

**A500, M6 to A5020**

## **Scheme Assessment Report**

**Revision 1**

**March 2017**

## A500, M6 to A5020

Project No: B1832076  
 Document Title: Scheme Assessment Report  
 Document No.: B1832076-OD-01  
 Revision: R1  
 Date: March 2017  
 Client name: Cheshire East Council  
 Project manager: Dan Teasdale  
 Author: Emily Lachlan / Javier Horas  
 File name: B1832076-OD-01 – Scheme Assessment Report

Jacobs U.K. Limited

© Copyright 2017 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This report has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

### Document history and status

Rev	Date	Description	By	Review	Approved
R0	01/04/16	Draft Issue	K. Huxley	D. Teasdale	S. Kar
R1	31/03/17	Updated following consultations	E. Lachlan	J. Horas	D. Teasdale

## Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Scheme Description	1
1.2	Context for the scheme	1
1.3	Statement of Problem and Objectives	2
1.4	Background to Scheme	3
1.5	Purpose of Report	3
<b>2</b>	<b>Existing Conditions and Constraints</b>	<b>5</b>
2.1	Introduction	5
2.2	Study Area	5
2.3	Constraints Map	5
2.4	Existing Conditions and Constraints: Engineering	5
2.5	Existing Conditions and Constraints: Environment	12
2.6	Existing Conditions: Traffic	18
<b>3</b>	<b>Description of the Route Options</b>	<b>23</b>
3.1	Introduction	23
3.2	Option 1 – Widening to the North	23
3.3	Option 2 – Widening to the South	24
3.4	Option 3 – Widening to both the North and South (Hybrid)	25
3.5	Barthomley Road Overbridge	26
3.6	Radway Green Road Overbridge	26
3.7	Culverts	27
3.8	Existing Drainage	27
3.9	Discounted Options	28
3.10	Scheme Cost Estimate	28
3.11	Land	31
<b>4</b>	<b>Engineering Assessment</b>	<b>33</b>
4.1	Design Standards	33
4.2	Topography and Land Use	33
4.3	Geology, Geomorphology and Ground Conditions	34
4.4	Departures from Standards	35
4.5	Public Utilities	37
4.6	Structures	39
4.7	Reputation	43
4.8	Constructability	44
4.9	Operational Safety	47
<b>5</b>	<b>Environmental Assessment</b>	<b>49</b>
5.1	Introduction	49
5.2	Landscape	49
5.3	Ecology	51
5.4	Cultural Heritage	53
5.5	Air Quality	55
5.6	Greenhouse Gases	55

5.7	Noise and Vibration	56
5.8	The Water Environment	57
5.9	Effects on All Travellers	58
5.10	Community and Private Assets	59
5.11	Planning	60
<b>6</b>	<b>Ranking Summary and Scoring</b>	<b>61</b>
6.1	Ranking Summary	61
6.2	Scoring	62
6.3	Explanation of Weighting	64
6.4	Score Weightings Sensitivity Analysis	65
<b>7</b>	<b>Consultations</b>	<b>66</b>
<b>8</b>	<b>Conclusion</b>	<b>70</b>
	<b>Appendix A – Constraints Plan</b>	<b>72</b>
	<b>Appendix B – Public Rights of Way Plan</b>	<b>73</b>
	<b>Appendix C – General Arrangement Plans</b>	<b>74</b>
	<b>Appendix D – Land Ownership Plan</b>	<b>75</b>
	<b>Appendix E – Proposed Cross-section Plans</b>	<b>76</b>
	<b>Appendix F – Statutory Undertaker Plans</b>	<b>77</b>
	<b>Appendix G – Assumed Drainage Plans</b>	<b>78</b>
	<b>Appendix H – Score Weightings Sensitivity Analysis</b>	<b>79</b>



## 1 Introduction

### 1.1 Scheme Description

'A500, M6 to A5020' ("the scheme") is a proposed upgrade of the existing 3.3km single lane carriageway road, between M6 Junction 16 and the A5020 roundabout, to a dual carriageway. The scheme is to the southeast of Crewe and is one of two main routes from the town to the M6 motorway. The scheme is currently being developed by Cheshire East Council (CEC), and is considered to be an integral part of the Local Plan.

### 1.2 Context for the scheme

Crewe and Nantwich are settlements within Cheshire East and have over 45,664 households and a population of over 84,000. They are situated approximately 30 miles south of Manchester, and 48 miles north of Birmingham. Crewe is the largest town in Cheshire East, and is a major employment centre with a diversified base in education, manufacturing, services and distribution. It is also the primary shopping centre in the south of the Borough.

