-in-20 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the material on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769



Key Changes in Blue Route Scenario Compared to the Baseline

- Localised minor changes in the flow velocities on the floodplain in the vicinity of the Blue Route pier closest to the right bank of the Trout Beck (indicated by the black circle). The flow is deflected off of the pier, which increases velocity as the flow passes around the pier.
- There are no other changes in flow velocities on the floodplain in this reach of the Trout Beck.

Predicted Geomorphological Change

- The changes to the flow velocities are not significant enough to cause scour in the vicinity of the pier. As such there is unlikely to be changes to the floodplain.
- In the areas of the floodplain that see no changes to flow velocities sediment transport dynamics are expected to remain the same.

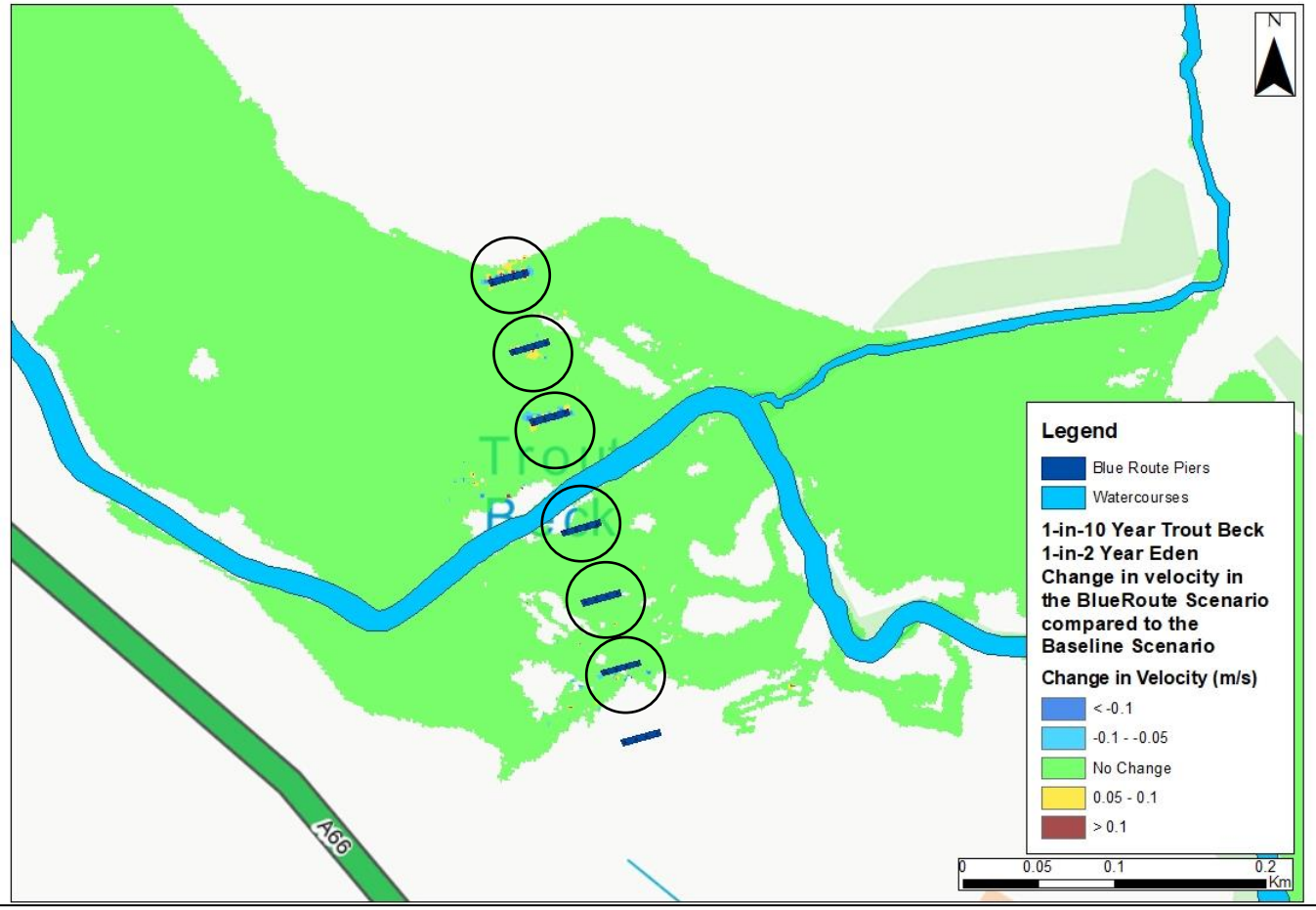
JBA consulting

Blue Route: Difference in floodplain velocities for the Eden 1-in-2 Year Trout Beck 1-in-2 Year Flood Event

A comparison of hydraulically modelled velocities to assess the potential impact erosion and scour on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769



Key Changes in Blue Route Scenario Compared to the Baseline

- Localised minor changes in the flow velocities on the floodplain in the vicinity of most of the Blue Route piers (indicated by the black circles). The flow is deflected off each of the of the piers, which increases velocity as the flow passes around the pier.
- There are no other changes in flow velocities on the floodplain in this reach of the Trout Beck.

Predicted Geomorphological Change

- The changes to the flow velocities are not significant enough to cause scour in the vicinity of each of the piers. As such there is unlikely to be changes to the floodplain.
- In the areas of the floodplain that see no changes to flow elocities sediment transport dynamics are expected to remain the same.

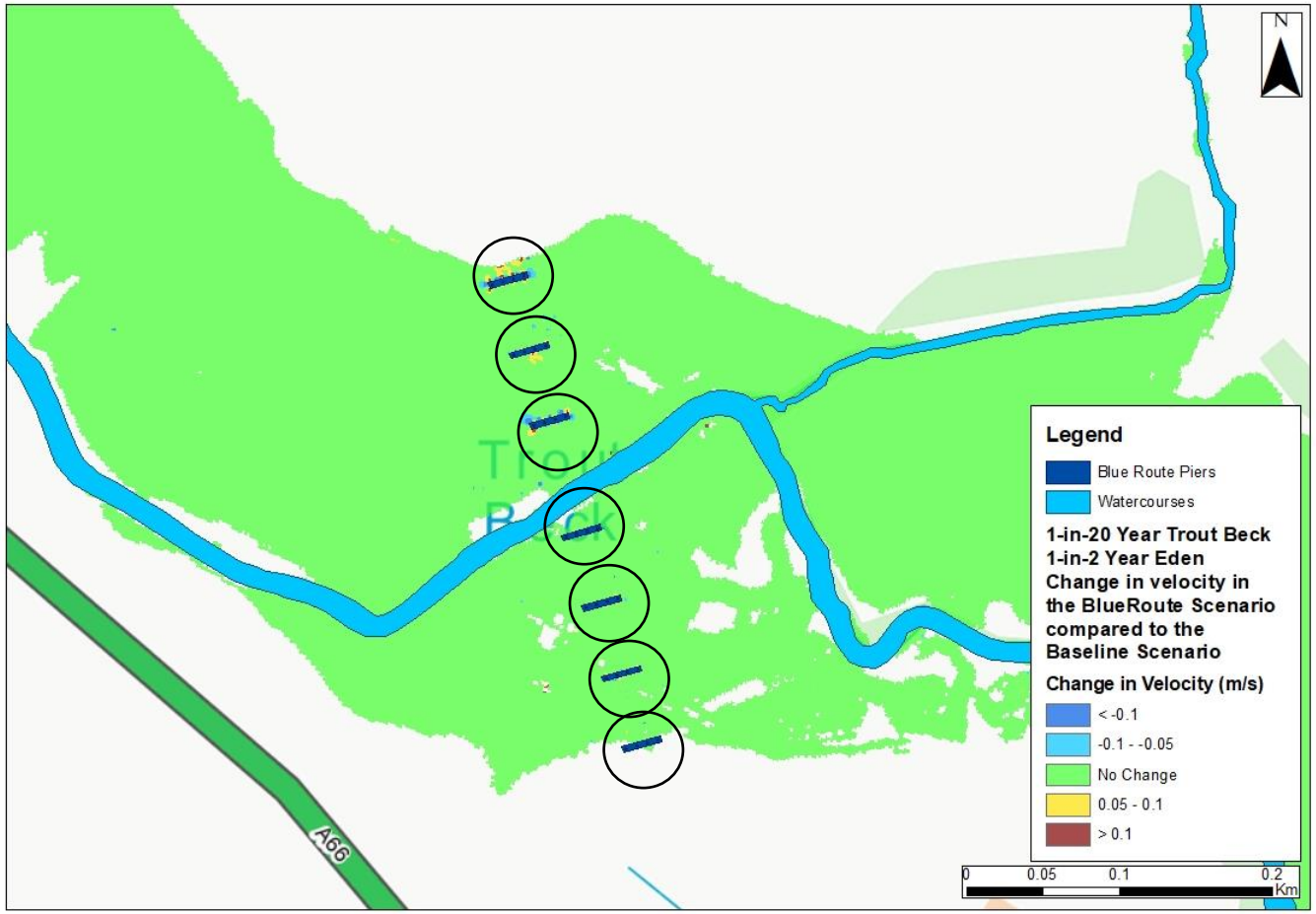
JBA consulting

Blue Route: Difference in floodplain velocities for the Eden 1-in-2 Year Trout Beck 1-in-10 Year Flood Event

A comparison of hydraulically modelled velocities to assess the potential impact erosion and scour on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769



Key Changes in Blue Route Scenario Compared to the Baseline

- Localised minor changes in the flow velocities on the floodplain in the vicinity of all the Blue Route piers (indicated by the black circles). The flow is deflected off each of the of the piers, which increases velocity as the flow passes around the pier.
- There are no other changes in flow velocities on the floodplain in this reach of the Trout Beck.

Predicted Geomorphological Change

- The changes to the flow velocities are not significant enough to cause scour in the vicinity of each of the piers. As such there is unlikely to be changes to the floodplain.
- In the areas of the floodplain that see no changes to flow velocities sediment transport dynamics are expected to remain the same.

JBA consulting

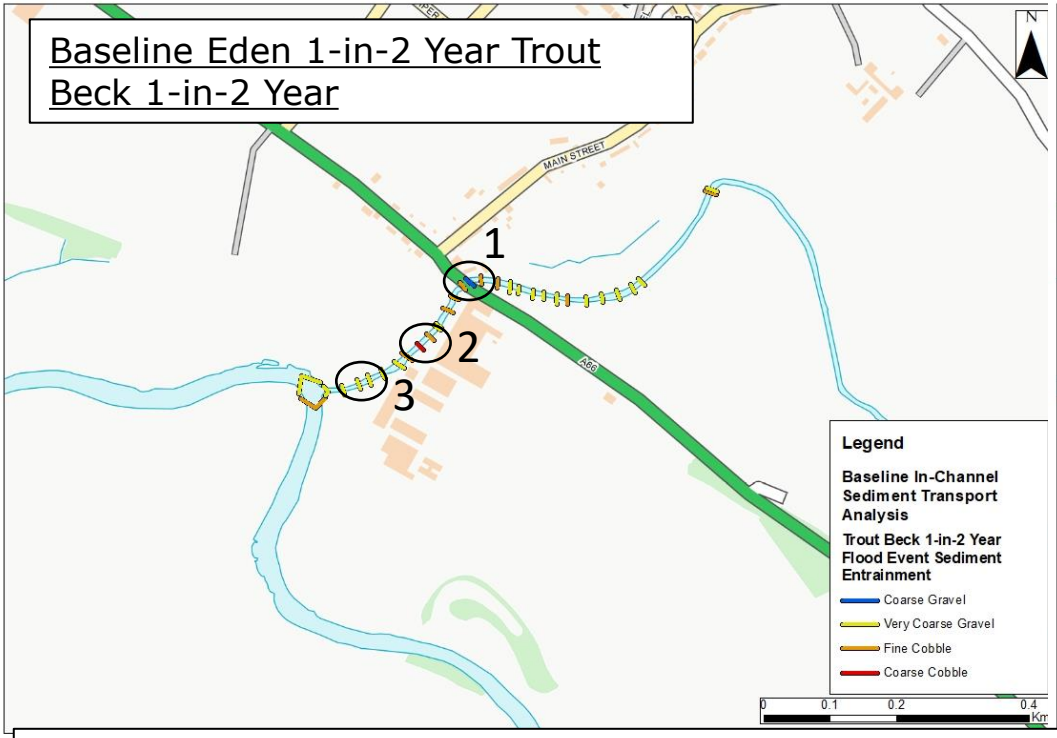
Blue Route: Difference in floodplain velocities for the Eden 1-in-2 Year Trout Beck 1-in-20 Year Flood Event

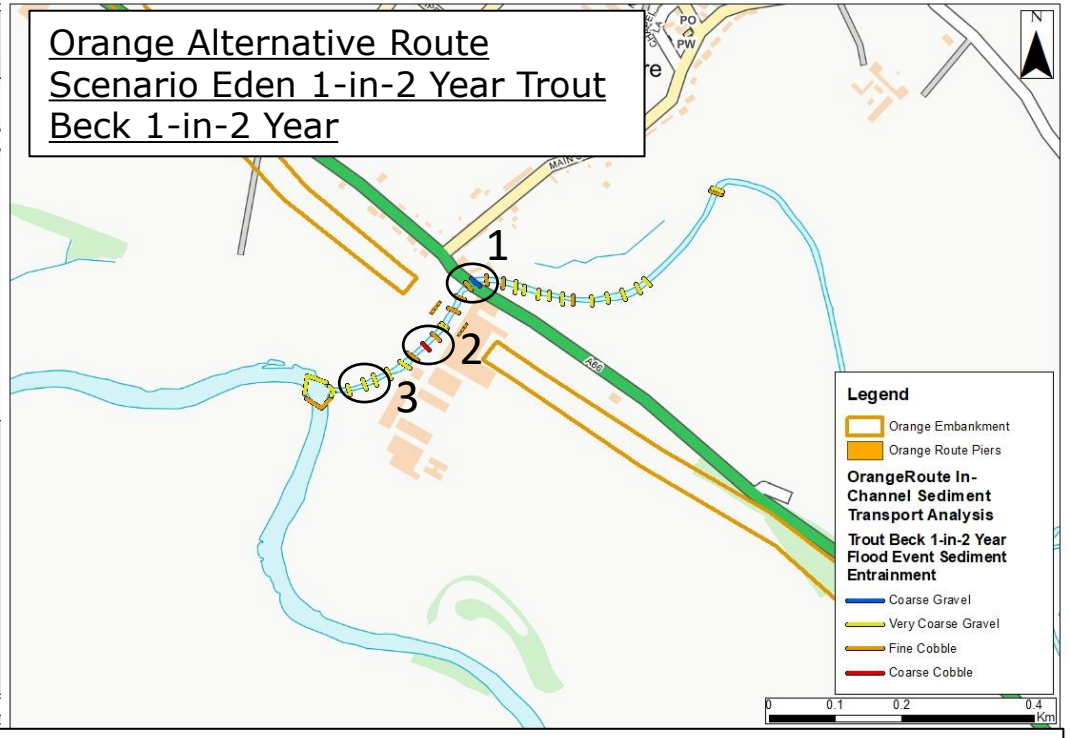
A comparison of hydraulically modelled velocities to assess the potential impact erosion and scour on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769

Analysis of Orange Alternative Route Results





Key Changes in Orange Alternative Route Scenario Compared to the Baseline

- Negligible.
- In-channel shear stress decreases upstream of the existing road bridge as the structure controls the flow and water level immediately upstream (black circle 1). This causes a decrease in the maximum size of sediment that can be mobilised (coarse gravel) compared to very coarse gravel and cobbles elsewhere.
- In-channel shear stress increases in the vicinity of black circle 2, as the channel gradient increases significantly in this area. This provides the watercourse with sufficient energy to mobilise coarse cobbles.
- In-channel energy reduces upstream of the confluence with the Eden (black circle 3), as the Eden water level impounds water levels in the Trout Beck and reduces velocities. This causes a drop in the maximum size of sediment that can be mobilised (very coarse gravel) compared to cobbles upstream of this impoundment.

Implications for Riverbed Substrate Composition

- Site observations revealed that the typical bed substrate within the vicinity of the Orange Alternative Route ranges from gravels to cobbles. The hydraulic model results indicate that the maximum sediment size that can be entrained ranges between coarse gravels to fine cobbles. Whilst there are in-channel shear stress increases in the vicinity of the Orange Alternative Route, the change is not significant enough to impact the size of sediment entrained. Therefore, there is unlikely to be any change to the bed substrate composition.

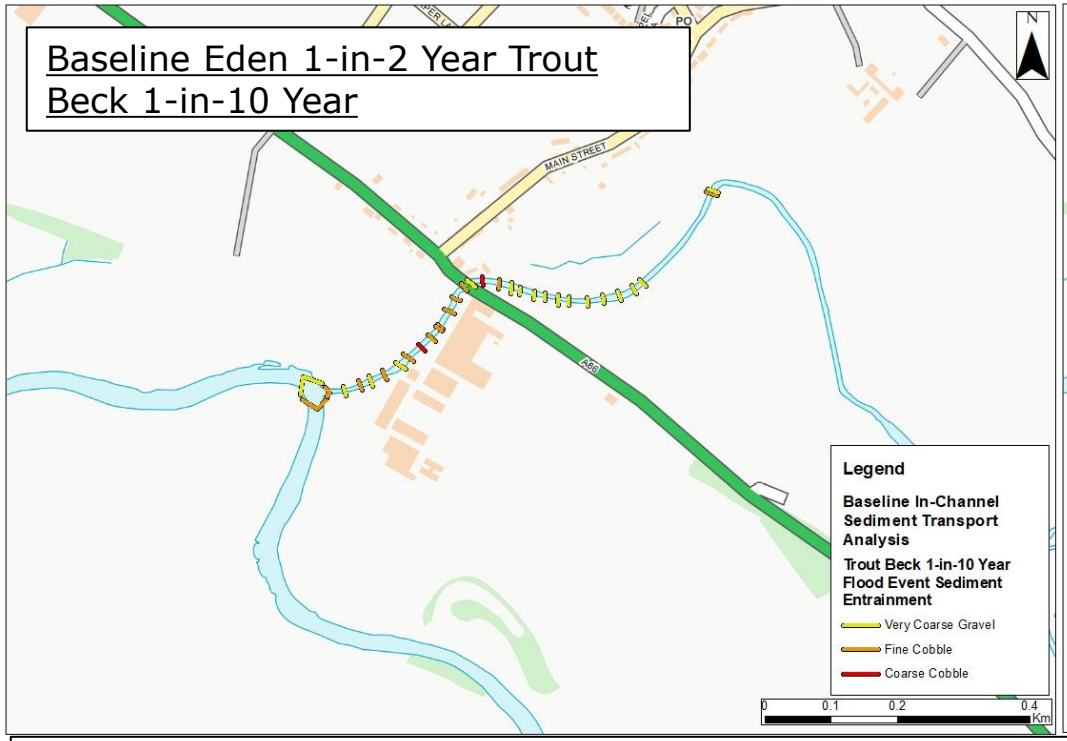
JBA consulting

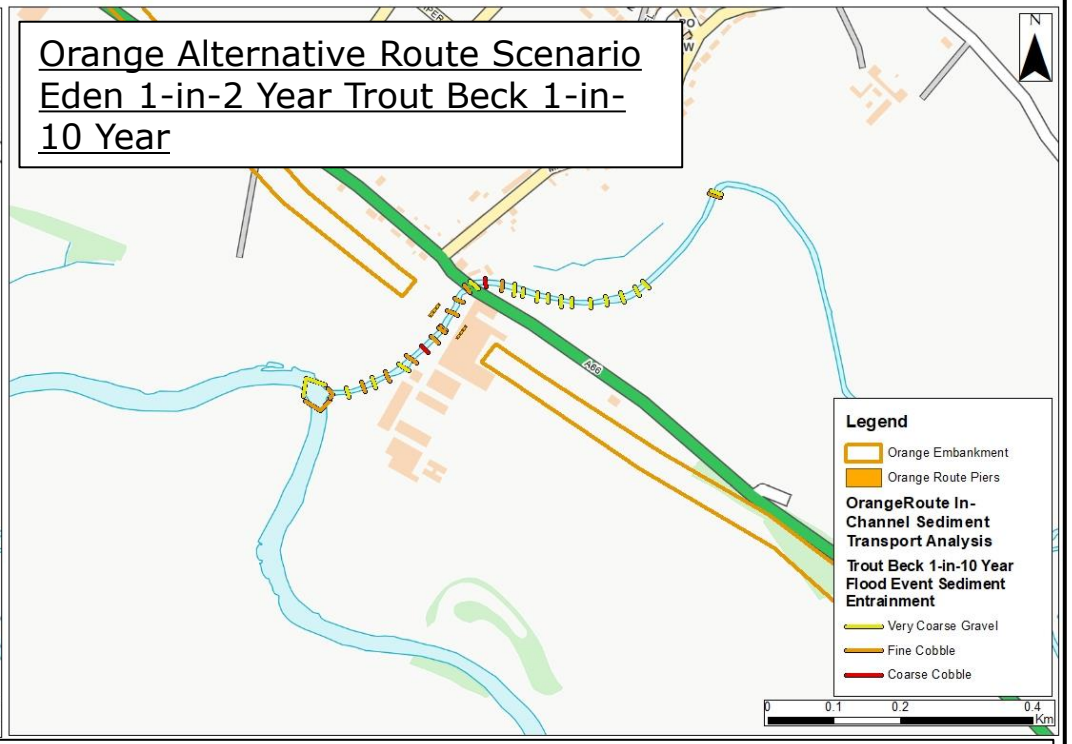
Orange Alternative Route: Comparison of hydraulically modelled sediment entrainment size for the Eden 1-in-2 Year and Trout Beck 1-in-2 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the riverbed substrate, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Preliminary 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769





Key Changes in Orange Alternative Route Scenario Compared to the Baseline

- Negligible.

Implications for Riverbed Substrate Composition

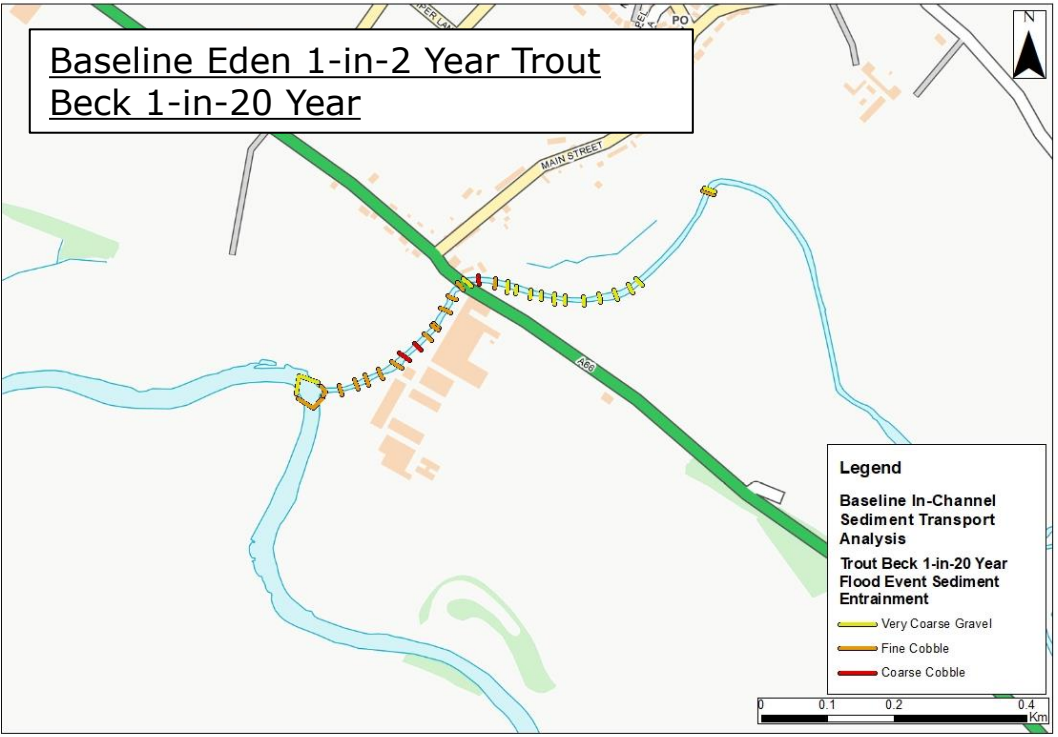
- Site observations revealed that the typical bed substrate within the vicinity of the Orange Alternative Route ranges from gravels to cobbles. The hydraulic model results for this reach indicate that the maximum sediment size that can be entrained ranges between coarse gravels to fine cobbles. Whilst there are in-channel shear stress increases in the vicinity of the Orange Alternative Route, the change is not significant enough to impact the size of sediment moved on the riverbed. Therefore, there is unlikely to be any change to the bed substrate composition.

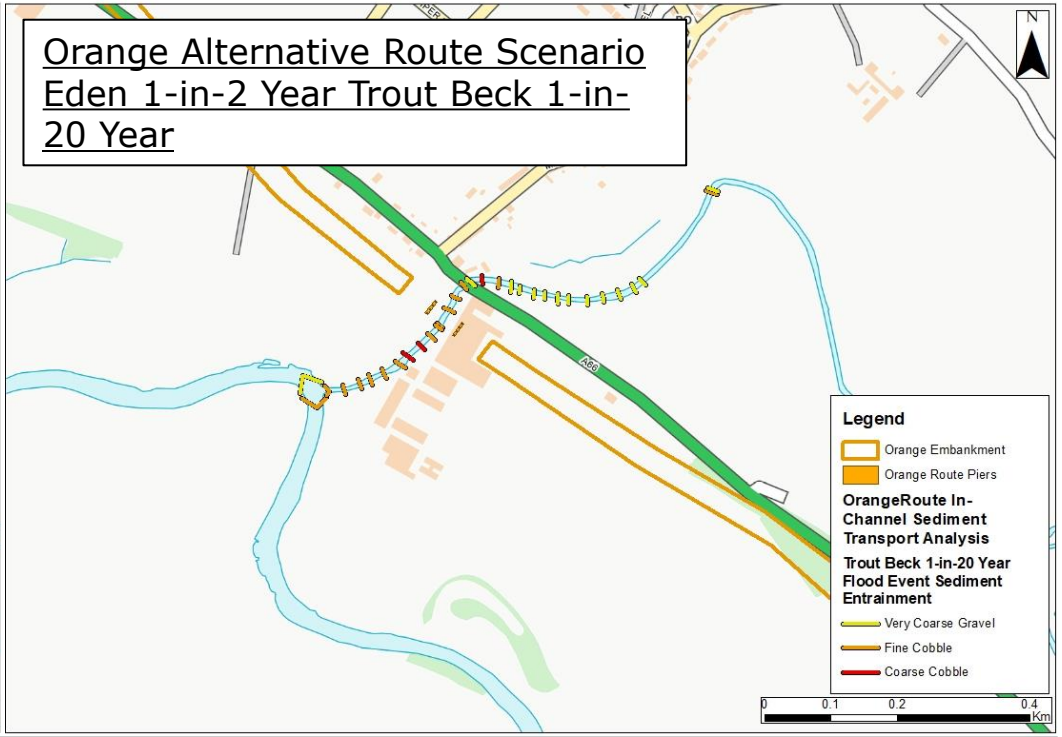
Orange Alternative Route: Comparison of hydraulically modelled sediment entrainment size for the Eden 1-in-2 Year and Trout Beck 1-in-10 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the riverbed substrate, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Preliminary 20/08/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769





Key Changes in Orange Alternative Route Scenario Compared to the Baseline

- Negligible.

Implications for Riverbed Substrate Composition

- Site observations revealed that the typical bed substrate within the vicinity of the Orange Alternative Route ranges from gravels to cobbles. The hydraulic model results for this reach indicate that the maximum sediment size that can be entrained ranges between coarse gravels to fine cobbles. Whilst there are in-channel shear stress increases in the vicinity of the Orange Alternative Route, the change is not significant enough to impact the size of sediment moved on the riverbed. Therefore, there is unlikely to be any change to the bed substrate composition.

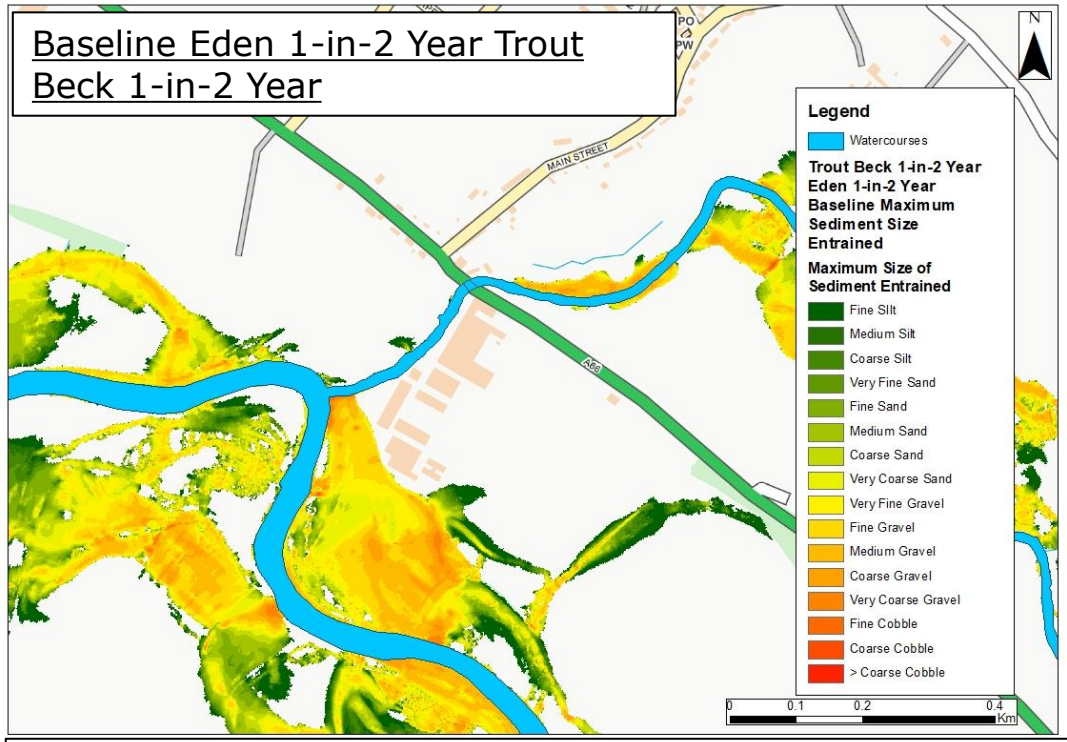
Orange Alternative Route: Comparison of hydraulically modelled sediment entrainment size for the Eden 1-in-2 Year and Trout Beck 1-in-20 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the riverbed substrate, for existing baseline conditions and predicted future change.

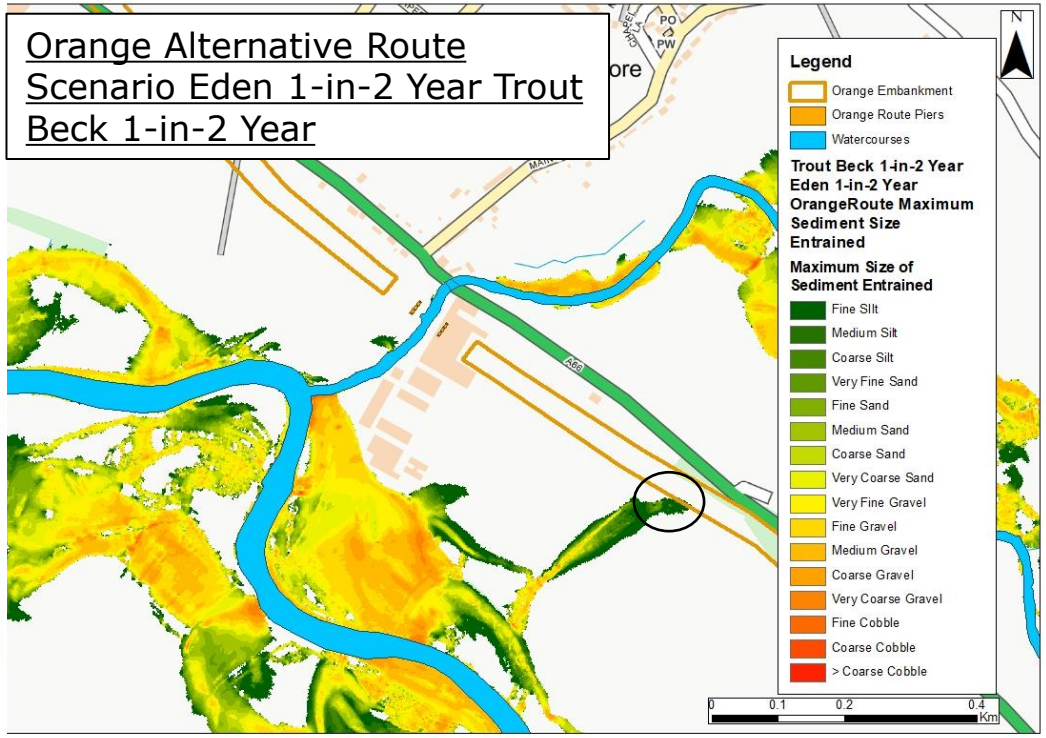
Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769

Baseline Eden 1-in-2 Year Trout Beck 1-in-2 Year



Orange Alternative Route Scenario Eden 1-in-2 Year Trout Beck 1-in-2 Year



Key Changes in Orange Alternative Route Scenario Compared to the Baseline

- There are minor changes associated with the Orange Alternative Route embankment reducing the extent of flooding on the left bank floodplain of the Trout Beck (indicated with the black circle)
- In all other areas, the Orange Alternative Route has no impact on the modelled shear stress and therefore no impact on the size of material that can be mobilised on the floodplain.

Predicted Geomorphological Change

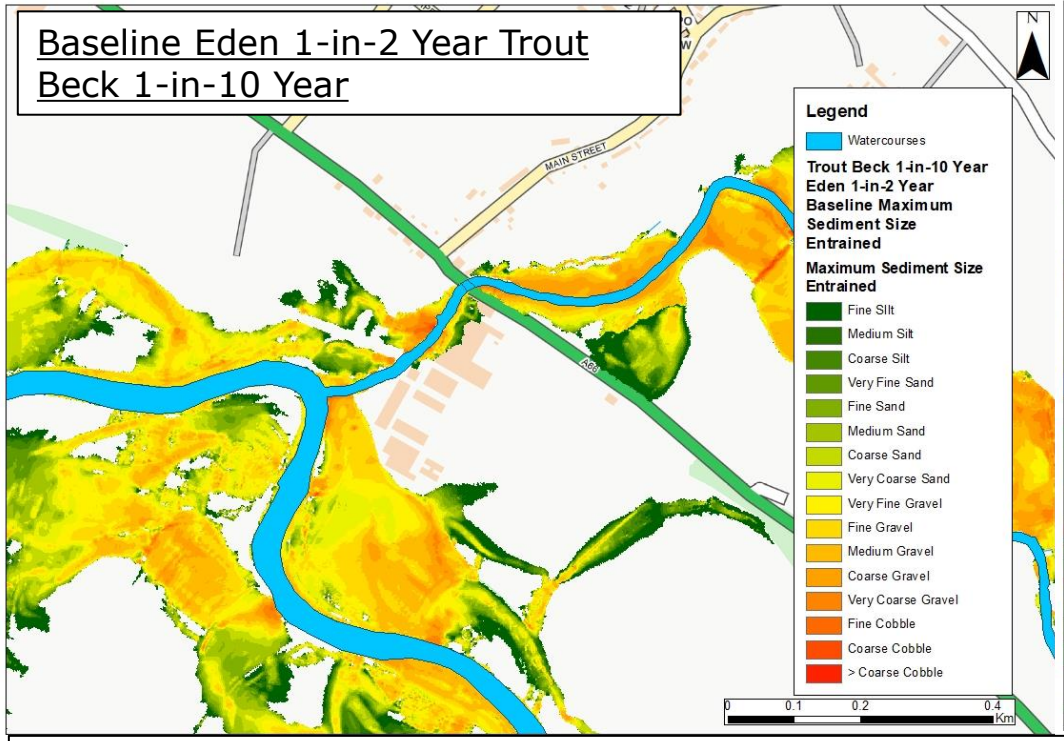
- The Orange Alternative Route will have no impact on the composition of the floodplain in this flood event.

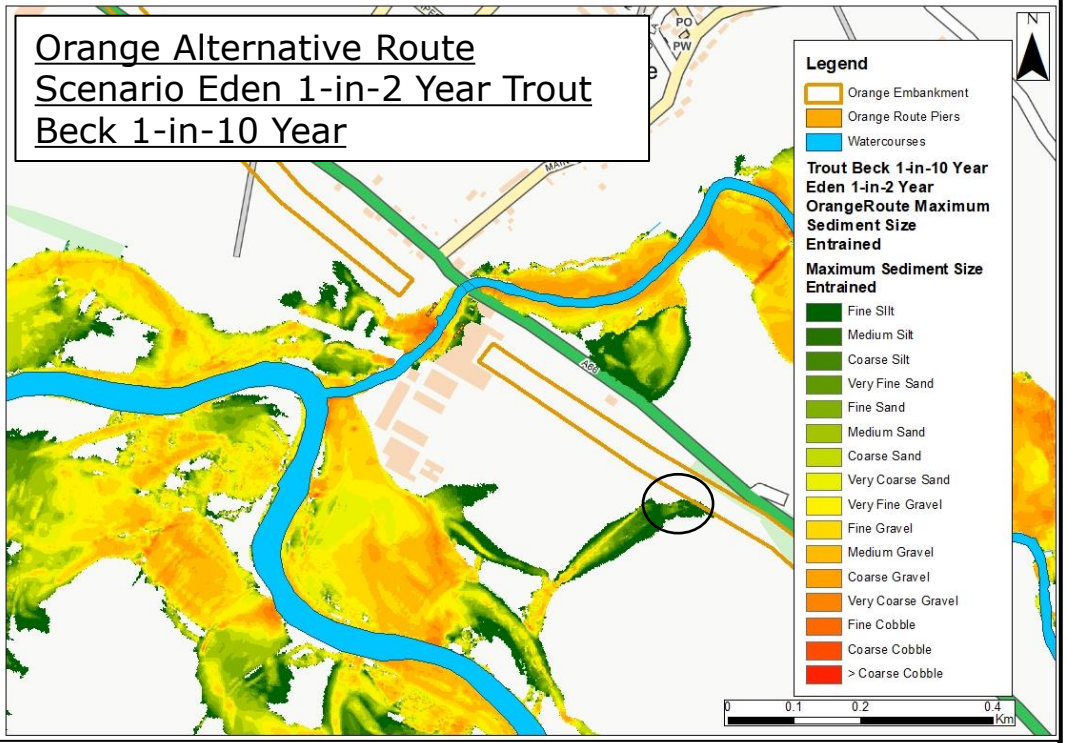
Orange Alternative Route: Floodplain Sediment Entrainment Comparison for the Eden 1-in-2 Year Trout Beck 1-in-2 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the material on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769





Key Changes in Orange Alternative Route Scenario Compared to the Baseline

- There are minor changes associated with the Orange Alternative Route embankment reducing the extent of flooding on the left bank floodplain of the Trout Beck (indicated with the black circle)
- In all other areas, the Orange Alternative Route has no impact on the modelled shear stress and therefore no impact on the size of material that can be mobilised on the floodplain.

Predicted Geomorphological Change

- The Orange Alternative Route will have no impact on the composition of the floodplain in this flood event.

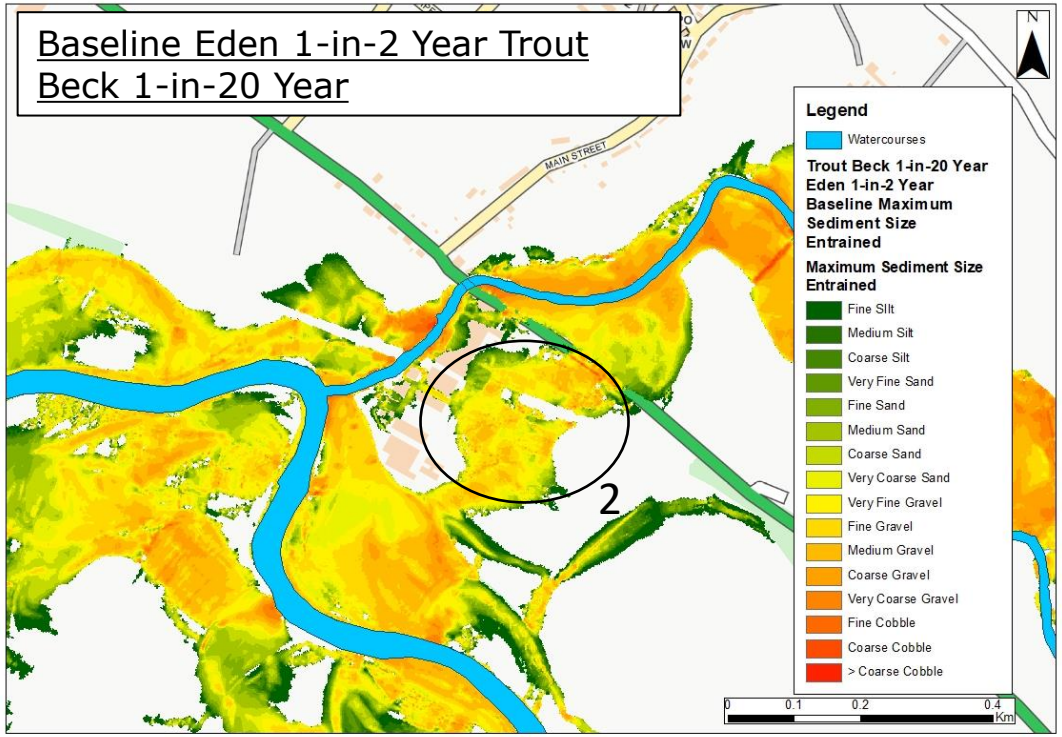
JBA consulting

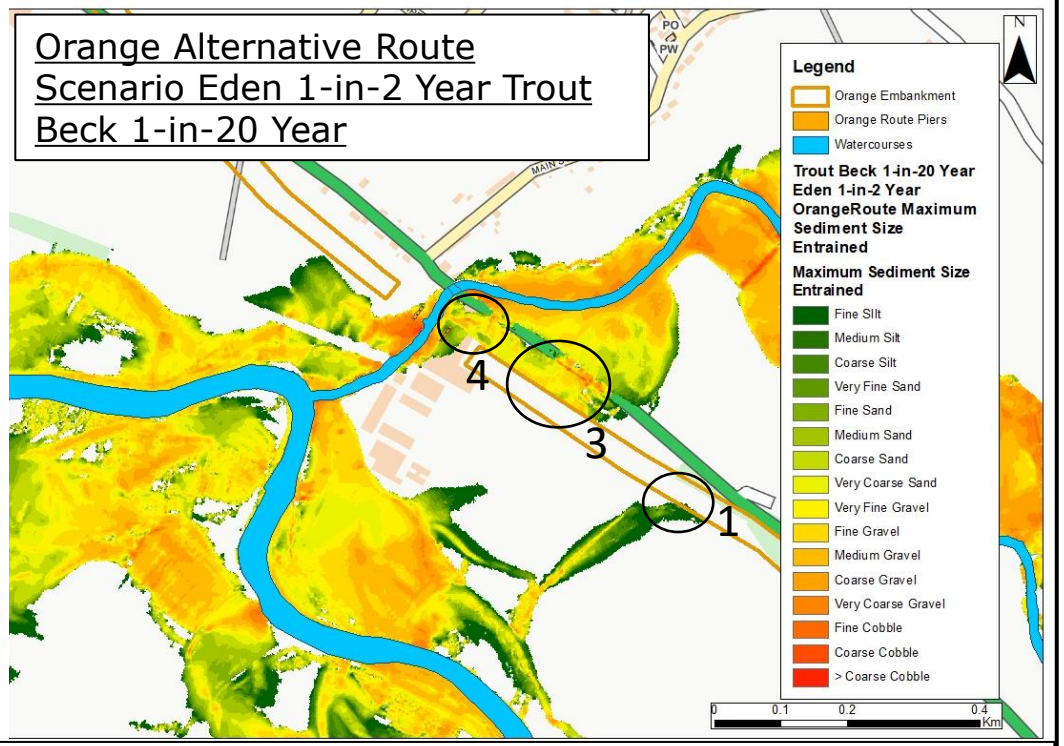
Orange Alternative Route: Floodplain Sediment Entrainment Comparison for the Eden 1-in-2 Year Trout Beck 1-in-10 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the material on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769





Key Changes in Orange Alternative Route Scenario Compared to the Baseline

- There are minor changes associated with the Orange Alternative Route embankment reducing the extent of flooding on the left bank floodplain of the Trout Beck (indicated black circle 1).
- The out of bank flow route on the left bank floodplain of the Trout Beck (indicated by black circle 2) is cut off by the Orange Alternative Route embankment (indicated by black circle 3). This out of bank flow route is then diverted into the Trout Beck at black circle 4. Modelled shear stress on the floodplain immediately upstream of the Orange Alternative Route embankment and on the left bank of the Trout Beck increases as the surface water flow is forced into the Trout Beck. This results in an increase in the size of sediment that can be mobilised (from sands and gravels to gravels and cobbles).
- In all other areas the Orange Alternative Route has no impact on shear stress and therefore no impact on the size of material that can be mobilised on the floodplain.

Predicted Geomorphological Change

- The increase in flow energy immediately upstream of the Orange Alternative Route embankment has the potential to scour floodplain material. The floodplain is occupied by a mixture of arable farmland farm buildings in this area. The increase in flow energy at black circle 2 and 3 will be sufficient to scour the grass and topsoil material, leading to an increase in sediment input into the River Eden and lead to bank stability issues on the Trout Beck.

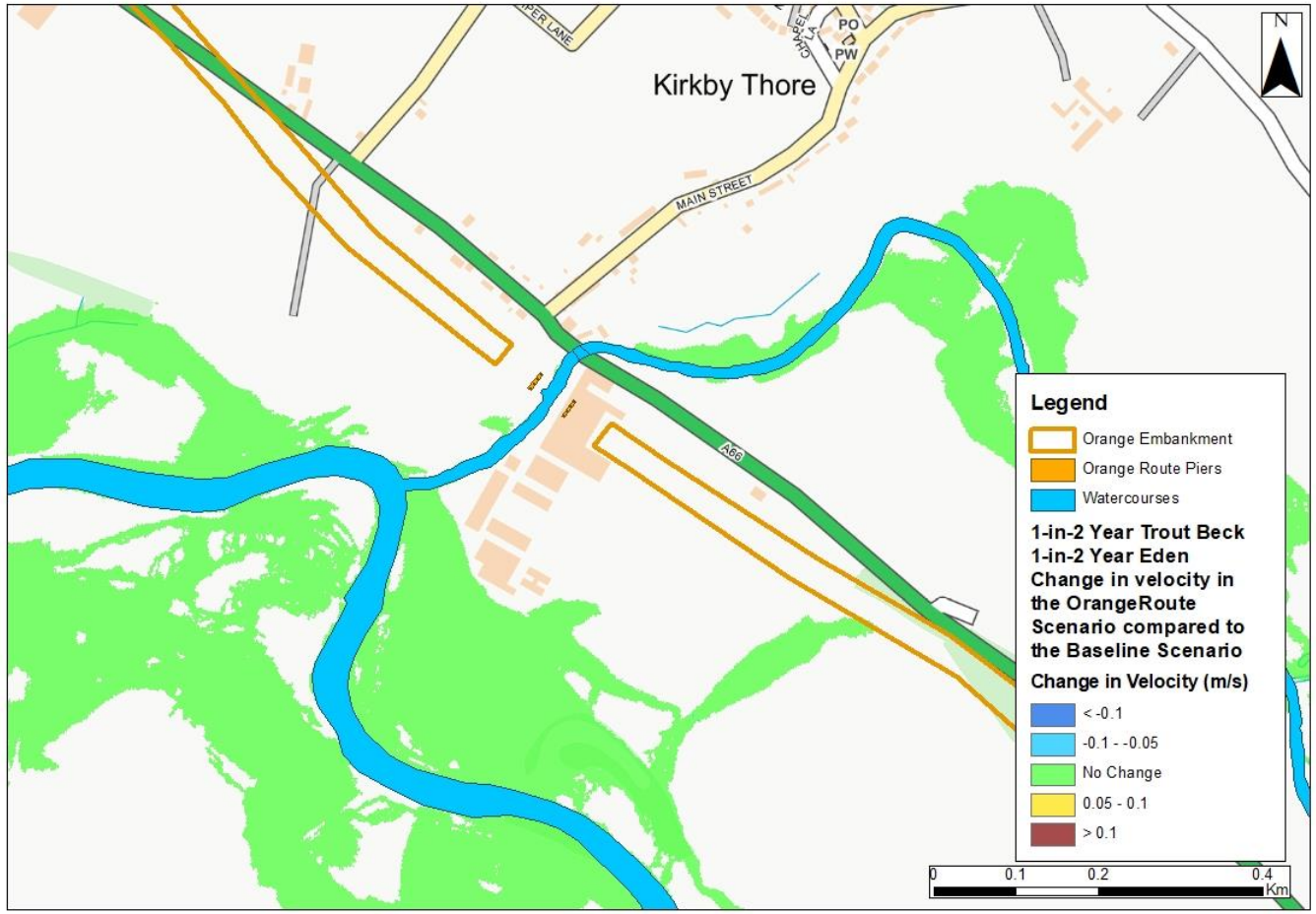
JBA consulting

Orange Alternative Route: Floodplain Sediment Entrainment Comparison for the Eden 1-in-2 Year Trout Beck 1-in-20 Year Flood Event

A comparison of hydraulically modelled sediment entrainment size, to assess the potential impact to the material on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769



Key Changes in the Orange Alternative Route Scenario Compared to the Baseline

- There are no changes in flow velocities on the floodplain in this reach of the Trout Beck.

Predicted Geomorphological Change

- The condition of the floodplain and sediment transport dynamics are expected to remain the same.

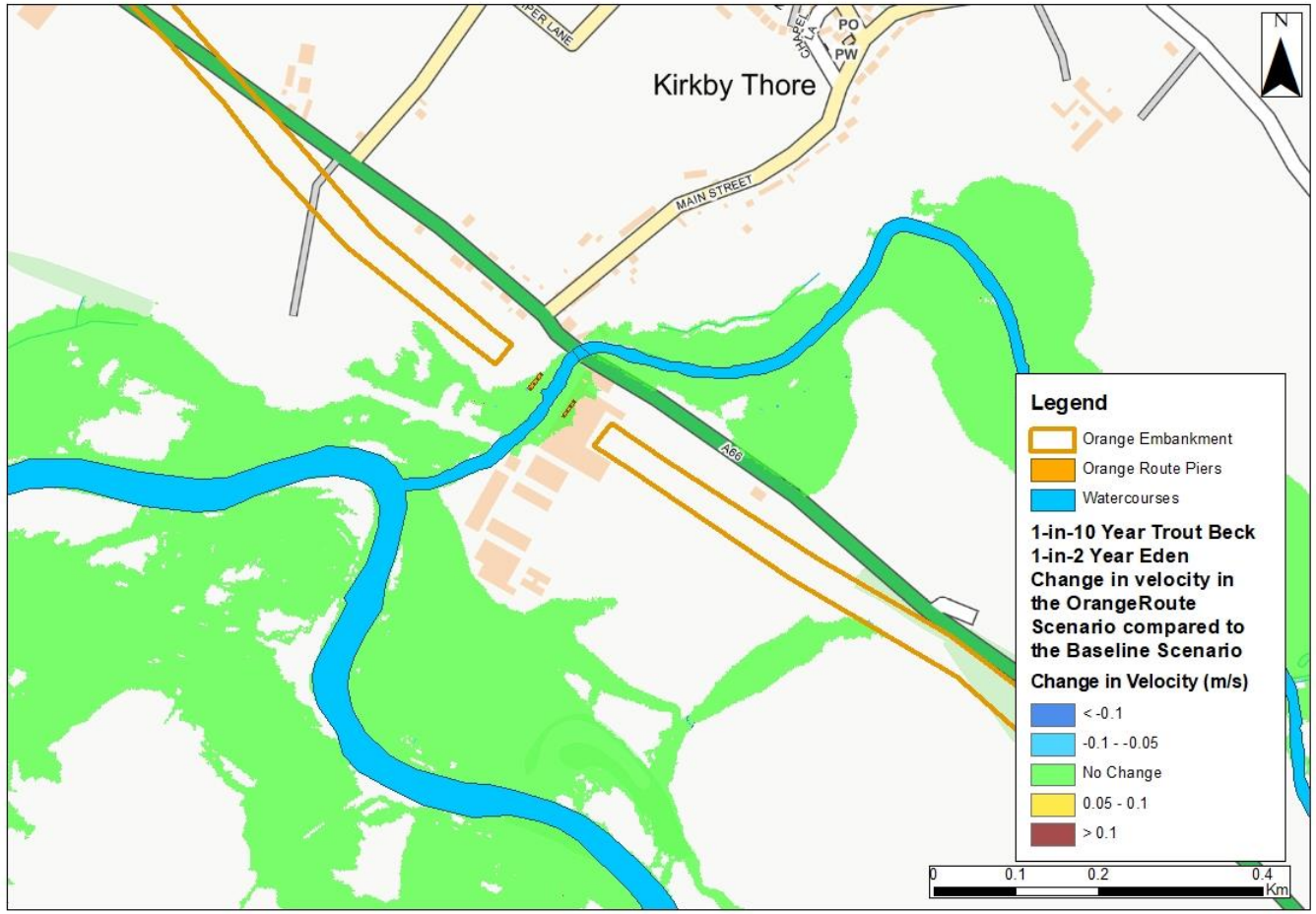
JBA consulting

Orange Alternative Route: Difference in floodplain velocities for the Eden 1-in-2 Year Trout Beck 1-in-2 Year Flood Event

A comparison of hydraulically modelled velocities to assess the potential impact erosion and scour on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769



Key Changes in the Orange Alternative Route Scenario Compared to the Baseline

- There are no changes in flow velocities on the floodplain in this reach of the Trout Beck.

Predicted Geomorphological Change

- The condition of the floodplain and sediment transport dynamics are expected to remain the same.

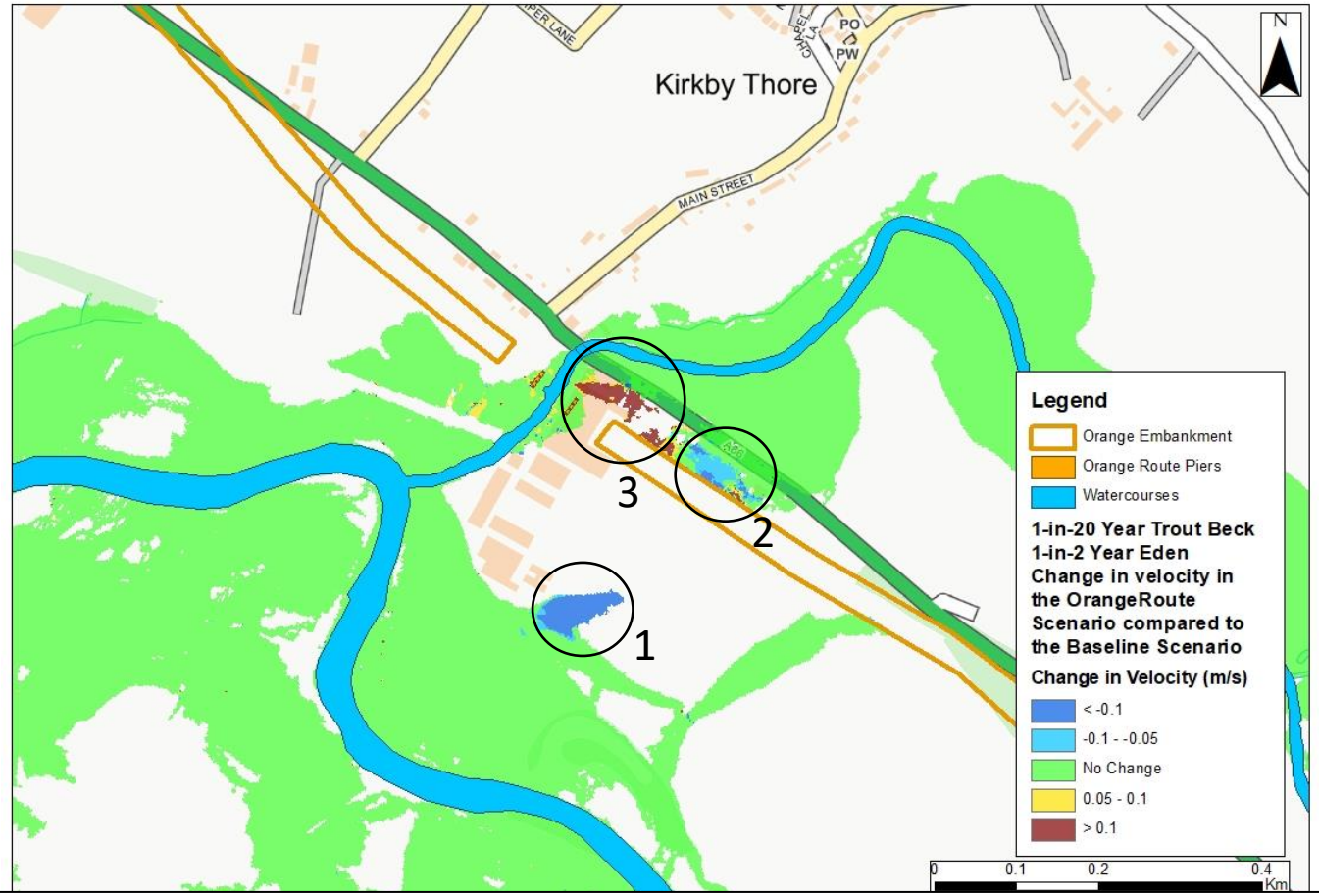
JBA consulting

Orange Alternative Route: Difference in floodplain velocities for the Eden 1-in-2 Year Trout Beck 1-in-10 Year Flood Event

A comparison of hydraulically modelled velocities to assess the potential impact erosion and scour on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769



Key Changes in the Orange Alternative Route Scenario Compared to the Baseline

- The out of bank flow route on the left bank floodplain of the Trout Beck (between black circles 1 and 2) is cut off by the Orange Alternative Route embankment. This out of bank flow route is then diverted into the Trout Beck at black circle 3. Flow velocity is reduced immediately upstream of the Orange Alternative Route embankment (indicated by black circle 2) and where the out of bank flow route joins the River Eden flood extent (indicated by black circle 1).
- As the out of bank flow route is diverted into the Trout Beck at black circle 3, the flow velocity increases significantly (velocities increase by as much as 0.4m/s).

Predicted Geomorphological Change

- The reduction in flow velocity at black circles 1 and 2 will increase sediment deposition on the floodplain.
- The increase in velocities at black circle 3 will increase the scour risk on the floodplain and left bank of the Trout Beck. This could lead to increases in sediment input in the River Eden and bank stability issues on the Trout Beck.

JBA consulting

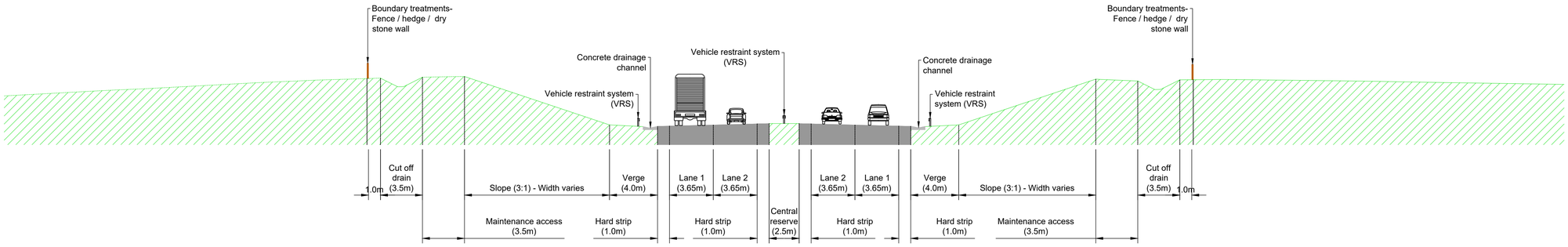
Orange Alternative Route: Difference in floodplain velocities for the Eden 1-in-2 Year Trout Beck 1-in-20 Year Flood Event

A comparison of hydraulically modelled velocities to assess the potential impact erosion and scour on the floodplain, for existing baseline conditions and predicted future change.

Revision Ref/Date	Amendments
Draft 19/08/2021	
Interim 15/09/2021	

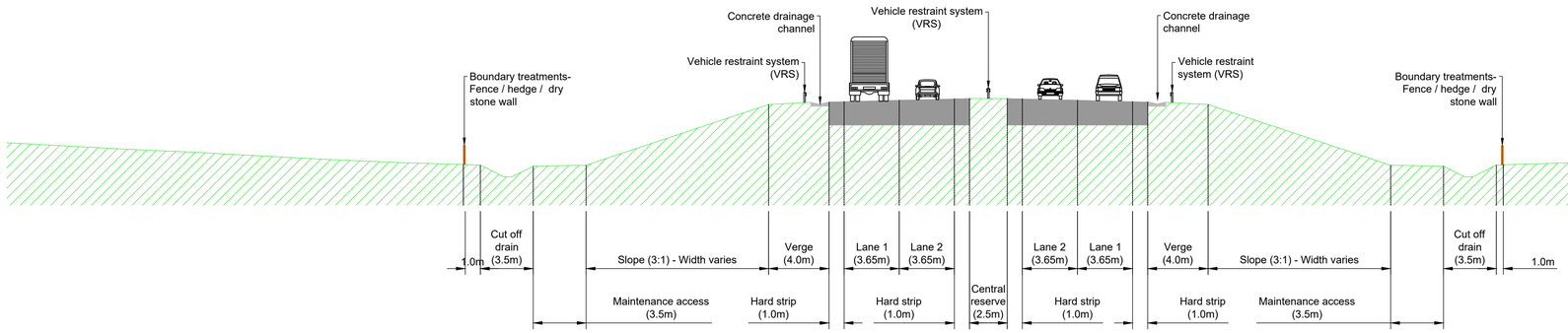
Drawn: Adam Church
Checked: Matt Hemsworth
Approved: Matt Hemsworth
Project Reference: 2021s0769

Plans and profiles



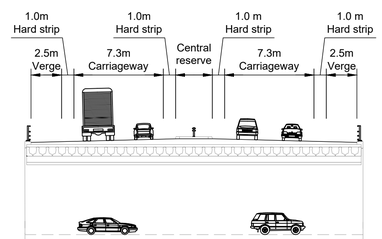
Typical Section - Main Line (Cutting)

Scale 1:250



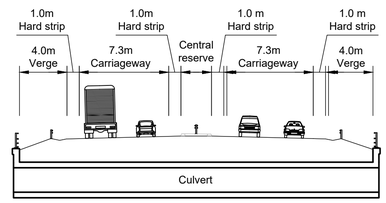
Typical Section - Main Line (Embankment)

Scale 1:250



Typical Section - Structure Carrying Main Line

Scale 1:250



Typical Section - Main Line Over Culvert Structure

Scale 1:250

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.
3. ACTUAL SECTIONS MAY VARY BASED ON CONSTRAINTS AT INDIVIDUAL LOCATIONS.

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	CFRI	SCHO	ASCR	DKID	SBAG	
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

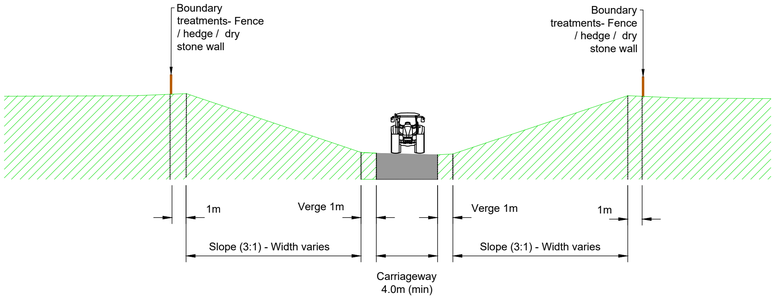
Drawing Title
A66 Typical Sections
Sheet 1 of 3

Project Ref. No.	Stage	Scale : As Shown @ A1
---	PCF3	Dimensions : M

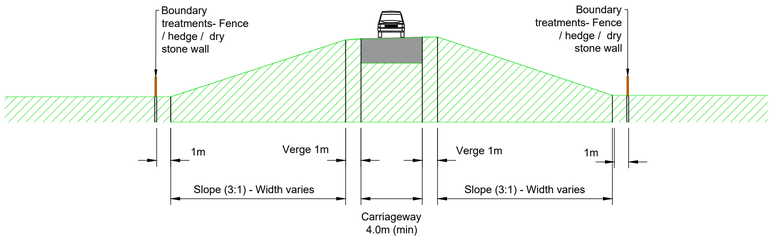
Drawing Number

Project	Originator	Volume	
HE565627 -	AMY -	HGN -	
S00	-DR-	CH-	000002
Location	Type	Role	Number

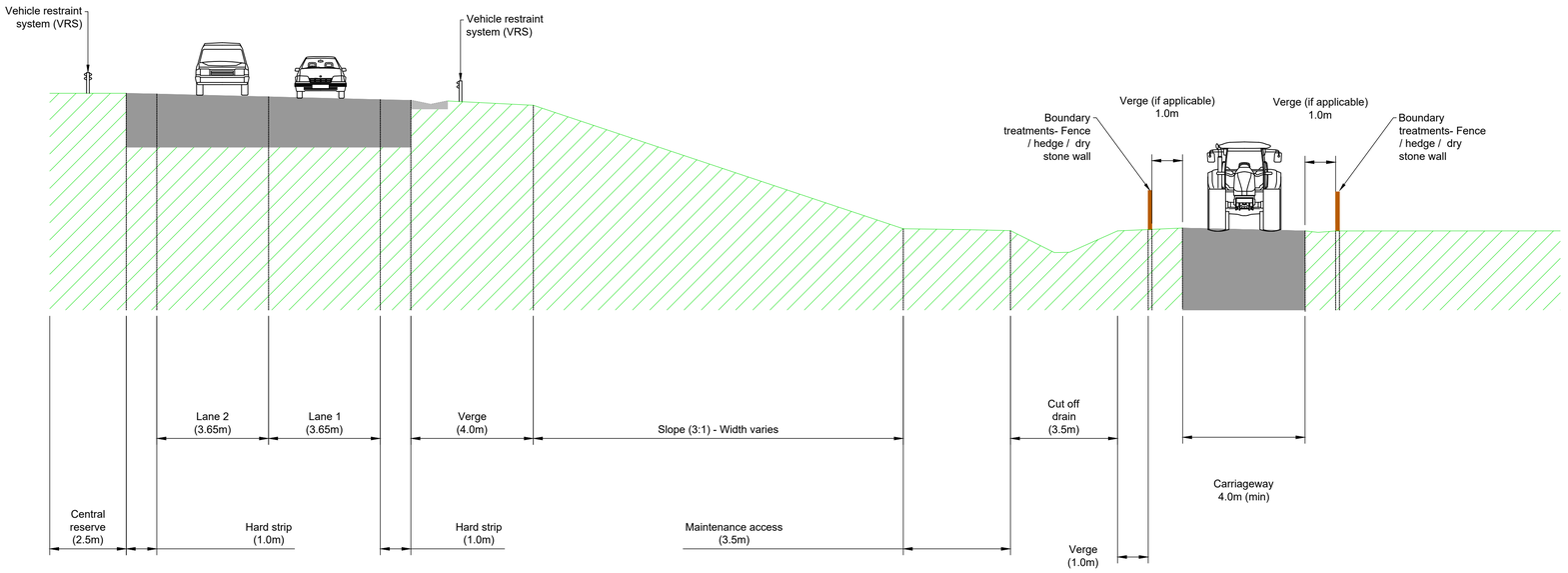
Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



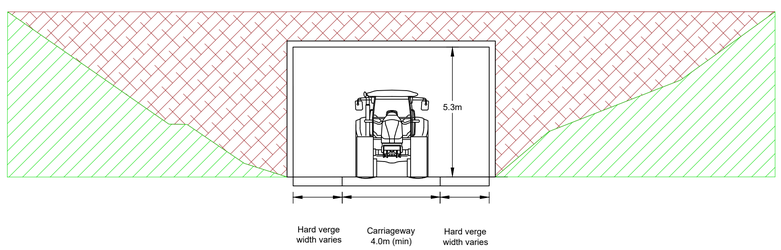
Typical Section - Private Means of Access/Access Track (In Cutting)
Scale 1:200



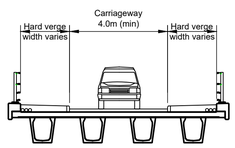
Typical Section - Private Means of Access/AccessTrack (In Embankment)
Scale 1:200



Typical Section - Private Means of Access next to A66 Mainline
Scale 1:100



Typical Section - Private Means of Access/Access Track Underpass
Scale 1:125



Typical Section - Structure Carrying Private Means of Access/Access Track
Scale 1:125

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.
3. ACTUAL SECTIONS MAY VARY BASED ON CONSTRAINTS AT INDIVIDUAL LOCATIONS.

---	---				
	---	---	---	---	---
	---	---	---	---	---
---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	CFRI	SCHO	ASCR	DKID	SBAG
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

Client
3 Piccadilly Place
Manchester
M1 3BN

Project Name
A66 Northern Trans-Pennine

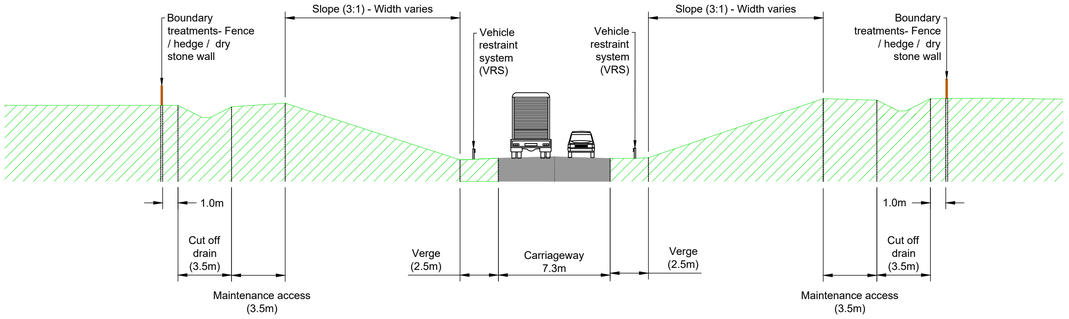
Drawing Title
A66 Typical Sections
Sheet 2 of 3

Project Ref. No.	Stage	Scale : As Shown @ A1
---	PCF3	Dimensions : M

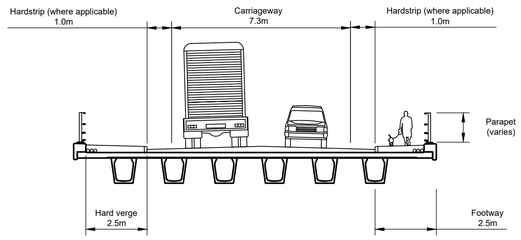
Drawing Number

Project	Originator	Volume	
HE565627 -	AMY -	HGN -	
S00		-DR-CH-	000003
Location		Type | Role |	Number

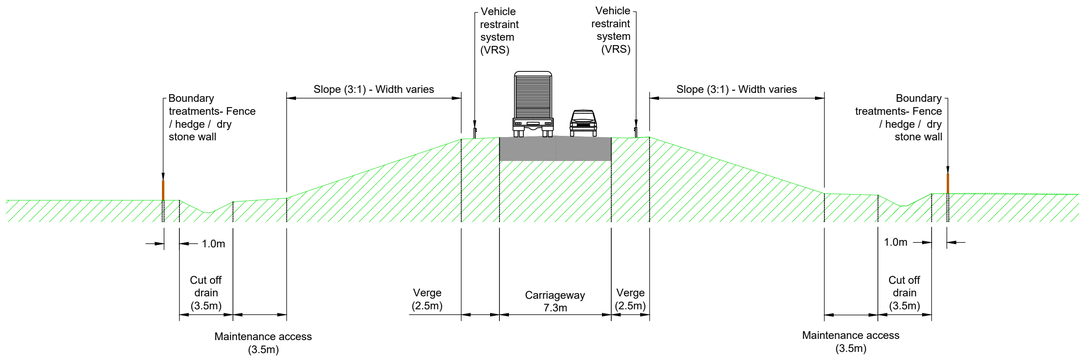
Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



Typical Section - Side Road (Cutting)
Scale 1:200



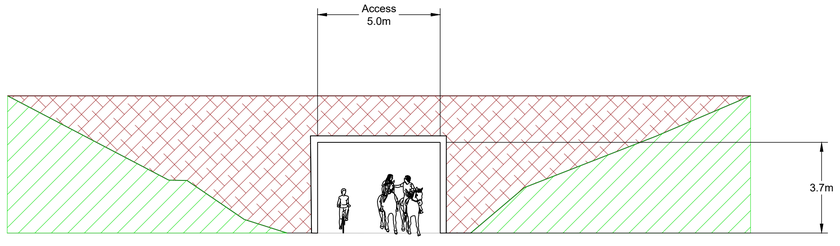
Typical Section - Structure Carrying Side Road with Footway
Scale 1:125



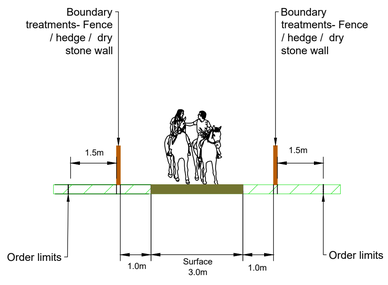
Typical Section - Side Road (Embankment)
Scale 1:200

* cycleway width will vary dependant on usage and applicable standards

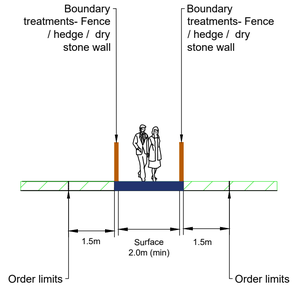
Typical Section - Structure Carrying Side Road with Cycleway
Scale 1:125



Typical Section - Underpass for Bridleway
Scale 1:125



Typical Section - Bridleway
Scale 1:100



Typical Section - Public Right of Way (Footway)
Scale 1:100

NOTES
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.
3. ACTUAL SECTIONS MAY VARY BASED ON CONSTRAINTS AT INDIVIDUAL LOCATIONS.

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	CFRI	SCHO	ASCR	DKID	SBAG	
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

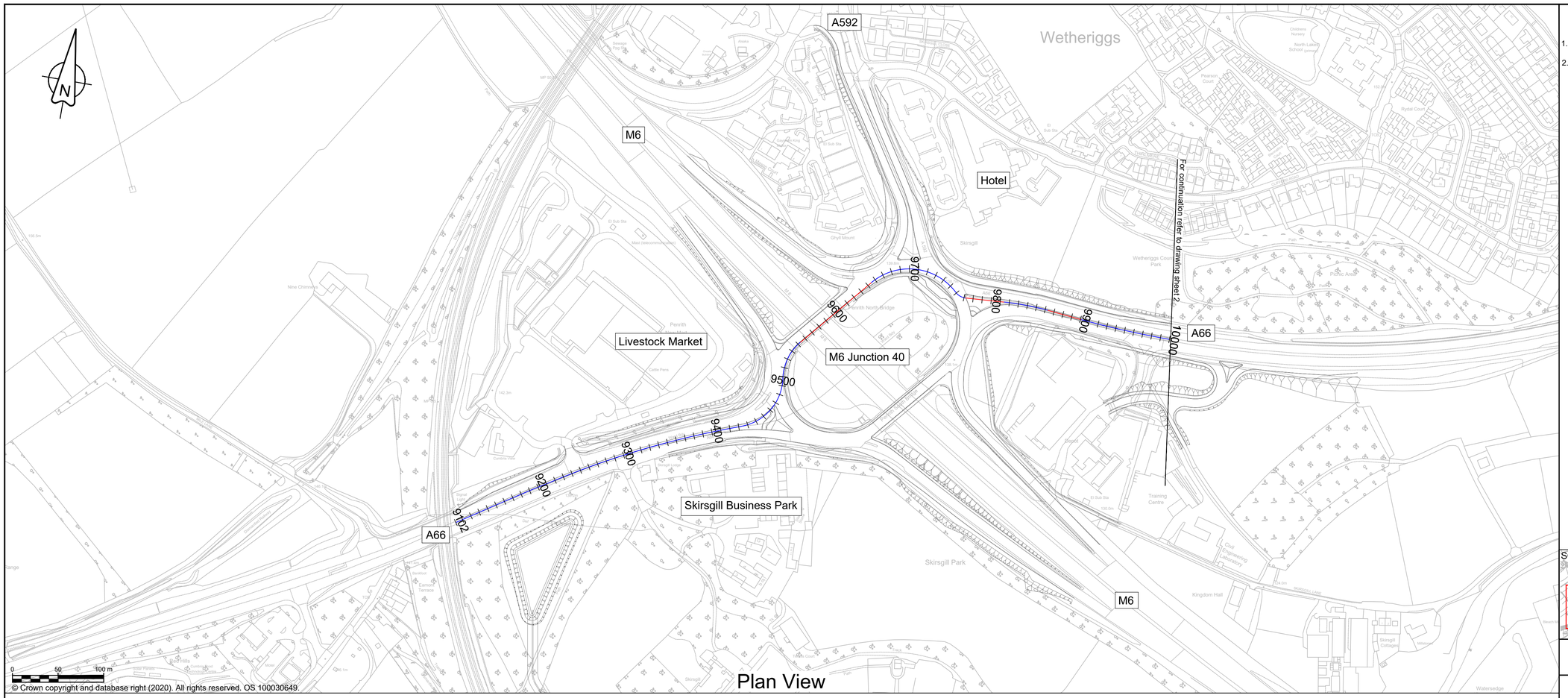
Project Name
A66 Northern Trans-Pennine

Drawing Title
A66 Typical Sections
Sheet 3 of 3

Project Ref. No.	Stage	Scale : As Shown @ A1
---	PCF3	Dimensions : M

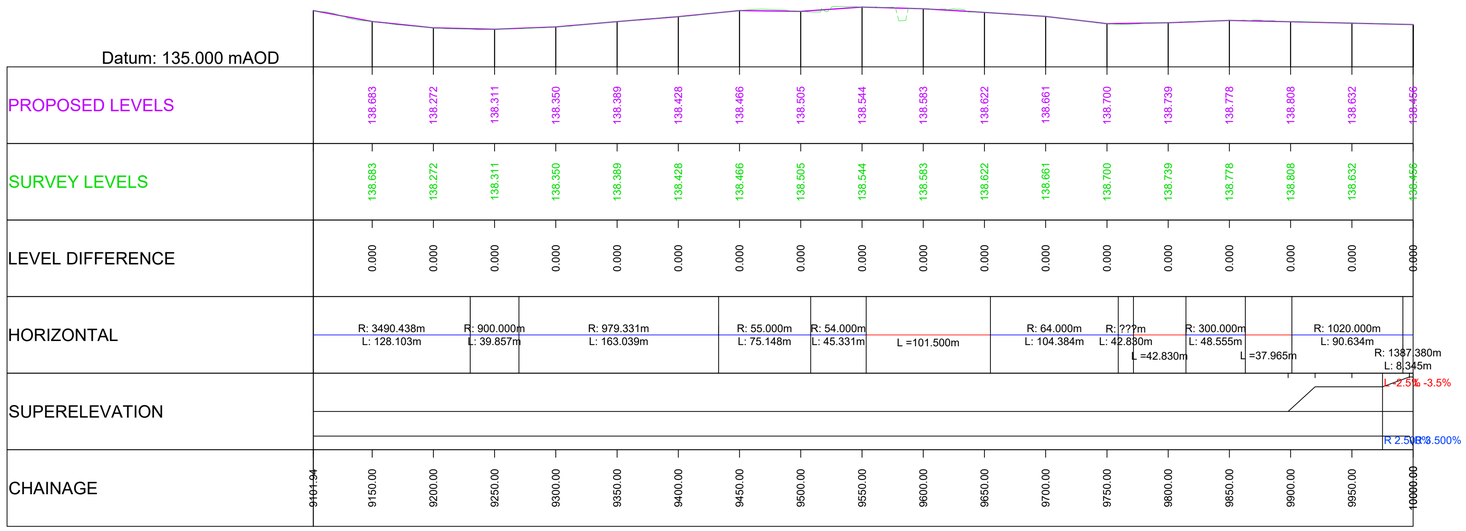
Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HGN -
S00 - DR - CH - 000006
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



0 50 100 m

Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 10000 | 11500 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	SCHO	SCHO	ASCR	DKID	DKID	
	25/08/21	25/08/21	31/08/21	31/08/21	31/08/21	
P02	SCHO	SCHO	ASCR	DKID	SBAG	
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

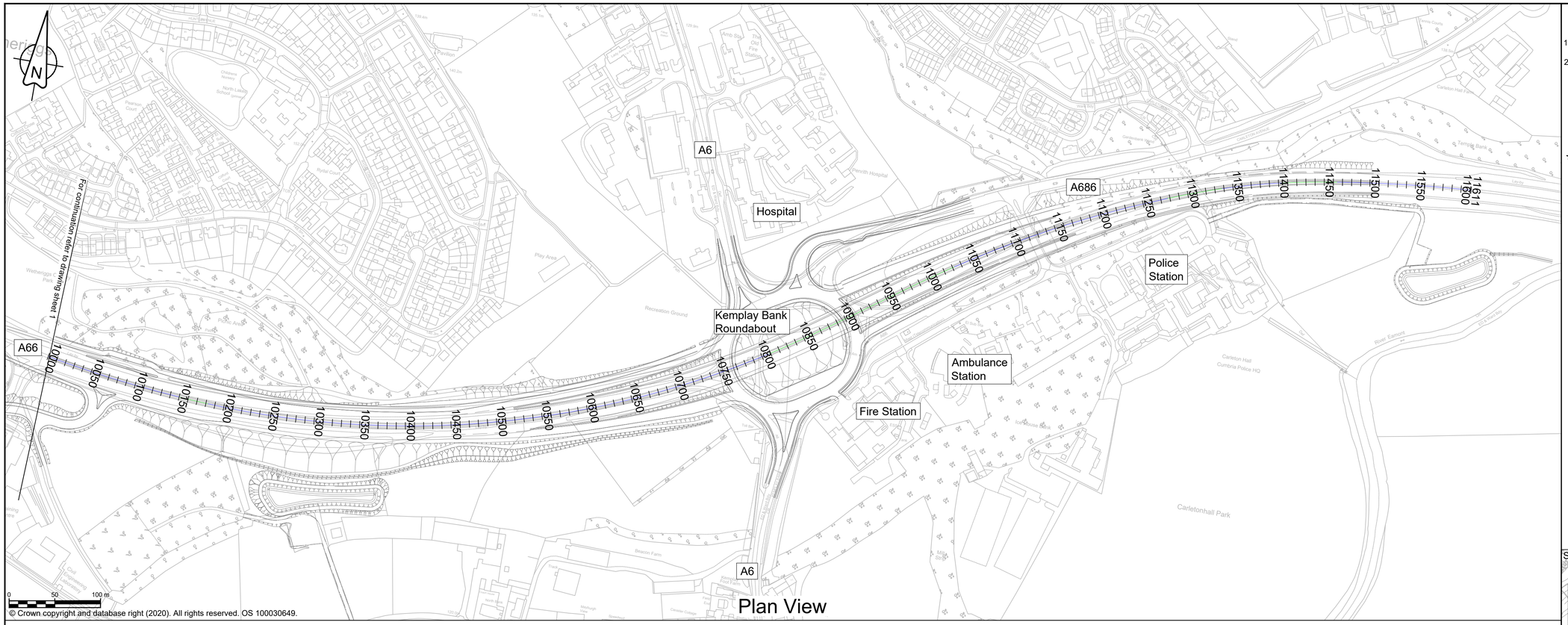
Project Name
A66 Northern Trans-Pennine

Drawing Title
M6 J40 to Kemplay Bank
Plan and Profile Mainline
Sheet 1 of 2

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S02 -DR-CH- 100003
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



Plan View

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

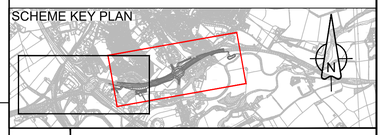
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 10000 | 11500 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



Revision					
---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	SCHO	SCHO	ASCR	DKID	DKID
	25/08/21	25/08/21	31/08/21	31/08/21	31/08/21
P02	SCHO	SCHO	ASCR	DKID	SBAG
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

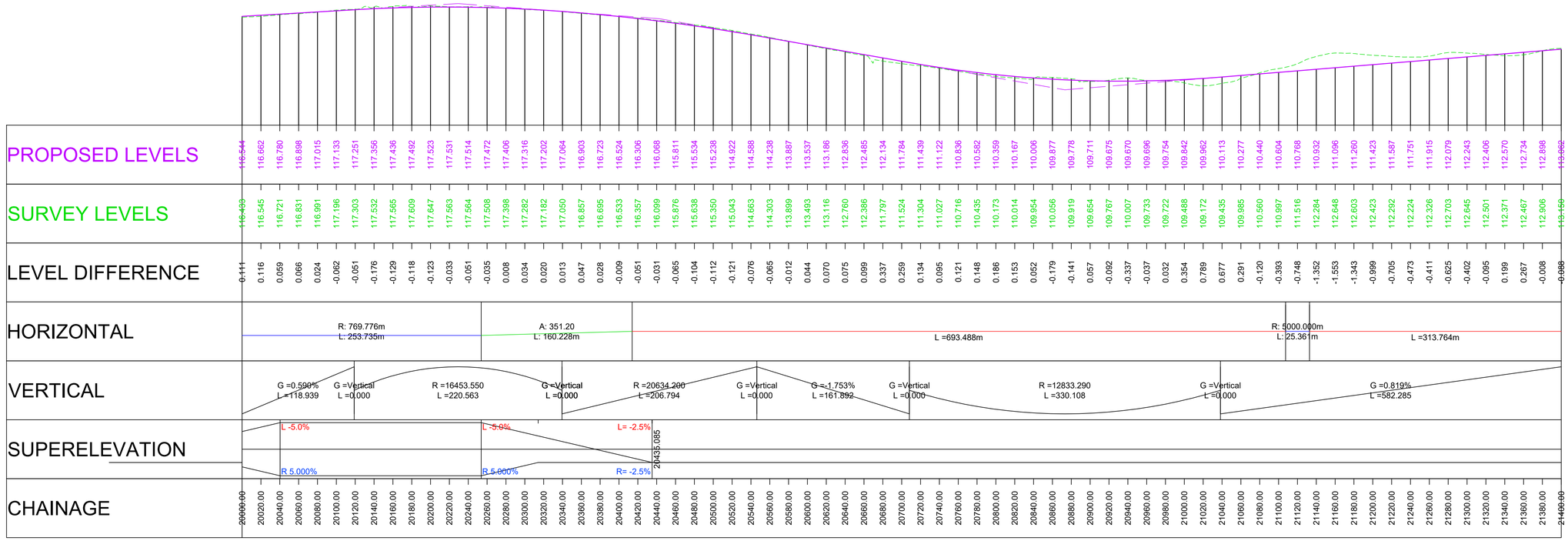
Drawing Title
M6 J40 to Kemplay Bank
Plan and Profile Mainline
Sheet 2 of 2

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S02 -DR-CH- 100004
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	SCHO	SCHO	ASCR	DKID	DKID
	24/08/21	24/08/21	24/08/21	25/08/21	25/08/21
P02	SCHO	SCHO	ASCR	DKID	SBAG
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

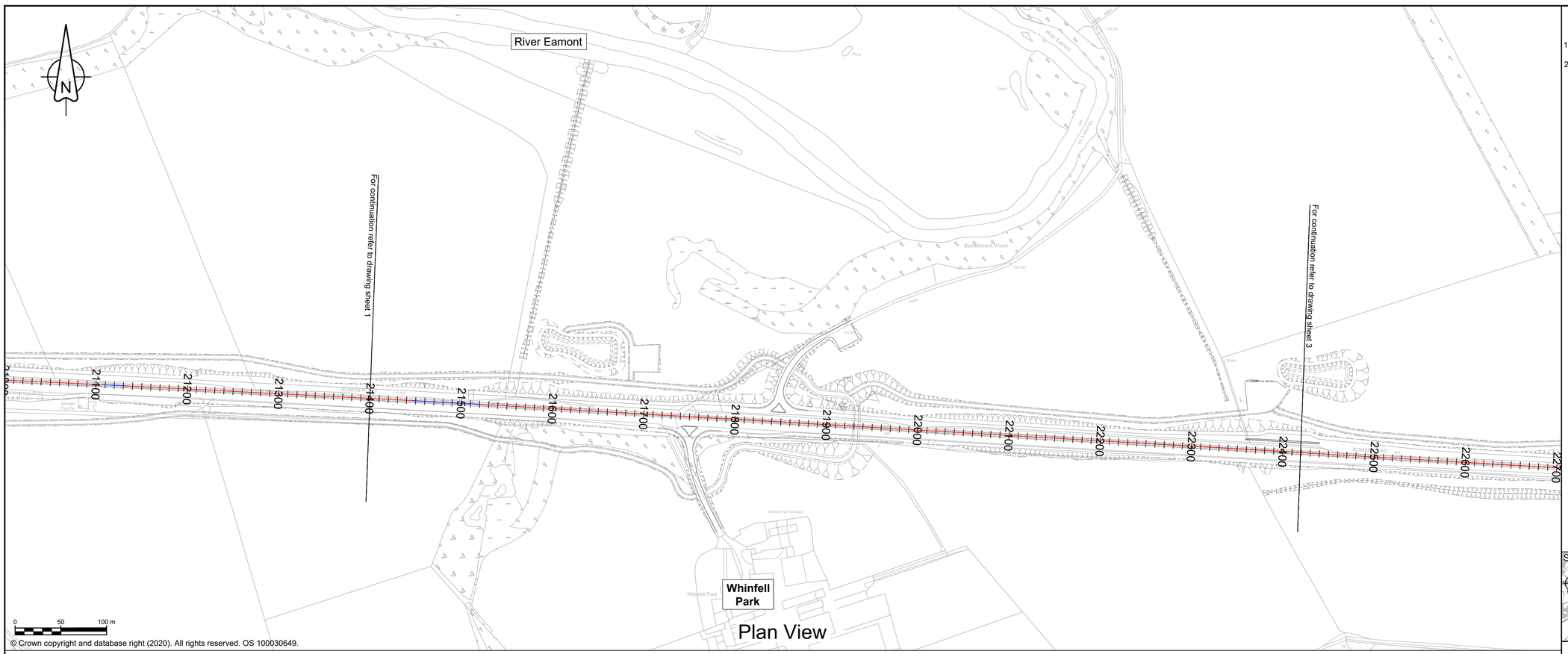
Drawing Title
Penrith to Temple Sowerby
Plan and Profile Mainline
Sheet 1 of 4

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

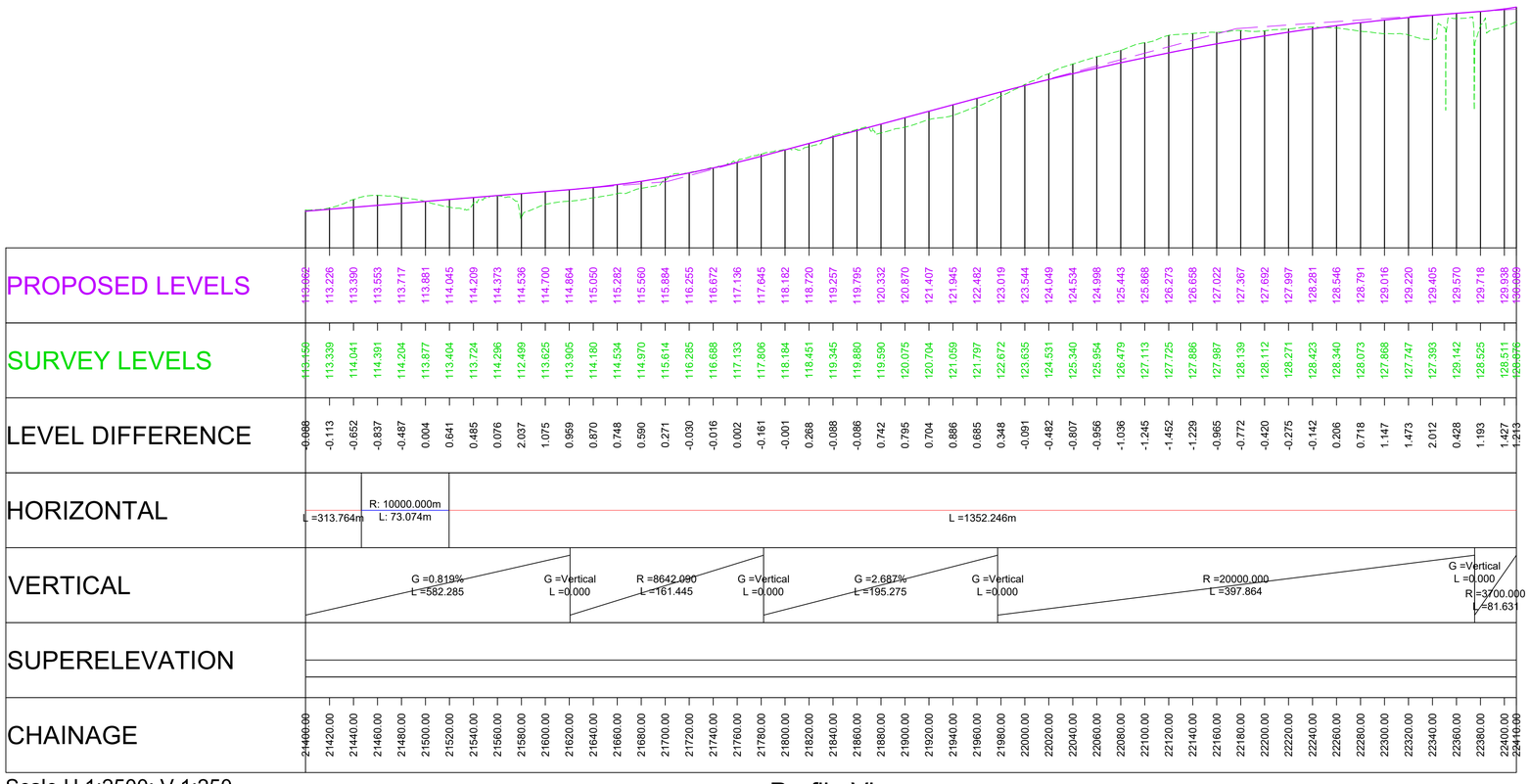
Project	Originator	Volume			
HE565627	- AMY	- HML	-		
S03		-DR	-CH	- 100001	
Location		Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

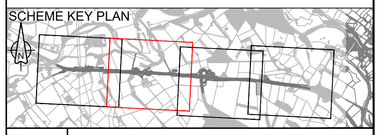
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	SCHO	SCHO	ASCR	DKID	DKID
	24/08/21	24/08/21	24/08/21	25/08/21	25/08/21
P02	SCHO	SCHO	ASCR	DKID	SBAG
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

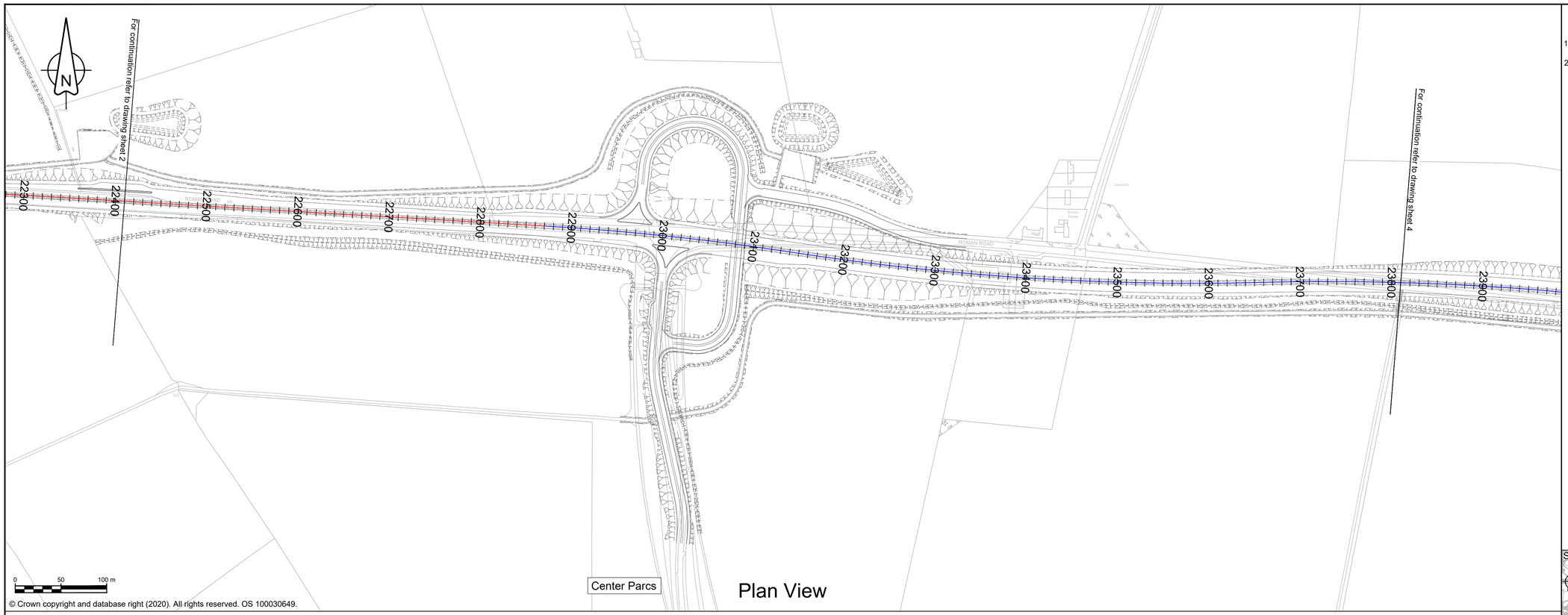
Drawing Title
Penrith to Temple Sowerby
Plan and Profile Mainline
Sheet 2 of 4

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

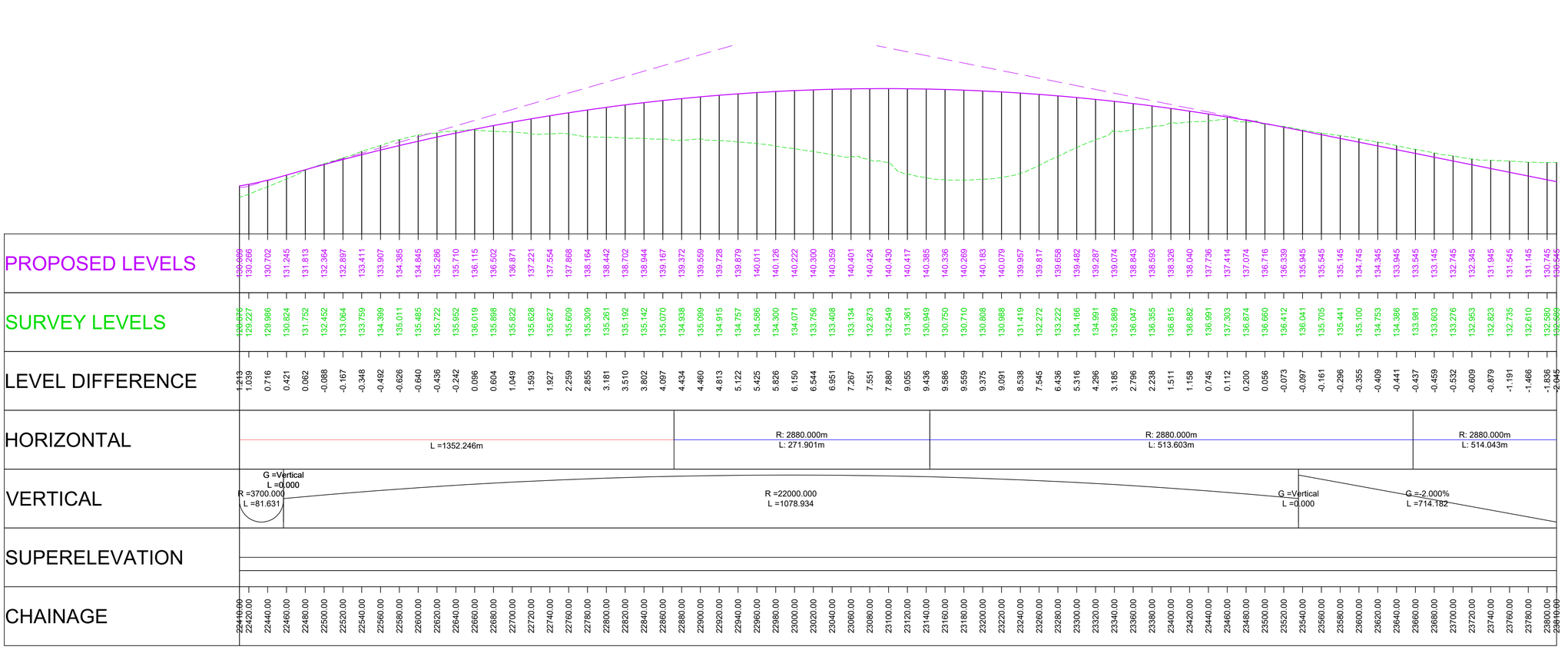
Project	Originator	Volume			
HE565627	- AMY	- HML	-		
S03		-DR-	CH-	100002	
Location		Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---				
	---	---	---	---	---
	---	---	---	---	---
P01					
	SCHO	SCHO	ASCR	DKID	DKID
	24/08/21	24/08/21	24/08/21	25/08/21	25/08/21
P02					
	SCHO	SCHO	ASCR	DKID	SBAG
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

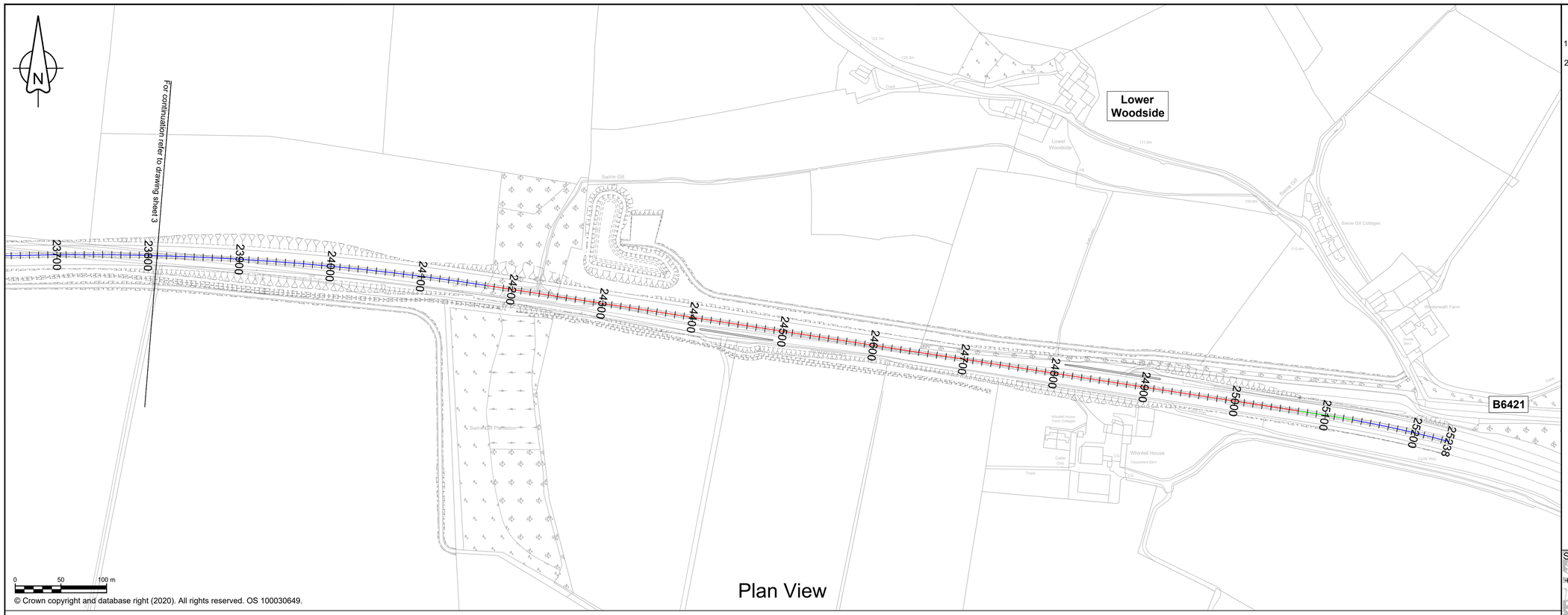
Drawing Title
Penrith to Temple Sowerby
Plan and Profile Mainline
Sheet 3 of 4

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

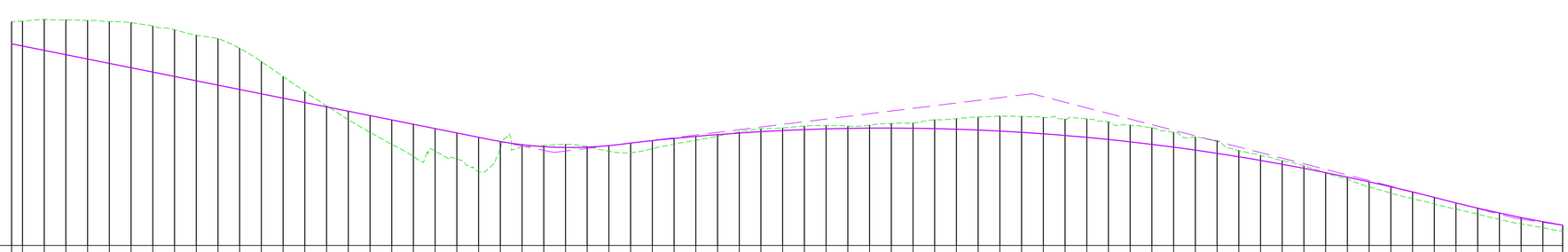
Project	Originator	Volume		
HE565627 -	AMY -	HML -		
S03		-DR-CH-	100003	
Location		Type	Role	Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



PROPOSED LEVELS	130.345 129.945 129.545 129.145 128.745 128.345 127.945 127.545 127.145 126.745 126.345 125.945 125.545 125.145 124.745 124.345 123.945 123.545 123.145 122.745 122.345 121.945 121.558 121.267 121.084 121.008 121.041 121.182 121.413 121.638 121.843 122.028 122.193 122.338 122.463 122.568 122.653 122.718 122.763 122.788 122.793 122.778 122.743 122.688 122.613 122.518 122.403 122.268 122.113 121.938 121.743 121.528 121.293 121.038 120.763 120.468 120.153 119.818 119.463 119.088 118.693 118.278 117.843 117.388 116.913 116.418 115.910 115.429 114.981 114.565 114.182 113.862
SURVEY LEVELS	132.631 132.798 132.754 132.693 132.583 132.494 132.194 131.840 131.338 131.017 130.127 128.908 127.538 126.151 124.835 123.573 122.394 121.291 120.181 120.674 119.980 118.770 120.920 121.040 121.184 121.290 121.096 120.660 120.530 120.895 121.324 121.665 122.046 122.441 122.734 122.809 122.976 123.032 122.969 123.062 123.222 123.256 123.557 123.658 123.817 123.887 123.870 123.792 123.610 123.635 123.357 123.057 122.817 122.393 121.968 121.633 120.726 120.279 119.793 119.324 118.649 118.067 117.384 116.807 116.302 115.804 115.376 114.887 114.393 113.977 113.625
LEVEL DIFFERENCE	-2.045 -2.286 -2.854 -3.209 -3.548 -3.839 -4.149 -4.250 -4.296 -4.194 -4.272 -3.783 -2.963 -1.994 -1.007 -0.091 0.771 1.550 2.254 2.963 2.071 2.365 3.174 0.638 0.227 -0.101 -0.282 -0.055 0.522 0.883 0.743 0.519 0.364 0.147 -0.102 -0.271 -0.241 -0.323 -0.314 -0.206 -0.273 -0.429 -0.478 -0.813 -0.970 -1.204 -1.369 -1.466 -1.523 -1.497 -1.697 -1.614 -1.528 -1.524 -1.355 -1.205 -1.165 -0.573 -0.461 -0.330 -0.236 0.045 0.211 0.459 0.581 0.611 0.614 0.535 0.542 0.588 0.588 0.557
HORIZONTAL	R: 2880.000m L: 514.043m; L =898.687m; A: 271.91 L: 60.500m; R: 1222.106m L: 107.577m
VERTICAL	G =-2.000% L =714.182; G =Vertical L =0.000; R =3700.000 L =119.444; G =Vertical L =0.000; R =20000.000 L =760.282; G =Vertical L =0.000; R =12192.930 L =129.799
SUPERELEVATION	i= -2.5%; R= -2.5%; 24949.280; L 5.0%; R -5.000%; L 5.0%; R -5.000%
CHAINAGE	23810.00 23820.00 23840.00 23860.00 23880.00 23900.00 23920.00 23940.00 23960.00 23980.00 24000.00 24020.00 24040.00 24060.00 24080.00 24100.00 24120.00 24140.00 24160.00 24180.00 24200.00 24220.00 24240.00 24260.00 24280.00 24300.00 24320.00 24340.00 24360.00 24380.00 24400.00 24420.00 24440.00 24460.00 24480.00 24500.00 24520.00 24540.00 24560.00 24580.00 24600.00 24620.00 24640.00 24660.00 24680.00 24700.00 24720.00 24740.00 24760.00 24780.00 24800.00 24820.00 24840.00 24860.00 24880.00 24900.00 24920.00 24940.00 24960.00 24980.00 25000.00 25020.00 25040.00 25060.00 25080.00 25100.00 25120.00 25140.00 25160.00 25180.00 25200.00 25220.00 25238.21

0 50 100 m

Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	SCHO	SCHO	ASCR	DKID	DKID	
	24/08/21	24/08/21	24/08/21	25/08/21	25/08/21	
P02						
	SCHO	SCHO	ASCR	DKID	SBAG	
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

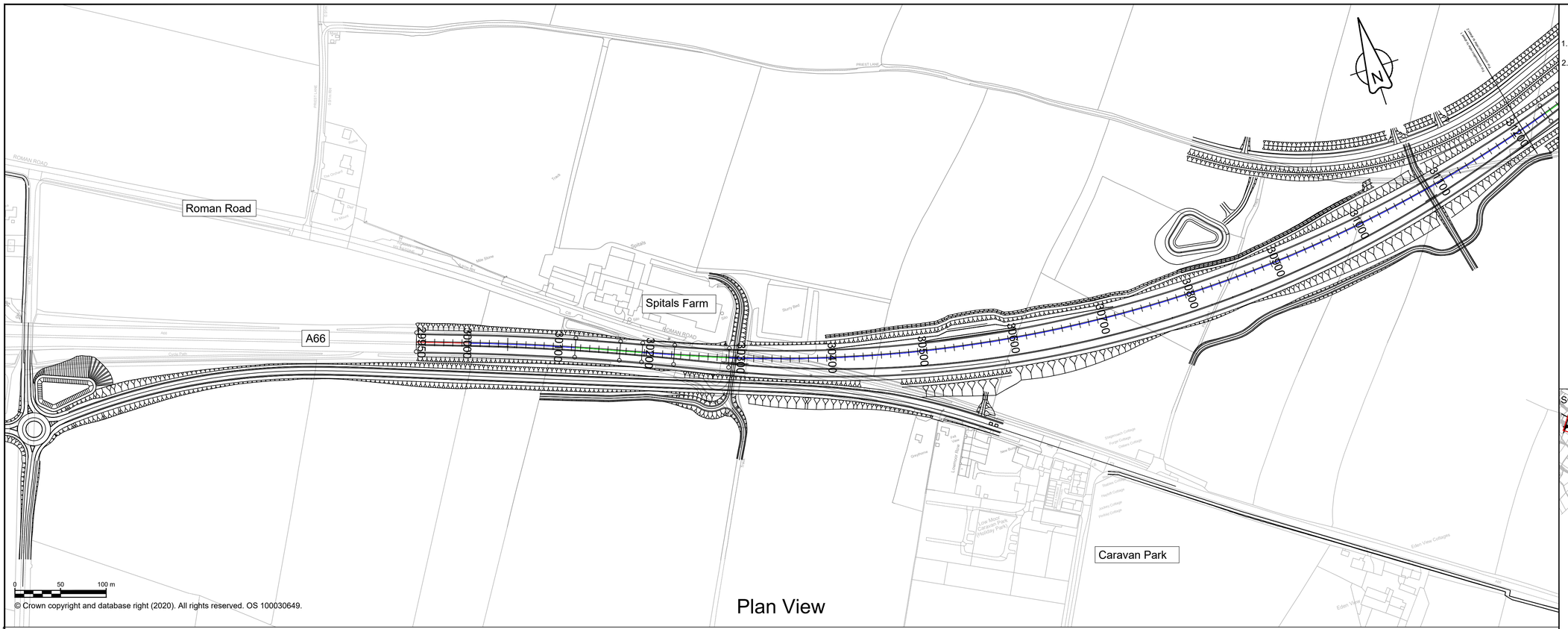
Project Name
A66 Northern Trans-Pennine

Drawing Title
Penrith to Temple Sowerby
Plan and Profile Mainline
Sheet 4 of 4

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S03 - DR - CH - 100004
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

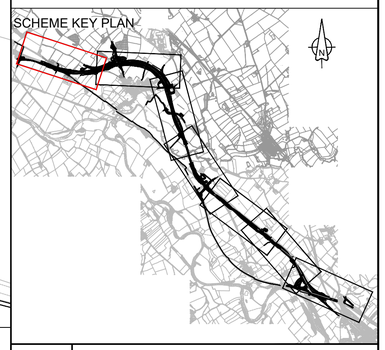
Plan

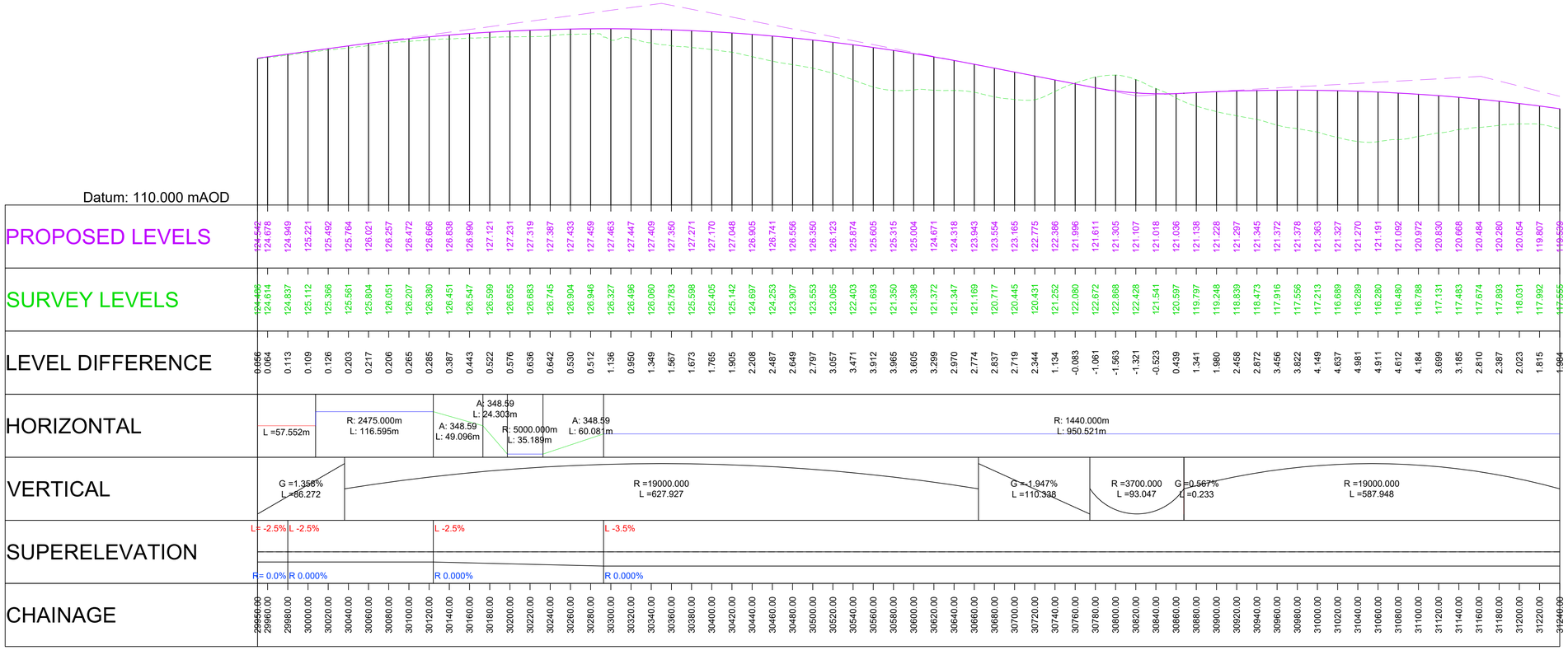
- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN





Scale H 1:2500; V 1:250

Profile View

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---	
	03/09/21	03/09/21	03/09/21	03/09/21	---	
P02	GCHI	GCHI	SHAL	KCRO	KCRO	
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

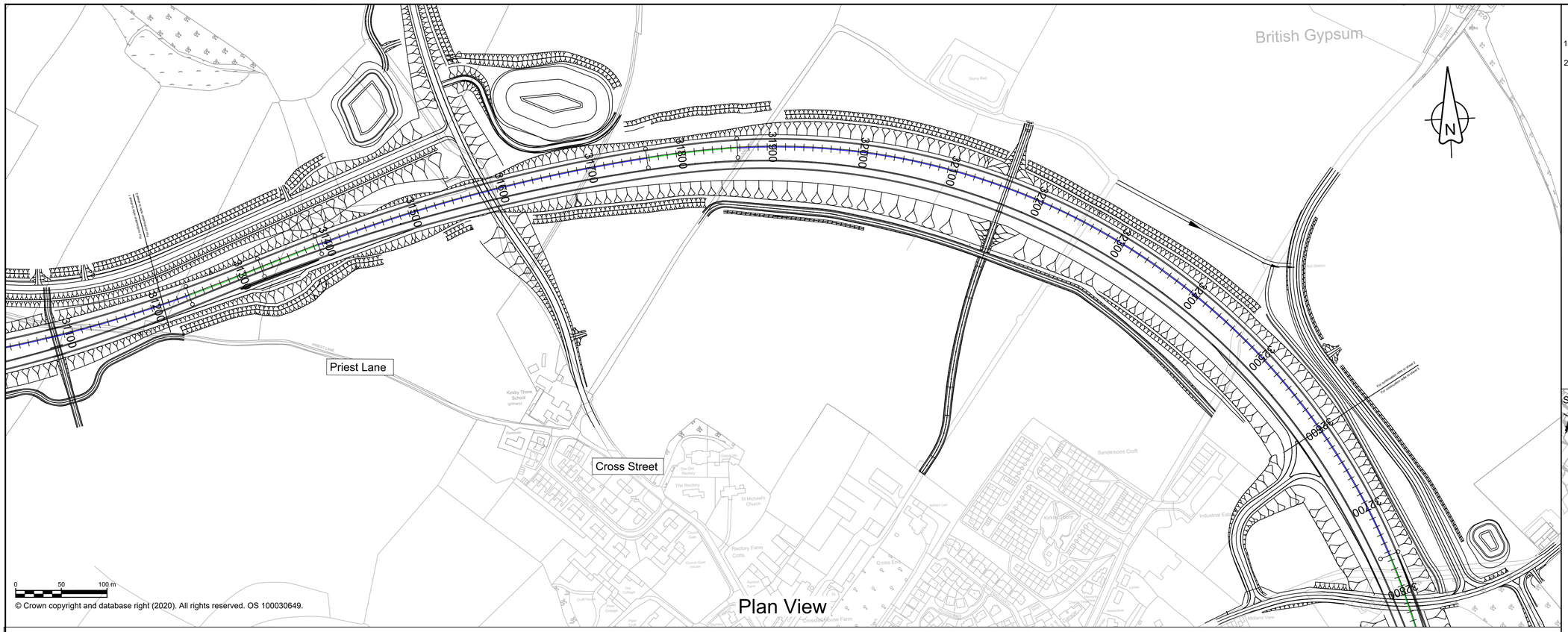
Project Name
A66 Northern Trans-Pennine

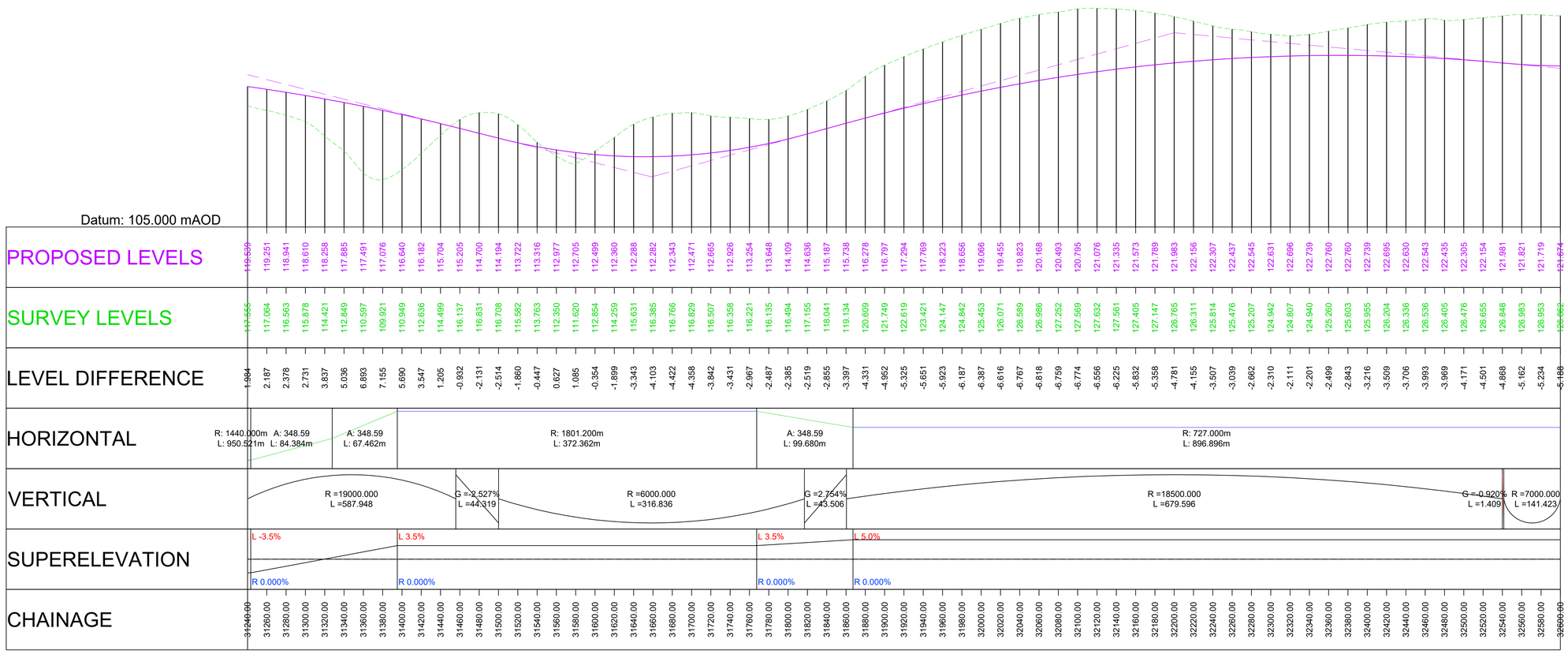
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Blue Option
Sheet 1 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S0405 -DR-CH- 000214
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02





NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

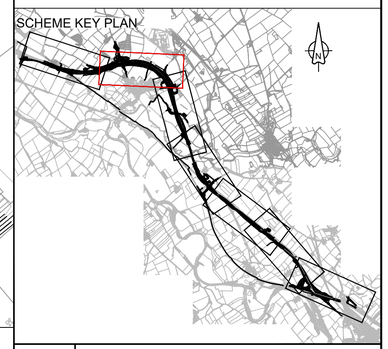
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---
	03/09/21	03/09/21	03/09/21	03/09/21	---
P02	GCHI	GCHI	SHAL	KCRO	KCRO
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

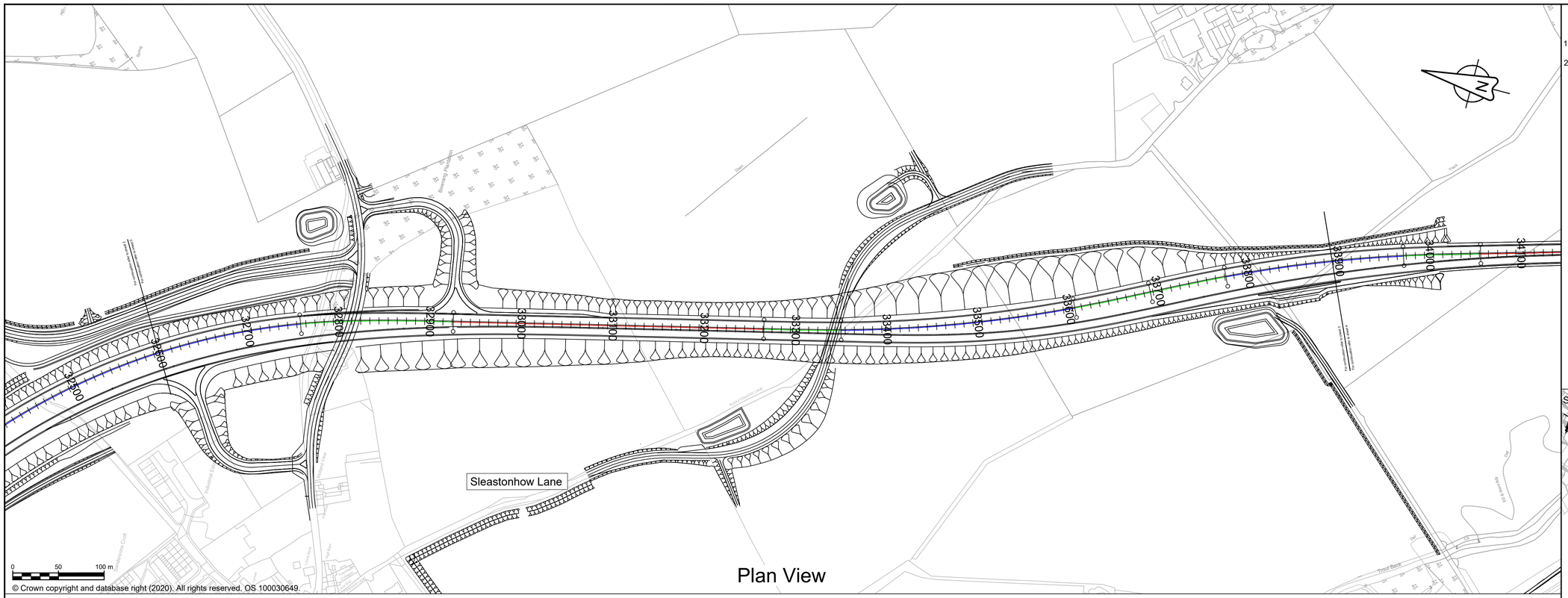
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Blue Option
Sheet 2 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

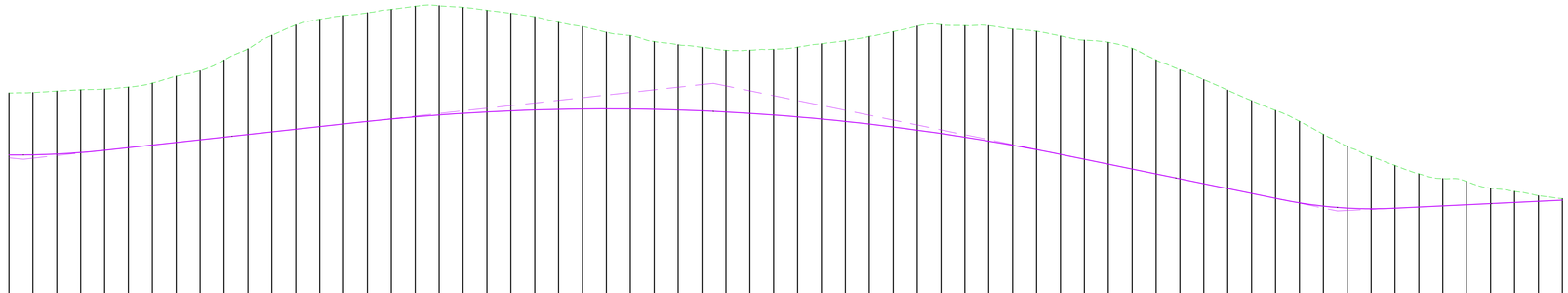
Drawing Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	HML	S0405	DR	CH	000215

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02

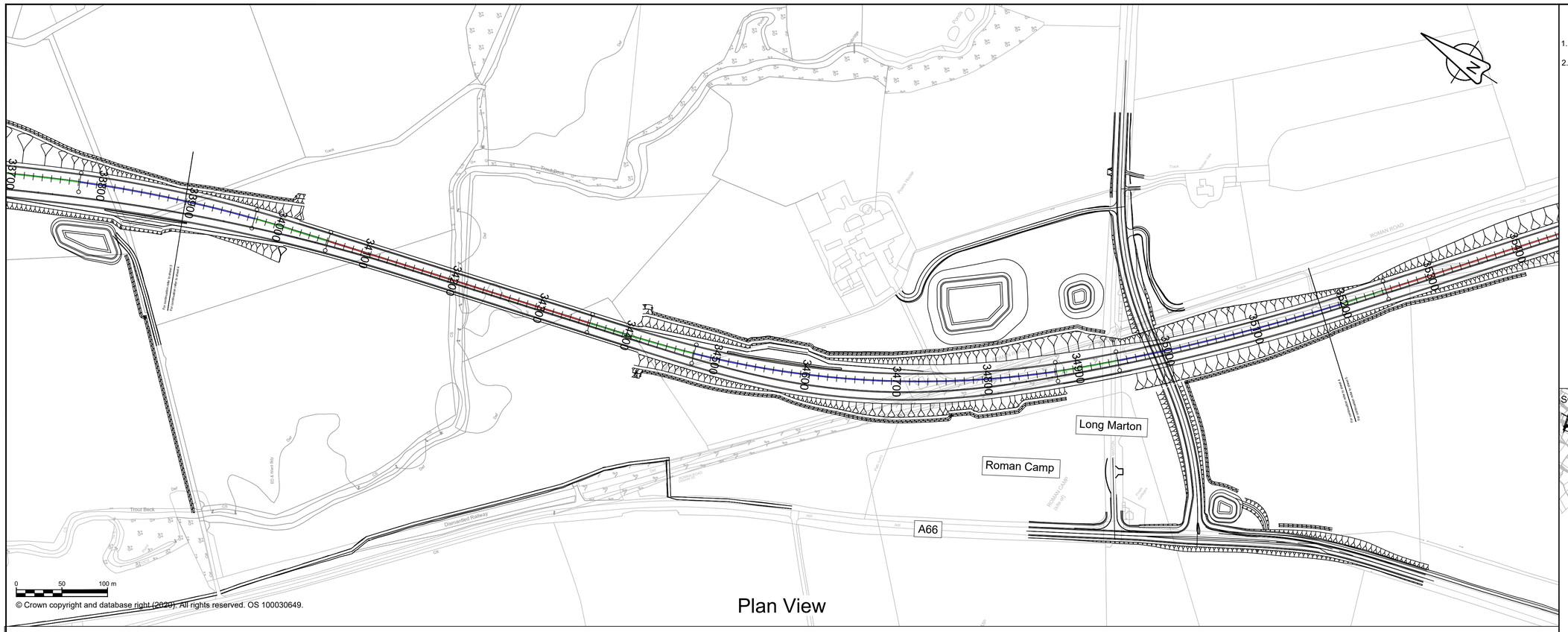


Plan View



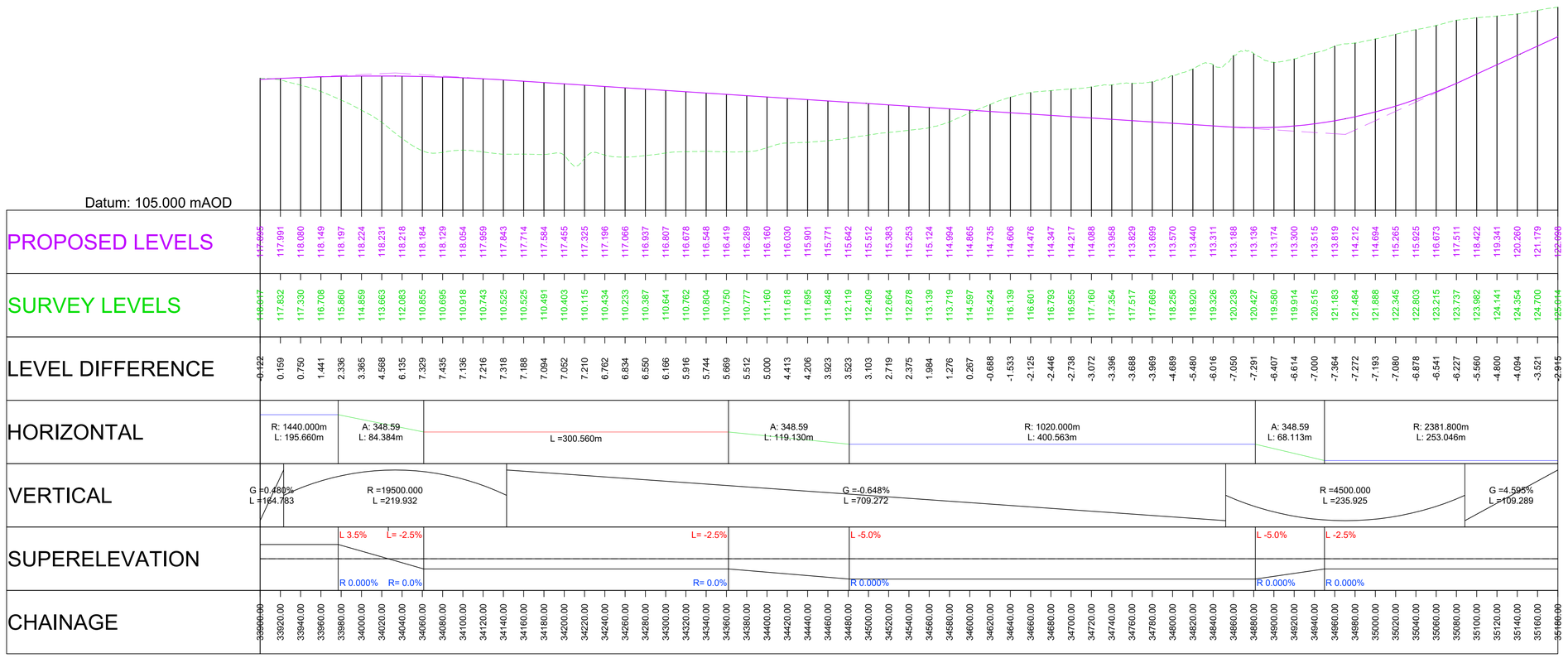
Datum: 110.000 mAOD

| | | |



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

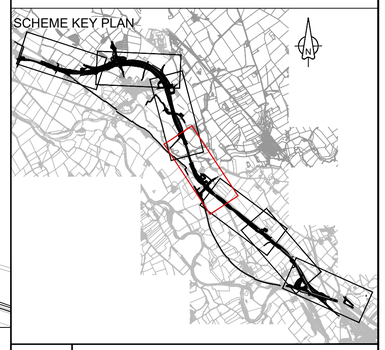
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---
	03/09/21	03/09/21	03/09/21	03/09/21	---
P02	GCHI	GCHI	SHAL	KCRO	KCRO
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

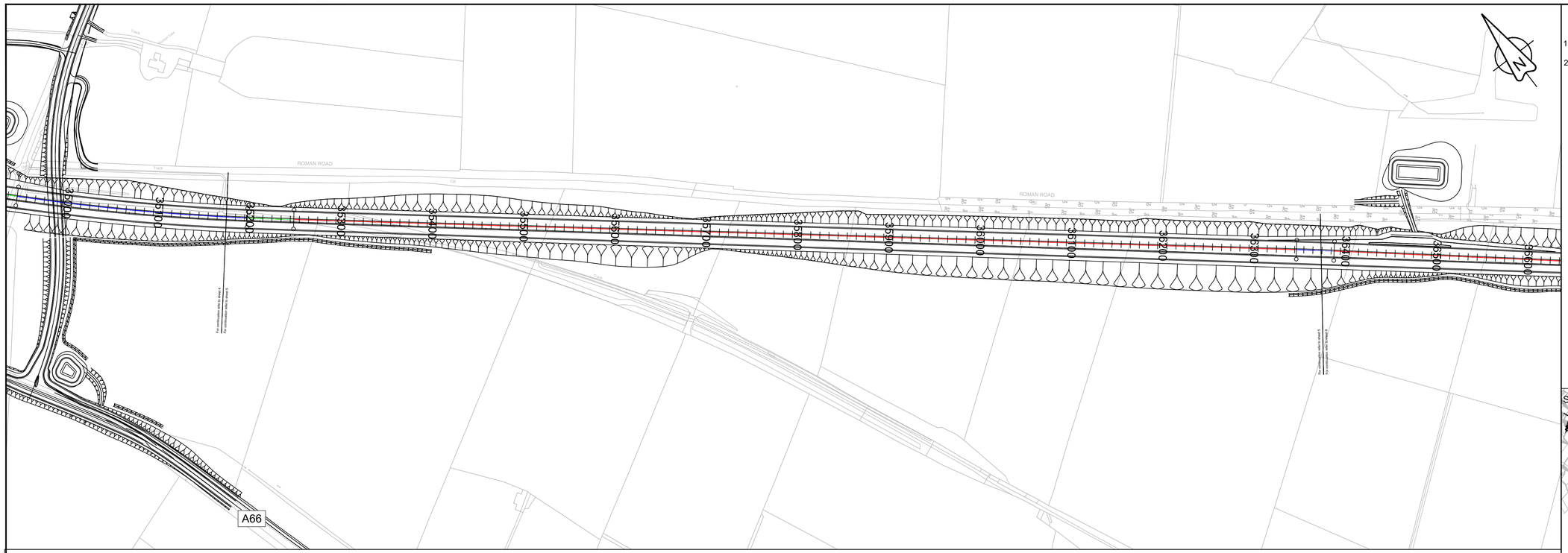
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Blue Option
Sheet 4 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	HML	S0405	DR	CH	000217

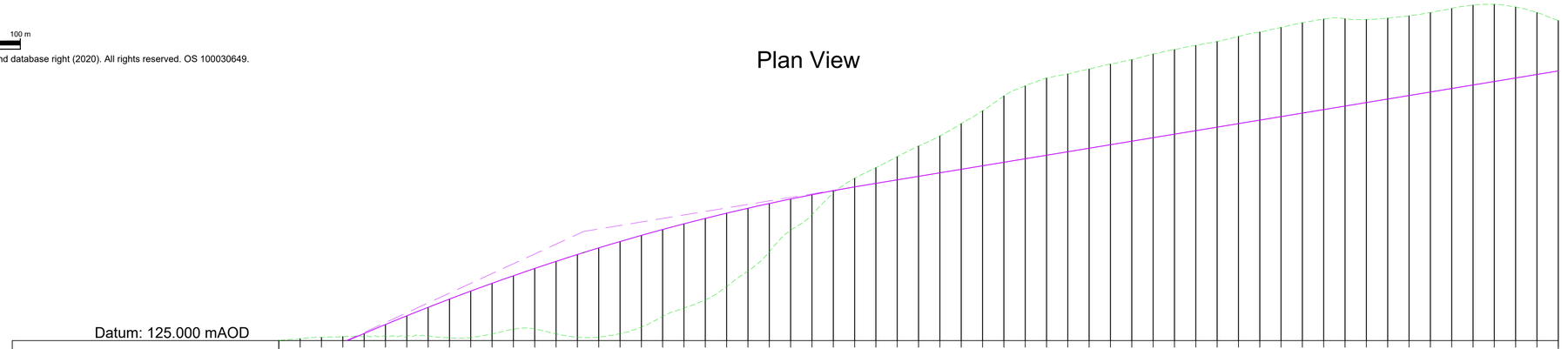
Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



0 50 100 m

© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



0 50 100 m

Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

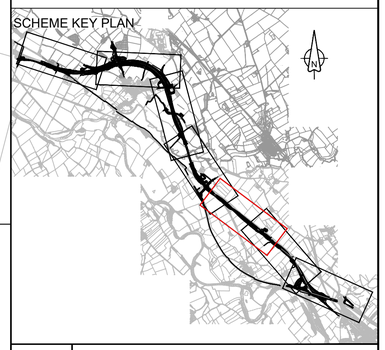
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---
	03/09/21	03/09/21	03/09/21	03/09/21	---
P02	GCHI	GCHI	SHAL	KCRO	KCRO
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

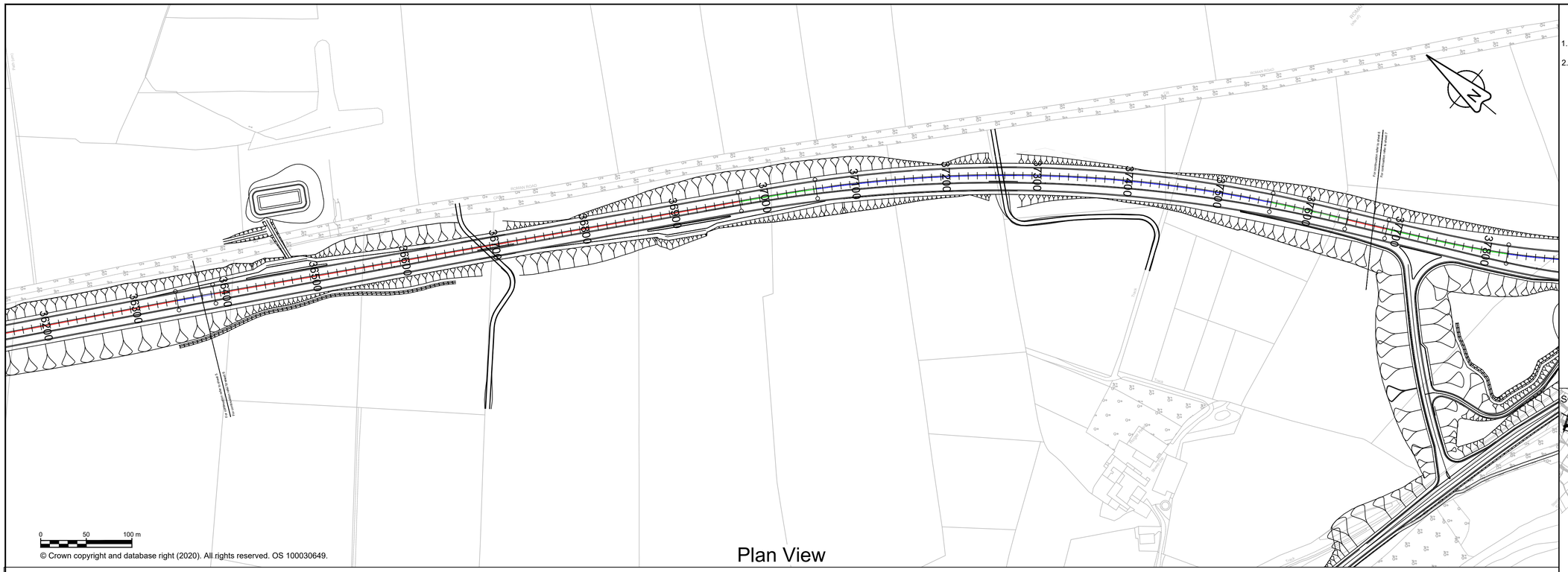
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Blue Option
Sheet 5 of 7

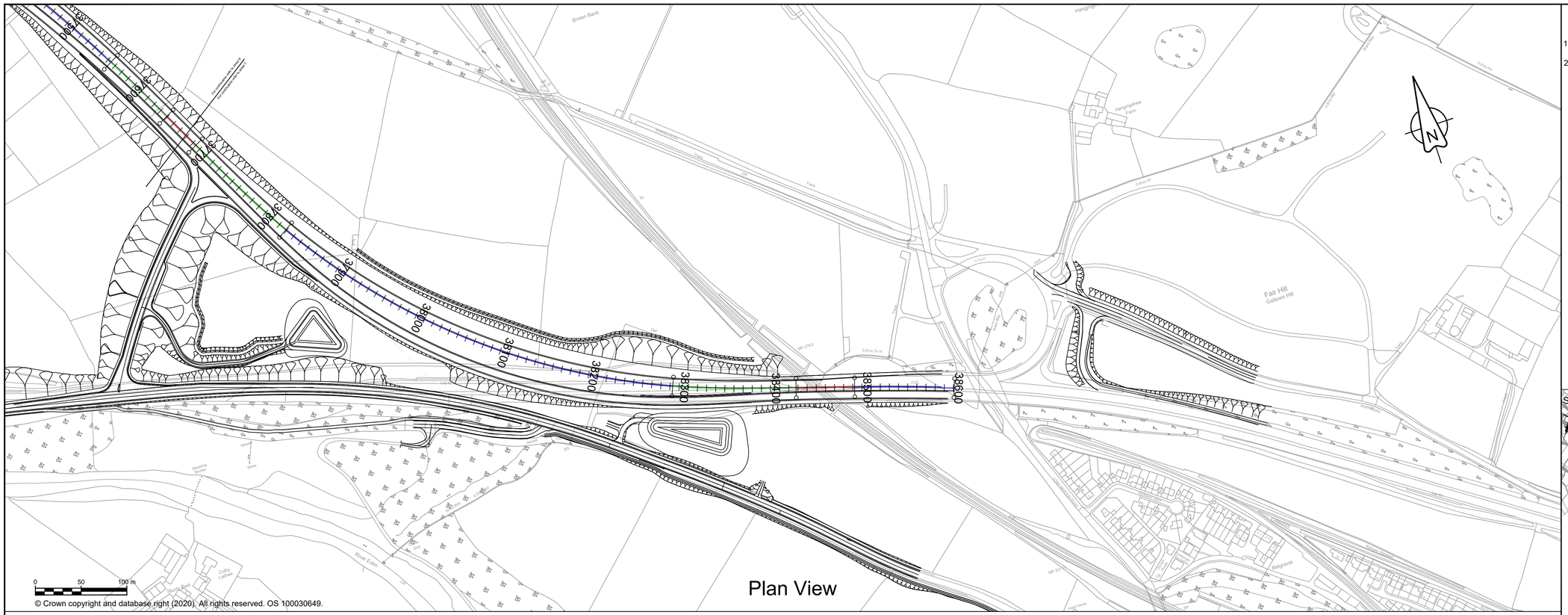
Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

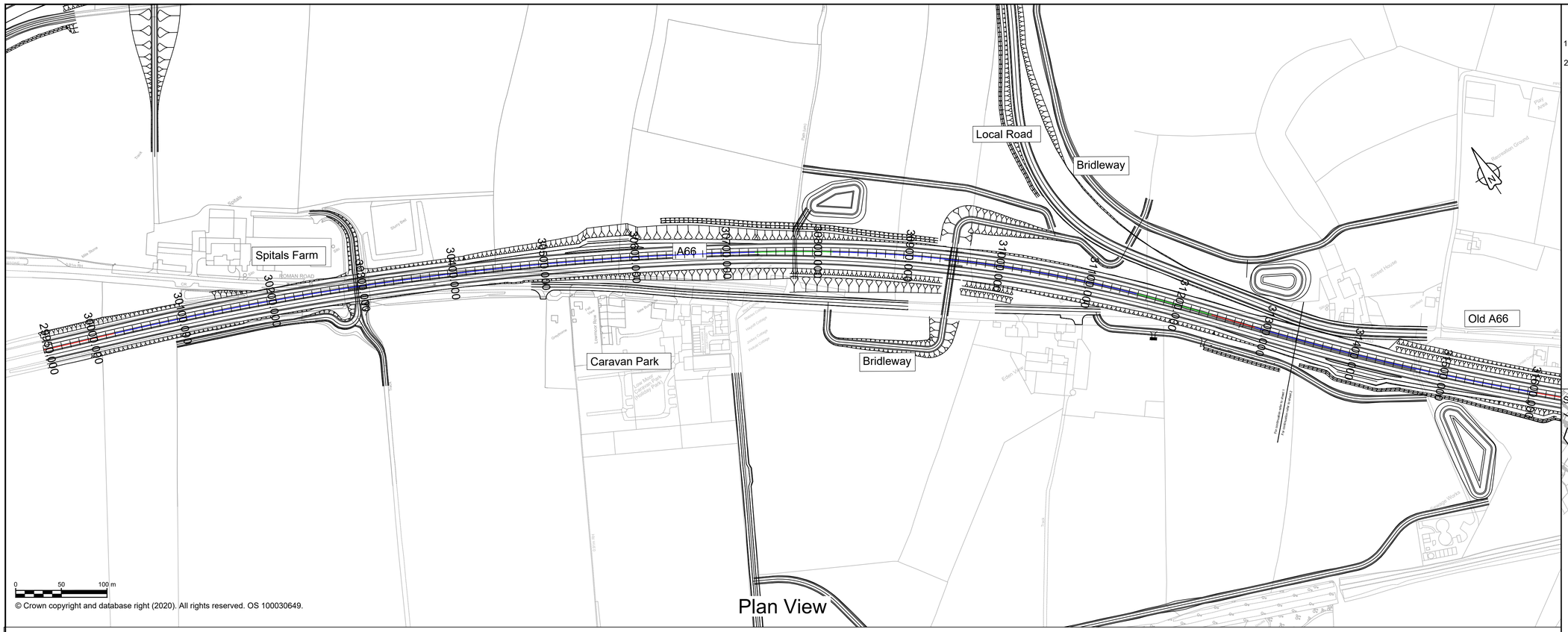
Drawing Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	HML	S0405	DR	CH	000218

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02


ROMAN ROAD
ROMAN ROAD
Path
Path
Track
Track
Track


Brown Bank
Hangingshaw Farm
Fair Hill
Gallows Hill
Belgravia
River Eden
Stainmore Railway
Kirkby Stephen Station
Coffey Lane
Bowber Head
Stainmore Summit
Tunnel
Viaduct
Truss
Arch
Culvert
Level Crossing
Footbridge
Gas Governor
Electricity Substation
Pylon
Telecom Mast
Cattle Grid
Public Right of Way
Permissive Path
Bridleway
Footpath
Road
Track
Fence
Wall
Hedge
Ditch
Stream
Woodland
Scrub
Orchard
Rough Grassland
Marsh
Reeds
Rushes
Quarry
Spoil Heap
Building
Church
Chapel
Graveyard
Pond
Lake
Sewage Works
Water Tank
Mine Shaft
Adit
Mine Working
Tumulus
Cairn
Standing Stone
Enclosure
Fort
Settlement
Roman Road
Roman Camp
Roman Fort
Roman Villa
Roman Temple
Roman Milestone
Roman Bridge
Roman Signal Station
Roman Amphitheatre
Roman Aqueduct
Roman Baths
Roman Theatre
Roman Wall
Roman Gate
Roman Tower
Roman Fortlet



Plan View

Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

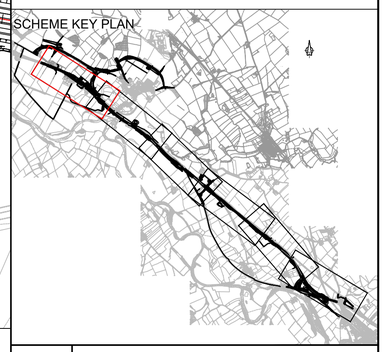
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---	
	07/09/21	07/09/21	07/09/21	07/09/21	---	

Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

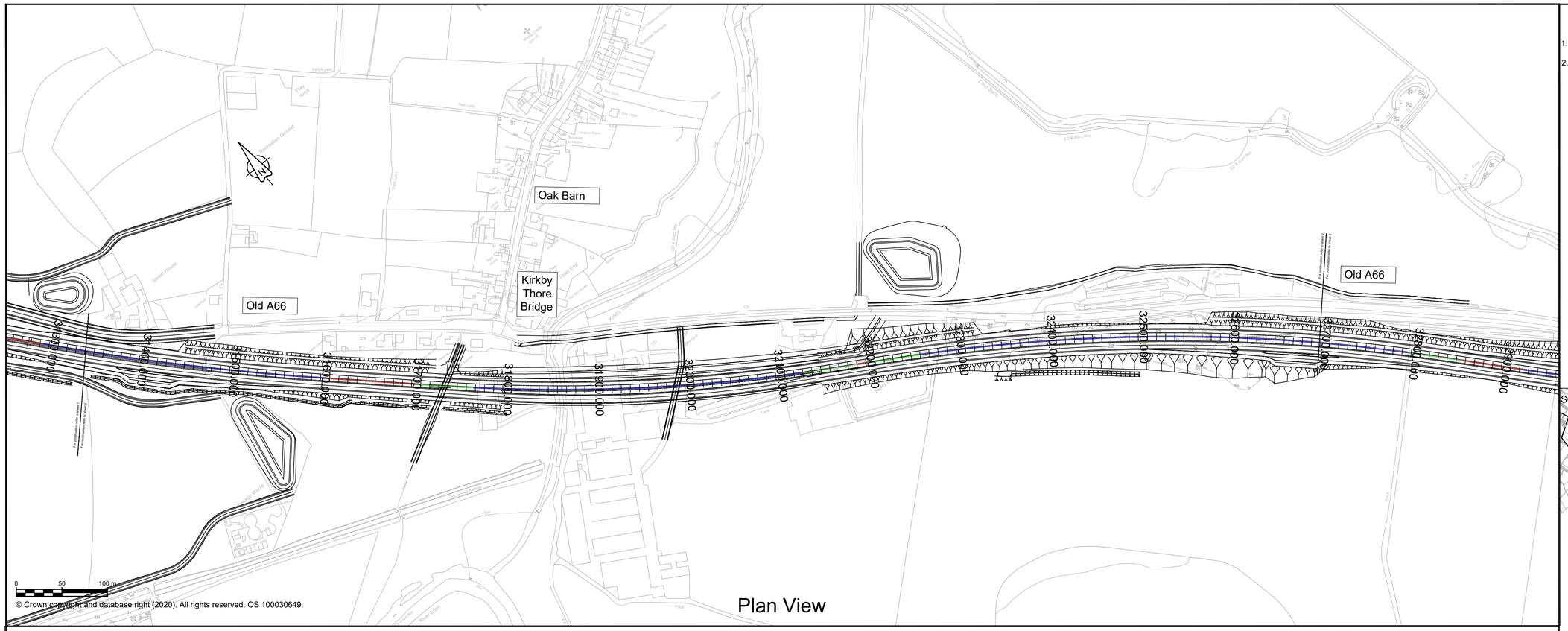
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Orange Option
Sheet 1 of 6

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

Project	Originator	Volume		
HE565627	AMY	HML	-	
S0405	DR	CH	000314	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

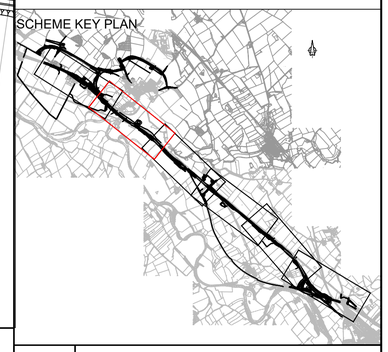
Plan

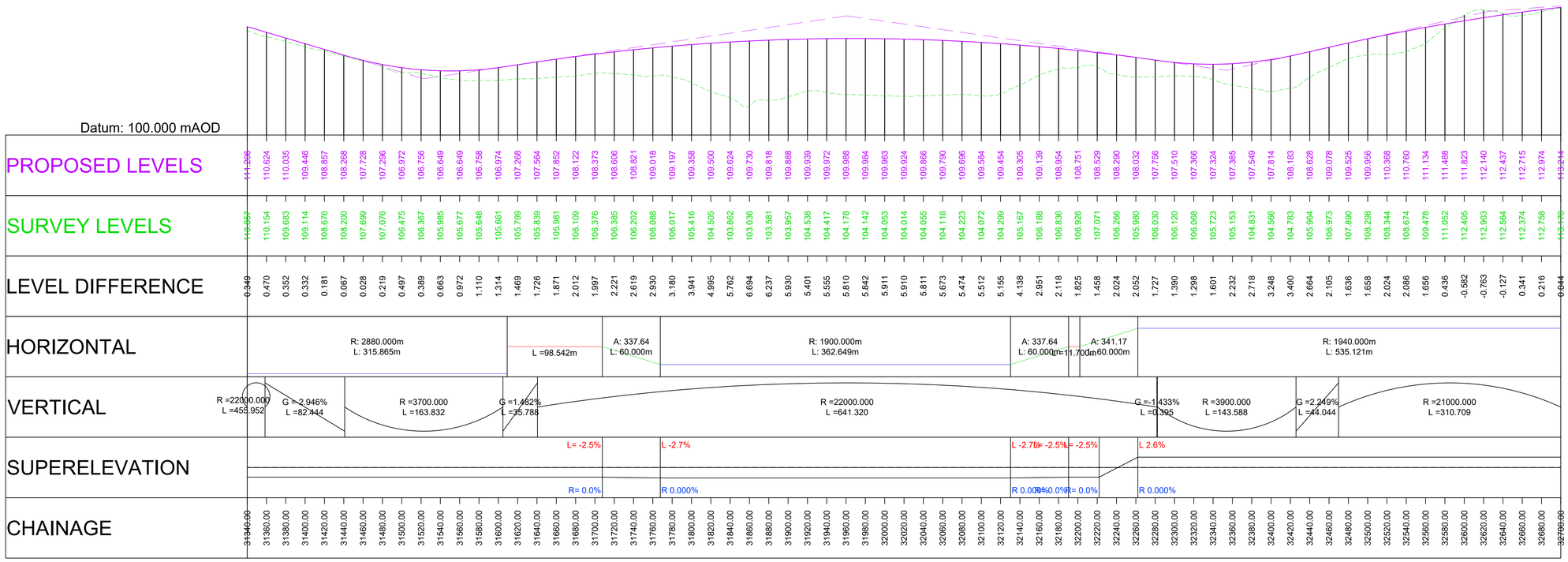
- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN





Scale H 1:2500; V 1:250

Profile View

---	---				
---	---	---	---	---	---
---	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---
	07/09/21	07/09/21	07/09/21	07/09/21	---

Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

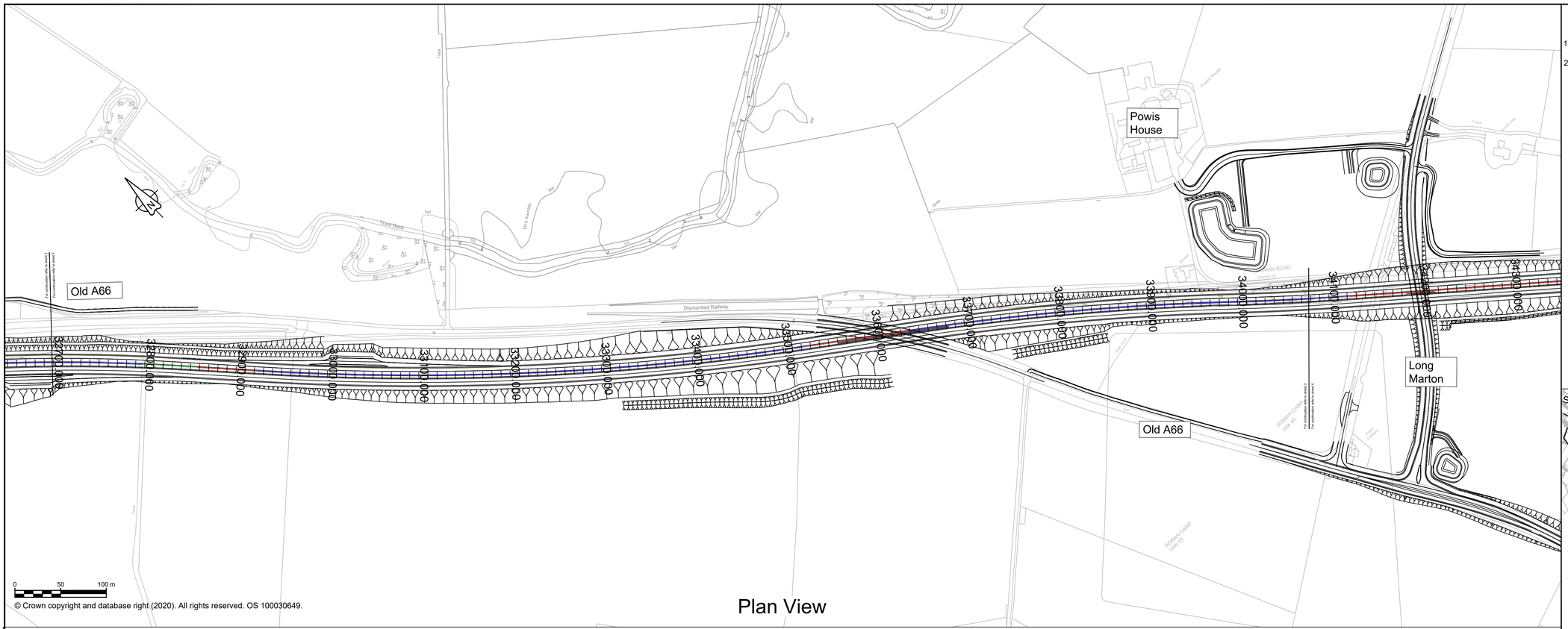
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Orange Option
Sheet 2 of 6

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

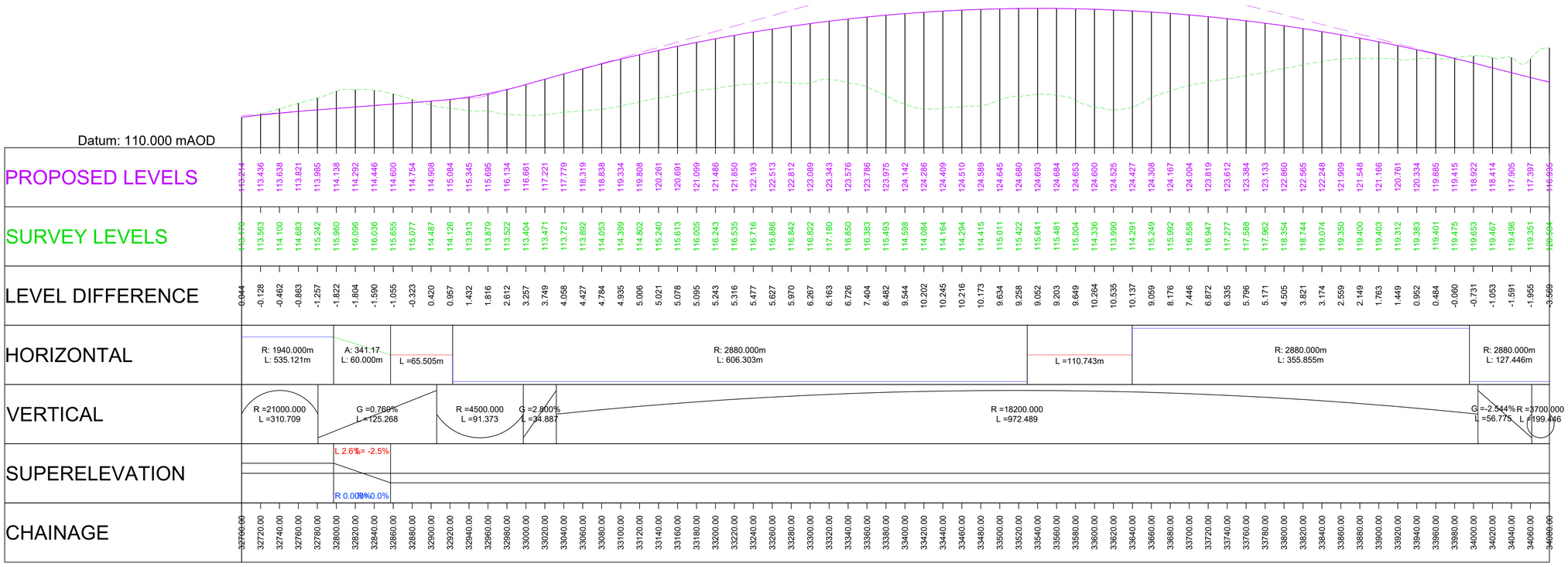
Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	HML	S0405	DR	CH	000315

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

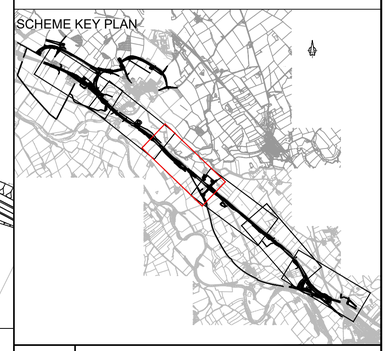
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---	
	07/09/21	07/09/21	07/09/21	07/09/21	---	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

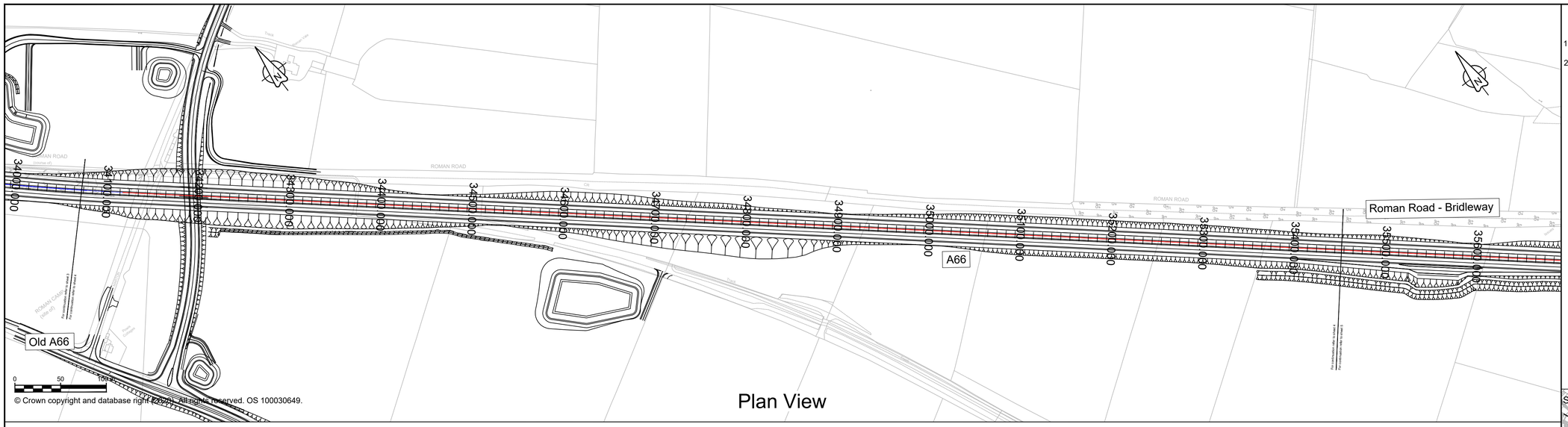
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Orange Option
Sheet 3 of 6

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	HML	S0405	DR	CH	000316

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View

Datum: 115.000 mAOD

PROPOSED LEVELS	116.935 116.581 116.335 116.197 116.167 116.246 116.432 116.727 117.129 117.640 118.209 118.779 119.348 119.918 120.487 121.056 121.626 122.195 122.764 123.334 123.906 124.524 125.199 125.930 126.717 127.517 128.317 129.117 129.917 130.717 131.517 132.317 133.117 133.917 134.717 135.517 136.317 137.117 137.917 138.717 139.517 140.315 141.095 141.854 142.592 143.308 144.002 144.675 145.327 145.957 146.565 147.152 147.717 148.261 148.784 149.285 149.764 150.222 150.658 151.073 151.467 151.838 152.189 152.518 152.825 153.111 153.375 153.618 153.839 154.039
SURVEY LEVELS	120.590 119.634 119.853 120.456 121.251 122.042 122.409 122.733 123.042 123.336 123.609 123.654 123.723 123.935 124.145 124.353 124.326 124.088 123.801 123.405 123.263 123.316 123.801 124.042 124.292 124.472 124.687 124.773 124.725 124.870 125.316 126.243 127.446 128.766 129.580 130.172 131.409 133.107 134.449 136.221 137.408 139.101 140.549 141.598 142.651 143.608 144.513 145.627 146.785 148.078 148.979 149.557 149.977 150.486 150.933 151.345 151.870 152.300 152.662 153.076 153.487 153.924 154.306 154.717 155.006 155.136 155.000 155.133 155.328 155.643
LEVEL DIFFERENCE	-3.569 -3.053 -3.518 -4.259 -5.084 -5.797 -5.977 -6.006 -5.912 -5.696 -5.400 -4.875 -4.375 -4.018 -3.658 -3.297 -2.700 -1.893 -1.036 -0.072 0.643 1.208 1.398 1.889 2.425 3.045 3.630 4.344 5.192 5.846 6.201 6.073 5.670 5.150 5.137 5.344 4.907 4.010 3.468 2.496 2.109 1.214 0.547 0.257 -0.059 -0.301 -0.511 -0.951 -1.459 -2.121 -2.414 -2.405 -2.260 -2.224 -2.149 -2.061 -2.106 -2.078 -2.004 -2.003 -2.020 -2.085 -2.117 -2.199 -2.181 -2.025 -1.624 -1.515 -1.488 -1.604
HORIZONTAL	R: 2880.000m L: 127.446m; L =2060.120m
VERTICAL	R =3700.000 L =199.446; G =2.847% L =212.311; R =7000.000 L =80.722; G =4.000% L =337.979; R =18600.000 L =844.933
SUPERELEVATION	
CHAINAGE	34080.00 34100.00 34120.00 34140.00 34160.00 34180.00 34200.00 34220.00 34240.00 34260.00 34280.00 34300.00 34320.00 34340.00 34360.00 34380.00 34400.00 34420.00 34440.00 34460.00 34480.00 34500.00 34520.00 34540.00 34560.00 34580.00 34600.00 34620.00 34640.00 34660.00 34680.00 34700.00 34720.00 34740.00 34760.00 34780.00 34800.00 34820.00 34840.00 34860.00 34880.00 34900.00 34920.00 34940.00 34960.00 34980.00 35000.00 35020.00 35040.00 35060.00 35080.00 35100.00 35120.00 35140.00 35160.00 35180.00 35200.00 35220.00 35240.00 35260.00 35280.00 35300.00 35320.00 35340.00 35360.00 35380.00 35400.00 35420.00 35440.00 35460.00

0 50 100 m Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

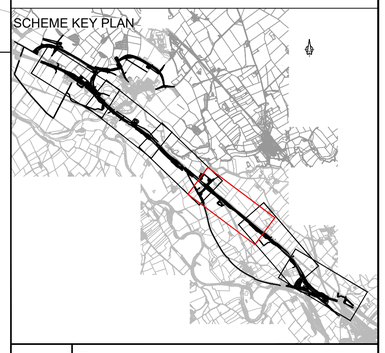
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---
	07/09/21	07/09/21	07/09/21	07/09/21	---

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

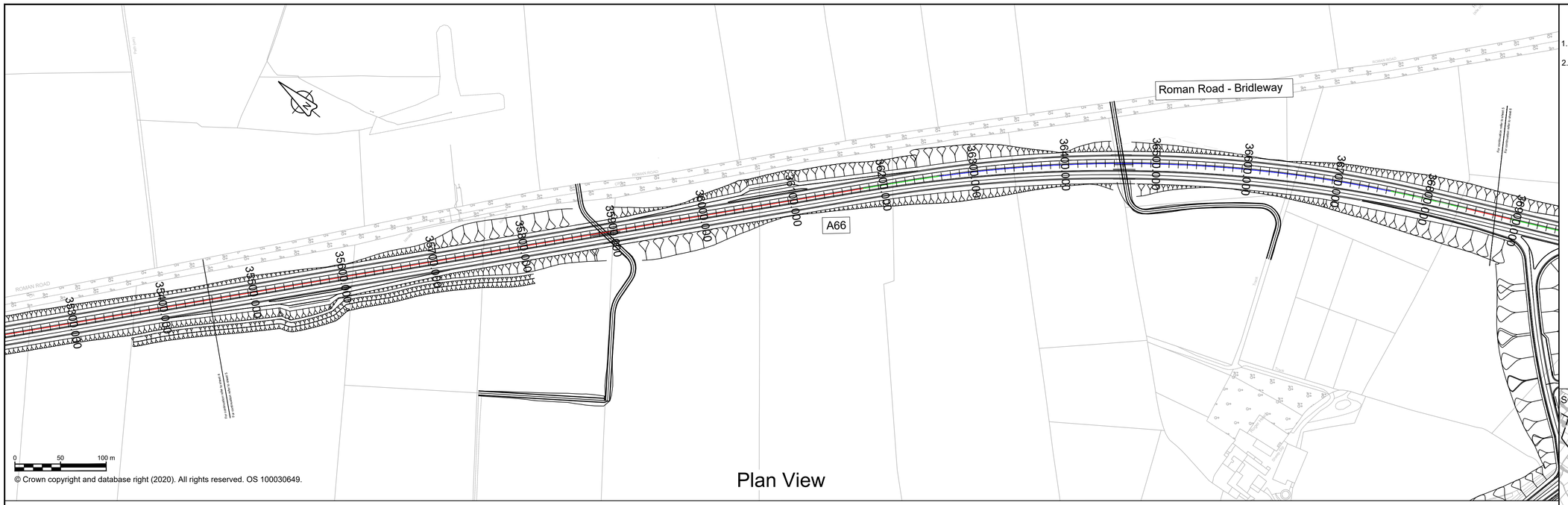
Project Name
A66 Northern Trans-Pennine

Drawing Title
Temple Sowerby to Appleby
Plan and Profile Orange Option
Sheet 4 of 6

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S0405 -DR-CH- 000317
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

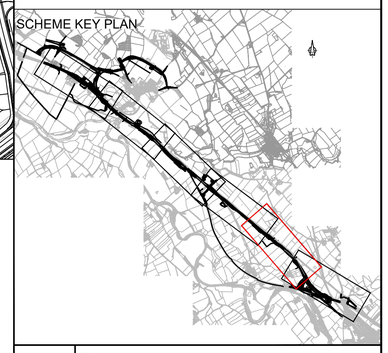
Plan

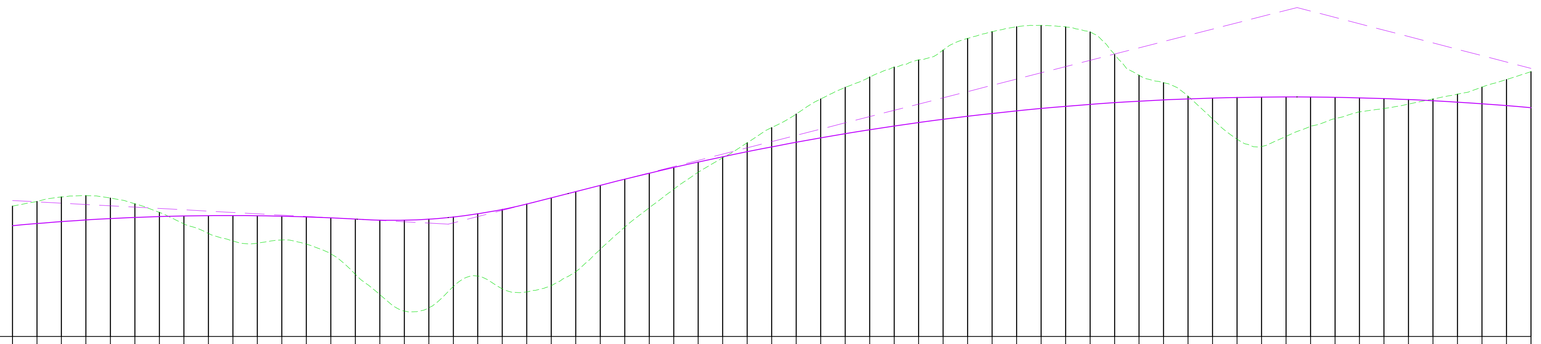
- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN





Datum: 145.000 mAOD

PROPOSED LEVELS	154.039 154.218 154.374 154.510 154.624 154.716 154.787 154.836 154.864 154.870 154.855 154.818 154.760 154.680 154.579 154.492 154.489 154.574 154.749 155.013 155.365 155.807 156.314 156.824 157.335 157.838 158.323 158.790 159.238 159.669 160.081 160.475 160.851 161.209 161.548 161.870 162.173 162.458 162.725 162.973 163.204 163.416 163.610 163.786 163.944 164.083 164.205 164.308 164.393 164.460 164.508 164.539 164.551 164.545 164.521 164.479 164.419 164.340 164.243 164.128 163.995 163.844 163.674
SURVEY LEVELS	156.043 156.021 156.388 156.497 156.299 155.831 155.126 154.191 153.412 152.795 152.610 152.876 152.531 151.745 150.070 148.416 147.070 147.333 149.068 149.930 148.877 148.633 149.148 150.277 152.107 153.917 155.511 157.013 158.404 159.585 160.810 162.049 163.153 164.384 165.337 166.179 166.990 167.574 168.381 169.328 169.876 170.284 170.391 170.276 169.857 168.025 166.319 165.719 164.607 162.752 161.106 160.502 161.330 162.147 162.780 163.328 163.609 163.966 164.386 164.778 165.355 165.970 166.621
LEVEL DIFFERENCE	-1.604 -1.804 -2.014 -1.987 -1.676 -1.115 -0.339 0.645 1.452 2.075 2.244 1.942 2.229 2.935 4.509 6.076 7.419 7.241 5.681 5.083 6.488 7.174 7.166 6.547 5.228 3.921 2.812 1.777 0.834 0.084 -0.729 -1.574 -2.302 -3.176 -3.789 -4.309 -4.817 -5.116 -5.656 -6.354 -6.672 -6.868 -6.781 -6.489 -5.913 -3.942 -2.114 -1.412 -0.214 1.708 3.402 4.037 3.221 2.398 1.741 1.151 0.809 0.374 -0.143 -0.650 -1.360 -2.126 -2.947
HORIZONTAL	L =2060.120m; A: 349.86 L: 85.000m; R: 1440.000m L: 496.715m
VERTICAL	R =18600.000 L =844.933; G =-0.543% L =9.477; R =4500.000 L =139.246; G =2.552% L =56.636; R =22000.000 L =1133.683
SUPERELEVATION	L= -2.5%; L 3.5%; R= 0.0%; R 0.000%
CHAINAGE	35460.00 35480.00 35500.00 35520.00 35540.00 35560.00 35580.00 35600.00 35620.00 35640.00 35660.00 35680.00 35700.00 35720.00 35740.00 35760.00 35780.00 35800.00 35820.00 35840.00 35860.00 35880.00 35900.00 35920.00 35940.00 35960.00 35980.00 36000.00 36020.00 36040.00 36060.00 36080.00 36100.00 36120.00 36140.00 36160.00 36180.00 36200.00 36220.00 36240.00 36260.00 36280.00 36300.00 36320.00 36340.00 36360.00 36380.00 36400.00 36420.00 36440.00 36460.00 36480.00 36500.00 36520.00 36540.00 36560.00 36580.00 36600.00 36620.00 36640.00 36660.00 36680.00 36700.00

0 50 100 m

Scale H 1:2500; V 1:250

Profile View

Revision					
---	---	---	---	---	---
---	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---
	07/09/21	07/09/21	07/09/21	07/09/21	---
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

Drawing Title
Temple Sowerby to Appleby
Plan and Profile Orange Option
Sheet 5 of 6

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

Project	Originator	Volume		
HE565627 -	AMY -	HML -		
S0405	-DR-	CH-	000318	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

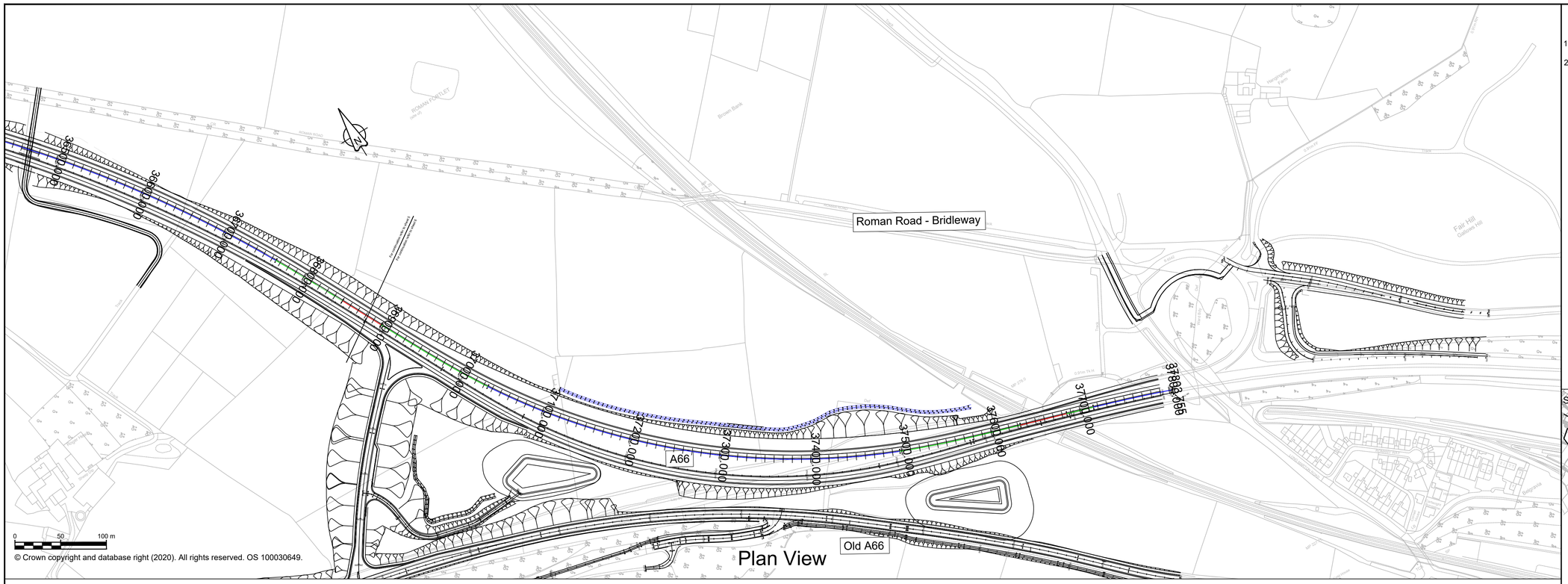
KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

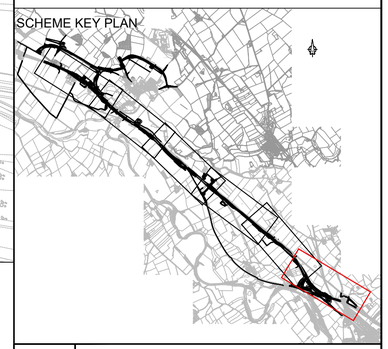
- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

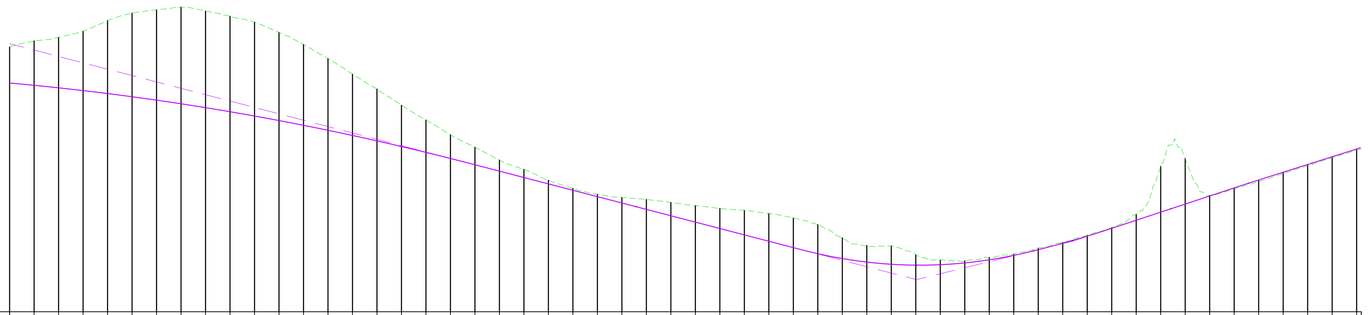


© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View

SCHEME KEY PLAN





Datum: 145.000 mAOD

PROPOSED LEVELS	163.674 163.486 163.280 163.056 162.814 162.554 162.275 161.978 161.663 161.330 160.979 160.609 160.221 159.816 159.391 158.949 158.489 158.010 157.513 156.999 156.478 155.958 155.438 154.918 154.397 153.877 153.357 152.837 152.316 151.796 151.276 150.755 150.235 149.738 149.342 149.055 148.876 148.804 148.841 148.986 149.239 149.601 150.065 150.590 151.172 151.810 152.470 153.130 153.790 154.450 155.110 155.757 156.389 157.021 157.653 158.285
SURVEY LEVELS	166.621 167.109 167.401 167.902 168.771 169.374 169.651 169.865 169.546 169.117 168.646 167.803 166.819 165.670 164.406 163.175 161.853 160.655 159.451 158.433 157.381 156.627 155.727 155.064 154.592 154.329 154.165 153.923 153.667 153.431 153.277 153.021 152.649 152.109 151.031 150.409 150.372 149.652 149.220 149.155 149.439 149.705 150.196 150.658 151.243 151.869 152.948 156.867 157.500 154.498 155.056 155.620 156.286 156.914 157.579 158.196
LEVEL DIFFERENCE	-2.947 -3.622 -4.121 -4.845 -5.957 -6.821 -7.376 -7.887 -7.883 -7.787 -7.667 -7.194 -6.597 -5.855 -5.014 -4.225 -3.364 -2.645 -1.938 -1.434 -0.903 -0.669 -0.289 -0.147 -0.194 -0.451 -0.808 -1.087 -1.350 -1.635 -2.001 -2.265 -2.414 -2.371 -1.689 -1.354 -1.496 -0.848 -0.379 -0.169 -0.200 -0.105 -0.131 -0.068 -0.071 -0.059 -0.478 -3.737 -3.710 -0.049 0.054 0.137 0.104 0.108 0.074 0.089
HORIZONTAL	R: 1440.000m L: 496.715m; A: 349.86 L: 85.000m; L =49.689m; A: 318.20 L: 135.000m; R: 750.000m L: 463.478m; A: 318.20 L: 135.000m; L =52.183m; A: 256.90 L: 30.000m; R: 2200.000m L: 88.540m
VERTICAL	R =22000.000 L =1133.683; G =-2.601% L =271.107; R =3700.000 L =187.056; G =2.454% R =7000.000 L =59.145; G =3.299% L =101.593; R =18200.000 L =25.453; G =3.159% L =78.704
SUPERELEVATION	L 3.5% L= -2.5% L= -2.5% L -7.0% L -7.0% L= -2.5% L= -2.5% L 2.5% L 2.5%; R 0.000% R= 0.0% R= 0.0% R 0.000% R 0.000% R= 0.0% R= 0.0% R 0.000% R 0.000%
CHAINAGE	36700.00 36720.00 36740.00 36760.00 36780.00 36800.00 36820.00 36840.00 36860.00 36880.00 36900.00 36920.00 36940.00 36960.00 36980.00 37000.00 37020.00 37040.00 37060.00 37080.00 37100.00 37120.00 37140.00 37160.00 37180.00 37200.00 37220.00 37240.00 37260.00 37280.00 37300.00 37320.00 37340.00 37360.00 37380.00 37400.00 37420.00 37440.00 37460.00 37480.00 37500.00 37520.00 37540.00 37560.00 37580.00 37600.00 37620.00 37640.00 37660.00 37680.00 37700.00 37720.00 37740.00 37760.00 37780.00 37800.00

0 50 100 m

Scale H 1:2500; V 1:250

Profile View

---	---				
	---	---	---	---	---
	---	---	---	---	---
---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---
	07/09/21	07/09/21	07/09/21	07/09/21	---
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

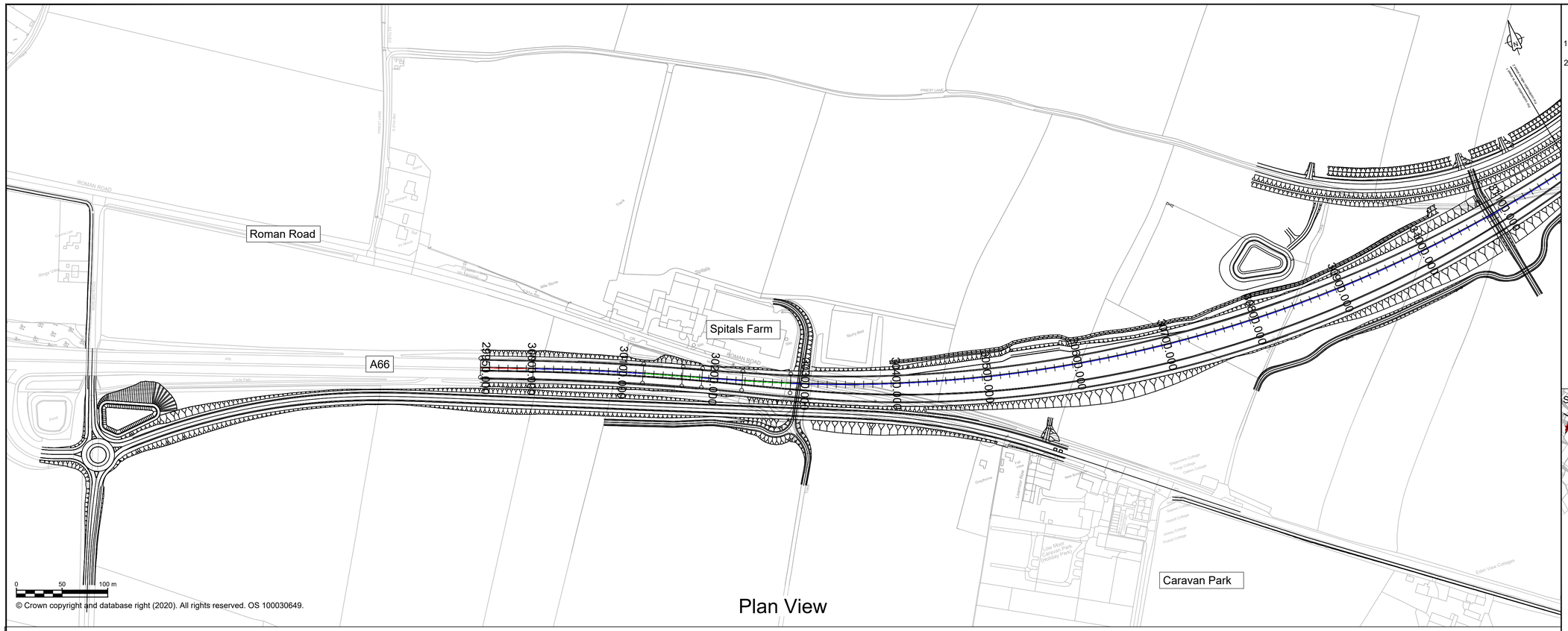
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Orange Option
Sheet 6 of 6

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

Project	Originator	Volume		
HE565627 -	AMY -	HML -		
S0405	-DR-	CH-	000319	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View

Datum: 110.000 mAOD

PROPOSED LEVELS	124.542 124.671 124.928 125.186 125.443 125.700 125.957 126.200 126.423 126.624 126.804 126.963 127.101 127.217 127.313 127.388 127.442 127.474 127.486 127.476 127.446 127.394 127.322 127.228 127.113 126.978 126.821 126.643 126.444 126.224 125.983 125.721 125.438 125.133 124.808 124.462 124.095 123.706 123.297 122.878 122.460 122.042 121.633 121.314 121.103 121.001 121.006 121.102 121.198 121.272 121.326 121.359 121.370 121.361 121.330 121.278 121.206 121.112 120.997 120.861 120.705 120.527 120.328 120.108 119.866 119.604
SURVEY LEVELS	124.486 124.614 124.837 125.112 125.366 125.561 125.803 126.051 126.207 126.380 126.451 126.547 126.598 126.655 126.683 126.745 126.904 126.947 126.334 126.498 126.062 125.784 125.598 125.405 125.143 124.698 124.254 123.907 123.553 123.065 122.403 121.693 121.350 121.397 121.371 121.347 121.169 120.717 120.445 120.431 121.251 122.079 122.672 122.868 122.428 121.541 120.597 119.798 119.248 118.839 118.473 117.917 117.556 117.214 116.690 116.289 116.280 116.479 116.788 117.131 117.483 117.674 117.893 118.031 117.992 117.556
LEVEL DIFFERENCE	0.056 0.057 0.091 0.074 0.077 0.140 0.154 0.150 0.216 0.244 0.353 0.416 0.503 0.563 0.630 0.643 0.538 0.528 1.152 0.978 1.384 1.611 1.723 1.823 1.971 2.280 2.567 2.736 2.891 3.159 3.580 4.028 4.088 3.737 3.437 3.115 2.926 2.990 2.852 2.447 1.209 -0.038 -1.039 -1.554 -1.325 -0.541 0.409 1.305 1.949 2.434 2.853 3.442 3.814 4.147 4.641 4.990 4.926 4.633 4.210 3.730 3.222 2.853 2.435 2.077 1.874 2.049
HORIZONTAL	L =57.552m; R: 2475.000m L: 120.511m; A: 327.03 L: 43.211m; R: 3000.000m L: 21.391m; R: 3000.000m L: 44.235m; A: 327.03 L: 52.880m; R: 1440.000m L: 962.193m
VERTICAL	G =1.287% L =106.521; R =19000.000 L =641.968; G =-2.092% L =73.992; R =3700.000 L =97.018; G =0.530% L =11.527; R =19000.000 L =576.883
SUPERELEVATION	L 2.5%; L= -2.5%; L -3.5%; R 0.000%; R= 0.0%; R 0.000%
CHAINAGE	29960.00 29960.00 29980.00 30000.00 30020.00 30040.00 30060.00 30080.00 30100.00 30120.00 30140.00 30160.00 30180.00 30200.00 30220.00 30240.00 30260.00 30280.00 30300.00 30320.00 30340.00 30360.00 30380.00 30400.00 30420.00 30440.00 30460.00 30480.00 30500.00 30520.00 30540.00 30560.00 30580.00 30600.00 30620.00 30640.00 30660.00 30680.00 30700.00 30720.00 30740.00 30760.00 30780.00 30800.00 30820.00 30840.00 30860.00 30880.00 30900.00 30920.00 30940.00 30960.00 30980.00 31000.00 31020.00 31040.00 31060.00 31080.00 31100.00 31120.00 31140.00 31160.00 31180.00 31200.00 31220.00 31240.00

0 50 100 m

Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

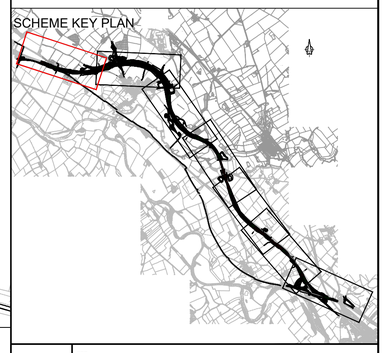
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
---	---	---	---	---	---	---

---	---	---	---	---	---	---

P01	GCHI	GCHI	SHAL	KCRO	---	
	07/09/21	07/09/21	07/09/21	07/09/21	---	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

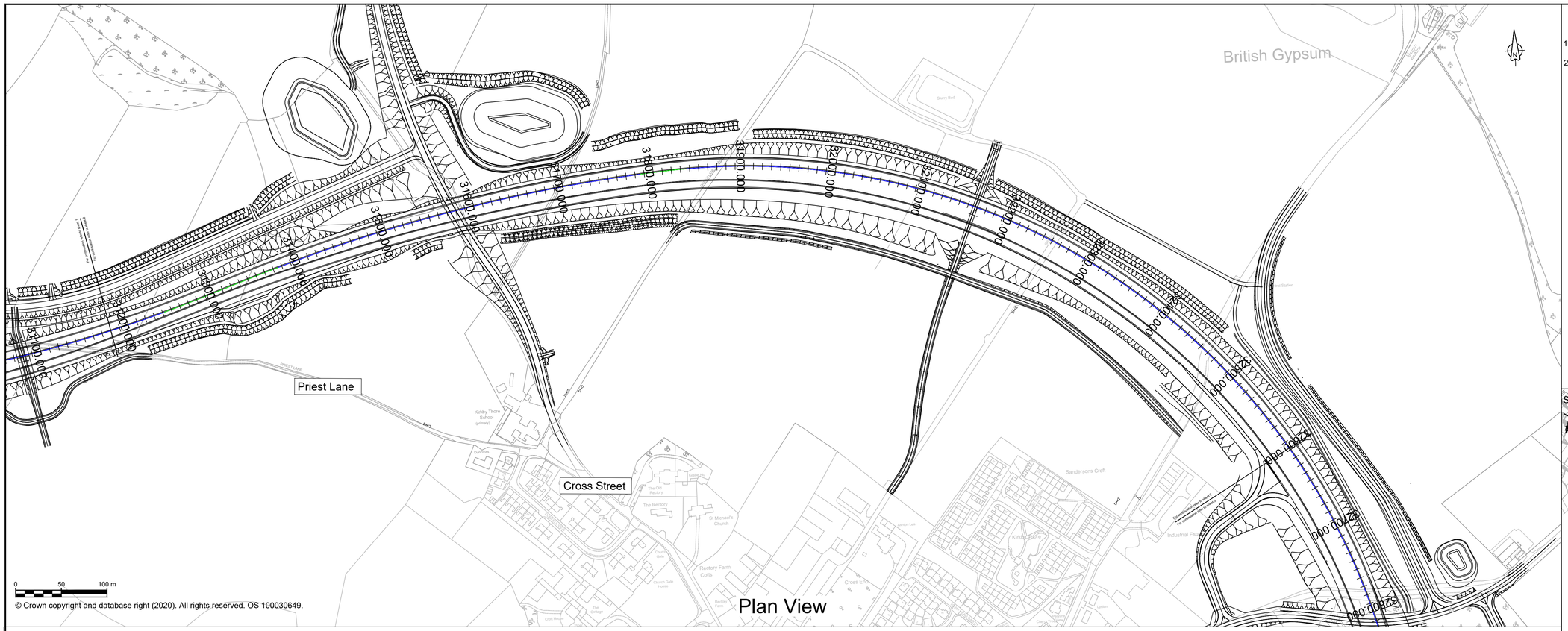
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Red Option
Sheet 1 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	HML	S0405	DR	CH	000415

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

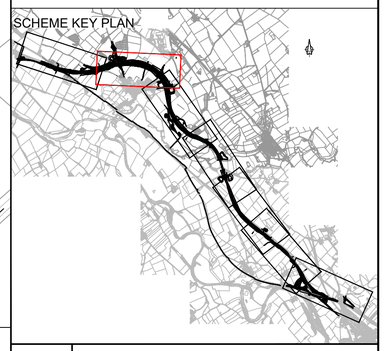
Plan

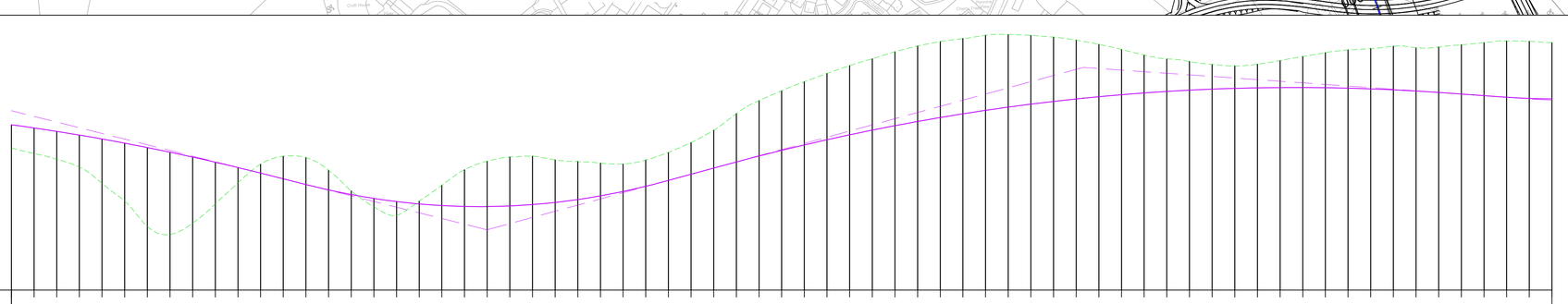
- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN





Datum: 105.000 mAOD

PROPOSED LEVELS	118.884 119.321 119.017 118.692 118.345 117.978 117.589 117.180 116.749 116.298 115.825 115.331 114.830 114.329 113.852 113.441 113.097 112.820 112.609 112.465 112.388 112.377 112.433 112.555 112.744 113.000 113.323 113.712 114.168 114.690 115.235 115.780 116.322 116.844 117.345 117.824 118.282 118.717 119.132 119.524 119.895 120.245 120.572 120.879 121.163 121.426 121.667 121.887 122.085 122.261 122.416 122.549 122.661 122.751 122.819 122.866 122.891 122.894 122.876 122.836 122.775 122.692 122.587 122.461 122.320 122.179 122.039 121.935 121.888
SURVEY LEVELS	117.566 117.064 116.563 115.878 114.425 112.861 110.618 109.909 110.921 112.610 114.479 116.124 116.824 116.706 115.584 113.762 112.349 111.619 112.853 114.258 115.630 116.385 116.766 116.830 116.607 116.357 116.221 116.135 116.492 117.149 118.031 119.120 120.593 121.739 122.608 123.412 124.138 124.832 125.438 126.054 126.566 126.958 127.218 127.517 127.577 127.502 127.347 127.087 126.707 126.261 125.761 125.428 125.196 124.940 124.804 124.950 125.277 125.633 125.974 126.227 126.344 126.544 126.406 126.477 126.673 126.865 127.010 126.978 126.866
LEVEL DIFFERENCE	2.949 2.257 2.454 2.813 3.920 5.117 6.971 7.271 5.828 3.687 1.346 -0.793 -1.994 -2.377 -1.732 -0.321 0.748 1.200 -0.244 -1.793 -3.243 -4.008 -4.333 -4.275 -3.763 -3.356 -2.898 -2.423 -2.324 -2.459 -2.796 -3.340 -4.272 -4.895 -5.263 -5.588 -5.856 -6.115 -6.307 -6.530 -6.671 -6.713 -6.646 -6.638 -6.414 -6.076 -5.679 -5.200 -4.622 -4.000 -3.345 -2.878 -2.535 -2.189 -1.984 -2.085 -2.386 -2.739 -3.098 -3.391 -3.569 -3.852 -3.819 -4.016 -4.353 -4.686 -4.972 -5.043 -4.977
HORIZONTAL	R: 1440.000m A: 327.03 L: 962.193m L: 74.269m; A: 327.03 L: 59.376m; R: 1801.200m L: 410.378m; A: 248.33 L: 50.590m; R: 727.000m L: 1098.375m
VERTICAL	R =19000.000 L =576.883; G =-2.506% L =45.754; R =6000.000 L =313.911; G =2.726% L =52.139; R =18500.000 L =634.755; G =-0.705% L =53.286; R =7000.000 L =164.433
SUPERELEVATION	L -3.5% R 0.000%; L 3.5% R 0.000%; L 3.5% R 0.000%; L 7.0% R 0.000%
CHAINAGE	31240.00 31260.00 31280.00 31300.00 31320.00 31340.00 31360.00 31380.00 31400.00 31420.00 31440.00 31460.00 31480.00 31500.00 31520.00 31540.00 31560.00 31580.00 31600.00 31620.00 31640.00 31660.00 31680.00 31700.00 31720.00 31740.00 31760.00 31780.00 31800.00 31820.00 31840.00 31860.00 31880.00 31900.00 31920.00 31940.00 31960.00 31980.00 32000.00 32020.00 32040.00 32060.00 32080.00 32100.00 32120.00 32140.00 32160.00 32180.00 32200.00 32220.00 32240.00 32260.00 32280.00 32300.00 32320.00 32340.00 32360.00 32380.00 32400.00 32420.00 32440.00 32460.00 32480.00 32500.00 32520.00 32540.00 32560.00 32580.00 32600.00

0 50 100 m

Scale H 1:2500; V 1:250

Profile View

---	---				
	---	---	---	---	---
	---	---	---	---	---
---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---
	07/09/21	07/09/21	07/09/21	07/09/21	---
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

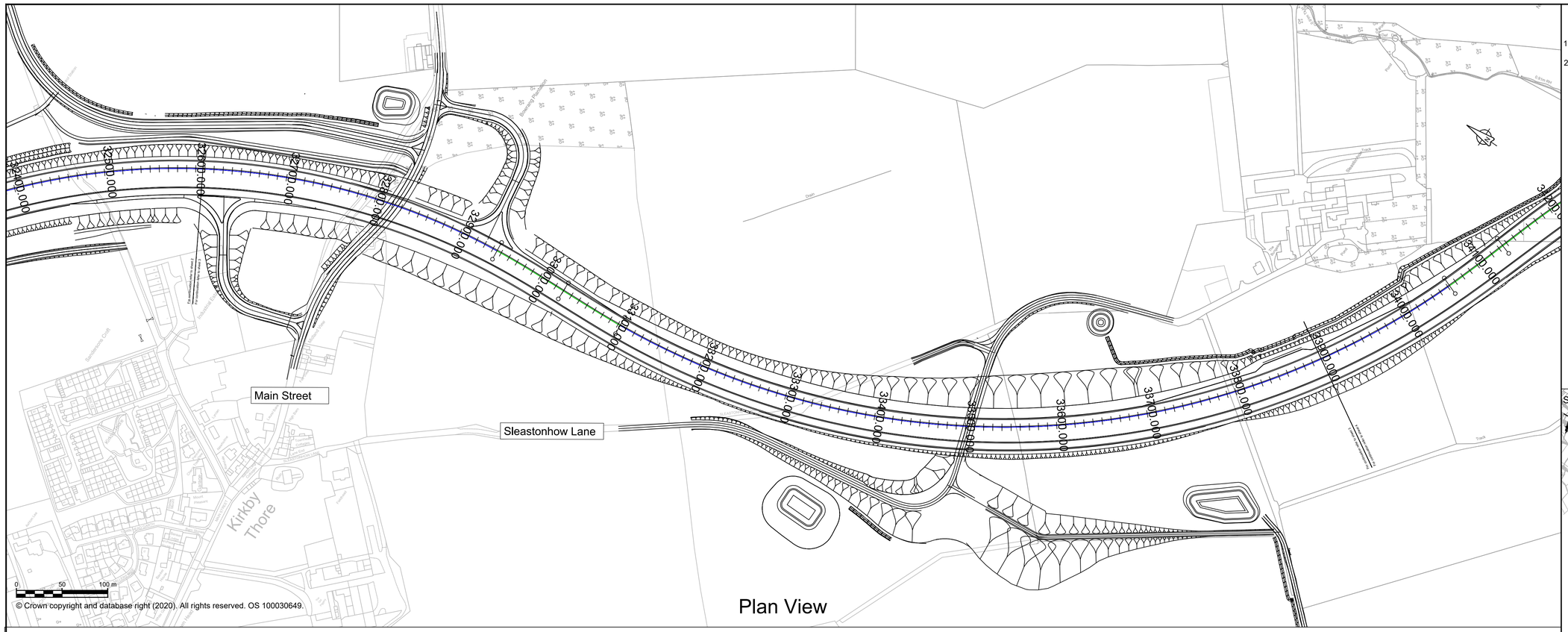
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Red Option
Sheet 2 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

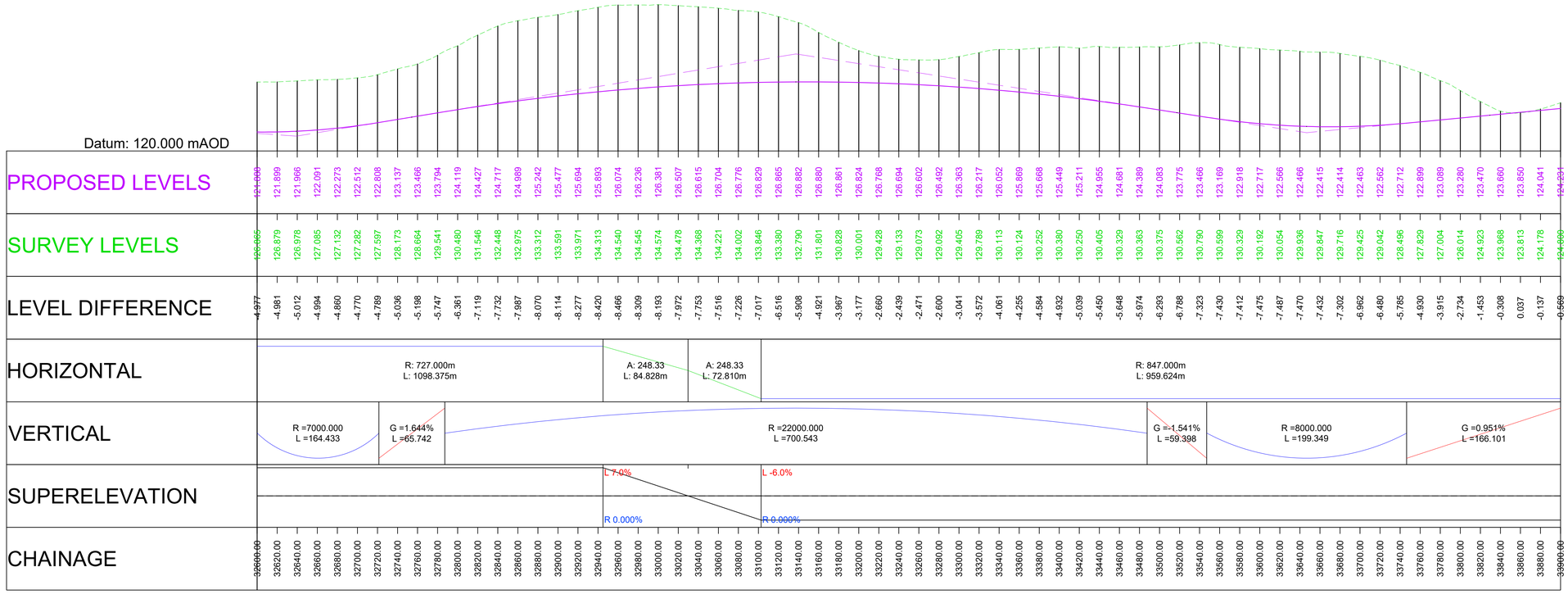
Drawing Number

Project	Originator	Volume	
HE565627 -	AMY -	HML -	
S0405	-DR-	CH-	000416
Location	Type	Role	Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

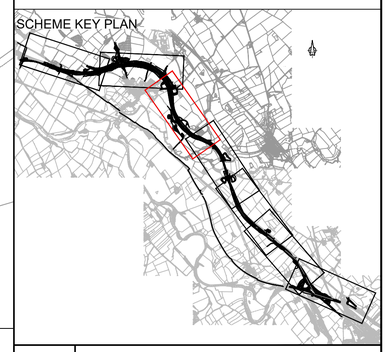
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---				
	---	---	---	---	---
	---	---	---	---	---
---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---
	07/09/21	07/09/21	07/09/21	07/09/21	---
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

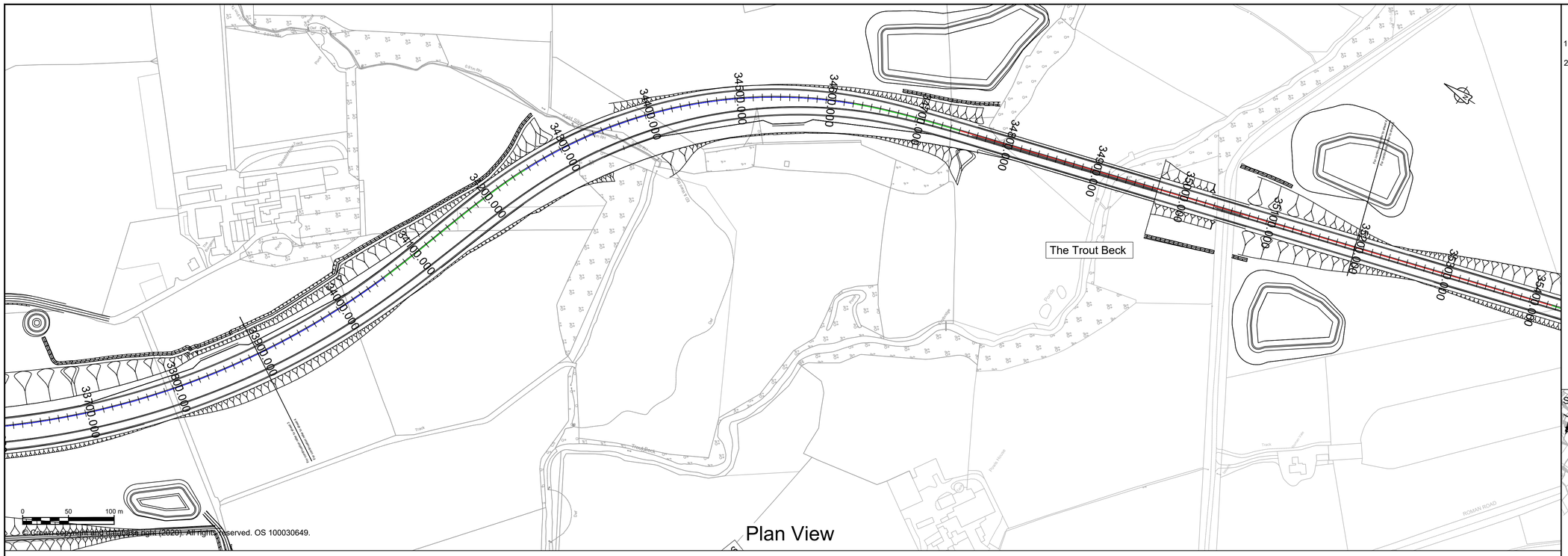
Project Name
A66 Northern Trans-Pennine

Drawing Title
Temple Sowerby to Appleby
Plan and Profile Red Option
Sheet 3 of 7

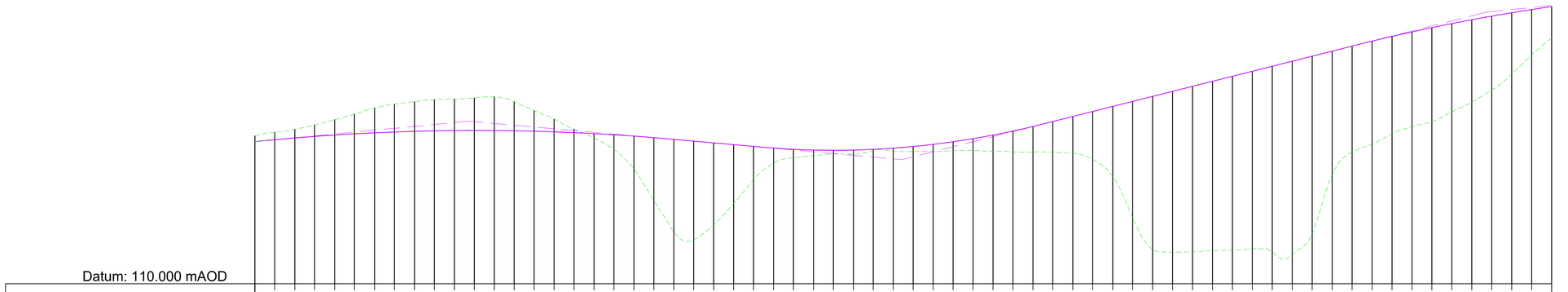
Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S0405 -DR-CH- 000417
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

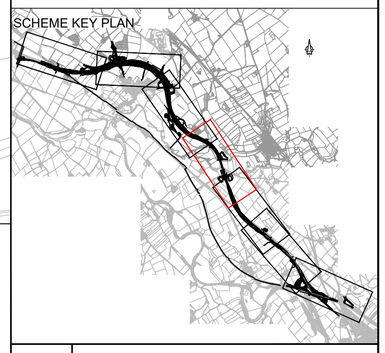
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	GCHI	GCHI	SHAL	KCRO	---	
	07/09/21	07/09/21	07/09/21	07/09/21	---	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

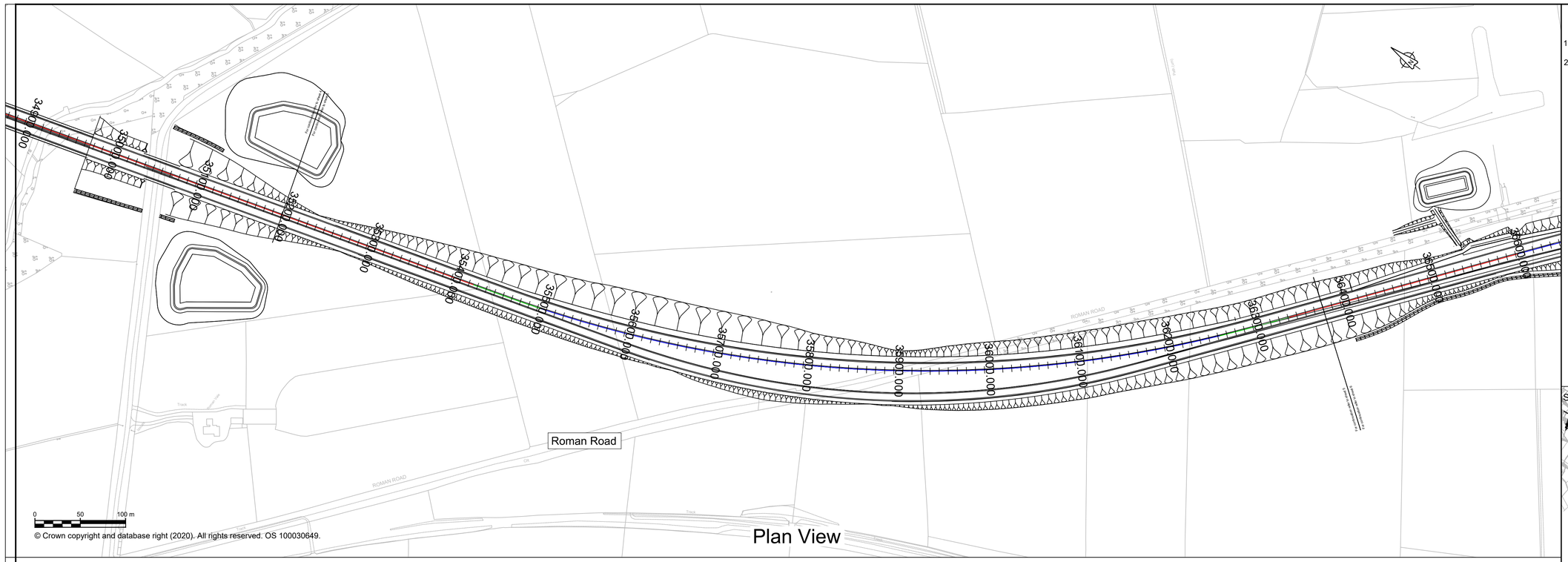
Project Name
A66 Northern Trans-Pennine

Drawing Title
Temple Sowerby to Appleby
Plan and Profile Red Option
Sheet 4 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

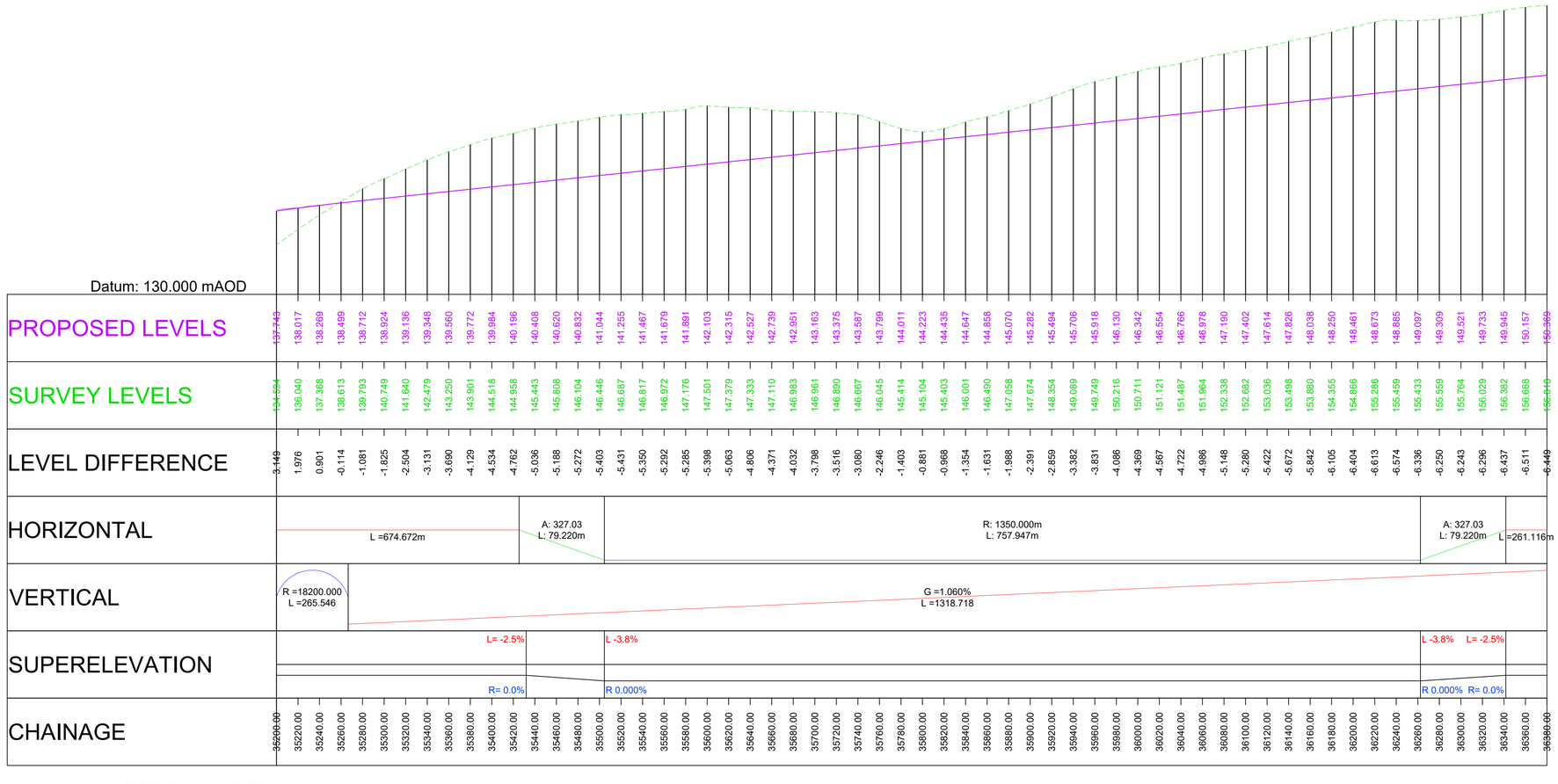
Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S0405 -DR-CH- 000418
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

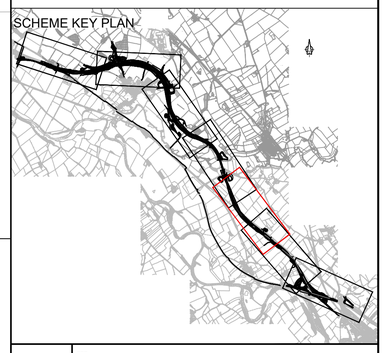
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- ##### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	GCHI	GCHI	SHAL	KCRO	---	
	07/09/21	07/09/21	07/09/21	07/09/21	---	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

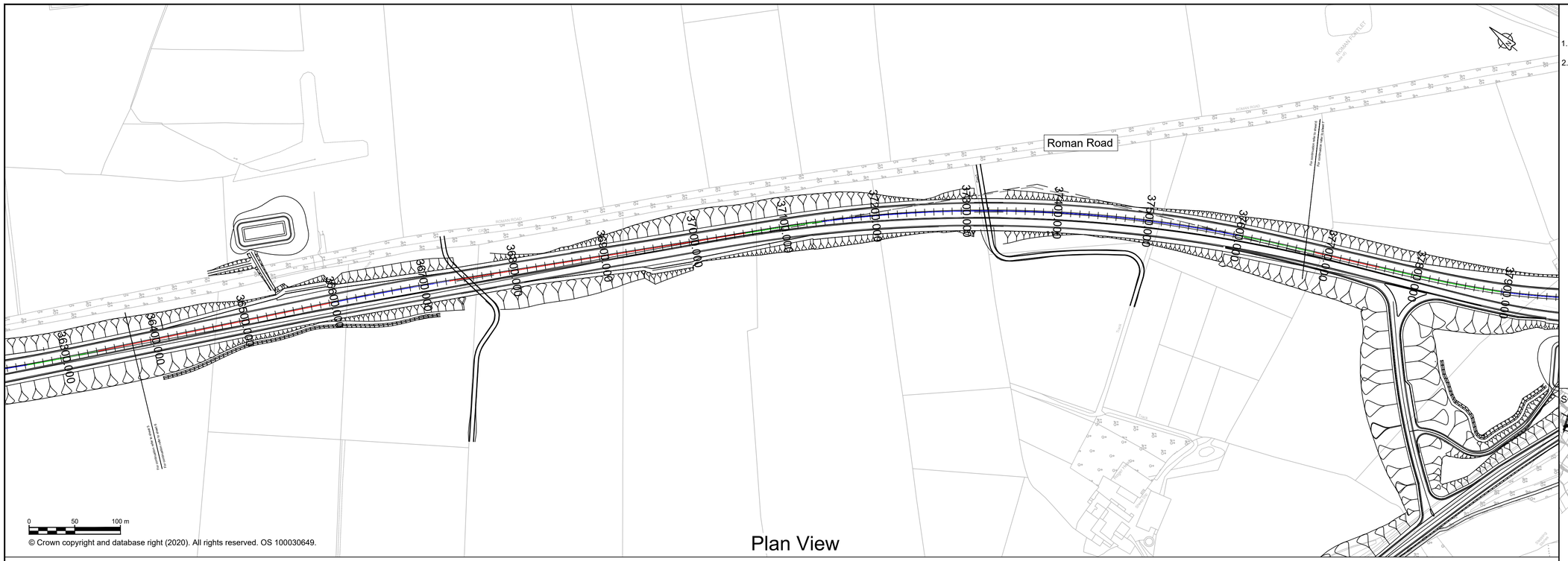
Project Name
A66 Northern Trans-Pennine

Drawing Title
Temple Sowerby to Appleby
Plan and Profile Red Option
Sheet 5 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

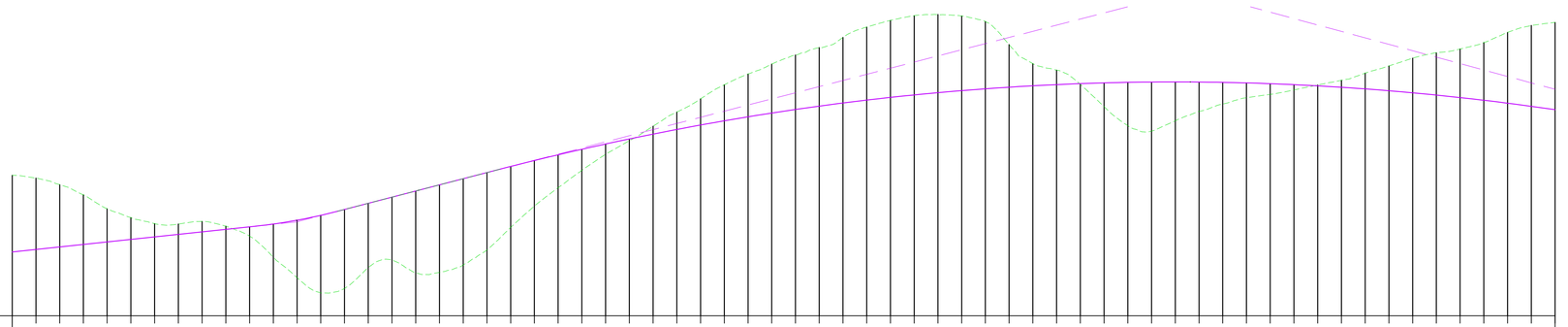
Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S0405 -DR-CH- 000419
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Datum: 145.000 mAOD

PROPOSED LEVELS	150.389 150.581 150.793 151.005 151.217 151.429 151.641 151.853 152.064 152.276 152.488 152.724 153.046 153.456 153.952 154.469 154.985 155.502 156.019 156.535 157.052 157.567 158.067 158.548 159.011 159.456 159.883 160.291 160.682 161.054 161.408 161.744 162.062 162.361 162.642 162.905 163.150 163.377 163.586 163.776 163.948 164.102 164.238 164.356 164.455 164.537 164.600 164.645 164.672 164.680 164.671 164.643 164.597 164.533 164.450 164.350 164.231 164.094 163.939 163.766 163.575 163.365 163.137 162.891 162.627 162.345
SURVEY LEVELS	156.840 156.586 156.033 155.180 154.007 153.286 152.754 152.720 152.949 152.542 151.708 149.932 148.208 146.939 147.306 149.061 149.692 148.621 148.650 149.280 150.542 152.445 154.229 155.778 157.244 158.586 159.734 160.952 162.143 163.255 164.438 165.345 166.180 166.943 167.566 168.421 169.293 169.851 170.250 170.351 170.221 169.757 167.819 166.217 165.672 164.477 162.604 161.002 160.540 161.407 162.204 162.818 163.351 163.631 164.002 164.421 164.813 165.419 166.027 166.678 167.135 167.449 167.989 168.854 169.427 169.889
LEVEL DIFFERENCE	-6.449 -6.005 -5.240 -4.175 -2.790 -1.837 -1.113 -0.867 -0.884 -0.265 0.780 2.793 4.838 6.517 6.646 5.408 5.293 6.881 7.369 7.255 6.510 5.122 3.837 2.770 1.767 0.870 0.148 -0.661 -1.461 -2.202 -3.030 -3.601 -4.118 -4.582 -4.924 -5.516 -6.142 -6.474 -6.664 -6.574 -6.273 -5.655 -3.581 -1.861 -1.217 0.059 1.996 3.643 4.132 3.273 2.466 1.824 1.245 0.902 0.448 -0.071 -0.582 -1.325 -2.087 -2.912 -3.560 -4.084 -4.852 -5.963 -6.800 -7.344
HORIZONTAL	L =261.116m; R: 3000.000m L: 131.266m; L =328.120m; A: 344.96 L: 85.000m; R: 1400.000m L: 459.205m; A: 344.96 L: 85.000m
VERTICAL	G =1.060% L =1318.718; R =4500.000 L =68.580; G =2.584% L =137.137; R =22000.000 L =1163.546
SUPERELEVATION	L= -2.5% R= 0.0%; L 3.5% R 0.000%; L 3.5% R 0.000%
CHAINAGE	36380.00 36400.00 36420.00 36440.00 36460.00 36480.00 36500.00 36520.00 36540.00 36560.00 36580.00 36600.00 36620.00 36640.00 36660.00 36680.00 36700.00 36720.00 36740.00 36760.00 36780.00 36800.00 36820.00 36840.00 36860.00 36880.00 36900.00 36920.00 36940.00 36960.00 36980.00 37000.00 37020.00 37040.00 37060.00 37080.00 37100.00 37120.00 37140.00 37160.00 37180.00 37200.00 37220.00 37240.00 37260.00 37280.00 37300.00 37320.00 37340.00 37360.00 37380.00 37400.00 37420.00 37440.00 37460.00 37480.00 37500.00 37520.00 37540.00 37560.00 37580.00 37600.00 37620.00 37640.00 37660.00 37680.00

0 50 100 m

Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

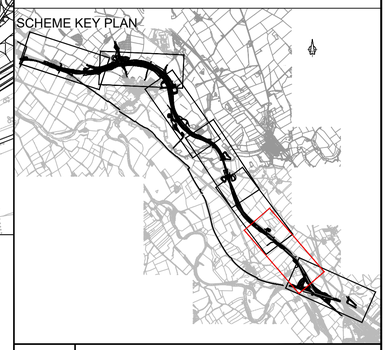
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	GCHI	GCHI	SHAL	KCRO	---	
	07/09/21	07/09/21	07/09/21	07/09/21	---	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

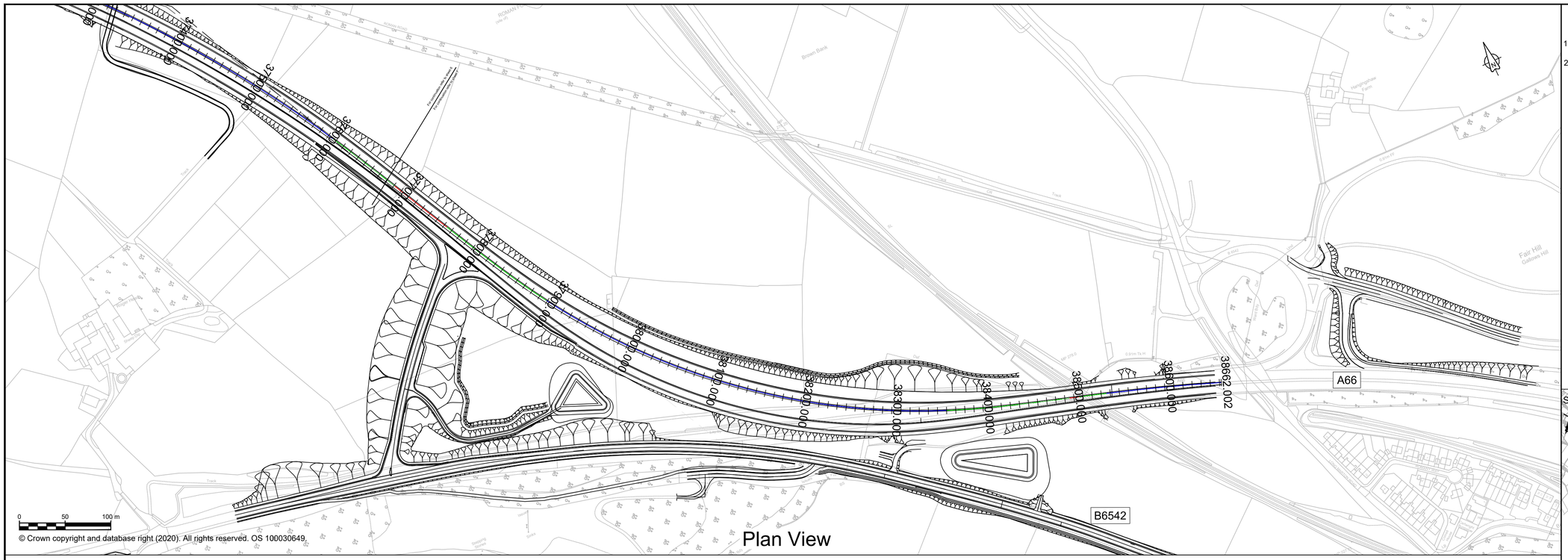
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Red Option
Sheet 6 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

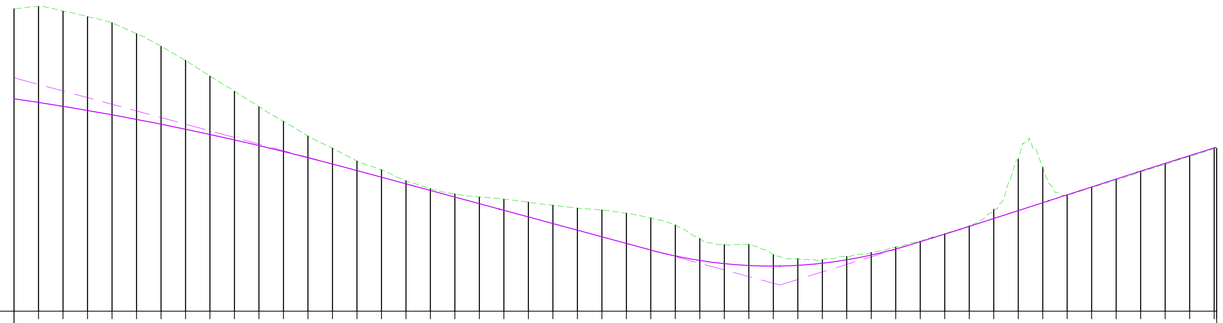
Project	Originator	Volume		
HE565627 -	AMY -	HML -		
S0405	-DR-	CH-	000420	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649

Plan View



Datum: 145.000 mAOD

PROPOSED LEVELS	162.345 162.044 161.726 161.389 161.034 160.660 160.269 159.859 159.432 158.986 158.521 158.039 157.539 157.020 156.484 155.943 155.402 154.861 154.320 153.779 153.238 152.697 152.156 151.614 151.073 150.532 149.992 149.514 149.145 148.884 148.731 148.686 148.749 148.920 149.200 149.587 150.083 150.679 151.296 151.923 152.569 153.214 153.860 154.505 155.151 155.796 156.440 157.074 157.707 158.341
SURVEY LEVELS	169.689 169.880 169.508 169.052 168.544 167.663 166.625 165.479 164.188 162.965 161.694 160.503 159.307 158.314 157.263 156.553 155.652 155.009 154.573 154.327 154.154 153.905 153.654 153.416 153.276 153.011 152.613 152.049 150.932 150.435 150.452 149.622 149.295 149.204 149.470 149.800 150.242 150.715 151.331 151.969 153.323 157.416 156.758 154.498 155.110 155.691 156.357 156.969 157.647 158.393
LEVEL DIFFERENCE	-7.344 -7.836 -7.783 -7.664 -7.510 -7.003 -6.356 -5.620 -4.757 -3.979 -3.172 -2.464 -1.768 -1.294 -0.780 -0.610 -0.250 -0.148 -0.254 -0.548 -0.917 -1.208 -1.498 -1.801 -2.202 -2.478 -2.621 -2.534 -1.787 -1.551 -1.721 -0.936 -0.546 -0.284 -0.270 -0.213 -0.160 -0.036 -0.036 -0.045 -0.754 -4.201 -2.899 0.007 0.041 0.106 0.083 0.105 0.061 0.091
HORIZONTAL	A: 344.96 L: 85.000m L =72.480m; A: 318.20 L: 135.000m; R: 750.000m L: 461.380m; A: 318.20 L: 135.000m; A: 256.90 L =101.380m; R: 2200.000m L: 125.950m
VERTICAL	R =22000.000 L =1163.546; G =-2.705% L =243.655; R =3700.000 L =214.238; G =3.227% L =134.375; R =18200.000 L =10.852 =58.573
SUPERELEVATION	L= -2.5% R= 0.0%; L= -2.5% R= 0.0%; L -7.0% L= -2.5% R 0.000% R= 0.0%; L= -2.5% R= 0.0%; L 2.5% R 0.000%; L 2.5% R 0.000%
CHAINAGE	37680.00 37700.00 37720.00 37740.00 37760.00 37780.00 37800.00 37820.00 37840.00 37860.00 37880.00 37900.00 37920.00 37940.00 37960.00 37980.00 38000.00 38020.00 38040.00 38060.00 38080.00 38100.00 38120.00 38140.00 38160.00 38180.00 38200.00 38220.00 38240.00 38260.00 38280.00 38300.00 38320.00 38340.00 38360.00 38380.00 38400.00 38420.00 38440.00 38460.00 38480.00 38500.00 38520.00 38540.00 38560.00 38580.00 38600.00 38620.00 38640.00 38662.00

0 50 100 m

Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

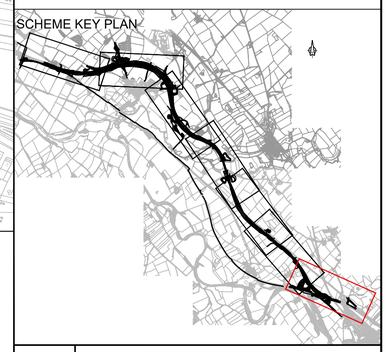
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



Revision					
---	---				
---	---				
---	---				
P01	GCHI	GCHI	SHAL	KCRO	---
	07/09/21	07/09/21	07/09/21	07/09/21	---
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

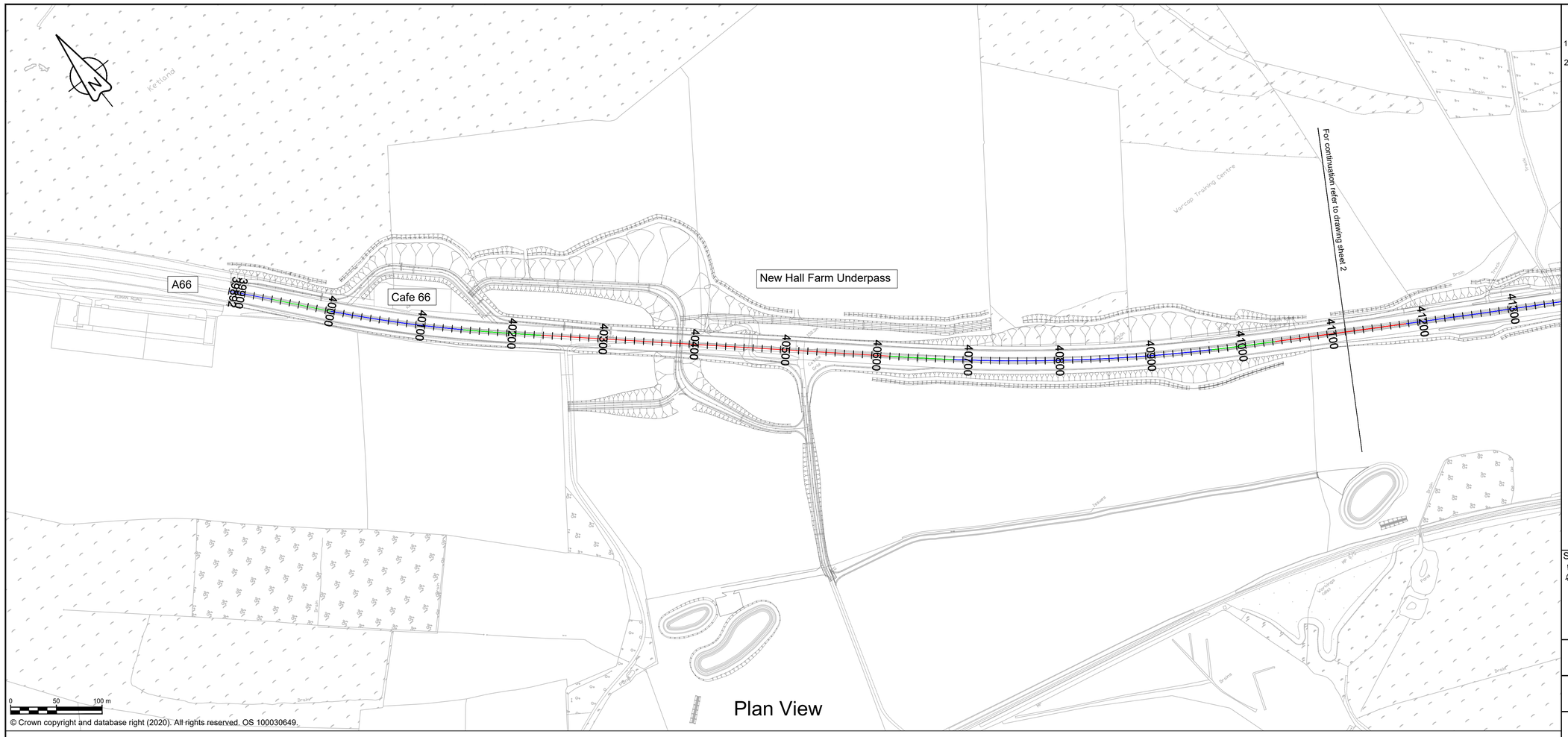
Drawing Title
Temple Sowerby to Appleby
Plan and Profile Red Option
Sheet 7 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

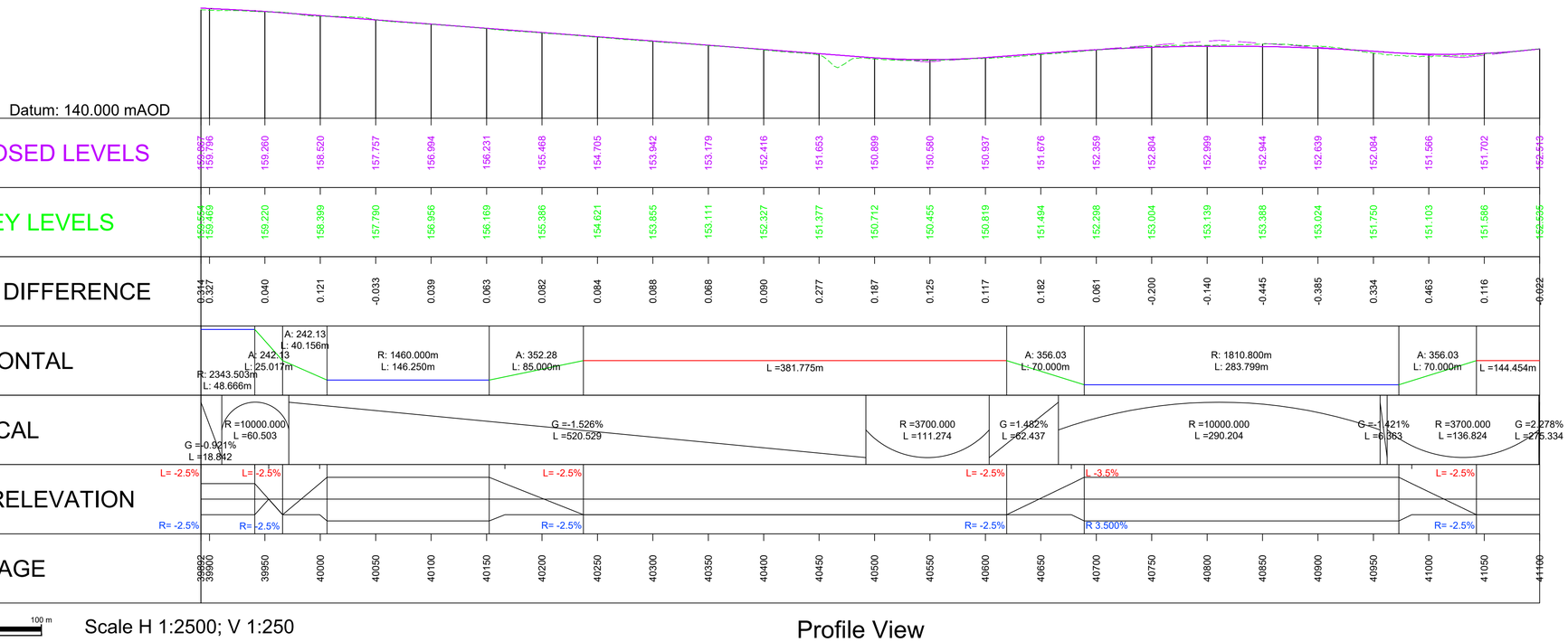
Project	Originator	Volume		
HE565627 -	AMY -	HML -		
S0405		-DR-	CH-	000421
Location		Type	Role	Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- ##### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	AAHM	AAHM	PBUN	OGAR	---	
	03/09/21	03/09/21	03/09/21	03/09/21	---	
P02	AAHM	AAHM	PBUN	OGAR	CBRO	
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

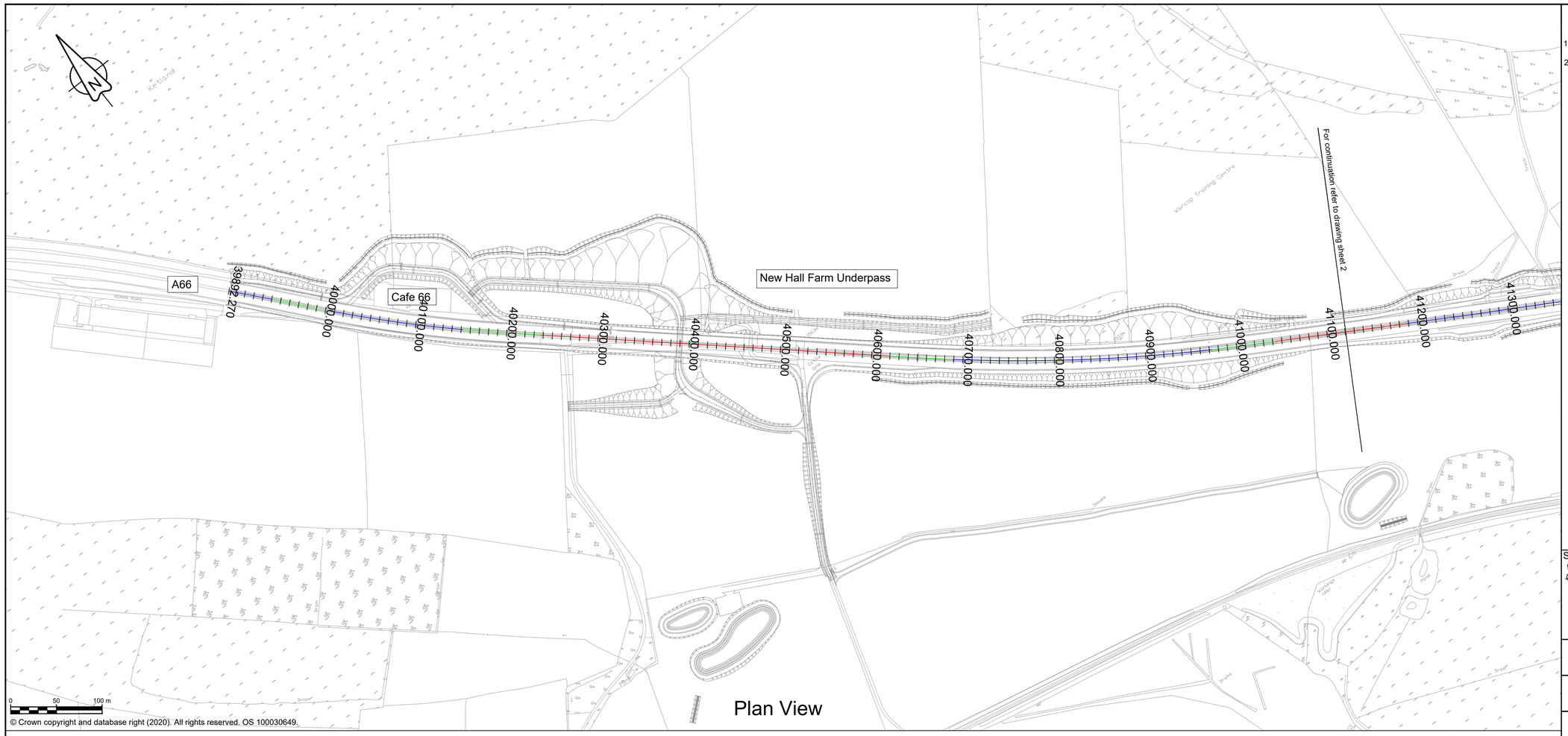
Drawing Title
Appleby to Brough
Option 2 - (Black-Blue-Black)
Plan and Profile Mainline
Sheet 1 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number

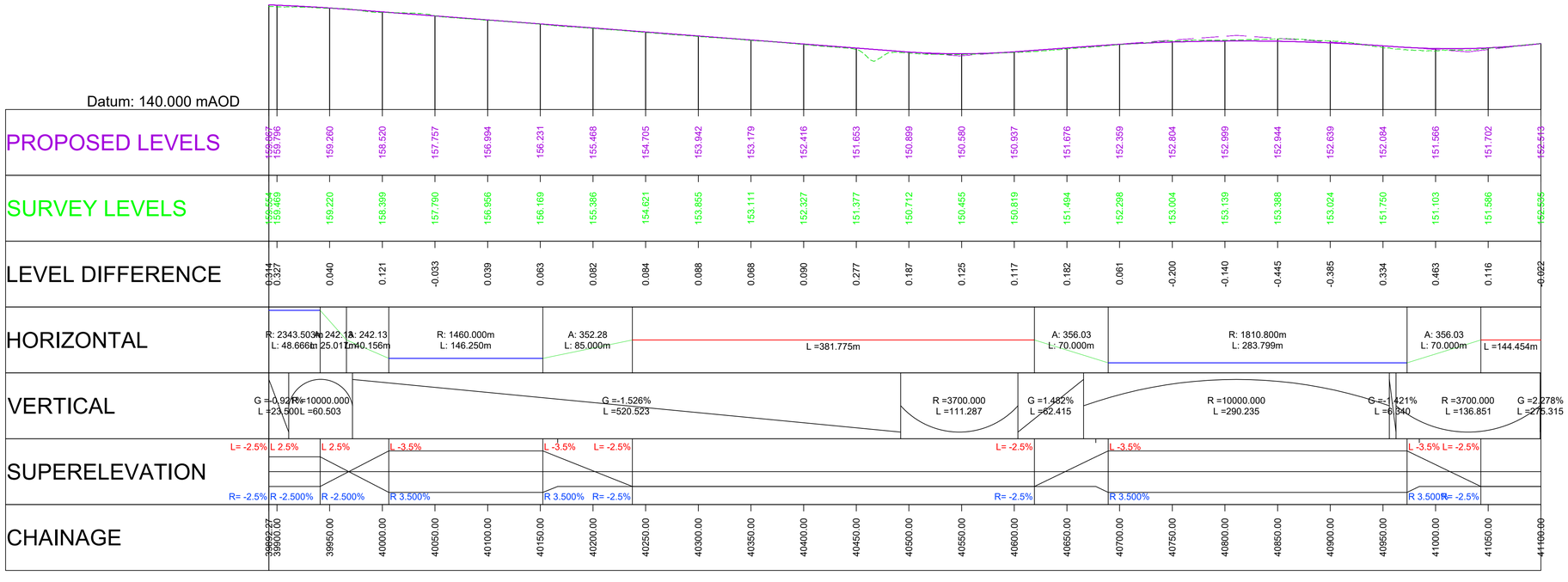
Project	Originator	Volume		
HE565627 -	AMY -	HML -		
S06	-DR-	CH-	398001	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

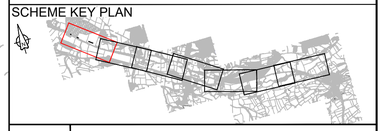
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	AAHM	AAHM	PBUN	OGAR	CBRO	
	16/09/21	16/09/21	16/09/21	16/09/21	17/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

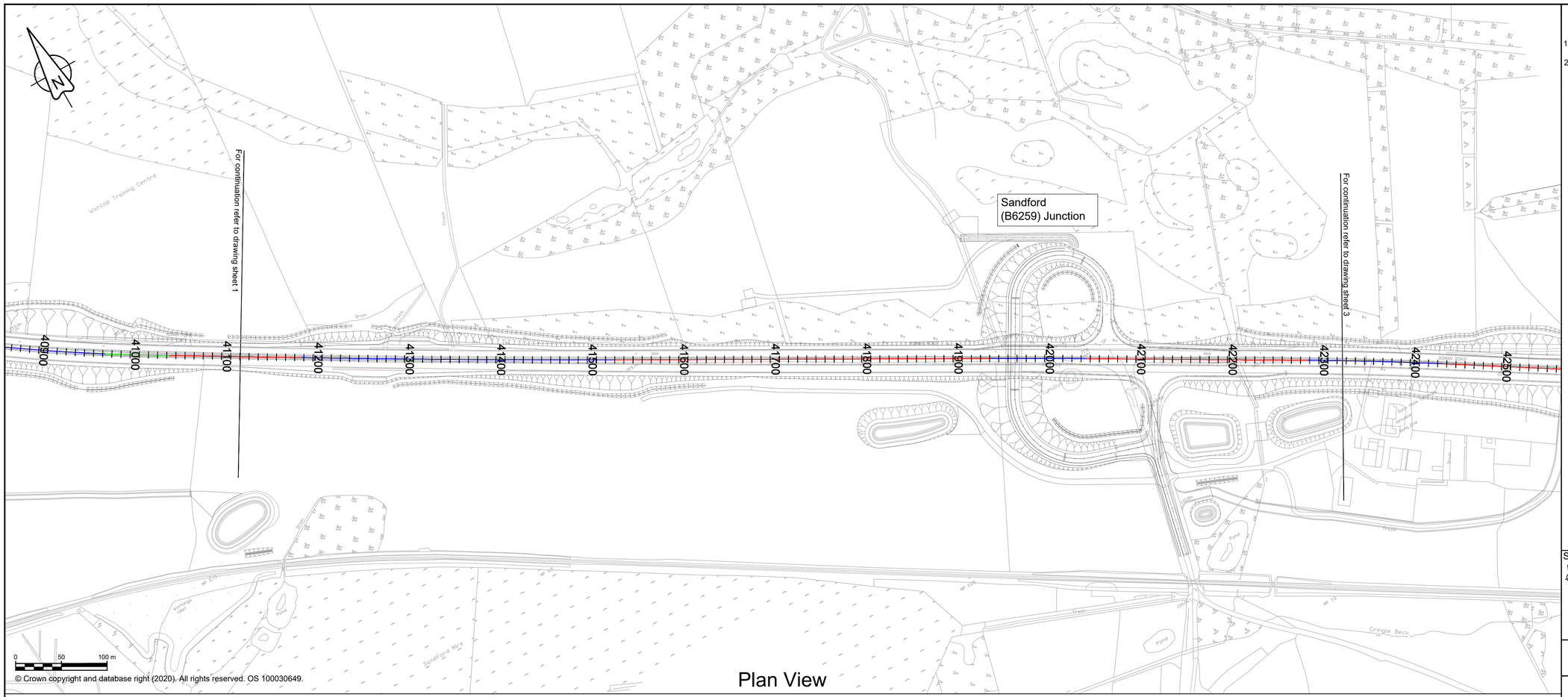
Project Name
A66 Northern Trans-Pennine

Drawing Title
Appleby to Brough
Option 1 - (Black-Black-Black)
Plan and Profile Mainline
Sheet 1 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S06 -DR-CH- 398101
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View

Datum: 140.000 mAOD

	41100	41150	41200	41250	41300	41350	41400	41450	41500	41550	41600	41650	41700	41750	41800	41850	41900	41950	42000	42050	42100	42150	42200	42250	42300
PROPOSED LEVELS	152.513	153.652	154.791	155.930	157.069	158.208	159.315	160.202	160.839	161.226	161.363	161.250	160.887	160.274	159.411	158.298	156.935	155.420	153.905	152.389	150.873	149.425	148.549	148.350	148.828
SURVEY LEVELS	152.686	153.644	155.022	156.466	158.132	159.233	159.855	159.980	160.037	160.398	161.086	161.054	160.982	160.434	159.771	159.121	157.939	156.746	155.092	152.945	150.693	148.364	146.157	145.841	146.759
LEVEL DIFFERENCE	-0.172	0.008	-0.231	-0.536	-1.063	-1.025	-0.540	0.222	0.802	0.828	0.267	0.196	-0.095	-0.160	-0.360	-0.824	-1.004	-1.326	-1.188	-0.556	0.180	1.061	2.392	2.509	2.069
HORIZONTAL	L =144.454m	R: 16510.550m L: 342.015m						L =411.646m										R: 9989.450m L: 105.558m	L =241.402m					R: 3919.450m L: 147.607m	
VERTICAL	G =2.278% L =275.334				R =10000.000 L =530.976													G =-3.032% L =222.088			R =3700.000 L =260.000				
SUPERELEVATION																									
CHAINAGE	41100	41150	41200	41250	41300	41350	41400	41450	41500	41550	41600	41650	41700	41750	41800	41850	41900	41950	42000	42050	42100	42150	42200	42250	42300

0 50 100 m

Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

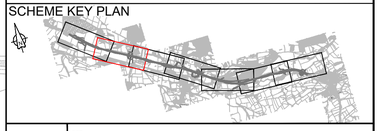
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	AAHM	AAHM	PBUN	OGAR	---
	03/09/21	03/09/21	03/09/21	03/09/21	---
P02	AAHM	AAHM	PBUN	OGAR	CBRO
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21

Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

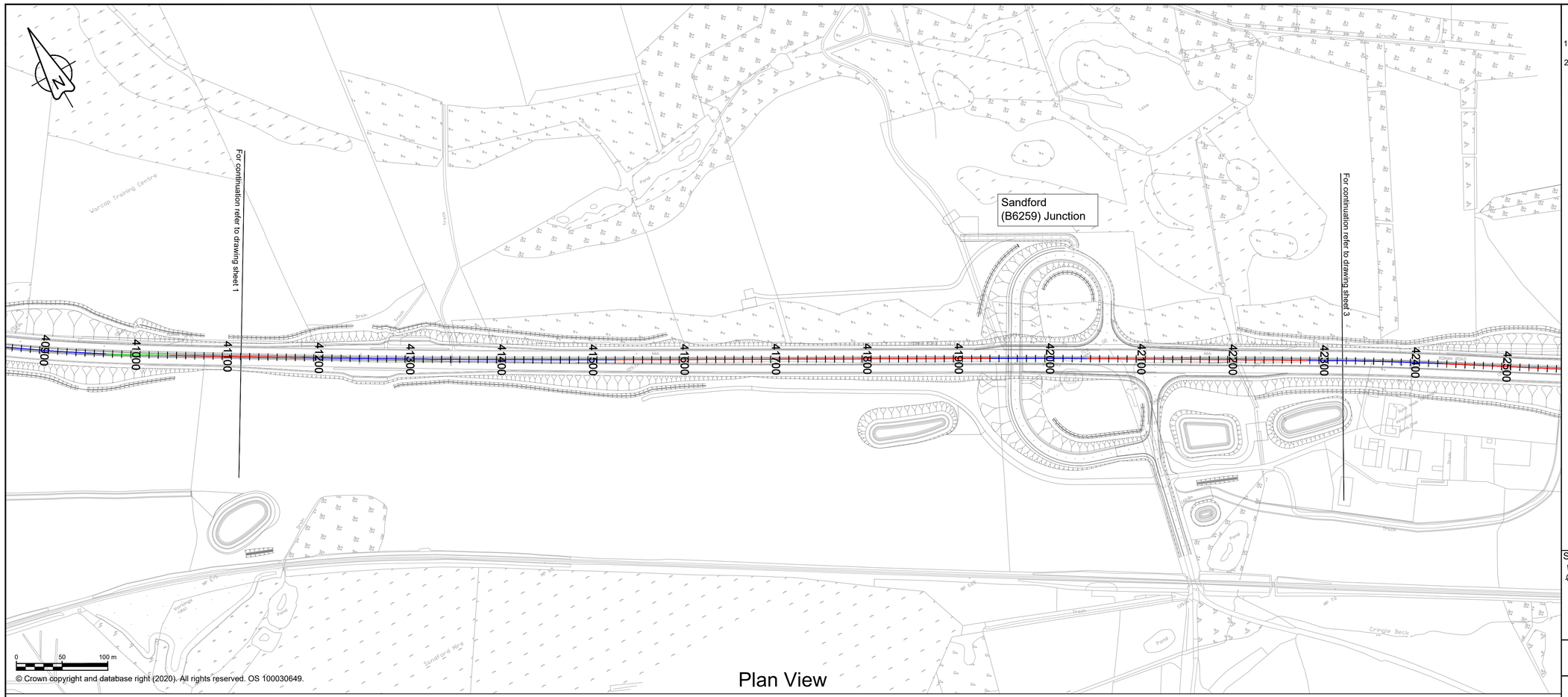
Project Name
A66 Northern Trans-Pennine

Drawing Title
Appleby to Brough
Option 2 - (Black-Blue-Black)
Plan and Profile Mainline
Sheet 2 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

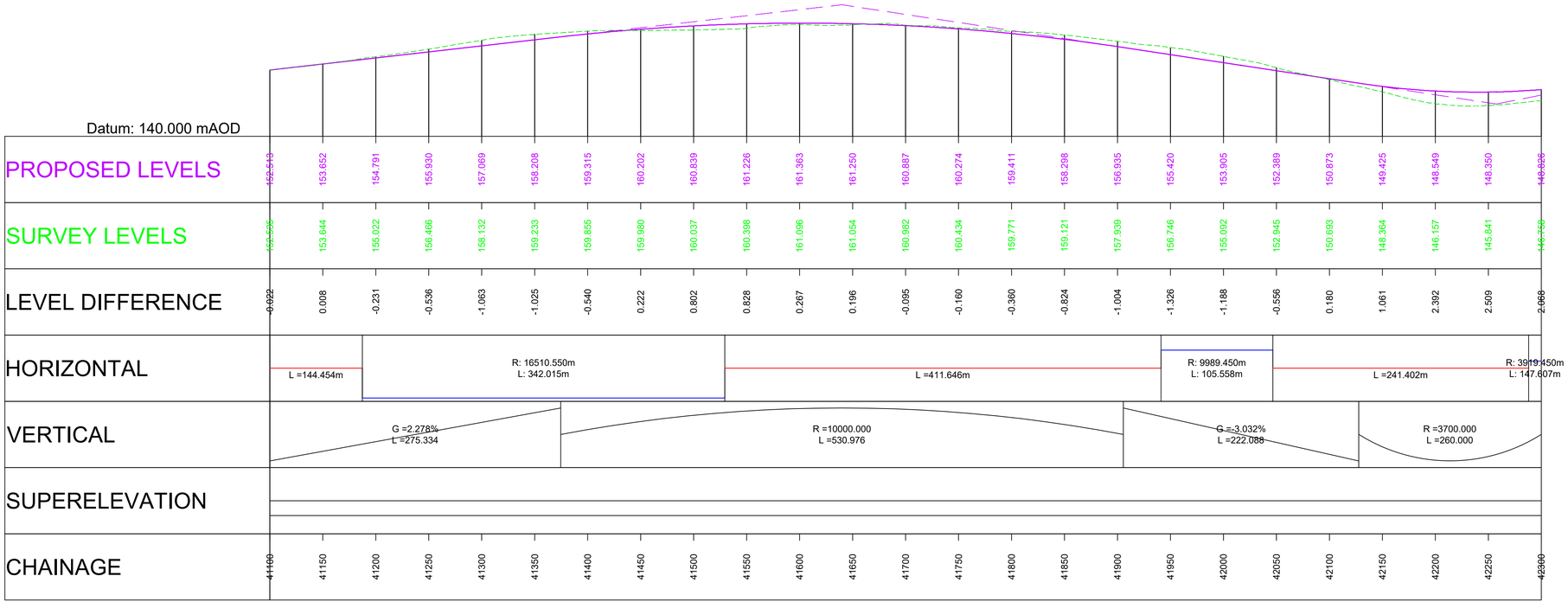
Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S06 -DR-CH- 411002
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

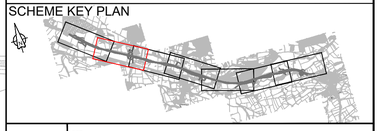
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	AAHM	AAHM	PBUN	OGAR	CBRO	
	16/09/21	16/09/21	16/09/21	16/09/21	17/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

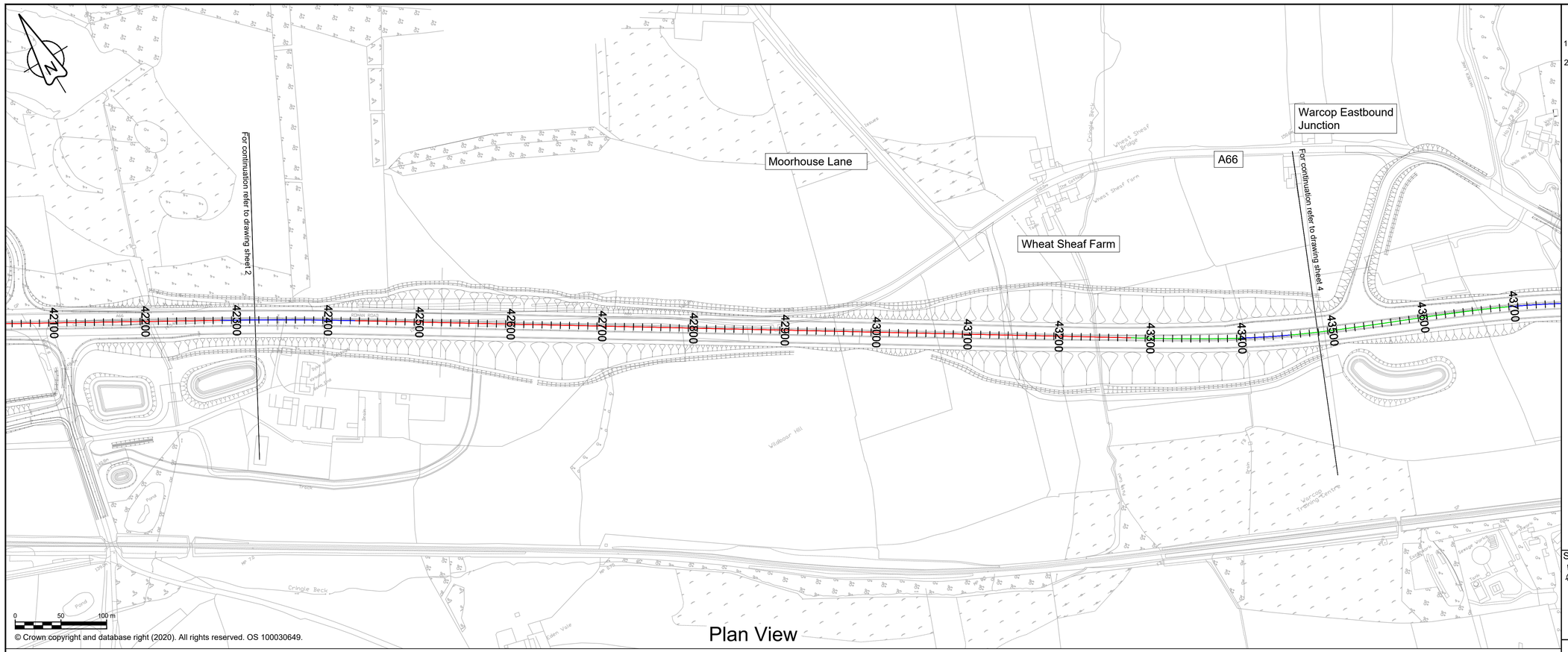
Project Name
A66 Northern Trans-Pennine

Drawing Title
Appleby to Brough
Option 1 - (Black-Black-Black)
Plan and Profile Mainline
Sheet 2 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

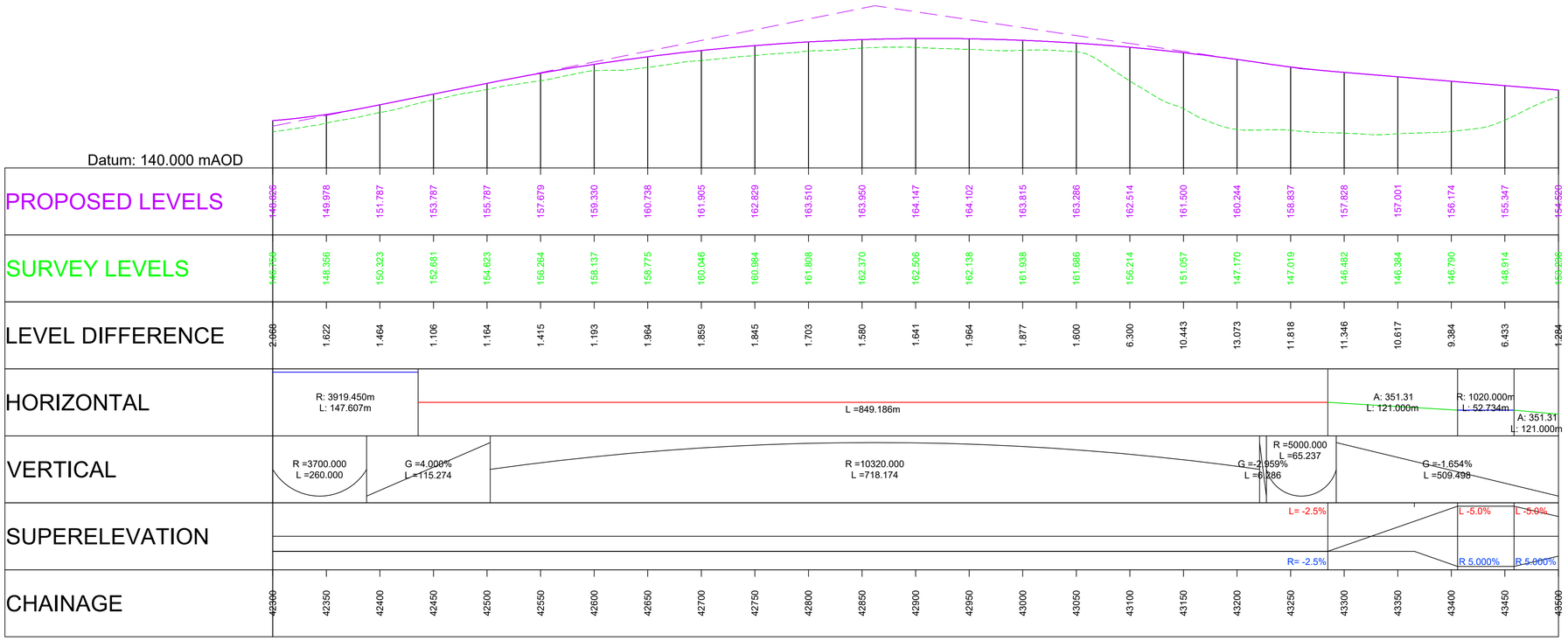
Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S06 -DR-CH- 411102
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	AAHM	AAHM	PBUN	OGAR	---	
	03/09/21	03/09/21	03/09/21	03/09/21	---	
P02						
	AAHM	AAHM	PBUN	OGAR	CBRO	
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

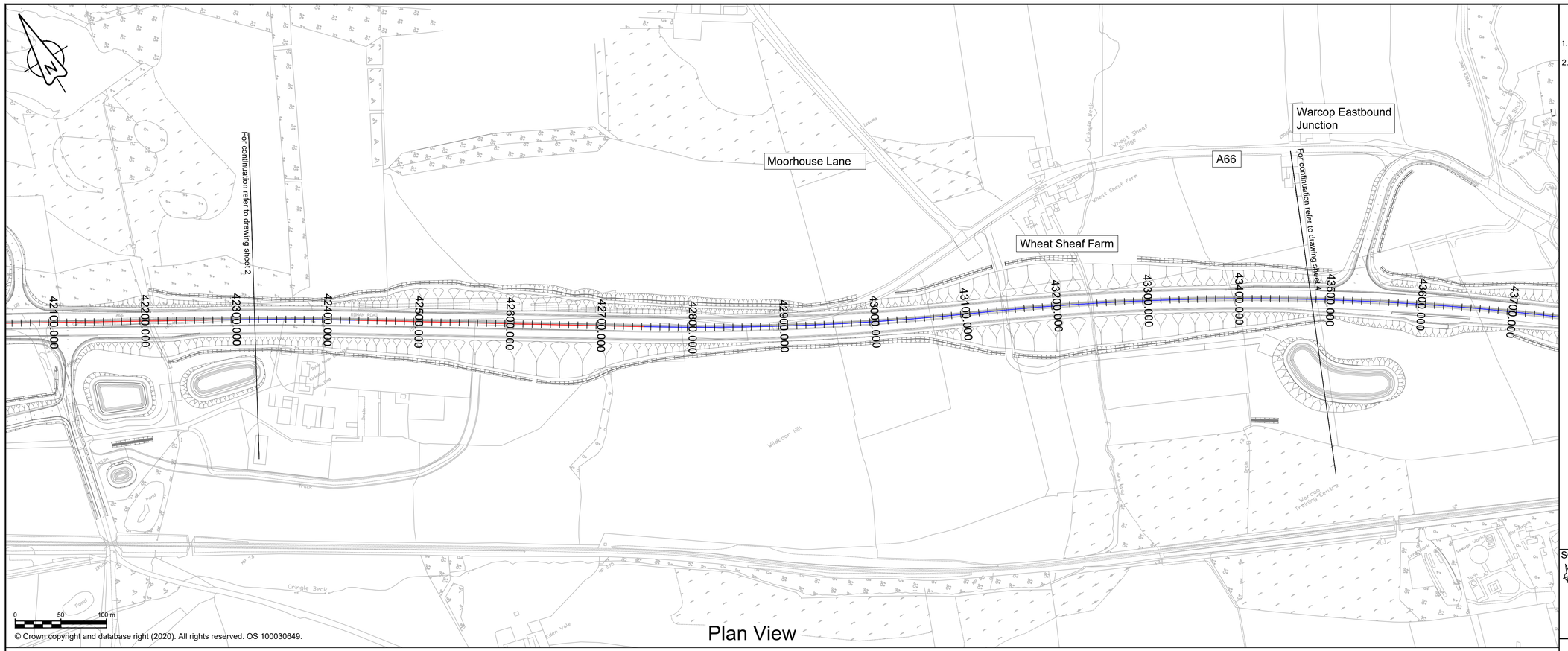
Drawing Title
Appleby to Brough
Option 2 - (Black-Blue-Black)
Plan and Profile Mainline
Sheet 3 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number

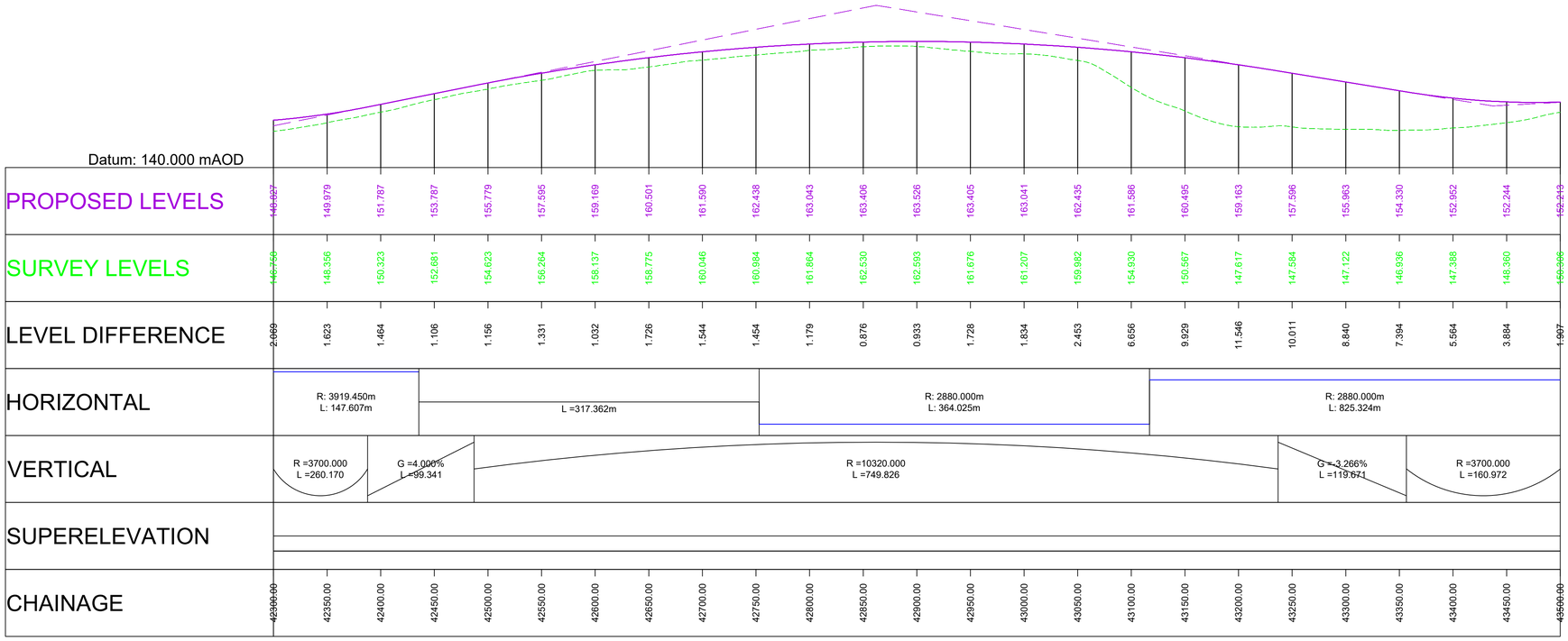
Project	Originator	Volume		
HE565627	AMY	HML		
S06	DR	CH	423003	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



0 50 100 m

Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

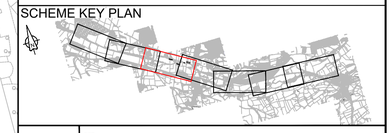
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	AAHM	AAHM	PBUN	OGAR	CBRO	
	16/09/21	16/09/21	16/09/21	16/09/21	17/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

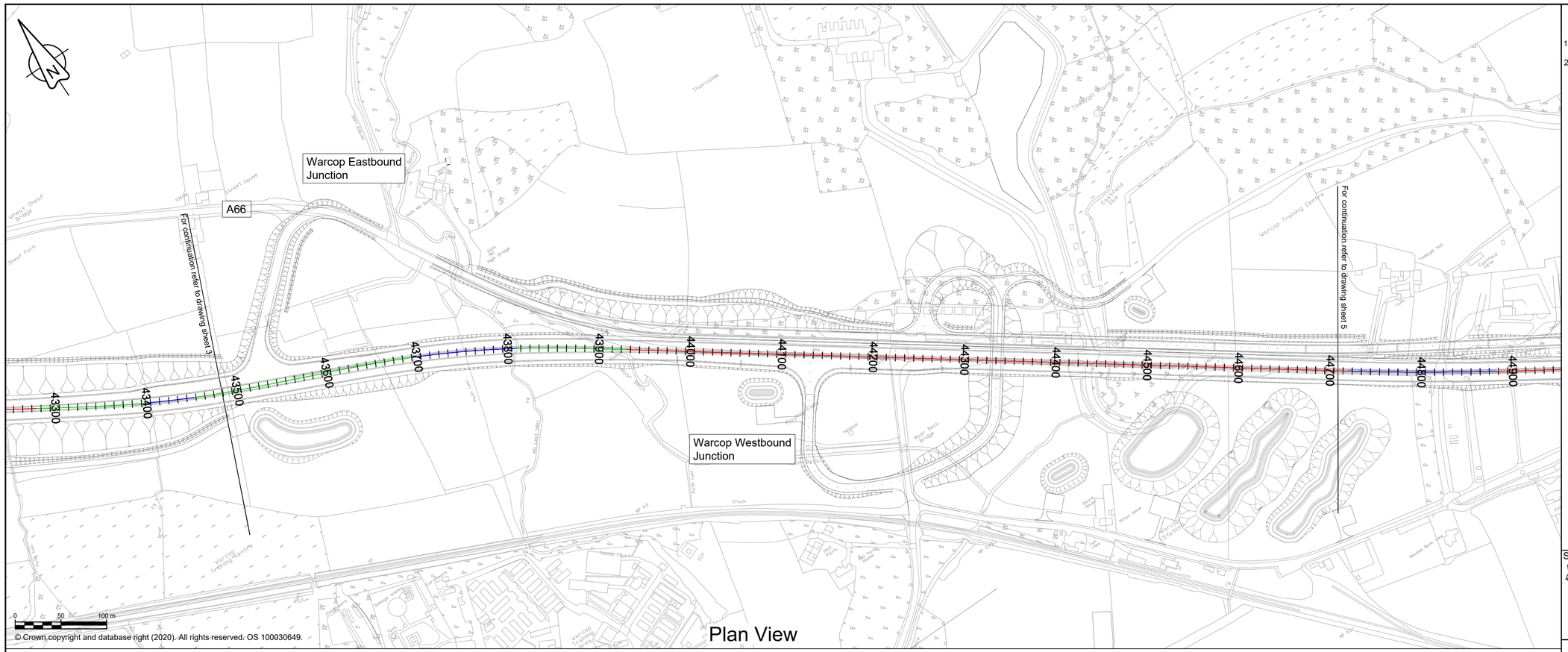
Drawing Title
Appleby to Brough
Option 1 - (Black-Black-Black)
Plan and Profile Mainline
Sheet 3 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

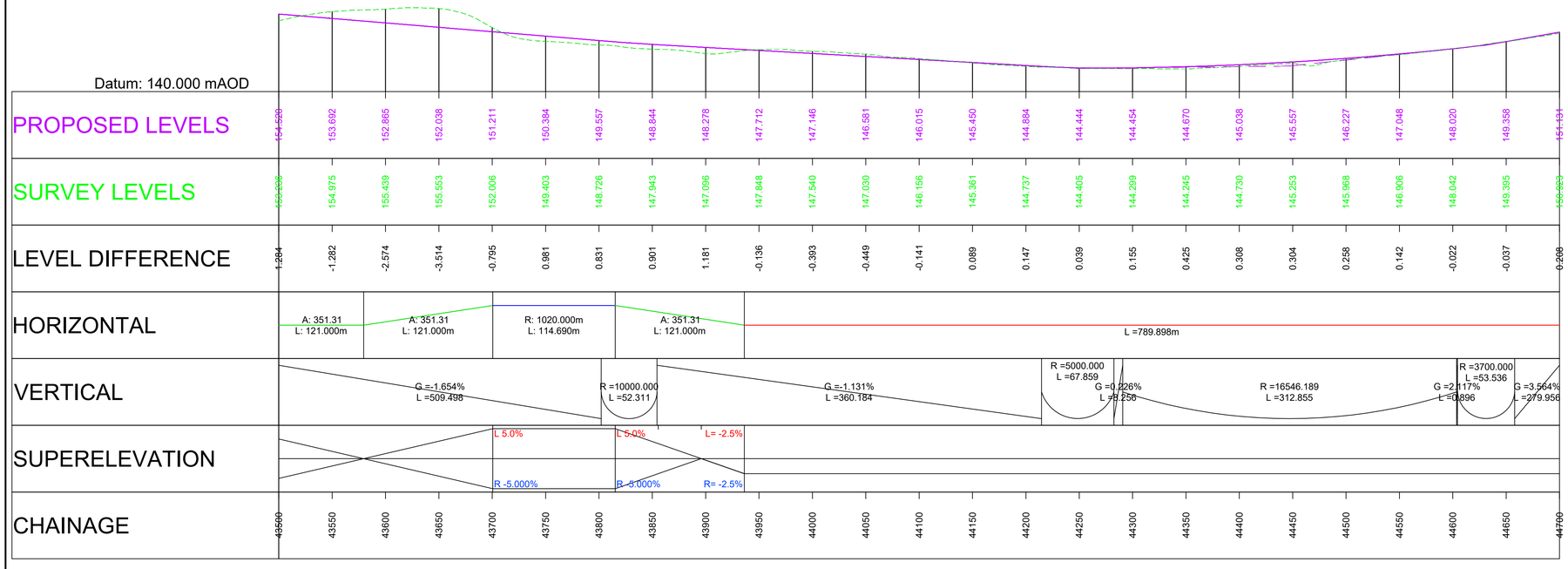
Drawing Number

Project	Originator	Volume		
HE565627 -	AMY -	HML -		
S06	-DR-	CH-	423103	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



Plan View



Profile View

0 50 100 m

Scale H 1:2500; V 1:250

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	AAHM	AAHM	PBUN	OGAR	---	
	03/09/21	03/09/21	03/09/21	03/09/21	---	
P02						
	AAHM	AAHM	PBUN	OGAR	CBRO	
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

Client
3 Piccadilly Place
Manchester
M1 3BN

Project Name
A66 Northern Trans-Pennine

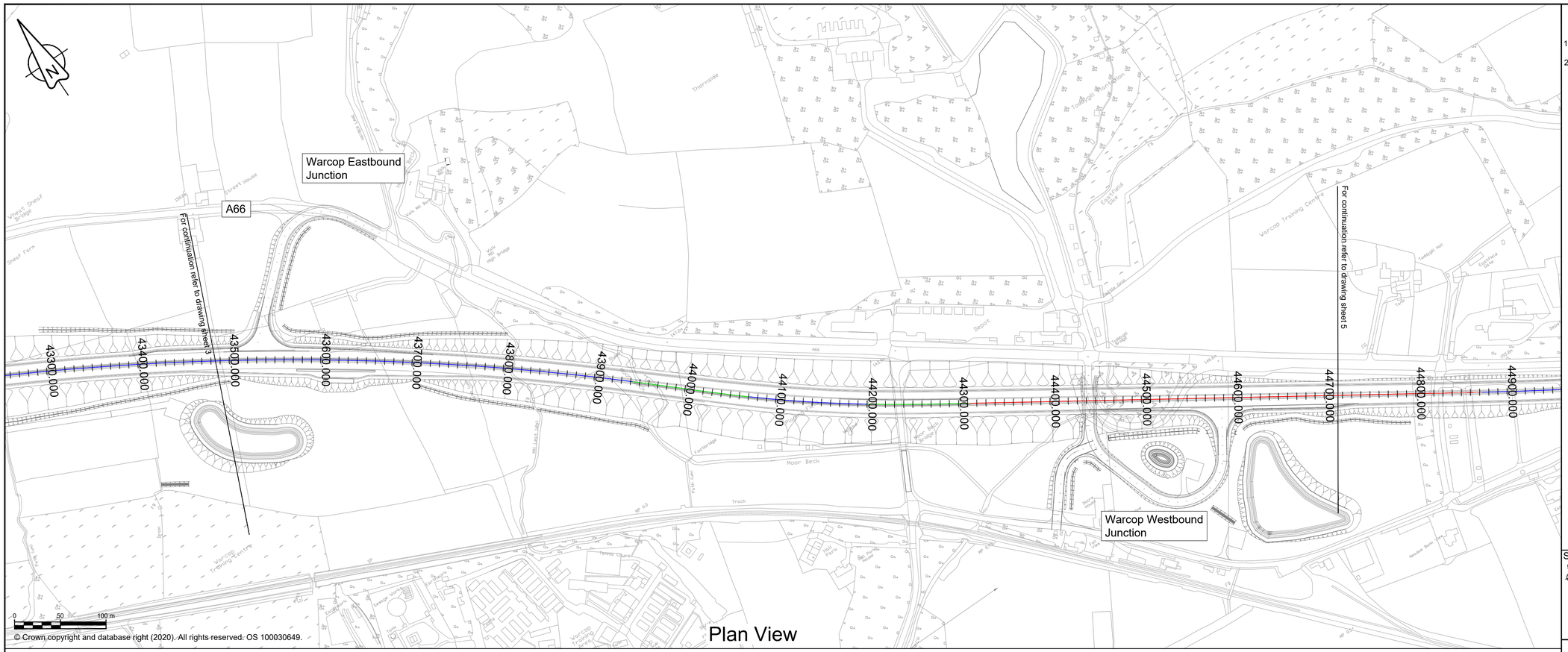
Drawing Title
Appleby to Brough
Option 2 - (Black-Blue-Black)
Plan and Profile Mainline
Sheet 4 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number

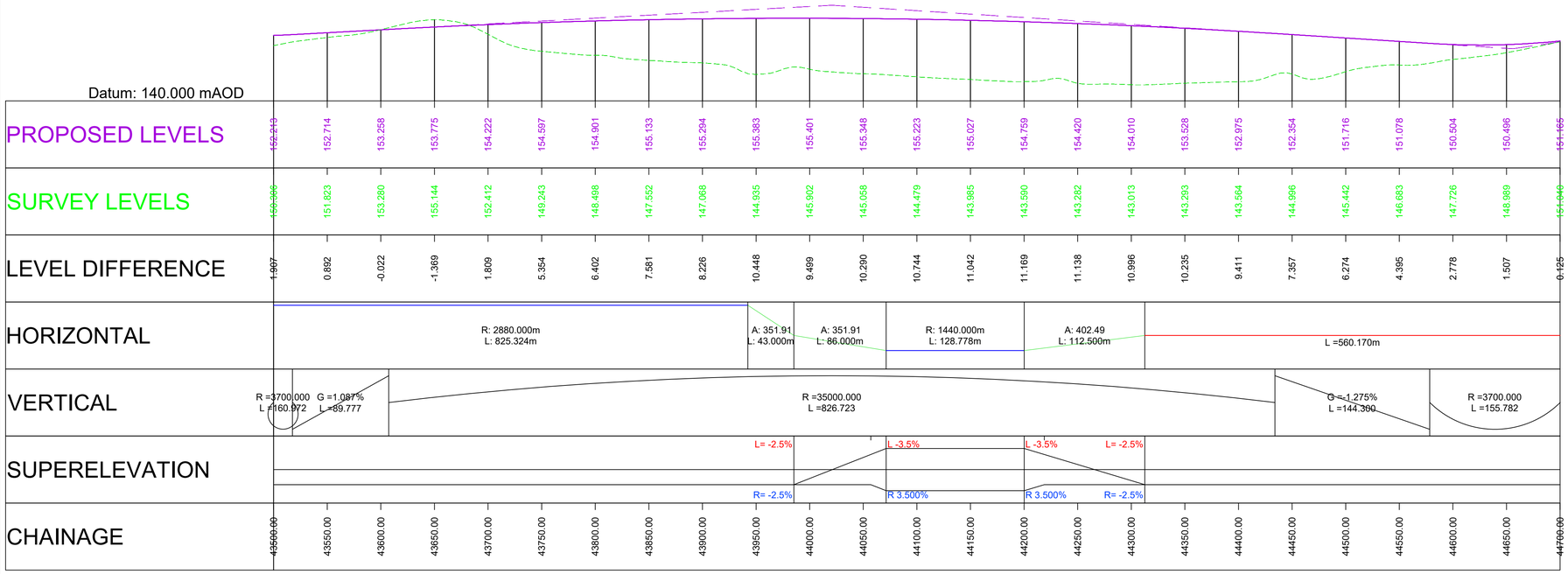
Project	Originator	Volume		
HE565627 -	AMY -	HML -		
S06	-DR-	CH-	435004	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---	---	---	---	---	---
---	---	---	---	---	---	---
P01	AAHM	AAHM	PBUN	OGAR	CBRO	
	16/09/21	16/09/21	16/09/21	16/09/21	17/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

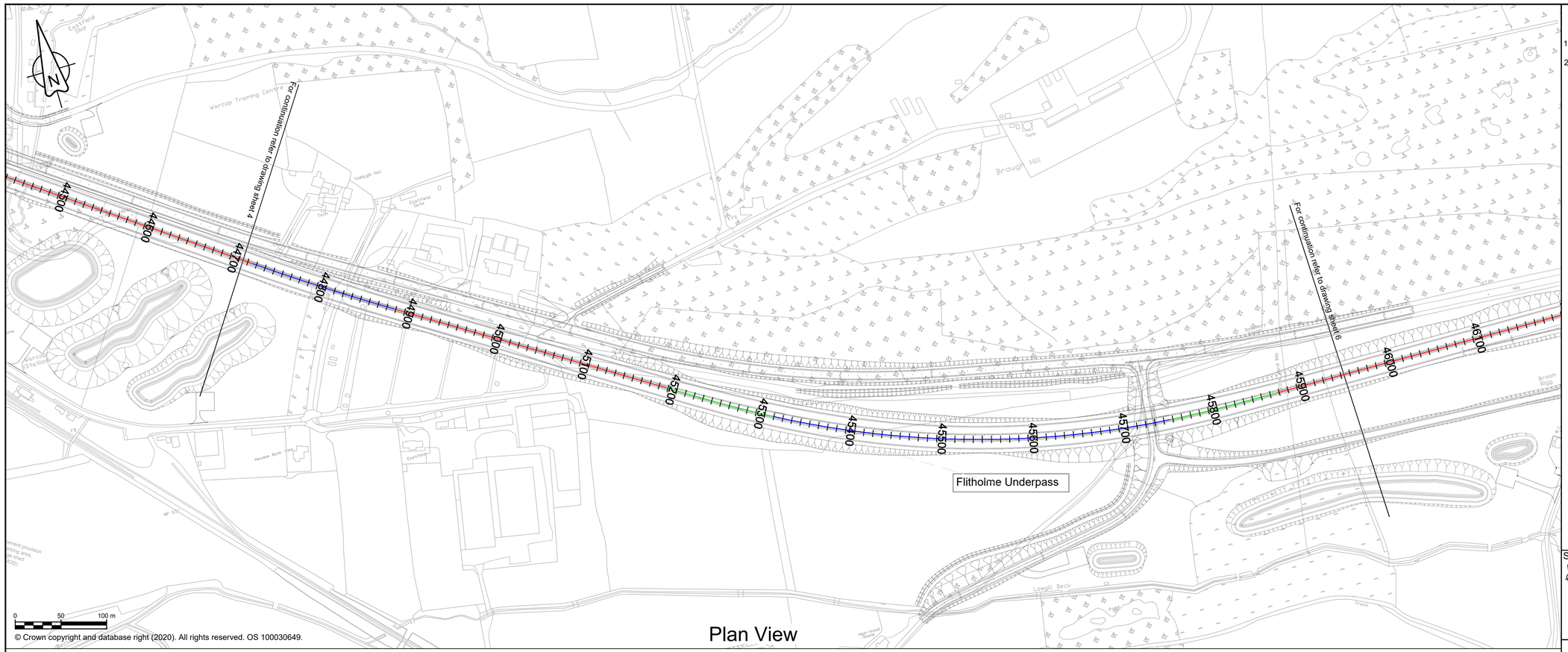
Project Name
A66 Northern Trans-Pennine

Drawing Title
Appleby to Brough
Option 1 - (Black-Black-Black)
Plan and Profile Mainline
Sheet 4 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S06 - DR - CH - 435104
Location | Type | Role | Number

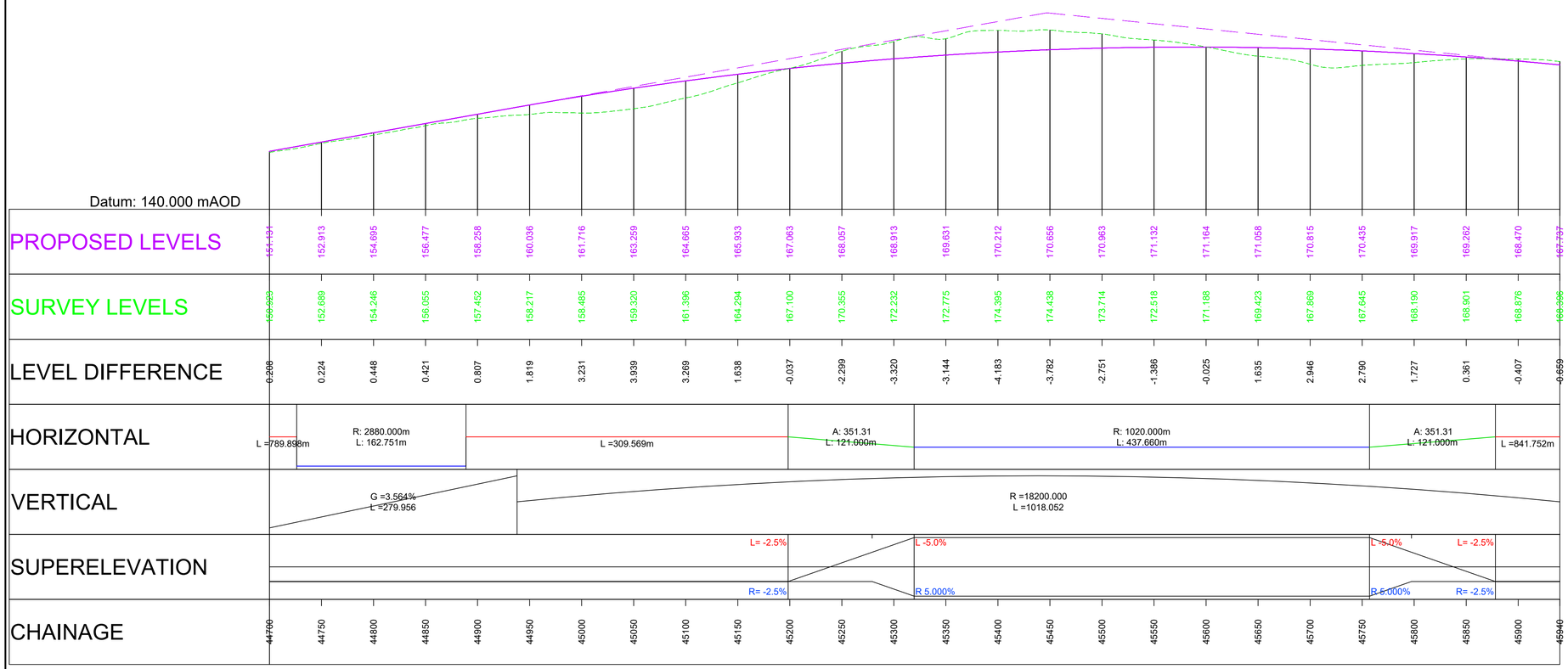
Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



0 50 100 m

© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



0 50 100 m

Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	AAHM	AAHM	PBUN	OGAR	---	
	03/09/21	03/09/21	03/09/21	03/09/21	---	
P02						
	AAHM	AAHM	PBUN	OGAR	CBRO	
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

Client
3 Piccadilly Place
Manchester
M1 3BN

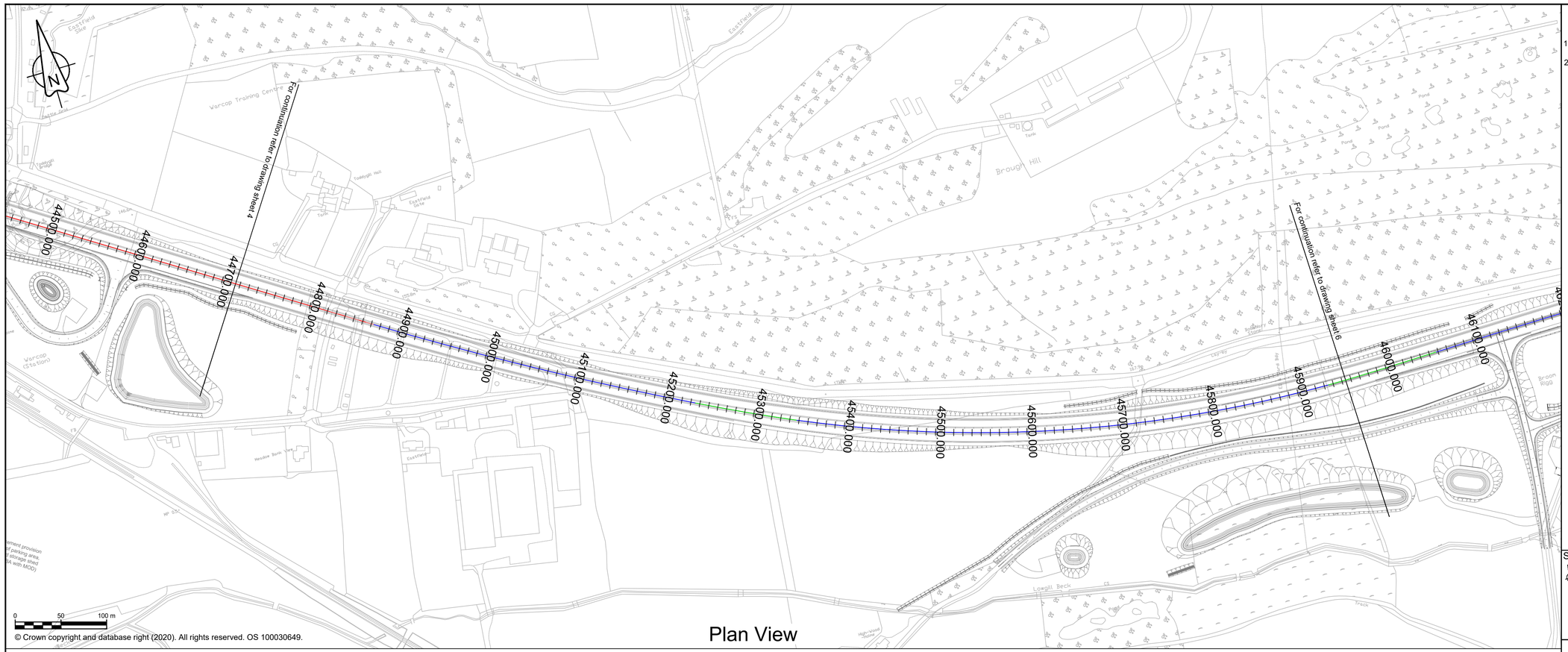
Project Name
A66 Northern Trans-Pennine

Drawing Title
Appleby to Brough
Option 2 - (Black-Blue-Black)
Plan and Profile Mainline
Sheet 5 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

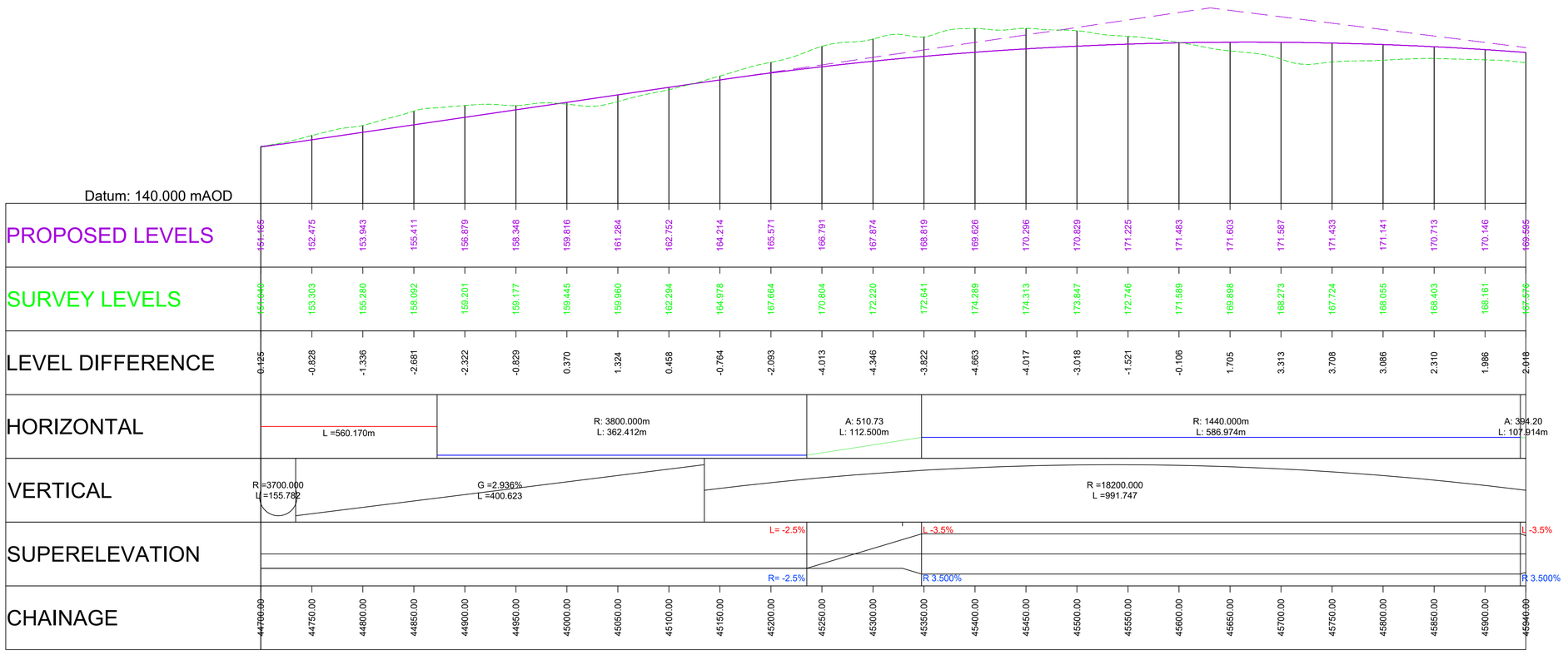
Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S06 -DR-CH- 447005
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

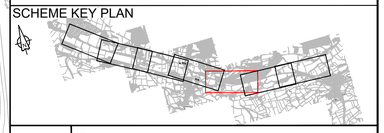
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---				
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
P01	AAHM	AAHM	PBUN	OGAR	CBRO
	16/09/21	16/09/21	16/09/21	16/09/21	17/09/21

Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

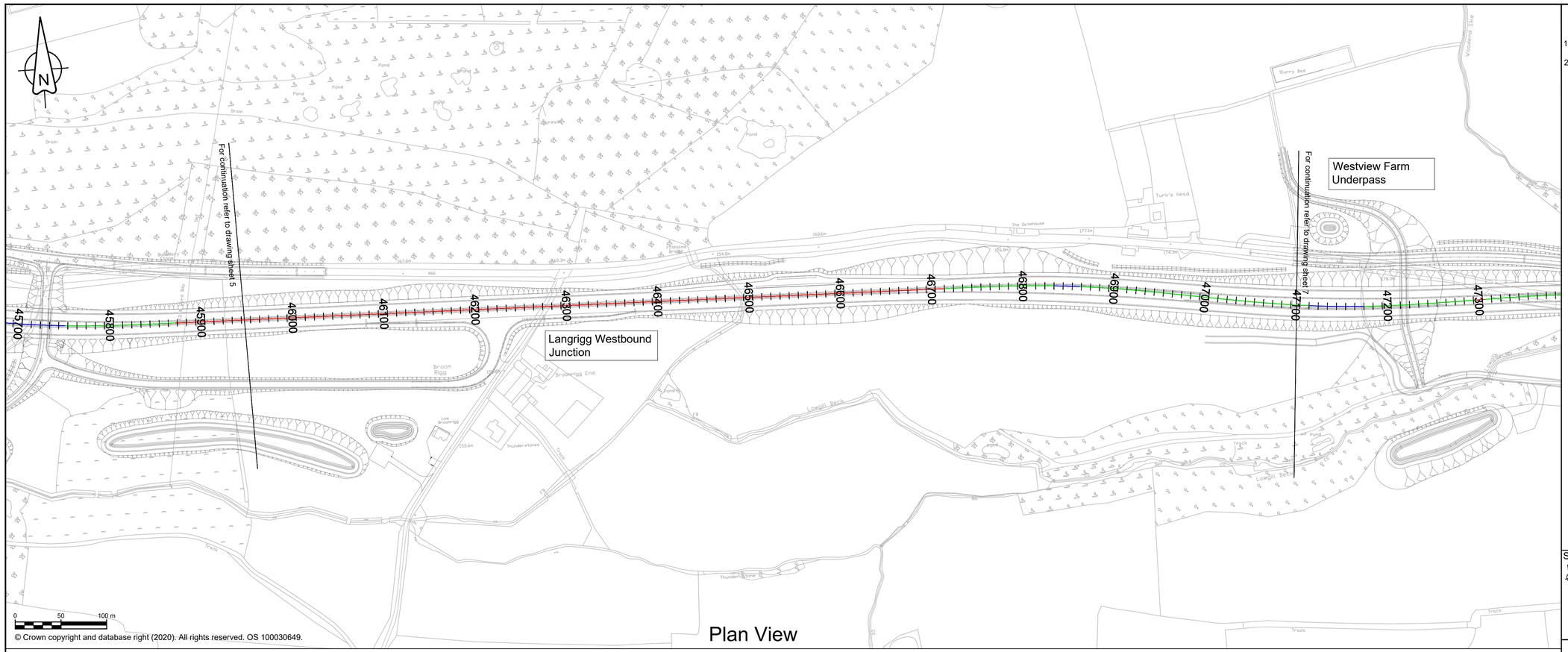
Drawing Title
Appleby to Brough
Option 1 - (Black-Black-Black)
Plan and Profile Mainline
Sheet 5 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number

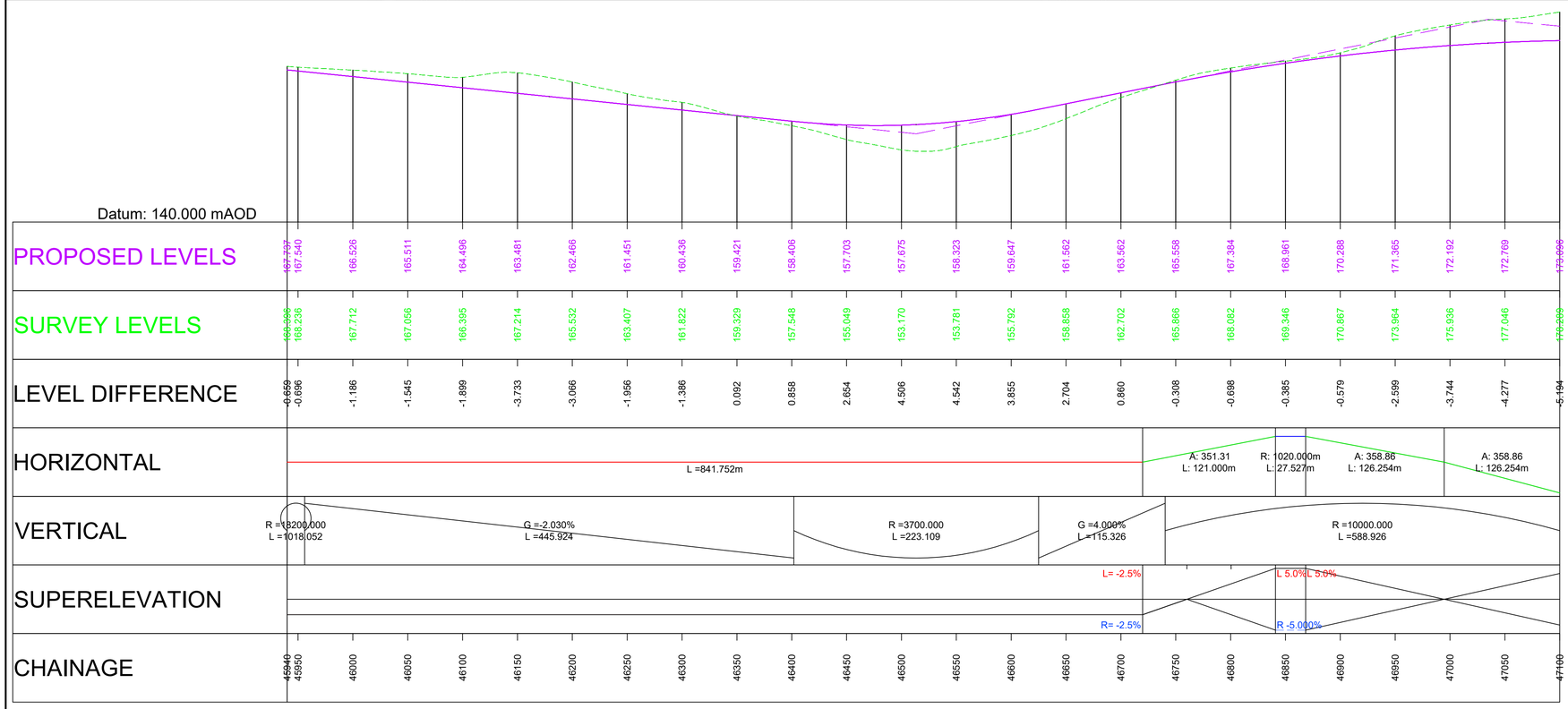
Project	Originator	Volume	
HE565627 -	AMY -	HML -	
S06	-DR-CH-	447105	
Location	Type	Role	Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

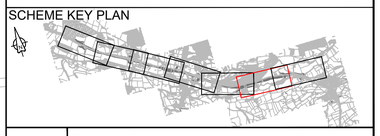
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	AAHM	AAHM	PBUN	OGAR	---
	03/09/21	03/09/21	03/09/21	03/09/21	---
P02	AAHM	AAHM	PBUN	OGAR	CBRO
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

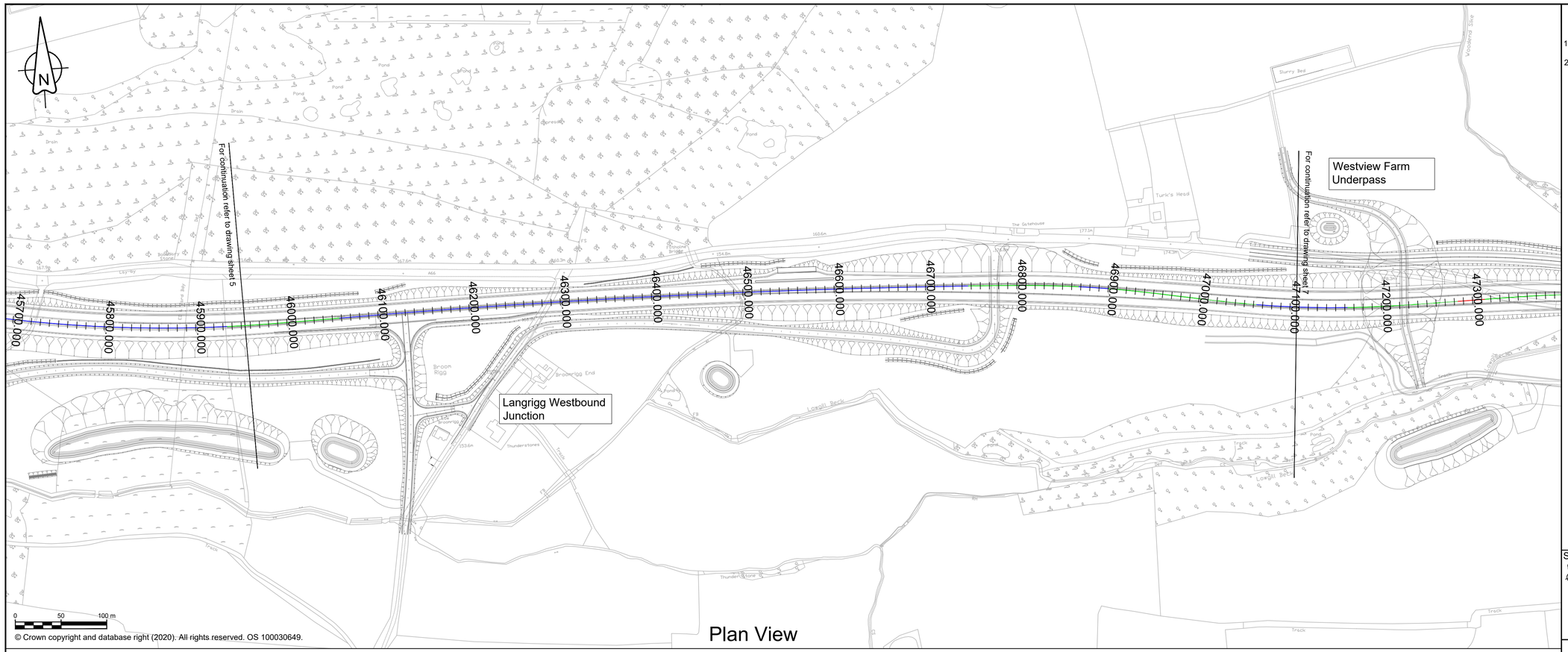
Project Name
A66 Northern Trans-Pennine

Drawing Title
Appleby to Brough
Option 2 - (Black-Blue-Black)
Plan and Profile Mainline
Sheet 6 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

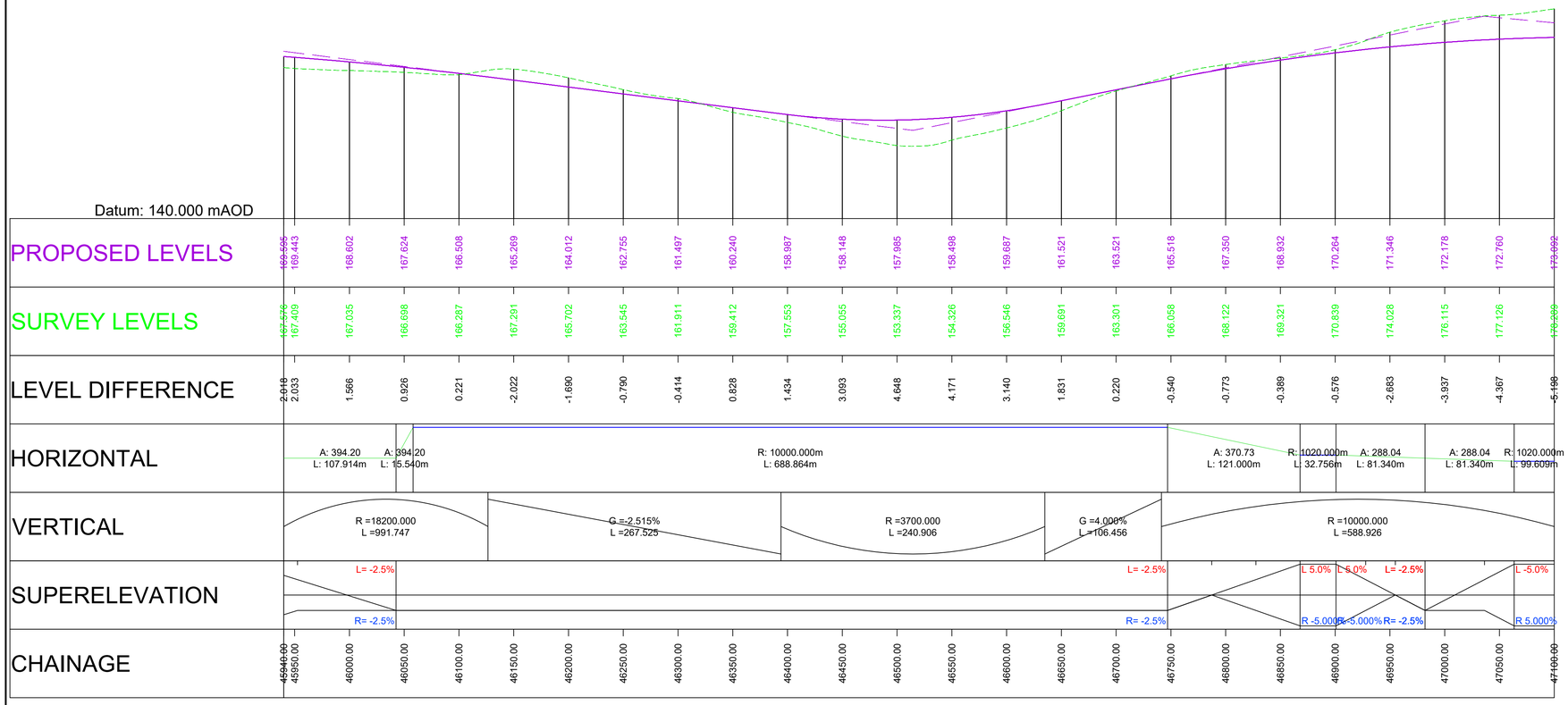
Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S06 -DR-CH- 459006
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

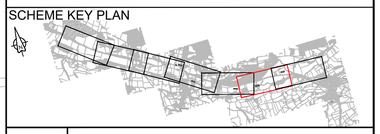
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### — ROAD NAMES
- 20000 | 21400 — CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	AAHM	AAHM	PBUN	OGAR	CBRO	
	16/09/21	16/09/21	16/09/21	16/09/21	17/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

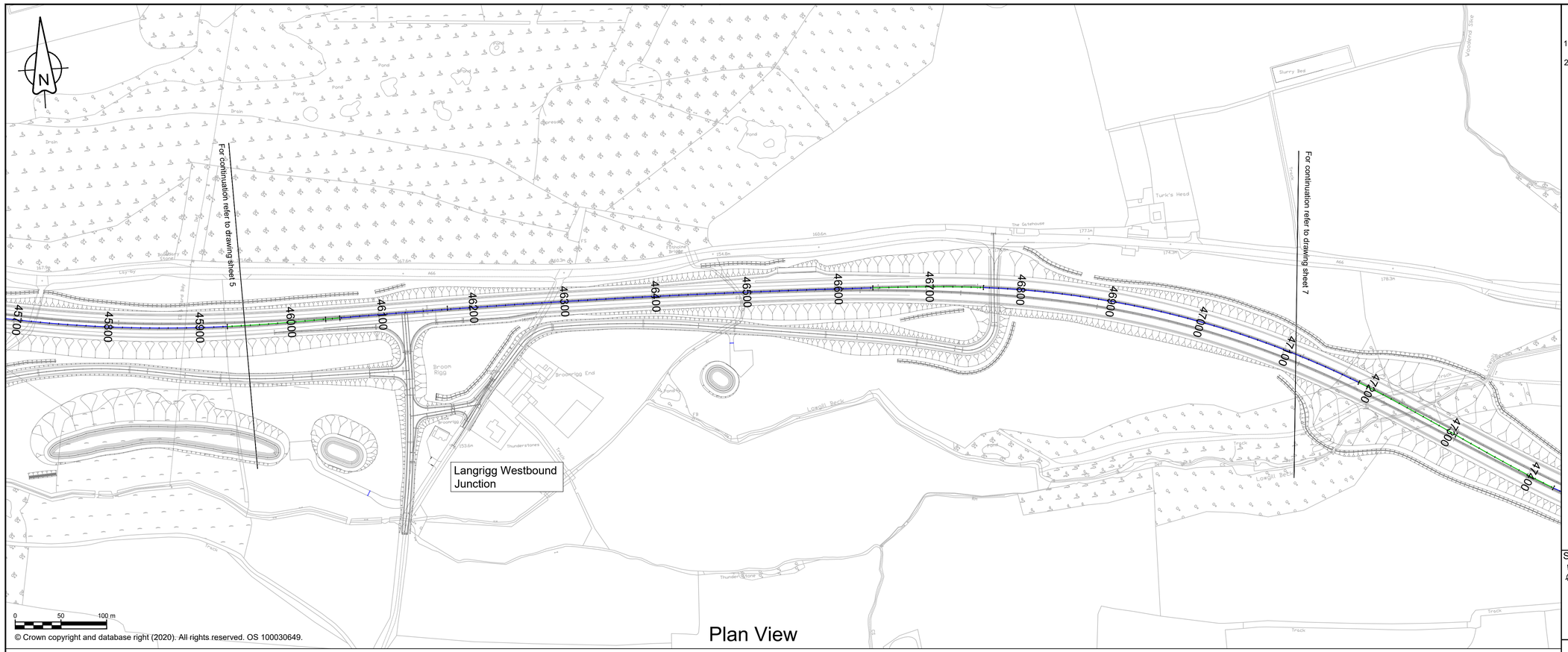
Project Name
A66 Northern Trans-Pennine

Drawing Title
Appleby to Brough
Option 1 - (Black-Black-Black)
Plan and Profile Mainline
Sheet 6 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

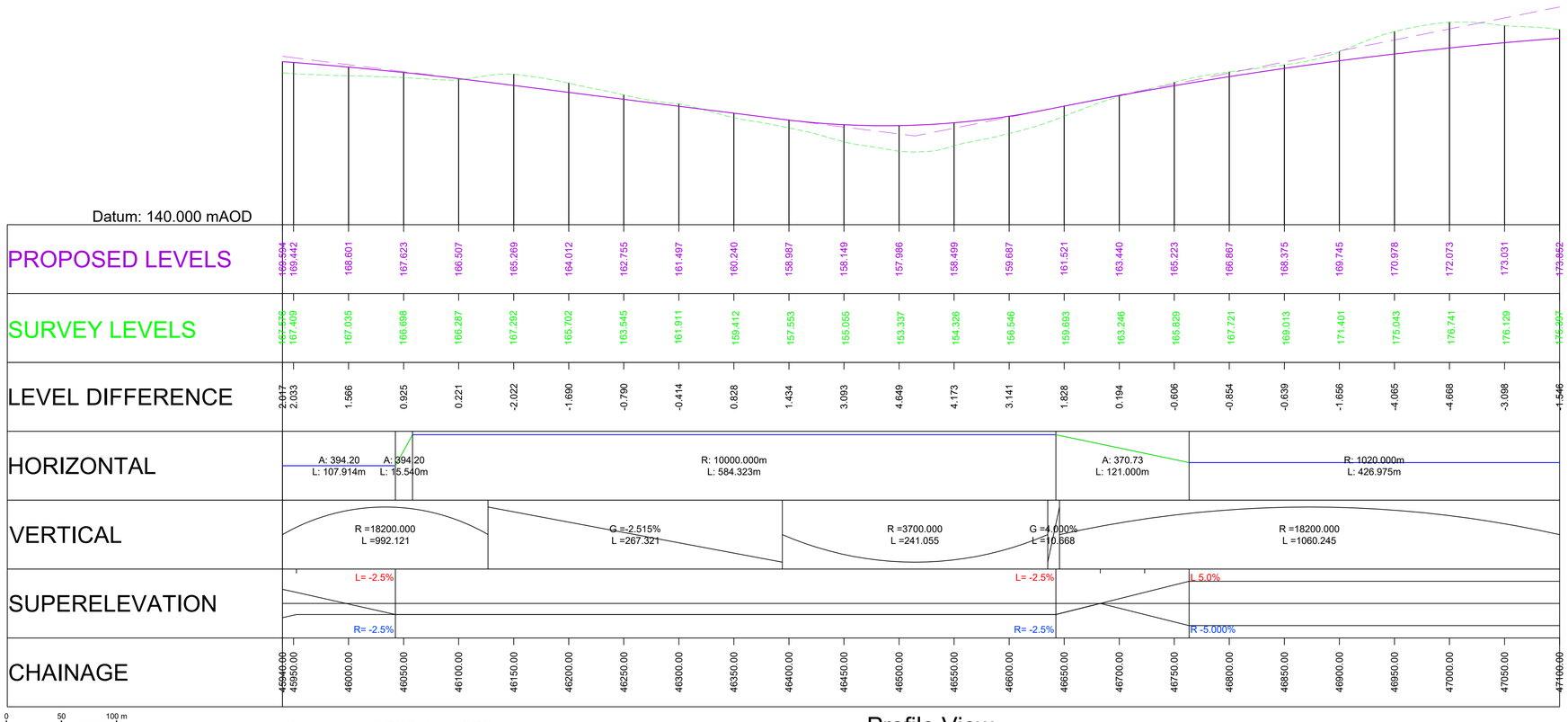
Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S06 - DR - CH - 459106
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

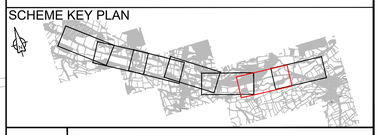
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	AAHM	AAHM	PBUN	OGAR	CBRO	
	17/09/21	17/09/21	17/09/21	17/09/21	17/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

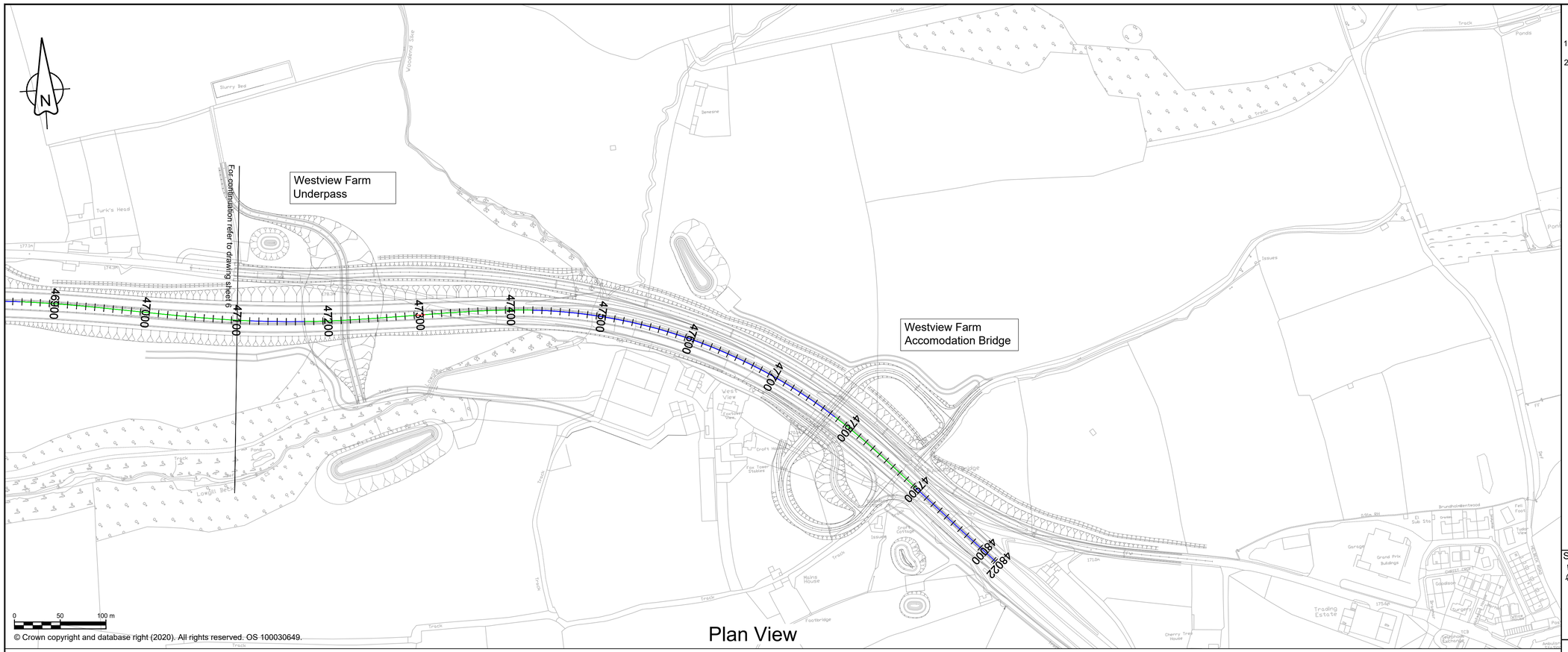
Drawing Title
Appleby to Brough
Option 3 - (Black-Black-Orange)
Plan and Profile Mainline
Sheet 6 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number

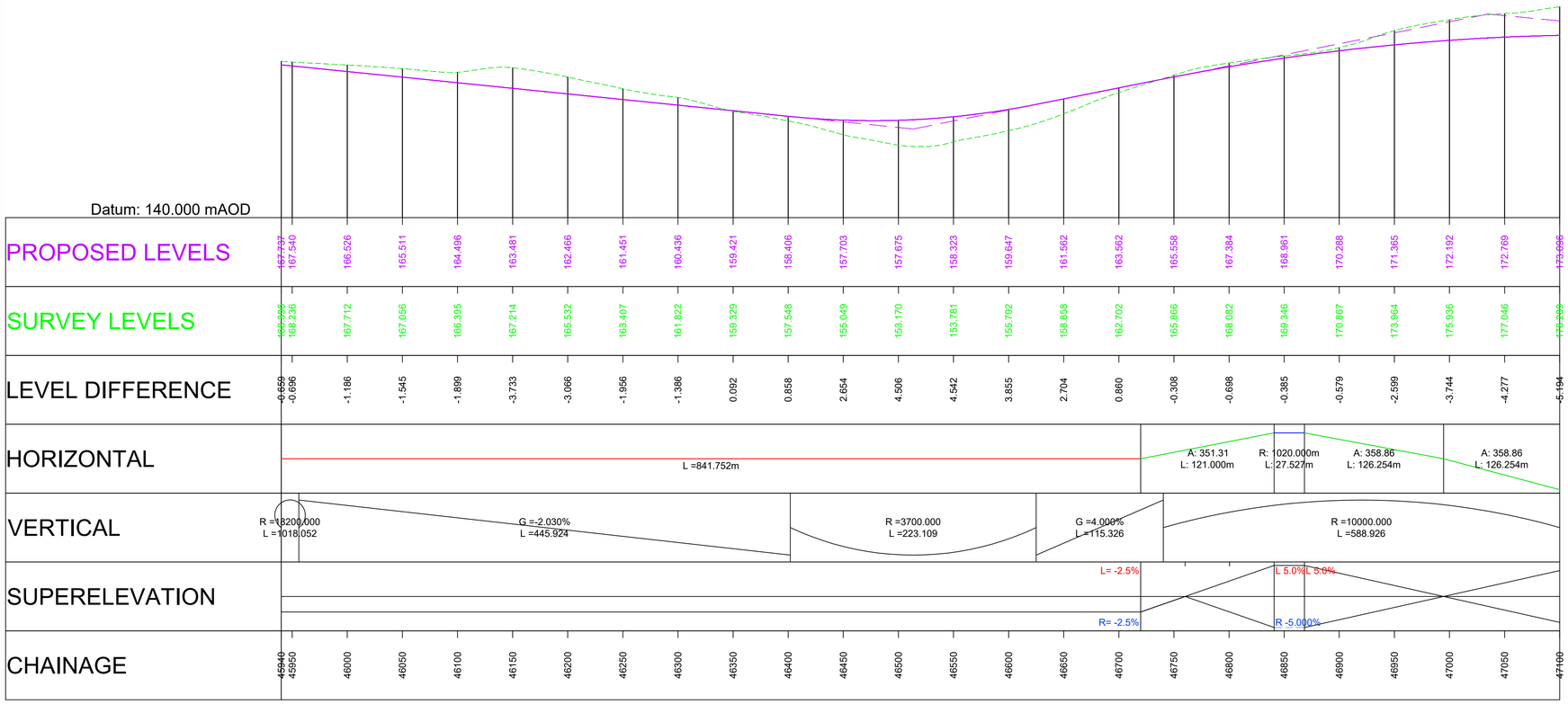
Project	Originator	Volume		
HE565627	- AMY	- HML	-	
S06	-DR	-CH	- 459306	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

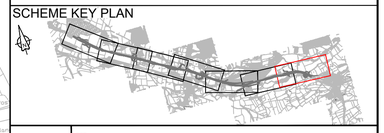
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	AAHM	AAHM	PBUN	OGAR	---	
	03/09/21	03/09/21	03/09/21	03/09/21	---	
P02						
	AAHM	AAHM	PBUN	OGAR	CBRO	
	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

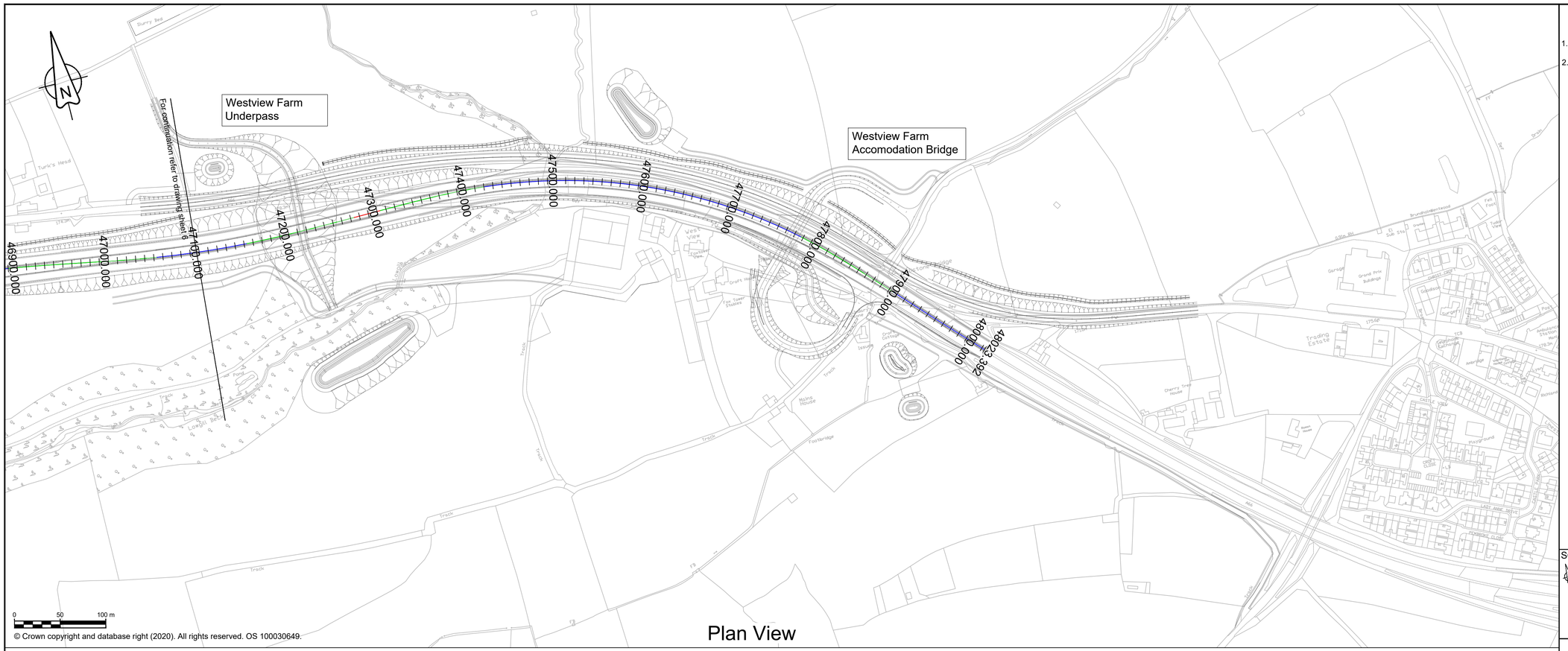
Project Name
A66 Northern Trans-Pennine

Drawing Title
Appleby to Brough
Option 2 - (Black-Blue-Black)
Plan and Profile Mainline
Sheet 7 of 7

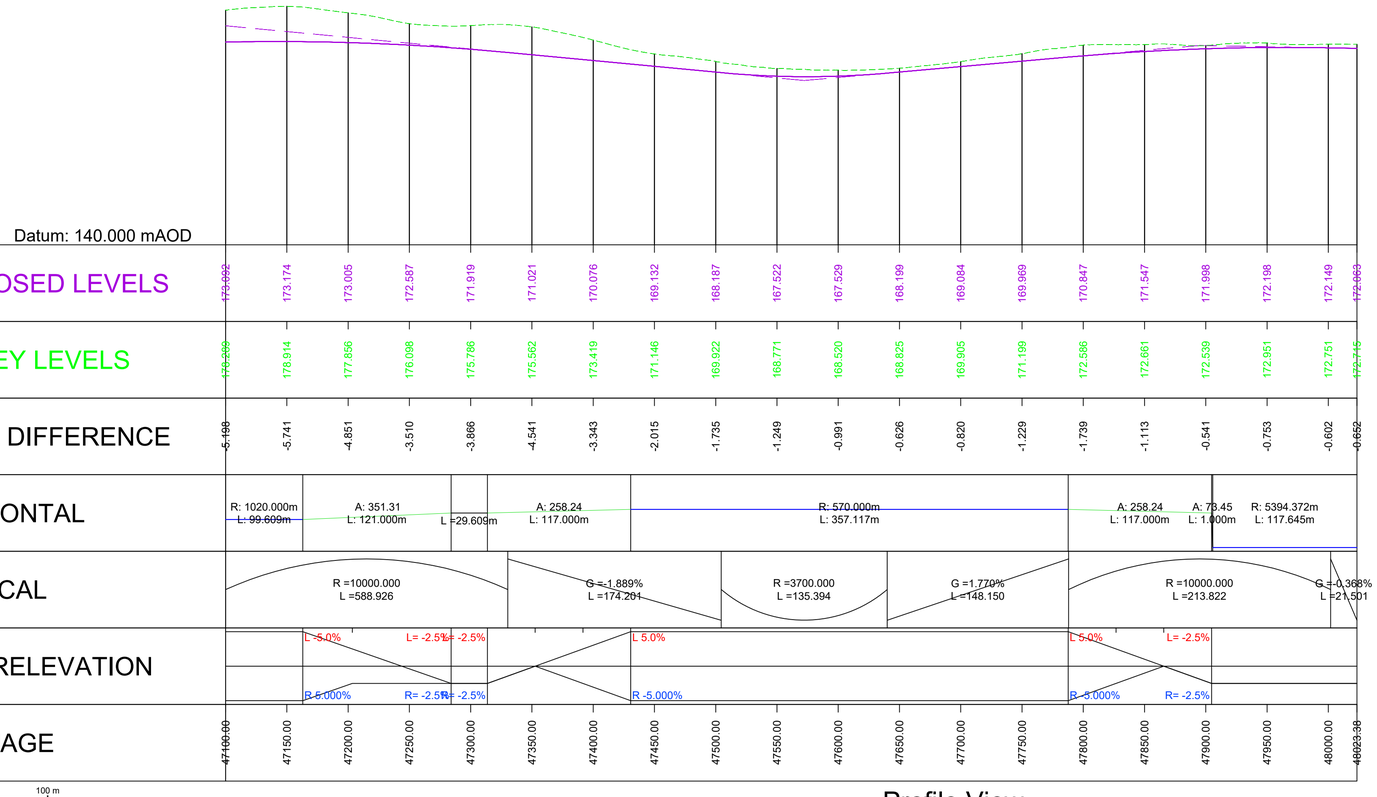
Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S06 - DR - CH - 471007
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



Plan View



Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

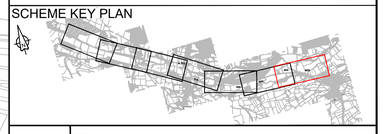
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	AAHM	AAHM	PBUN	OGAR	CBRO	
	16/09/21	16/09/21	16/09/21	16/09/21	17/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

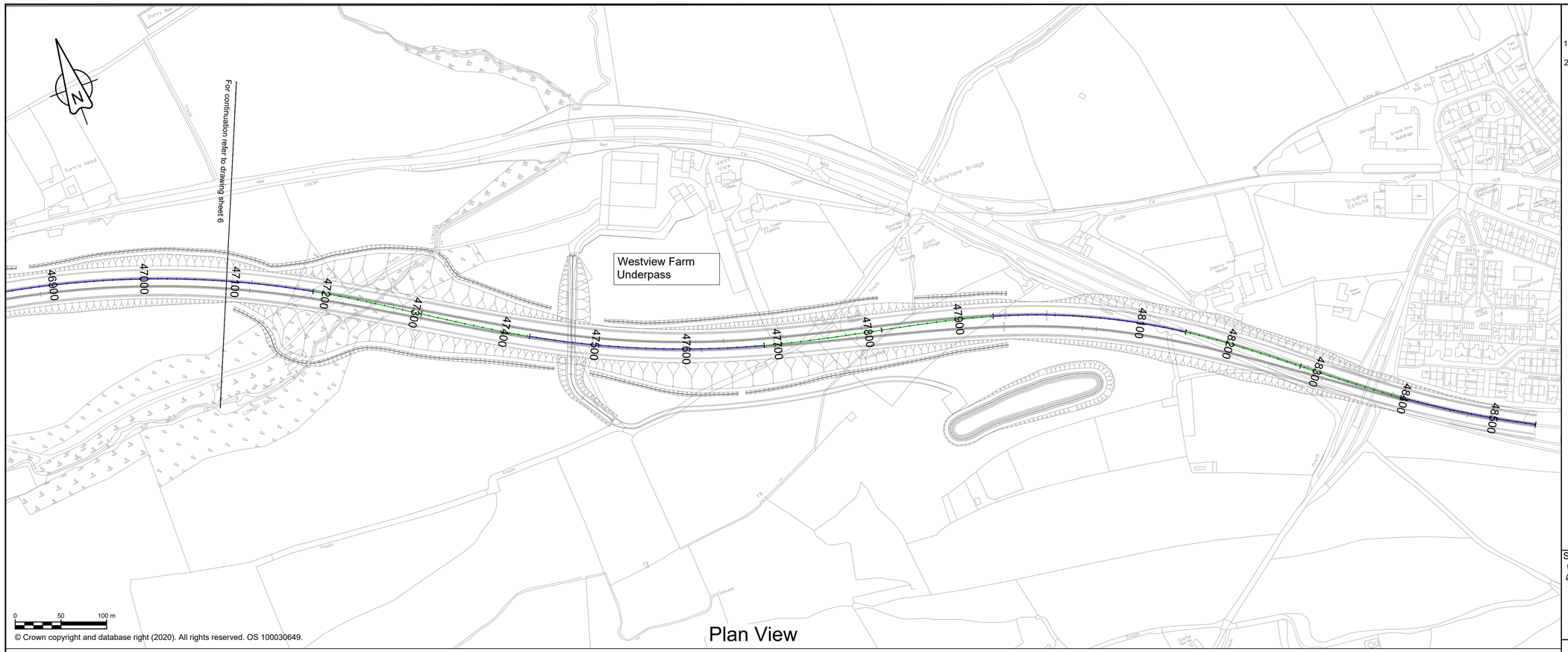
Drawing Title
Appleby to Brough
Option 1 - (Black-Black-Black)
Plan and Profile Mainline
Sheet 7 of 7

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number

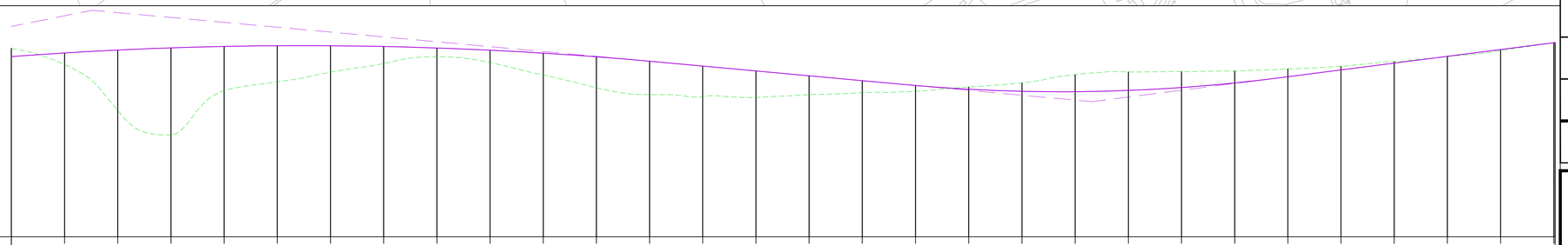
Project	Originator	Volume	
HE565627 -	AMY -	HML -	
S06	-DR-CH-	471107	
Location	Type	Role	Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



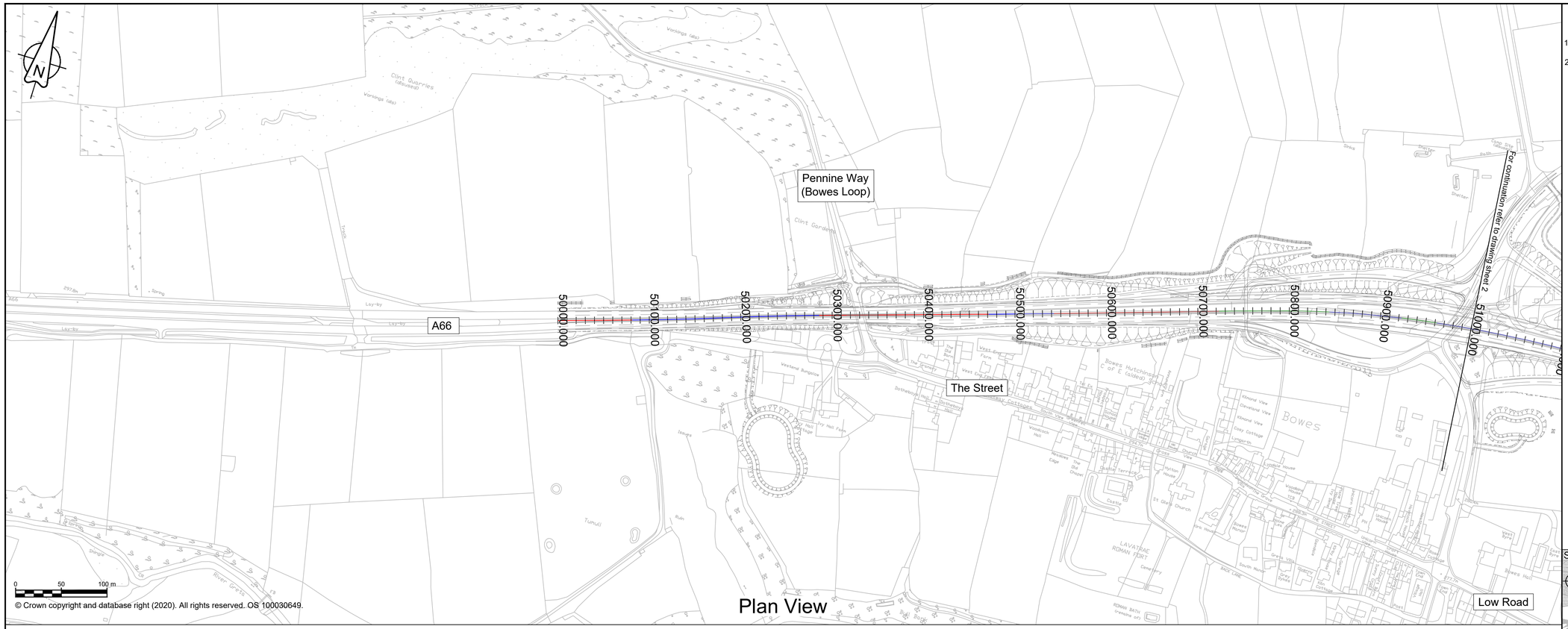
© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View

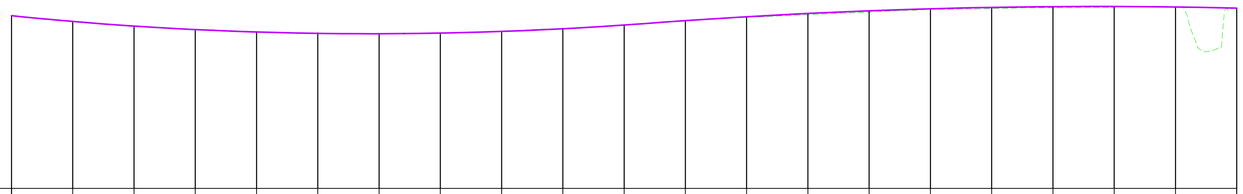


Datum: 140.000 mAOD

| | | |



Plan View



Datum: 260.000 mAOD

CHAINAGE	PROPOSED LEVELS	SURVEY LEVELS	LEVEL DIFFERENCE
50000.00	288.488	288.488	0.000
50050.00	287.243	287.250	-0.007
50100.00	286.490	286.499	-0.008
50150.00	285.926	285.967	-0.041
50200.00	285.530	285.558	-0.028
50250.00	285.302	285.374	-0.072
50300.00	285.240	285.283	-0.043
50350.00	285.344	285.401	-0.056
50400.00	285.615	285.658	-0.043
50450.00	286.053	286.121	-0.068
50500.00	286.658	286.681	-0.023
50550.00	287.377	287.370	0.007
50600.00	288.013	287.979	0.034
50650.00	288.547	288.338	0.209
50700.00	288.978	288.750	0.228
50750.00	289.308	289.261	0.047
50800.00	289.536	289.342	0.194
50850.00	289.662	289.485	0.176
50900.00	289.685	289.556	0.129
50950.00	289.607	289.598	0.009
51000.00	289.426	289.397	0.030

HORIZONTAL: L =81.535m; R: 2880.000m L: 101.362m; R: 2880.000m L: 103.186m; L =185.242m; R: 10000.000m L: 71.433m; L =180.440m; A: 351.20 L: 120.922m; R: 1020.000m L: 79.261m; A: 351.20 L: 38.695m; R: 1500.000m L: 649.304m

VERTICAL: R =13000.000 L =121.909; R =15000.000 L =396.889; R =24500.000 L =1223.462

SUPERELEVATION: L= -2.5% R= -2.5%; L= 5.0% R= -5.0%; L= 5.0% R= -5.0%; L= 3.4% R= -3.4%

0 50 100 m

Scale H 1:2500; V 1:500

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	ISSUED FOR STAT. CON. MAPBOOKS					
	ATUN	SHOT	AREM	RPEA	FMOL	
	01/09/21	01/09/21	01/09/21	01/09/21	02/09/21	

Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

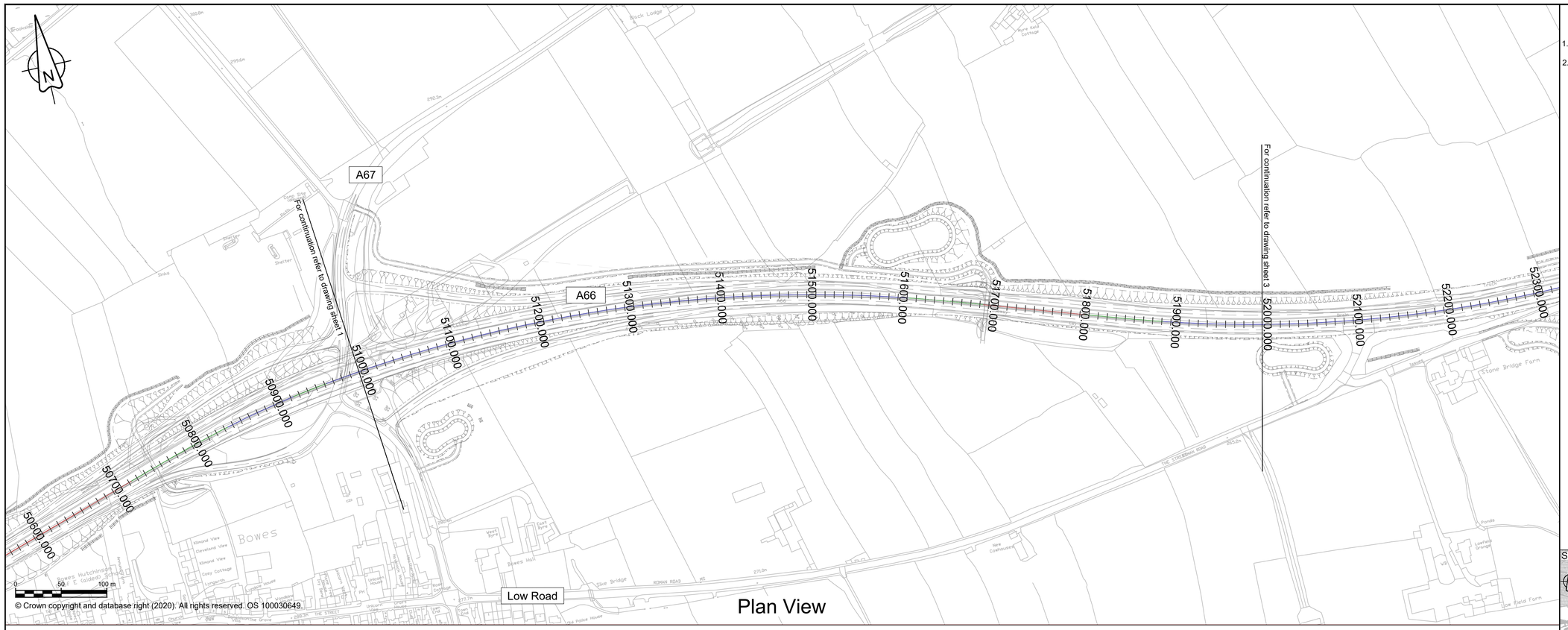
Project Name
A66 Northern Trans-Pennine

Drawing Title
Bowes Bypass
Plan and Profile Mainline
Sheet 1 of 3

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

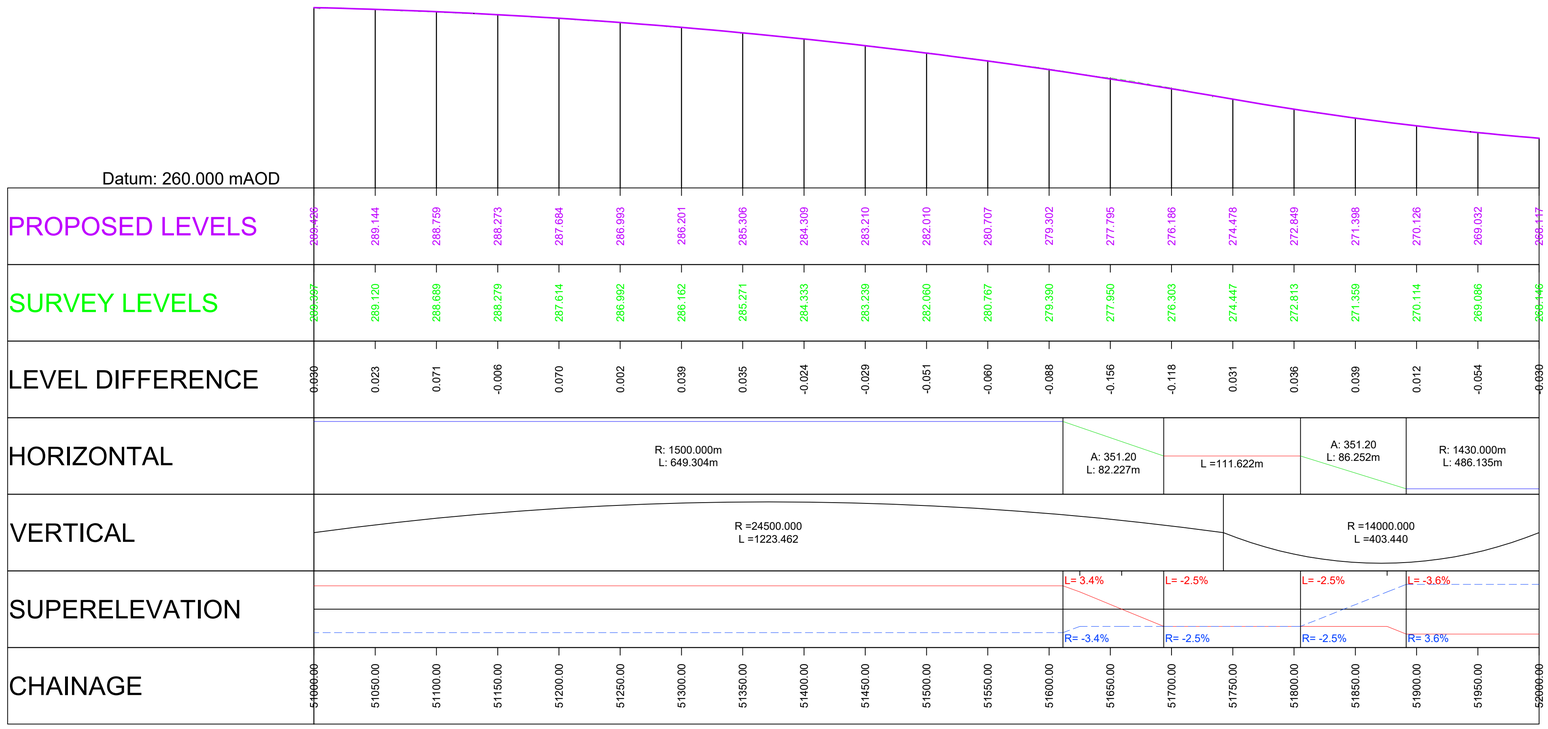
Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S07 -DR-CH- 000001
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S3	Fit for Internal Review and Comment	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



0 50 100 m

Scale H 1:2500; V 1:500

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	ISSUED FOR STAT. CON. MAPBOOKS					
	ATUN	SHOT	AREM	RPEA	FMOL	
	01/09/21	01/09/21	01/09/21	01/09/21	02/09/21	

Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

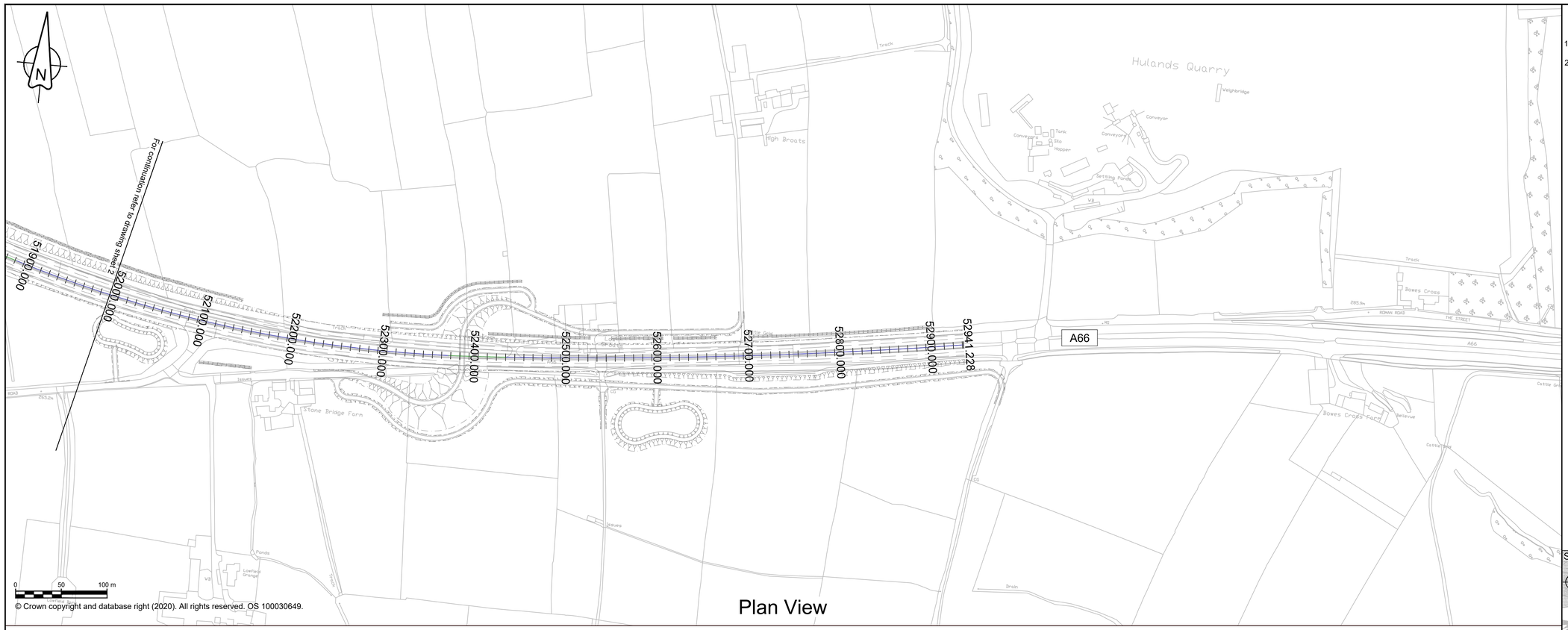
Drawing Title
Bowes Bypass
Plan and Profile Mainline
Sheet 2 of 3

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

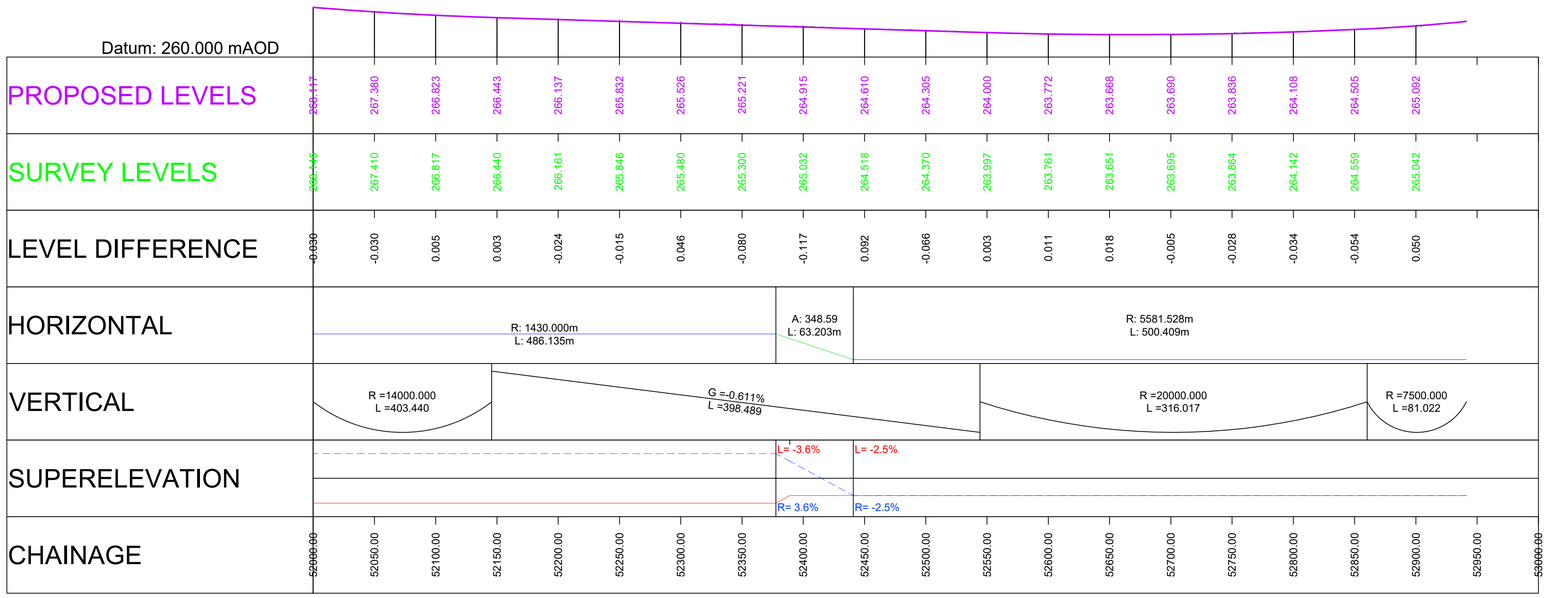
Project	Originator	Volume	
HE565627 -	AMY -	HML -	
S07	-DR-	CH-	000002
Location	Type	Role	Number

Suitability	Suitability Description	Revision
S3	Fit for Internal Review and Comment	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:500

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---				
---	---	---	---	---	---
	---	---	---	---	---
	---	---	---	---	---
---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	ISSUED FOR STAT. CON. MAPBOOKS				
	ATUN	SHOT	AREM	RPEA	FMOL
	01/09/21	01/09/21	01/09/21	01/09/21	02/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

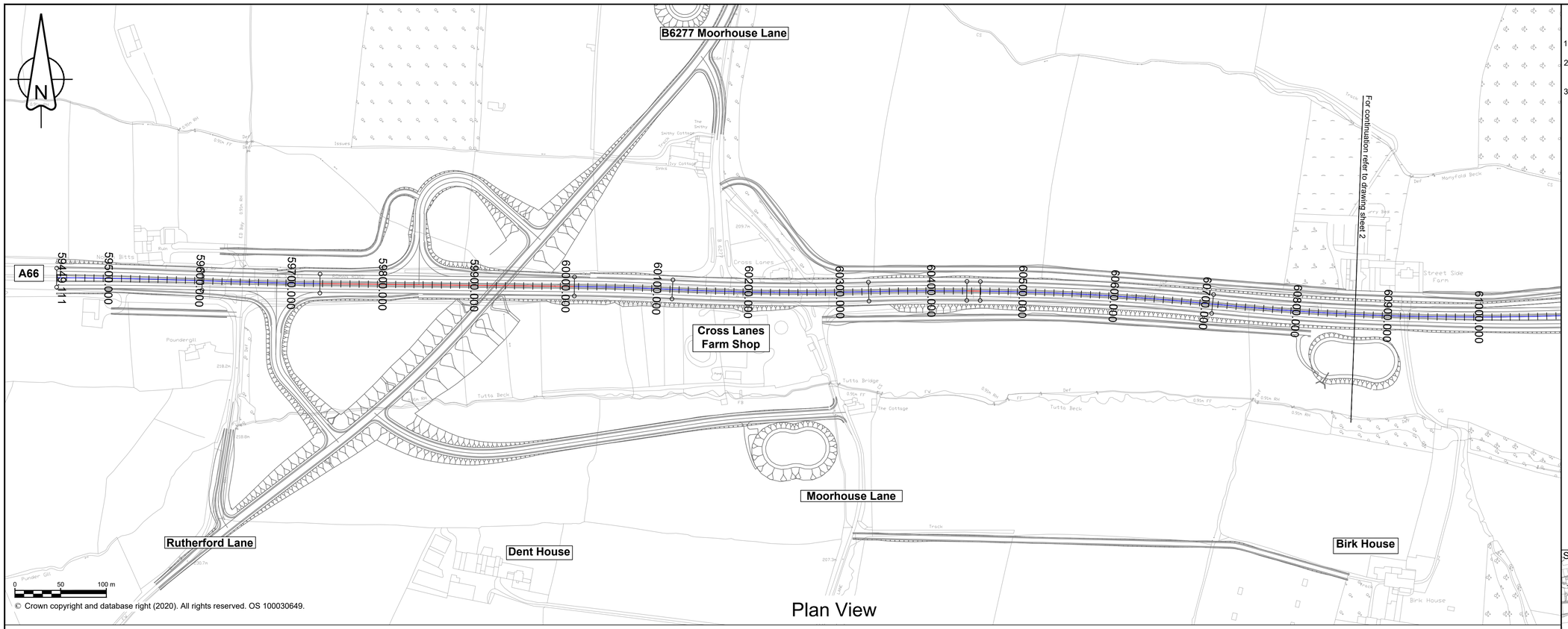
Drawing Title
Bowes Bypass
Plan and Profile Mainline
Sheet 3 of 3

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

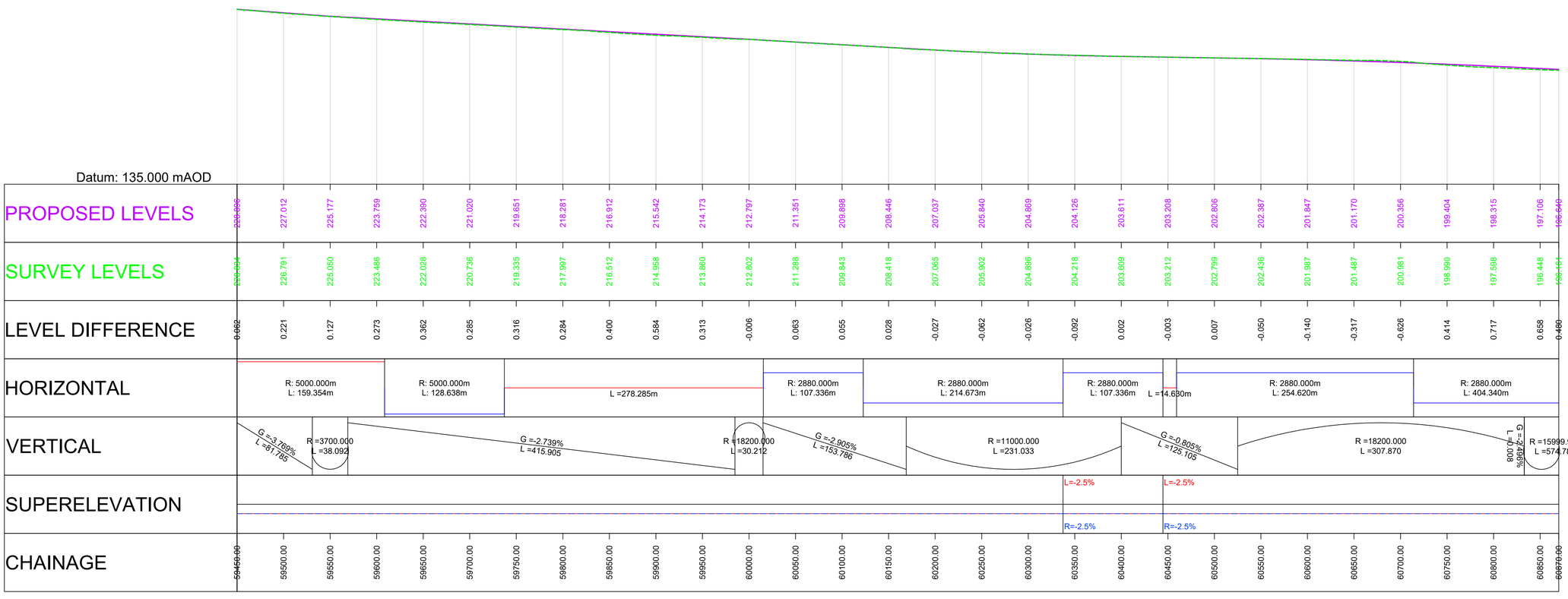
Project	Originator	Volume		
HE565627 -	AMY -	HML -		
S07	-DR-	CH-	000003	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S3	Fit for Internal Review and Comment	P01



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Scale H 1:2500; V 1:1250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.
3. THE PROPOSED A66 VERTICAL DESIGN LEVELS ARE IDENTICAL FOR ALL ROUTE OPTIONS (BLACK, BLUE & RED).

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	ISSUED FOR STAT. CON. MAPBOOKS					
	AREM	AREM	SHOT	THAL	FMOL	
	31/08/21	31/08/21	01/09/21	01/09/21	02/09/21	
P02	ISSUED FOR STAT. CON. ROUTE DEV. RPT.					
	AREM	AREM	THAL	FMOL	FMOL	
	20/09/21	20/09/21	20/09/21	20/09/21	20/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

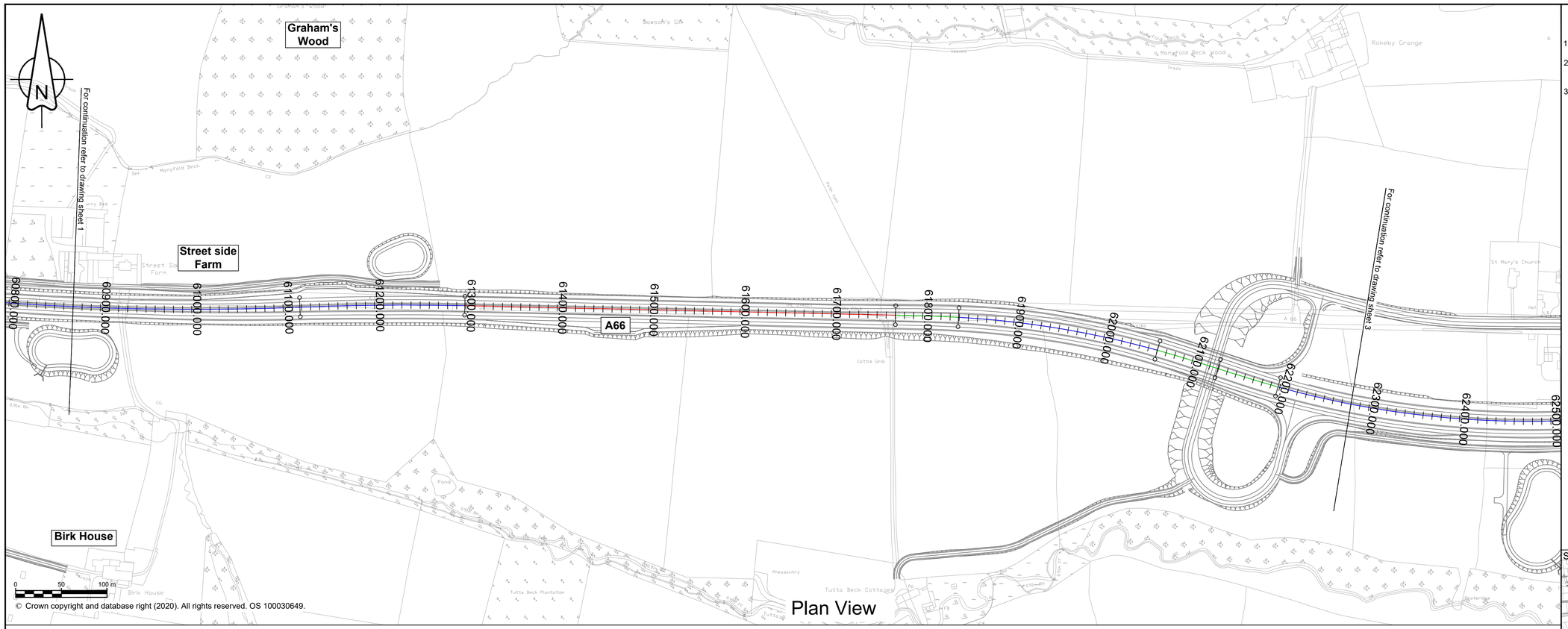
Project Name
A66 Northern Trans-Pennine

Drawing Title
Black Option
Cross Lanes to Rokeby
Plan and Profile Mainline
Sheet 1 of 3

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

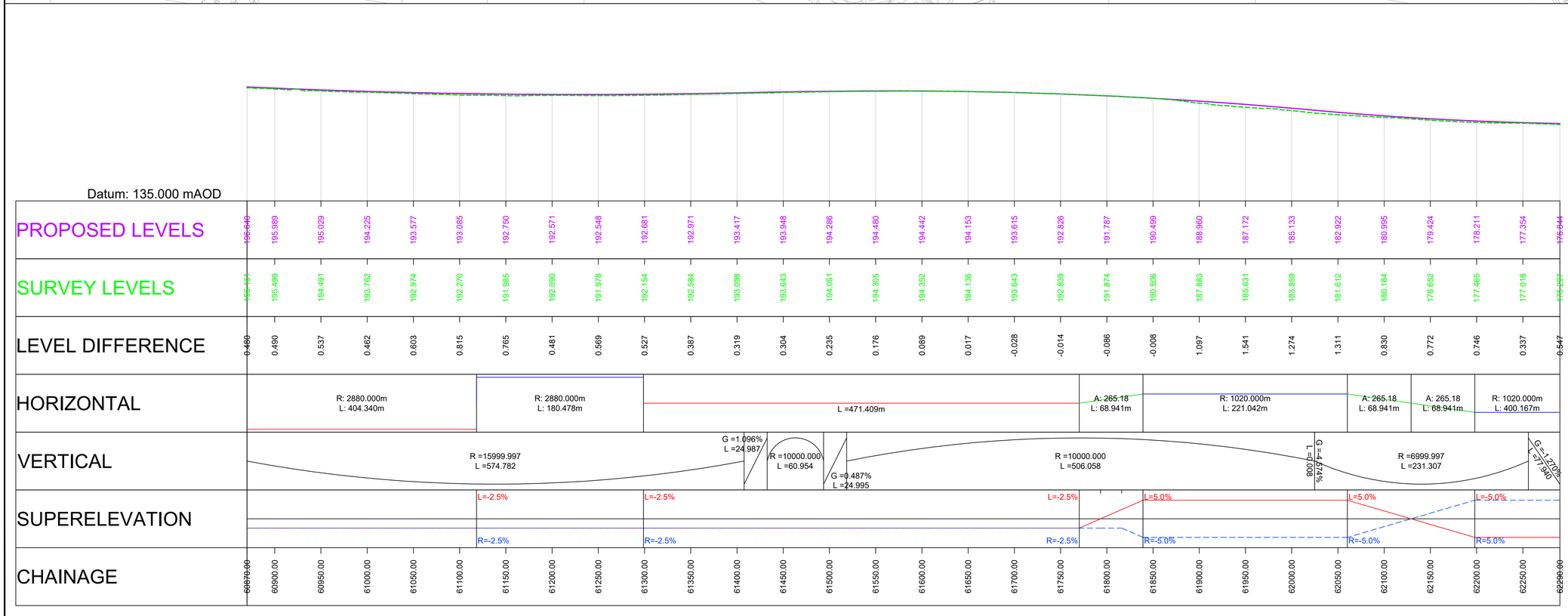
Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S08 -DR-CH- 600011
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Profile View

0 50 100 m
Scale H 1:2500; V 1:1250

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.
3. THE PROPOSED A66 VERTICAL DESIGN LEVELS ARE IDENTICAL FOR ALL ROUTE OPTIONS (BLACK, BLUE & RED).

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	ISSUED FOR STAT. CON. MAPBOOKS				
	AREM	AREM	SHOT	THAL	FMOL
	31/08/21	31/08/21	01/09/21	01/09/21	02/09/21
P02	ISSUED FOR STAT. CON. ROUTE DEV. RPT.				
	AREM	AREM	THAL	FMOL	FMOL
	20/09/21	20/09/21	20/09/21	20/09/21	20/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

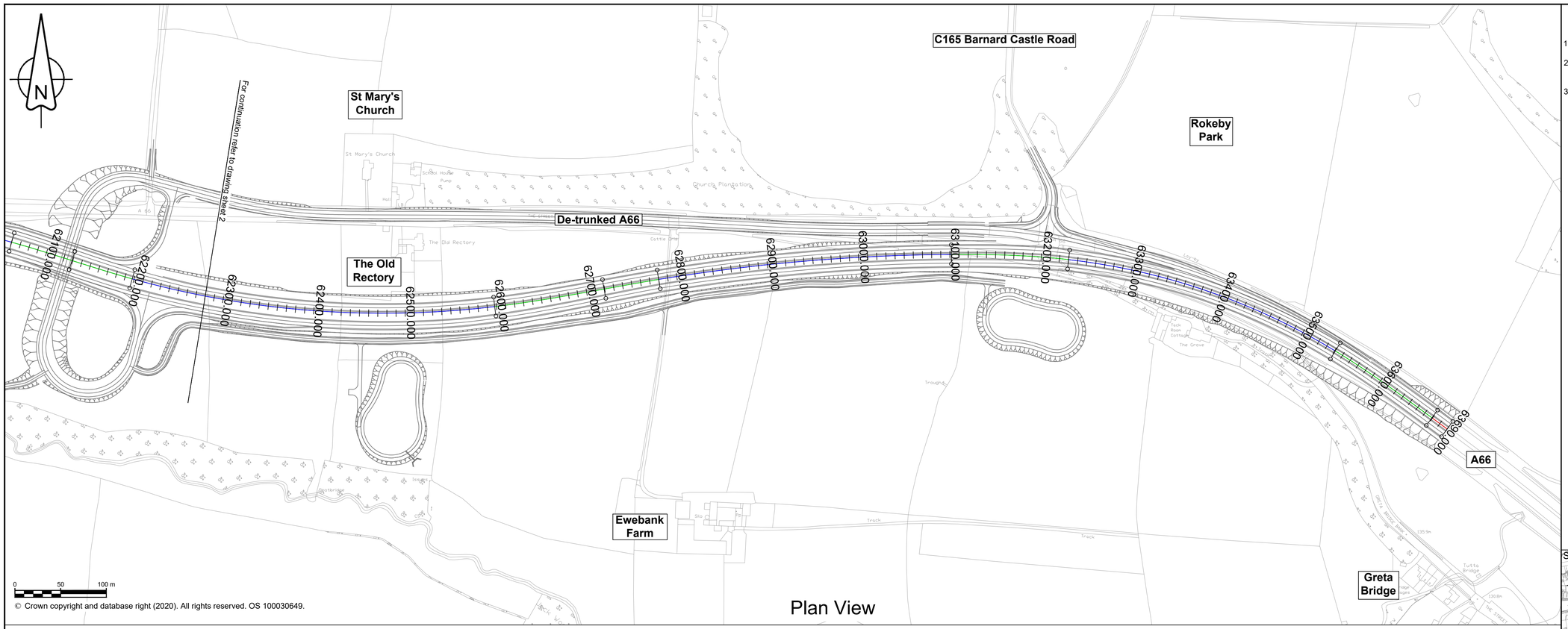
Project Name
A66 Northern Trans-Pennine

Drawing Title
Black Option
Cross Lanes to Rokeby
Plan and Profile Mainline
Sheet 2 of 3

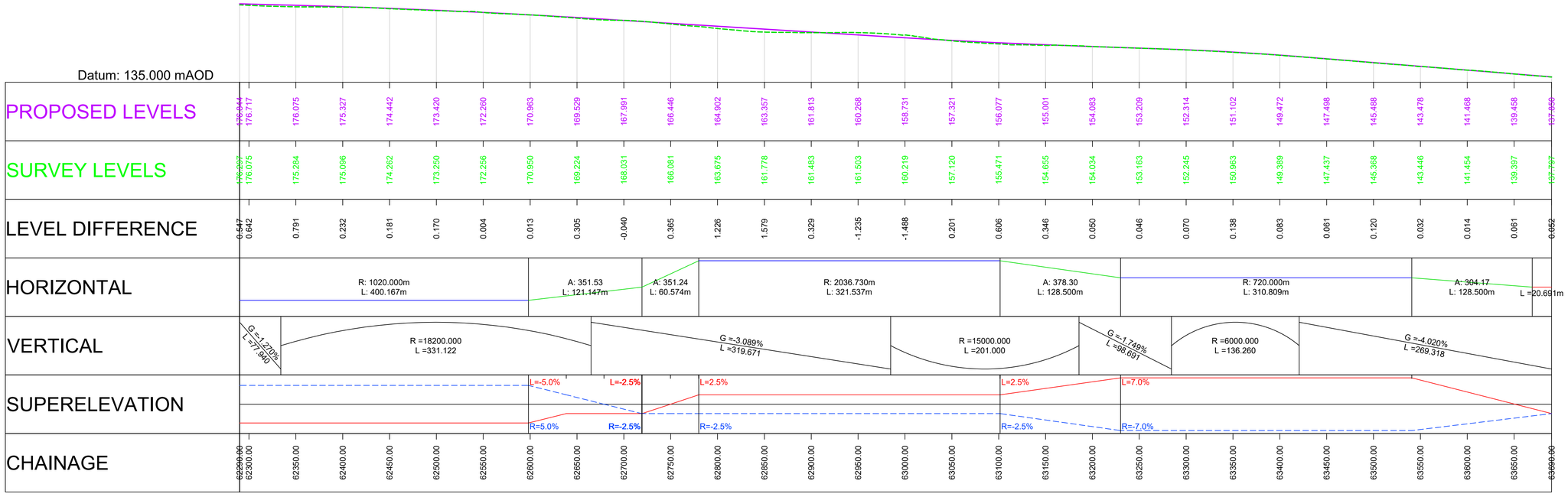
Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S08 -DR-CH- 600012
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



Plan View



0 50 100 m

Scale H 1:2500; V 1:1250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.
3. THE PROPOSED A66 VERTICAL DESIGN LEVELS ARE IDENTICAL FOR ALL ROUTE OPTIONS (BLACK, BLUE & RED).

KEY

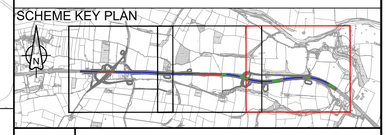
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---				
	---	---	---	---	---
	---	---	---	---	---
	---	---	---	---	---
P01	ISSUED FOR STAT. CON. MAPBOOKS				
	AREM	AREM	SHOT	THAL	FMOL
	31/08/21	31/08/21	01/09/21	01/09/21	02/09/21
P02	ISSUED FOR STAT. CON. ROUTE DEV. RPT.				
	AREM	AREM	THAL	FMOL	FMOL
	20/09/21	20/09/21	20/09/21	20/09/21	20/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

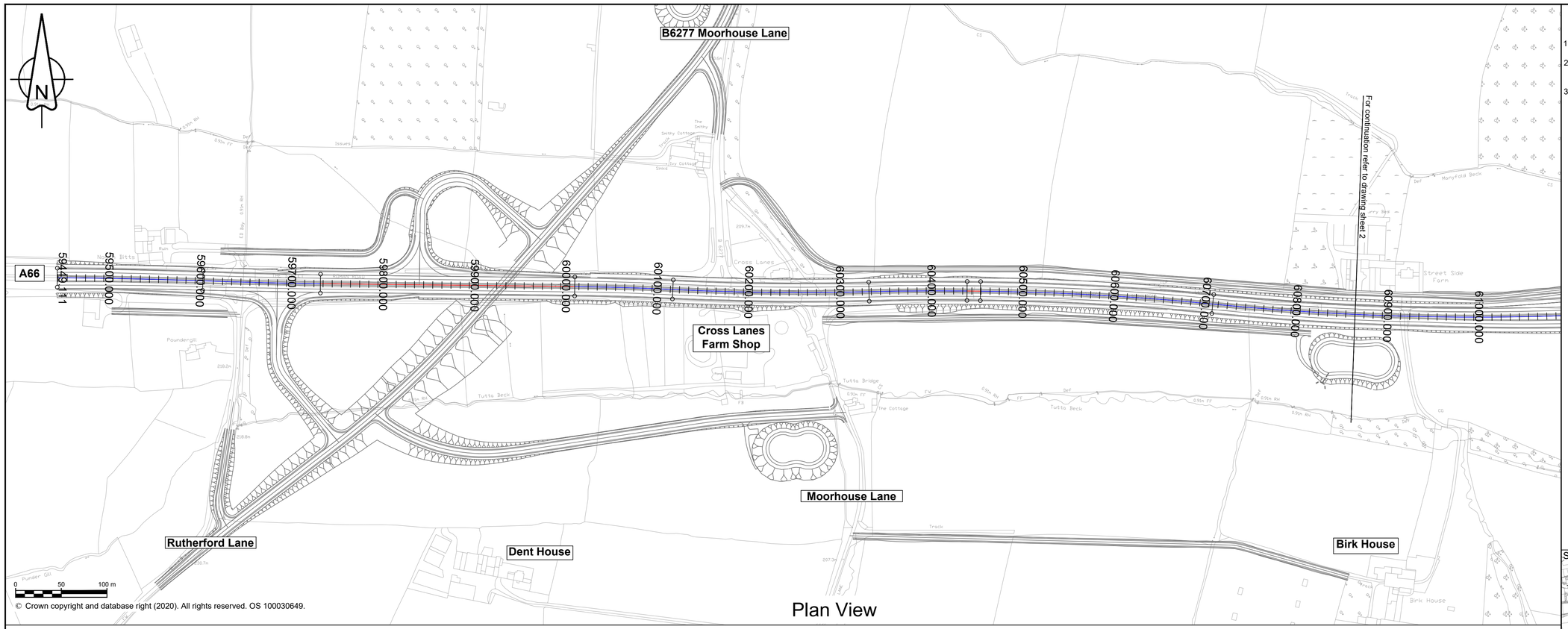
Drawing Title
Black Option
Cross Lanes to Rokeby
Plan and Profile Mainline
Sheet 3 of 3

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---	PCF3	Dimensions : M

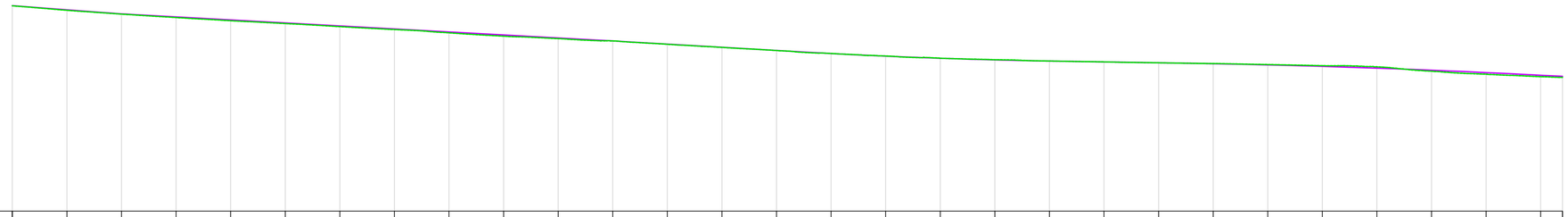
Drawing Number

Project	Originator	Volume		
HE565627	AMY	HML		
S08	DR	CH	600013	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02

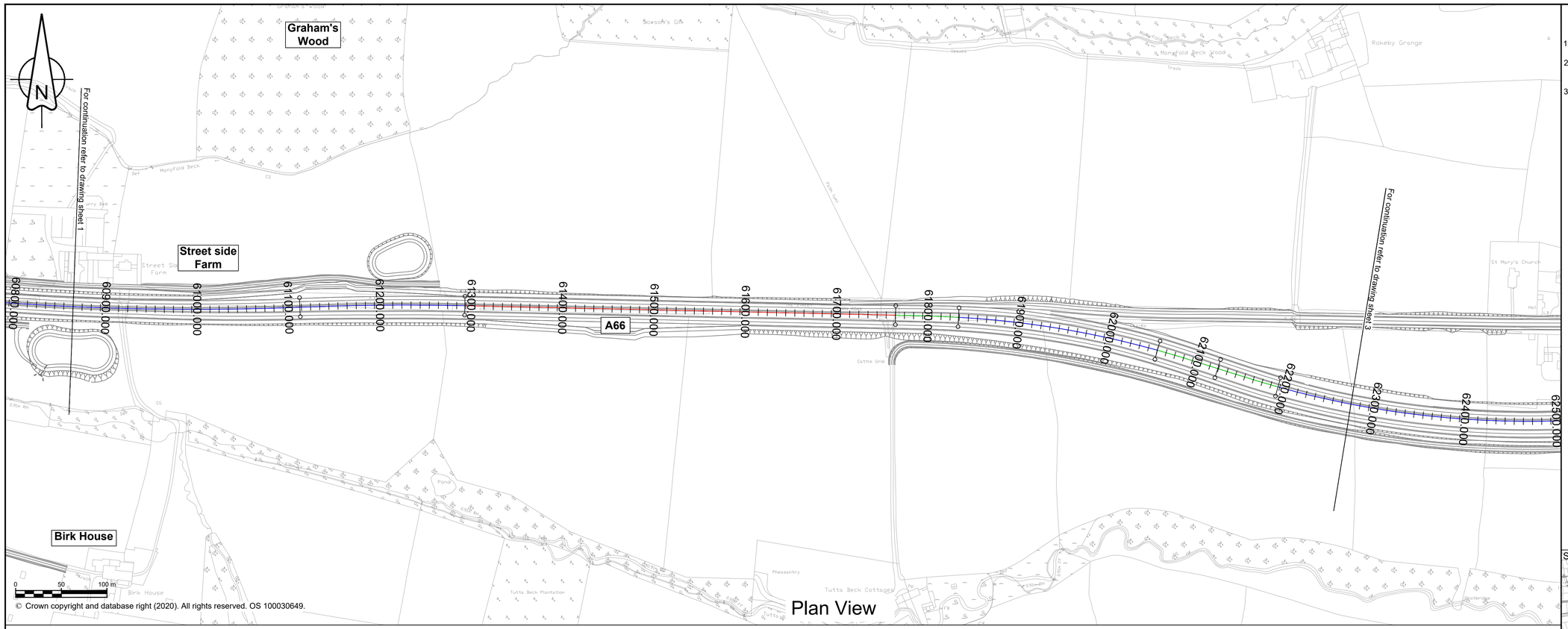


Plan View



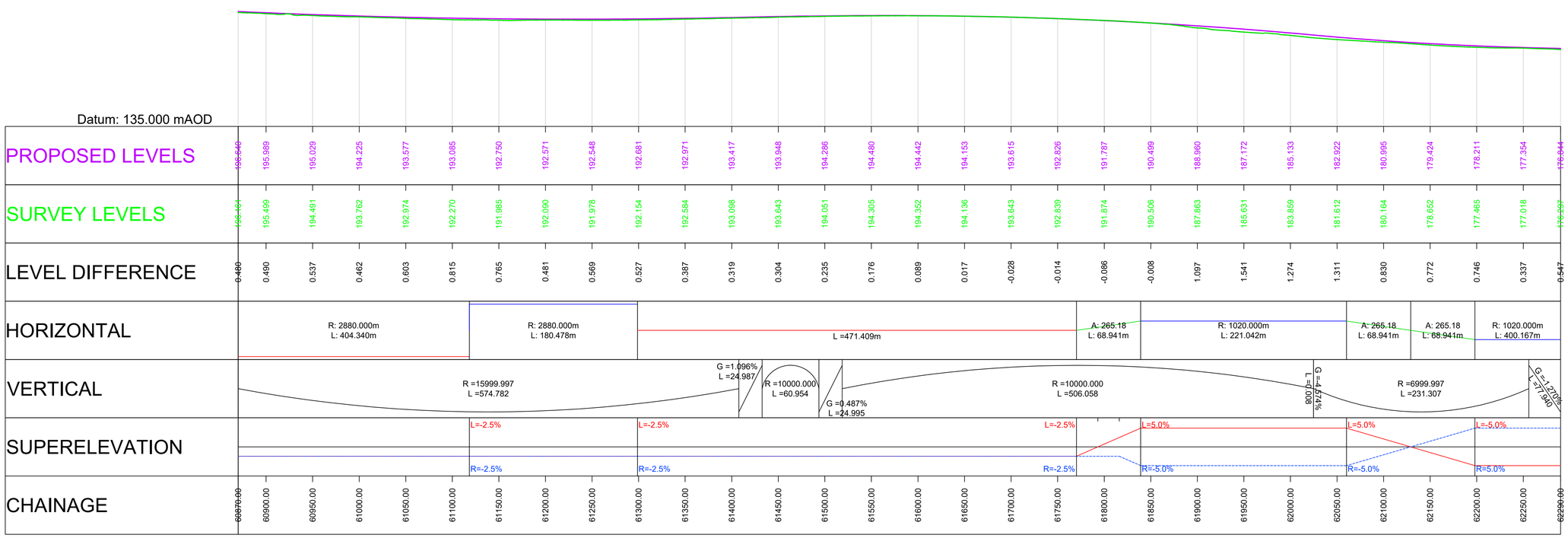
Datum: 135.000 mAOD

| | | |



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.
3. THE PROPOSED A66 VERTICAL DESIGN LEVELS ARE IDENTICAL FOR ALL ROUTE OPTIONS (BLACK, BLUE & RED).

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---				
	---	---	---	---	---
	---	---	---	---	---
---	---				
	---	---	---	---	---
	---	---	---	---	---
P01	ISSUED FOR STAT. CON. ROUTE DEV. RPT.				
	AREM	AREM	THAL	FMOL	FMOL
	20/09/21	20/09/21	20/09/21	20/09/21	20/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

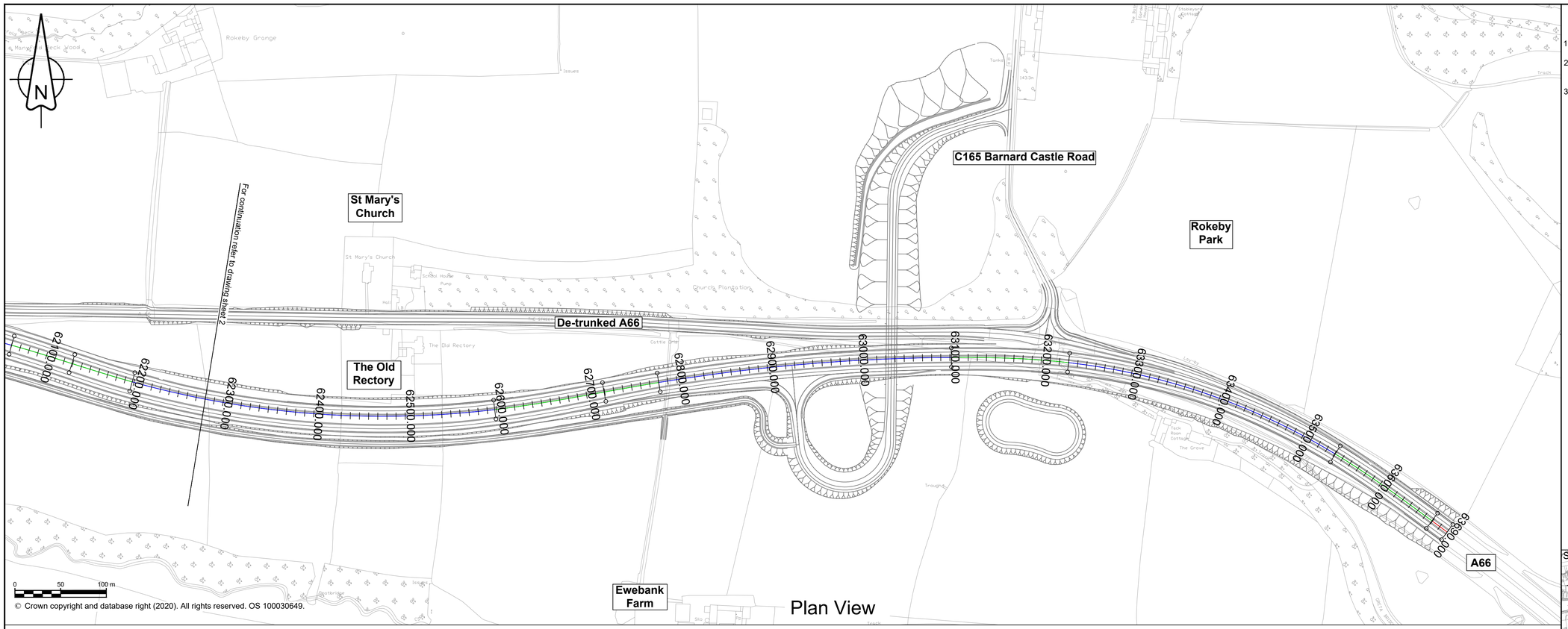
Drawing Title
Blue Option
Cross Lanes to Rokeby
Plan and Profile Mainline
Sheet 2 of 3

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number

Project	Originator	Volume		
HE565627 -	AMY -	HML -		
S08	-DR-	CH-	600022	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01

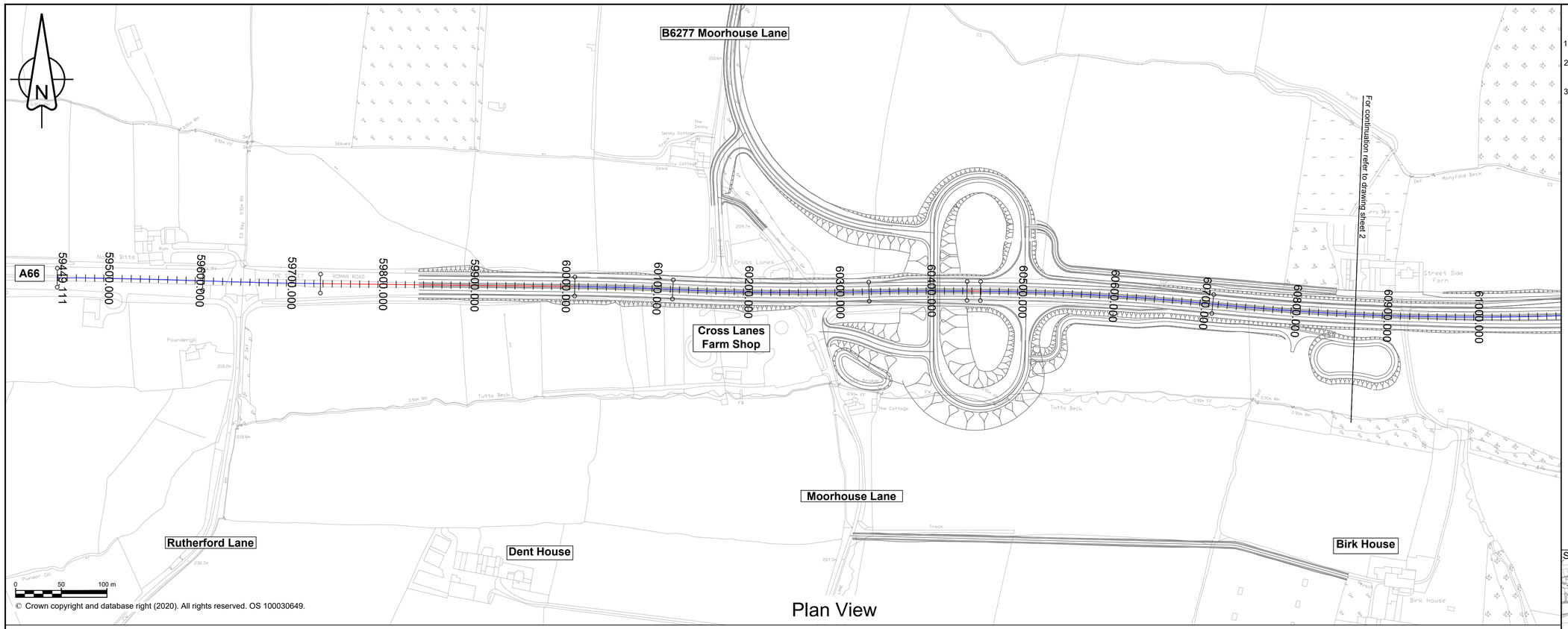


© Crown copyright and database right (2020). All rights reserved. OS 100030649.

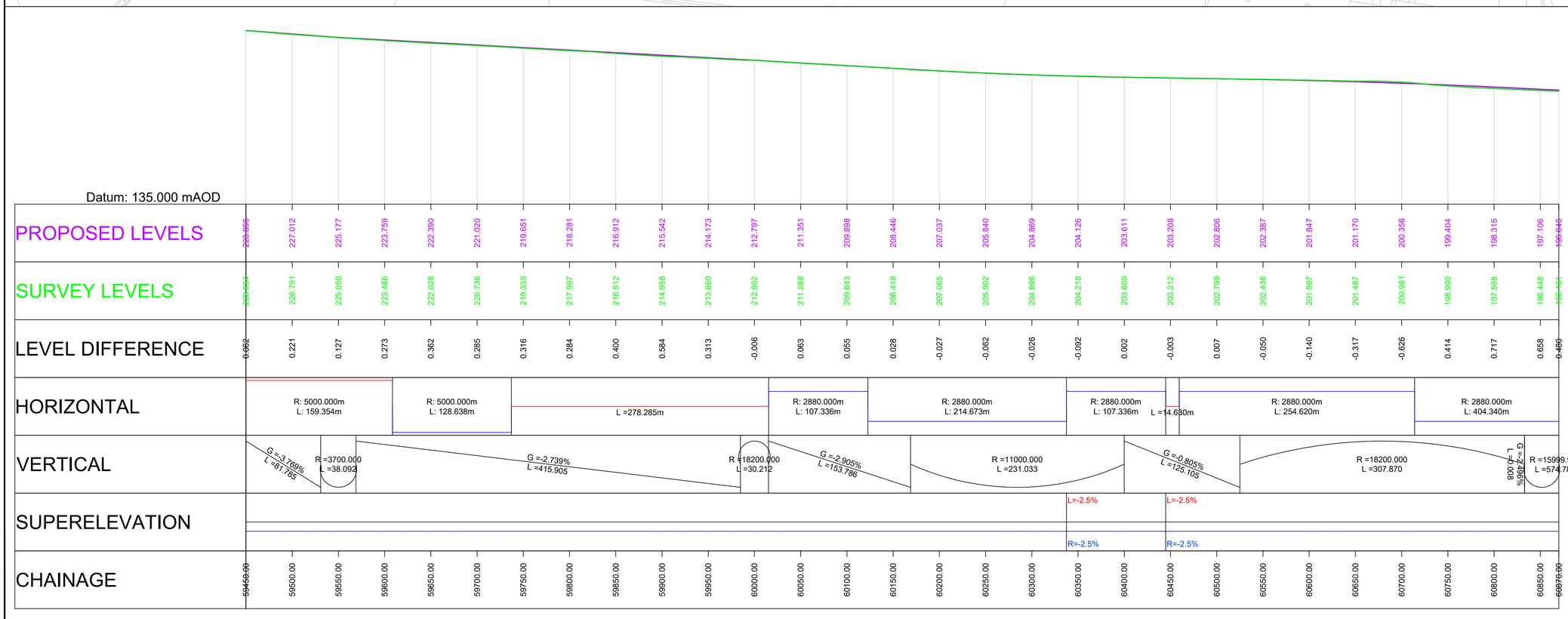
Plan View

Datum: 135.000 mAOD

| | | |



Plan View



Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.
3. THE PROPOSED A66 VERTICAL DESIGN LEVELS ARE IDENTICAL FOR ALL ROUTE OPTIONS (BLACK, BLUE & RED).

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	ISSUED FOR STAT. CON. ROUTE DEV. RPT.					
	AREM	AREM	THAL	FMOL	FMOL	
	20/09/21	20/09/21	20/09/21	20/09/21	20/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

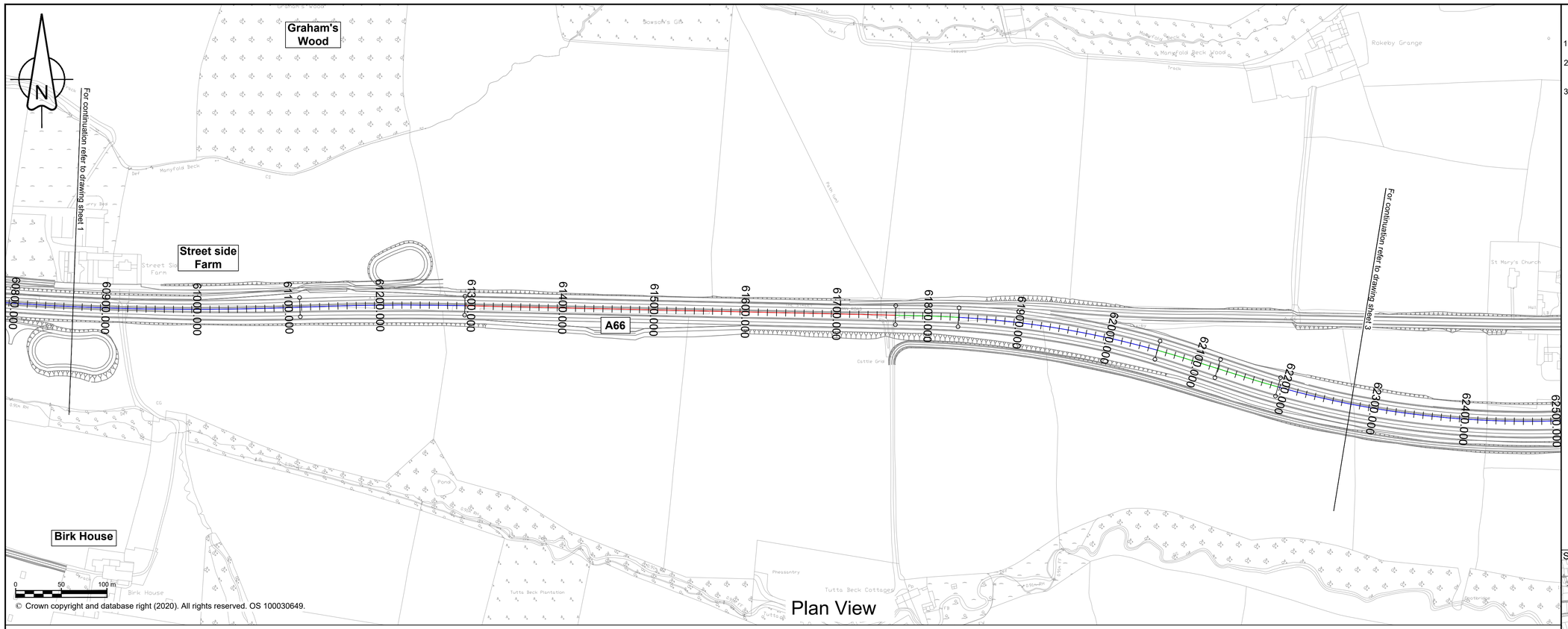
Project Name
A66 Northern Trans-Pennine

Drawing Title
Red Option
Cross Lanes to Rokeby
Plan and Profile Mainline
Sheet 1 of 3

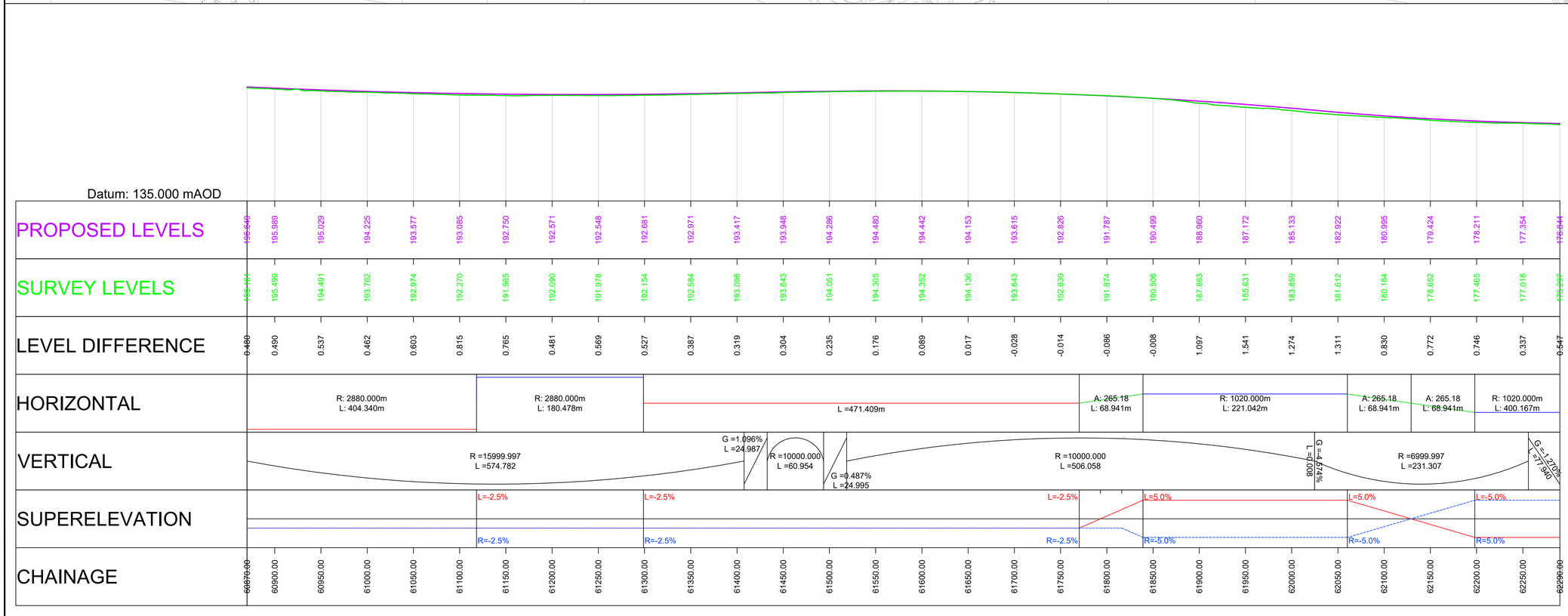
Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S08 -DR-CH- 600031
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



Plan View



0 50 100 m

Scale H 1:2500; V 1:1250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.
3. THE PROPOSED A66 VERTICAL DESIGN LEVELS ARE IDENTICAL FOR ALL ROUTE OPTIONS (BLACK, BLUE & RED).

KEY

Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

Revision					
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
P01	ISSUED FOR STAT. CON. ROUTE DEV. RPT.				
	AREM	AREM	THAL	FMOL	FMOL
	20/09/21	20/09/21	20/09/21	20/09/21	20/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

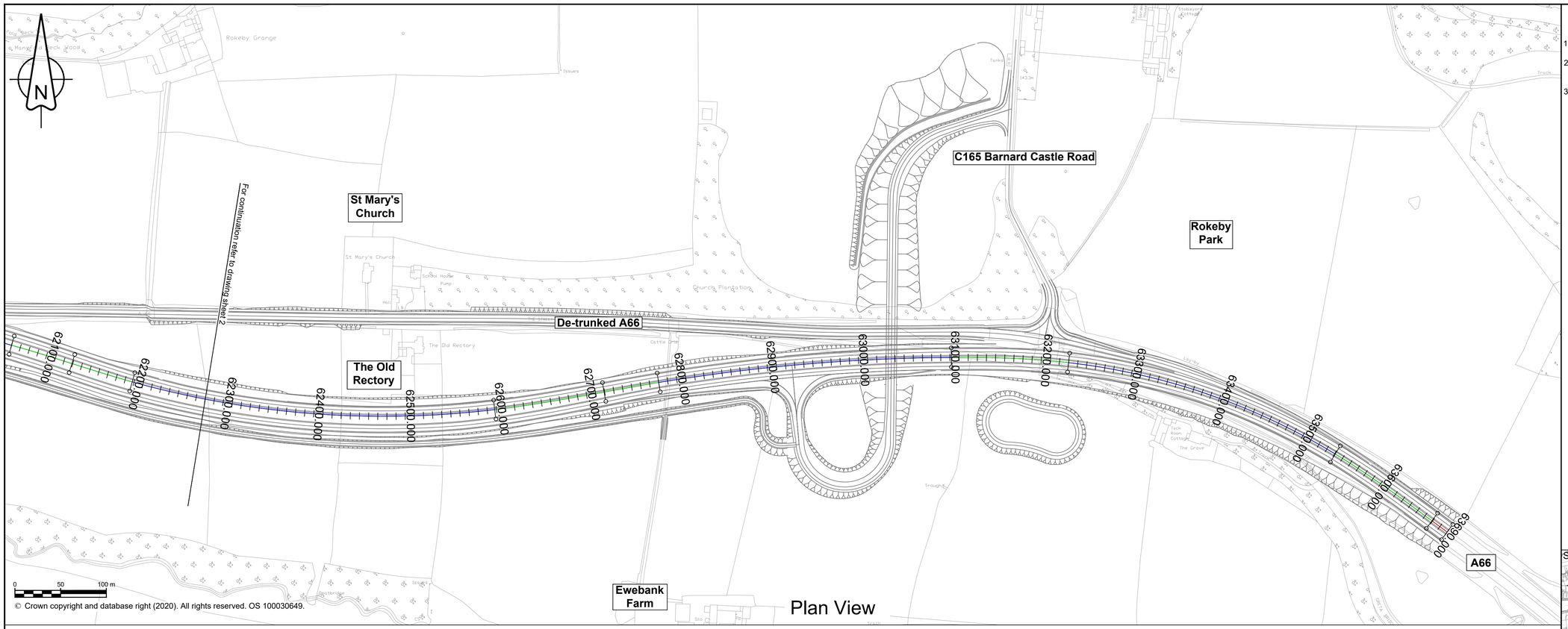
Project Name
A66 Northern Trans-Pennine

Drawing Title
Red Option
Cross Lanes to Rokeby
Plan and Profile Mainline
Sheet 2 of 3

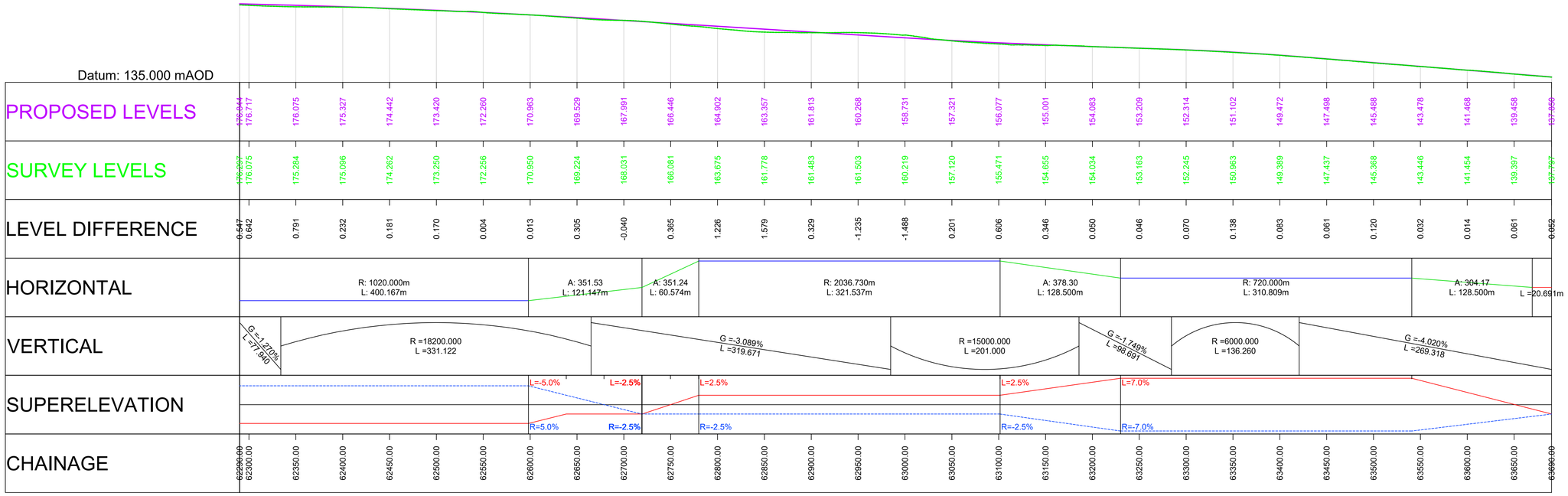
Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S08 -DR-CH- 600032
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



Plan View



Scale H 1:2500; V 1:1250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.
3. THE PROPOSED A66 VERTICAL DESIGN LEVELS ARE IDENTICAL FOR ALL ROUTE OPTIONS (BLACK, BLUE & RED).

KEY

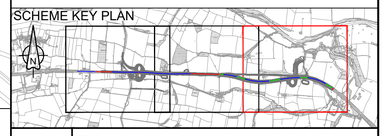
Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 20000 | 21400 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN



---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
	---	---	---	---	---	---
---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01	ISSUED FOR STAT. CON. ROUTE DEV. RPT.					
	AREM	AREM	THAL	FMOL	FMOL	
	20/09/21	20/09/21	20/09/21	20/09/21	20/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

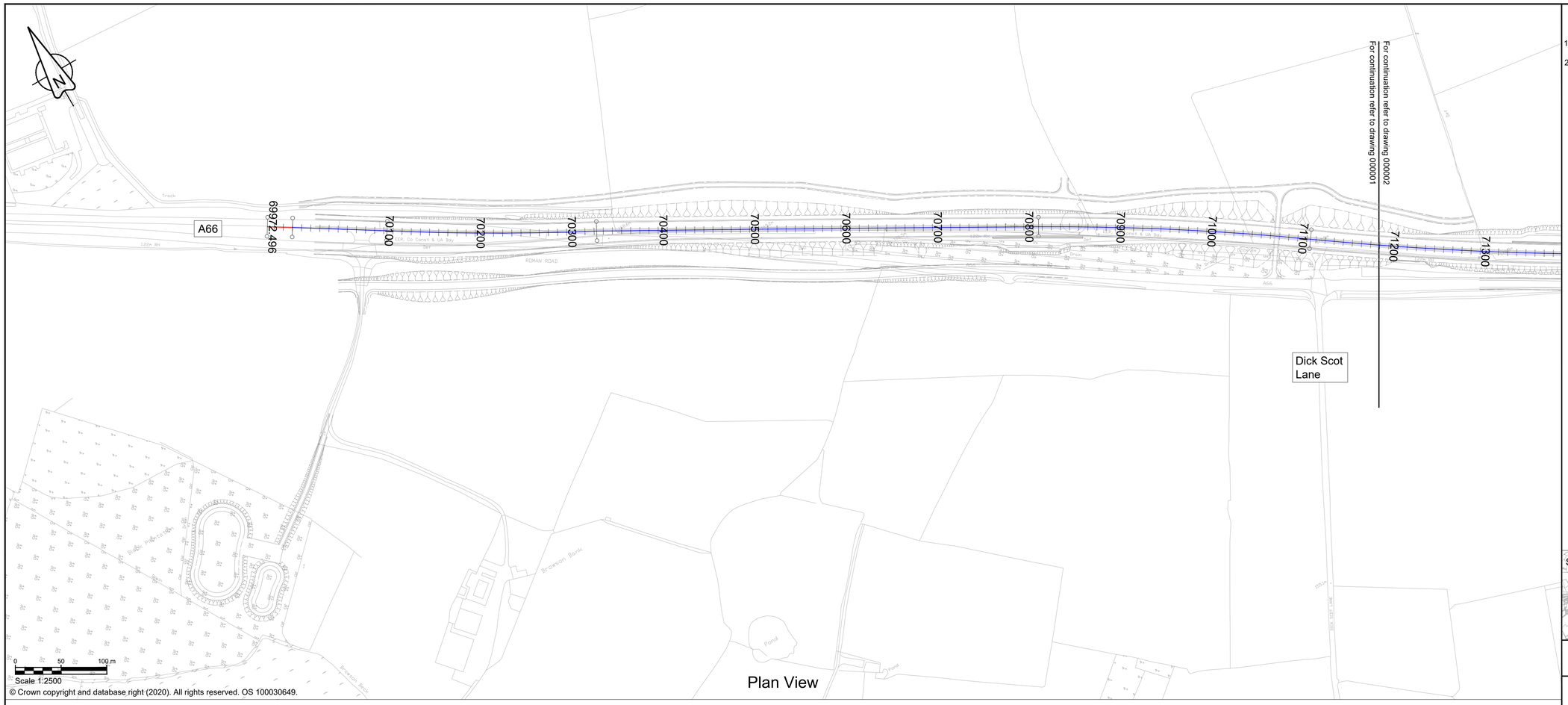
Drawing Title
Red Option
Cross Lanes to Rokeby
Plan and Profile Mainline
Sheet 3 of 3

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : M

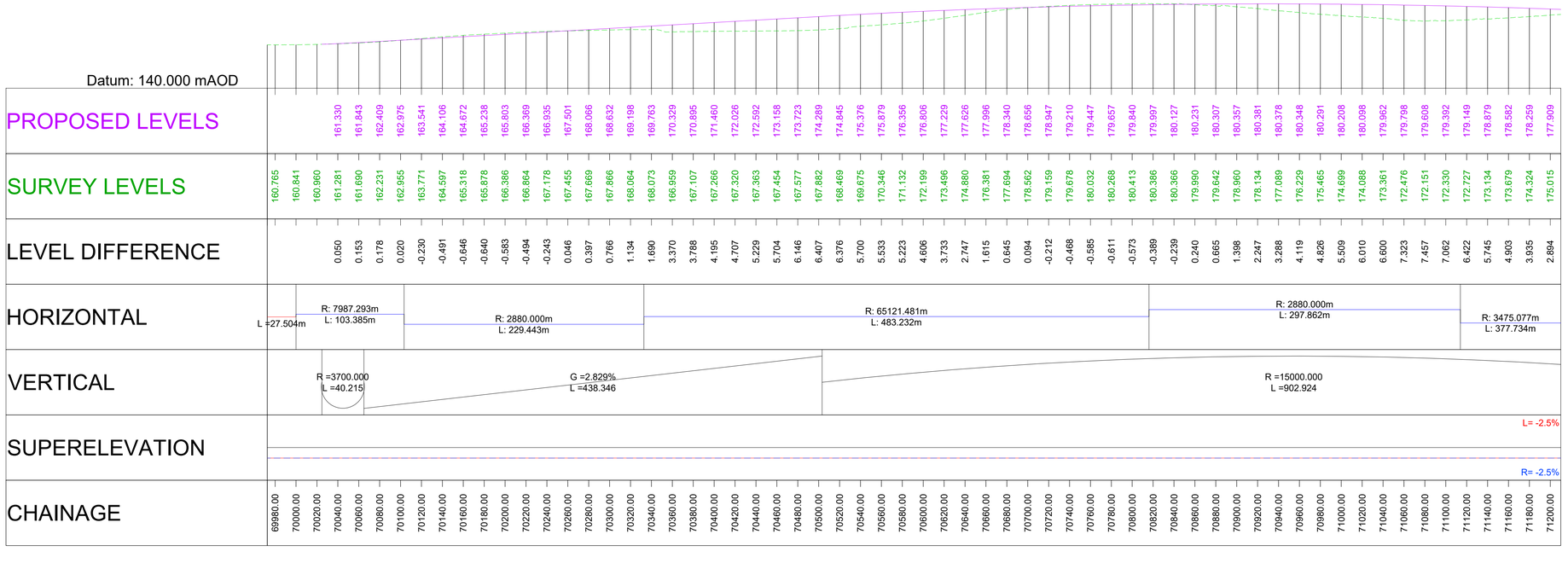
Drawing Number

Project	Originator	Volume		
HE565627 -	AMY -	HML -		
S08	-DR-	CH-	600033	
Location	Type	Role	Number	

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P01



Plan View



Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Horizontal - Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 70000 | 70020 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Vertical - Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

Revision					
---	---	---	---	---	---
	---	---	---	---	---
	---	---	---	---	---
P01	EKEL	EKEL	EKEL	TEGG	---
	27/08/21	27/08/21	27/08/21	27/08/21	---
P02	JMAR	EKEL	EKEL	TEGG	SSCO
	13/09/21	13/09/21	13/09/21	13/09/21	13/09/21
Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

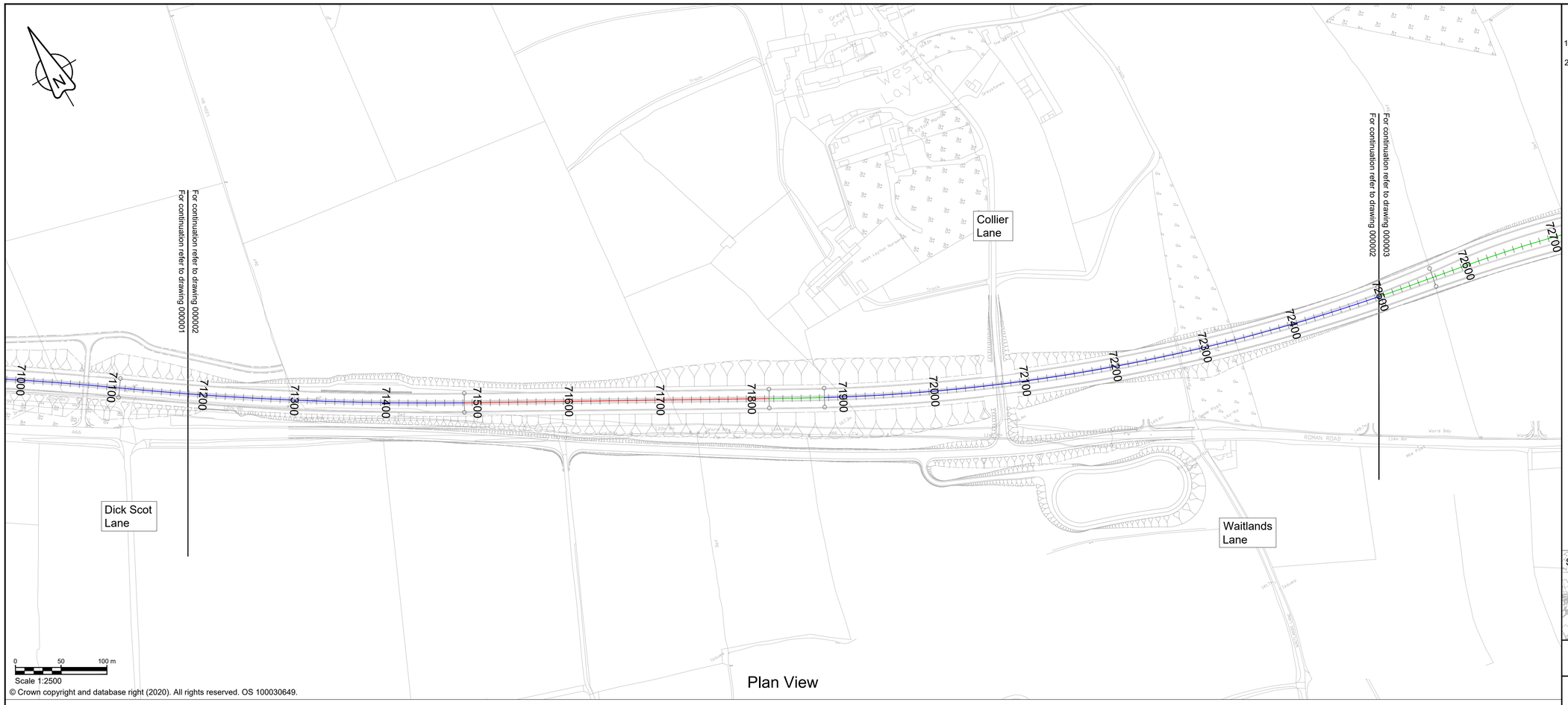
Project Name
A66 Northern Trans-Pennine

Drawing Title
Stephen Bank to Carkin Moor
Plan and Profiles Mainline
Sheet 1 of 4

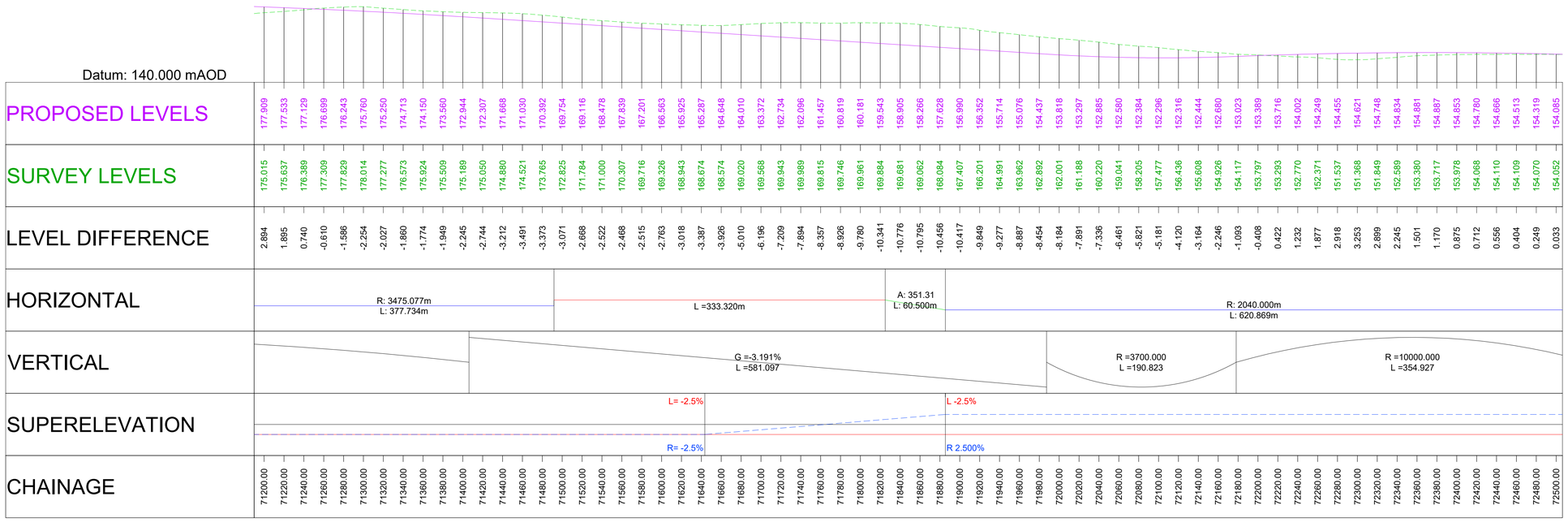
Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : N/A

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S09 -DR-CH- 000001
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



Plan View



Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Horizontal - Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 70000 | 70020 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Vertical - Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

Revision	Revision details				
	Created	Checked	Reviewed	Approved	Authorised
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
---	---	---	---	---	---
	---	---	---	---	---
	---	---	---	---	---
P01	EKEL	EKEL	EKEL	TEGG	---
	27/08/21	27/08/21	27/08/21	27/08/21	---
P02	JMAR	EKEL	EKEL	TEGG	SSCO
	13/09/21	13/09/21	13/09/21	13/09/21	13/09/21

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

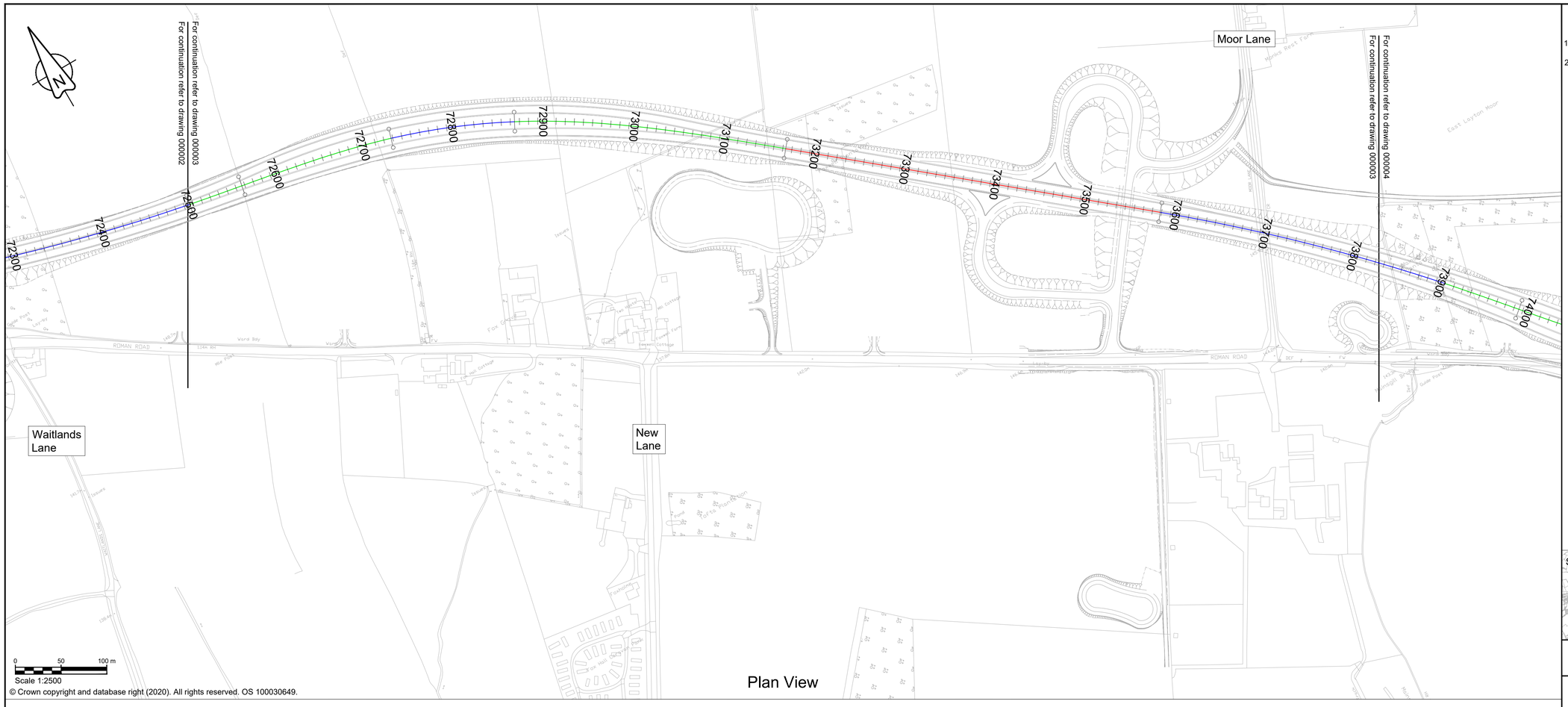
Project Name
A66 Northern Trans-Pennine

Drawing Title
Stephen Bank to Carkin Moor
Plan and Profiles Mainline
Sheet 2 of 4

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : N/A

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S09 -DR-CH- 000002
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02



© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View

Datum: 140.000 mAOD

PROPOSED LEVELS	154.085 153.812 153.504 153.191 152.878 152.565 152.252 151.939 151.626 151.313 151.000 150.688 150.375 150.062 149.749 149.436 149.123 148.810 148.497 148.184 147.871 147.559 147.246 146.933 146.620 146.307 145.994 145.681 145.369 145.122 144.983 144.953 145.030 145.178 145.328 145.477 145.627 145.776 145.926 146.075 146.225 146.374 146.524 146.674 146.823 146.973 147.122 147.272 147.421 147.571 147.720 147.862 147.983 148.081 148.157 148.212 148.245 148.271 148.297 148.323 148.349 148.375 148.401 148.427 148.453 148.479 148.505 148.531
SURVEY LEVELS	154.052 154.114 154.003 153.615 153.234 152.730 152.165 151.609 151.185 150.796 150.259 149.310 148.686 148.089 147.799 147.698 147.649 147.473 147.221 146.856 146.417 145.789 145.265 144.667 144.036 143.436 142.877 142.222 141.631 141.470 141.505 141.651 142.077 143.230 144.144 144.986 145.766 146.447 147.064 147.474 147.847 148.405 148.787 149.358 149.762 149.984 149.961 149.577 149.023 148.471 148.125 147.817 147.522 147.123 147.017 146.984 146.699 146.375 146.289 146.082 146.167 145.708 145.343 144.886 144.411 144.007 142.859 141.698
LEVEL DIFFERENCE	0.033 -0.302 -0.500 -0.424 -0.356 -0.166 0.087 0.330 0.441 0.518 0.741 1.377 1.689 1.972 1.950 1.738 1.474 1.337 1.277 1.329 1.455 1.770 1.981 2.266 2.584 2.871 3.117 3.459 3.738 3.652 3.479 3.301 2.953 1.948 1.184 0.491 -0.140 -0.670 -1.138 -1.399 -1.622 -2.030 -2.263 -2.685 -2.939 -3.011 -2.839 -2.305 -1.602 -0.900 -0.405 0.045 0.461 0.958 1.140 1.228 1.545 1.896 2.008 2.241 2.182 2.667 3.058 3.541 4.042 4.472 5.646 6.834
HORIZONTAL	A: 351.31 L: 60.500m; A: 351.19 L: 171.300m; R: 720.000m L: 136.453m; A: 463.69 L: 298.623m; L =415.429m; R: 2100.000m L: 320.858m
VERTICAL	G =-1.583% L =524.373; R =3700.000 L =86.231; G =0.748% L =733.106
SUPERELEVATION	L -2.5%; L 7.0%; L 7.0%; L= -2.5%; L= -2.5%; L 2.5%; R 2.500%; R -7.000%; R -7.000%; R= -2.5%; R= -2.5%; R -2.500%
CHAINAGE	72500.00 72520.00 72540.00 72560.00 72580.00 72600.00 72620.00 72640.00 72660.00 72680.00 72700.00 72720.00 72740.00 72760.00 72780.00 72800.00 72820.00 72840.00 72860.00 72880.00 72900.00 72920.00 72940.00 72960.00 72980.00 73000.00 73020.00 73040.00 73060.00 73080.00 73100.00 73120.00 73140.00 73160.00 73180.00 73200.00 73220.00 73240.00 73260.00 73280.00 73300.00 73320.00 73340.00 73360.00 73380.00 73400.00 73420.00 73440.00 73460.00 73480.00 73500.00 73520.00 73540.00 73560.00 73580.00 73600.00 73620.00 73640.00 73660.00 73680.00 73700.00 73720.00 73740.00 73760.00 73780.00 73800.00 73820.00 73840.00

0 50 100 m
Scale H 1:2500; V 1:1250

Profile View

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Horizontal - Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 70000 | 70020 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Vertical - Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	EKEL	EKEL	EKEL	TEGG	---	
	27/08/21	27/08/21	27/08/21	27/08/21	---	
P02						
	JMAR	EKEL	EKEL	TEGG	SSCO	
	13/09/21	13/09/21	13/09/21	13/09/21	13/09/21	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

Drawing Title
Stephen Bank to Carkin Moor
Plan and Profiles Mainline
Sheet 3 of 4

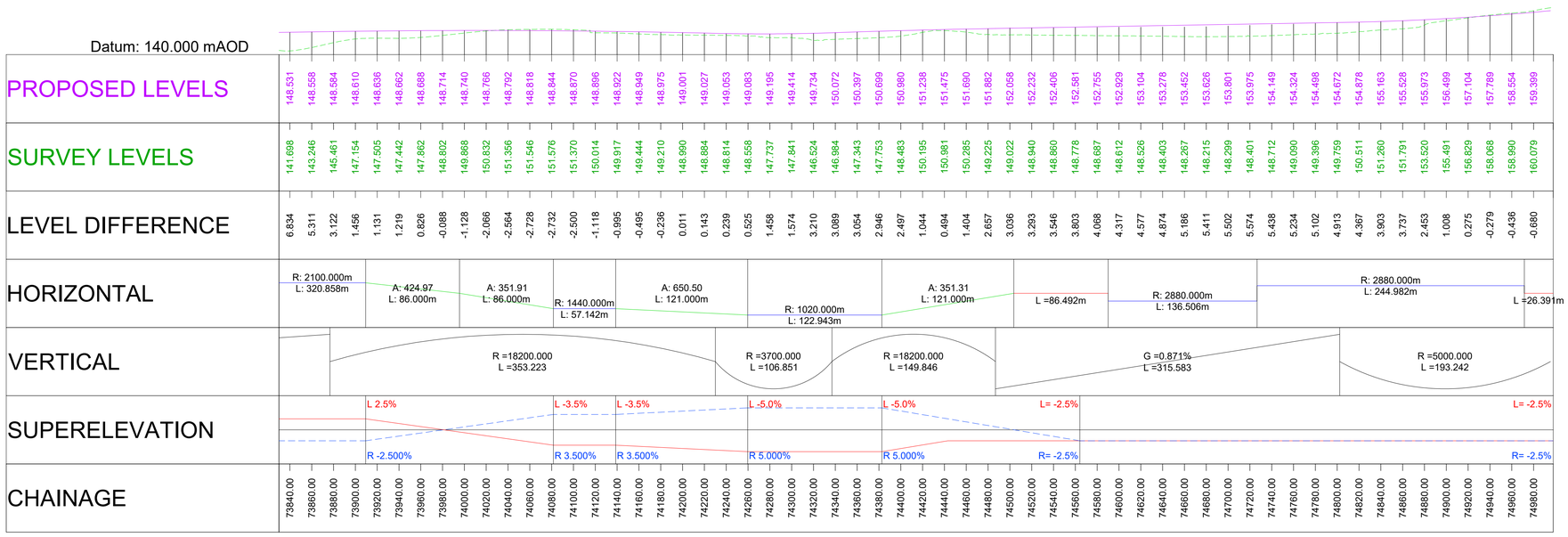
Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : N/A

Drawing Number
Project | Originator | Volume |
HE565627 - AMY - HML -
S09 -DR-CH- 000003
Location | Type | Role | Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02

© Crown copyright and database right (2020). All rights reserved. OS 100030649.

Plan View



Profile View

Scale H 1:2500; V 1:1250

NOTES

1. ALL DIMENSIONS ARE IN METRES ABOVE DATUM UNLESS NOTED OTHERWISE.
2. THE DESIGN SHOWN ON THESE ENGINEERING SECTION DRAWINGS IS ILLUSTRATIVE AND WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT.

KEY

Horizontal - Plan

- THE SCHEME (SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
- CURVE ALIGNMENT
- STRAIGHT ALIGNMENT
- TRANSITION ALIGNMENT
- #### ROAD NAMES
- 70000 | 70020 CHAINAGE (MEASURED DISTANCE ALONG THE SCHEME LENGTH)

Vertical - Profile

- PROPOSED VERTICAL DESIGN LEVEL
- EXISTING GROUND LEVEL

SCHEME KEY PLAN

---	---					
	---	---	---	---	---	---
	---	---	---	---	---	---
P01						
	EKEL	EKEL	EKEL	TEGG	---	
	27/08/21	27/08/21	27/08/21	27/08/21	---	
P02						
	JMAR	EKEL	EKEL	TEGG	---	
	13/09/21	13/09/21	13/09/21	13/09/21	---	
Revision	Revision details					
	Created	Checked	Reviewed	Approved	Authorised	
	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	

Designer
Amey OW Limited
Chancery Exchange
10 Furnival Street
London, EC4A 1AB

A66 NTP Integrated Project Team

Client
3 Piccadilly Place
Manchester
M1 3BN

highways england

Project Name
A66 Northern Trans-Pennine

Drawing Title
Stephen Bank to Carkin Moor
Plan and Profiles Mainline
Sheet 4 of 4

Project Ref. No.	Stage	Scale : 1:2500 @ A1
---		Dimensions : N/A

Drawing Number

Project	Originator	Volume	
HE565627 -	AMY -	HML -	
S09	-DR-CH-	000004	
Location	Type	Role	Number

Suitability	Suitability Description	Revision
S1	Fit for Co-ordination	P02