Crewe and Nantwich are the closest large towns to the scheme, and the A500 is one of two main routes to the motorway network (the other being the A534 which travels to the northeast of Crewe to meet M6 Junction 17).

The A500 begins at Nantwich as a dual carriageway, then travels eastwards, passing to the south of Crewe, until its junction with the A5020 to the southeast of Crewe. It then continues as a single carriageway road to M6 Junction 16 – this is the section of road included in the scheme. To the east of the M6, the A500 continues as a dual carriageway towards Stoke and 'the potteries'.

### 1.3 Statement of Problem and Objectives

Cheshire East Council have aspirations for the development of Crewe, and the existing single carriageway section of the A500 is considered to be a barrier to realising the full potential of that development.

'All Change for Crewe: High Growth City', published by CEC in September 2013, states that;

- "New strategic highways investment corridors will be created within Cheshire East. Firstly, linking the planned SEMMMS relief road in the north via Macclesfield and Congleton to the M6 at J17 and then on to Crewe. Secondly, developing plans with the Highways Agency for the A500 corridor to become an "Expressway" between Crewe and the Potteries. These corridors will act as the catalyst for growth for both existing businesses and new areas for development and growth, all of which will be linked into the expansion and connectivity benefits provided at Crewe as part of the wider High Growth City concept."
- A500 widening will facilitate growth, and create the right conditions for future growth and development.

The Cheshire East Local Plan had a second public examination in September / October 2016, and modifications are currently out for consultation. The aim is for it to be adopted by Summer 2017. It states that;

- "This Plan is strongly underpinned by a need to improve transport connections across the Borough. New projects are planned in all towns as part of the Plan, to address congestion issues. These include the Congleton Link Road, South Macclesfield Link Road, and improvements on the A51, A530 and A500 Barthomley Link."
- The Local Plan includes the following development sites in the vicinity of the scheme;
  - Basford East and Basford West.
  - South Cheshire Growth Village.
  - White Moss Quarry, at Alsager
  - Radway Green Extension, at Alsager
- The Local Plan says of the development site at Basford East; "The delivery of the employment elements of the site, as well as the contributions that it will make towards infrastructure improvements, including the A500, Crewe Green Link Road, Junction 16 of the M6 and the spine road, are considered to be of vital importance to the delivery of 'All Change for Crewe'".

The Infrastructure Delivery Plan, which covers the period from 2014 to 2030 and is included in the Local Plan submission, states that;

- "There is a need to improve traffic flow at Junction 16 of the M6 and link capacity on the A500 Barthomley Link."

The schemes objectives are as follows;

- To support the economic, physical and social regeneration of Crewe and the Northern Gateway
- Improve journey time and reliability
- Improve the reliability of public transport
- Improve connectivity between important economic centres, LEP and local authority areas, regions and to North Wales
- Support delivery of key national infrastructure, i.e. HS2 and the Crewe Hub Station
- Support delivery of key employment and housing allocations
- Boost business integration and productivity; improve the efficiency and reliability of the highway network, reduce the conflict between the local and strategic traffic, and provide an improved route for freight and business travel
- Facilitate future improvements to M6 J16

#### 1.4 Background to Scheme

The A500 between M6 J16 and the A5020 was constructed in the mid-1980's, but developments in eastern Crewe and the construction of the A500 Hough Shavington Bypass immediately to the west (opened to traffic in 2003) have generated a significant increase in traffic flows, causing congestion. The proposed developments required to deliver 'All Change for Crewe' and included in the Local Plan will generate more traffic, and exacerbate problems on the link.

A study was undertaken in 2014 'A500 Dualling and Widening – Preliminary Cost Study Report', which considered three design options and provided a cost estimate for each. The design options were to add a new carriageway to the north to create a dual carriageway; to add a new carriageway to the south to create a new dual carriageway, and; to add a third lane to the existing single carriageway. The cost estimates found that the two options to create a dual carriageway had a similar cost, and the option to create a three lane single carriageway had a cost of approximately 60% of the dual carriageway options.

#### 1.5 Purpose of Report

This Scheme Assessment Report has been based upon the Design Manual for Roads and Bridges, TD 37/93 – Scheme Assessment Reporting. The guidance describes the different stages of scheme assessment and how these should be reported.

The purpose of a Scheme Assessment Report is to provide an assessment of the engineering, environmental and traffic advantages, disadvantages and constraints of a proposed scheme.

This report is nominally based on a Stage 2 Scheme Assessment Report, and will recommend a preferred route, but will also cover the requirements of a Stage 1 report. However, it will not provide all of the details normally included at this stage.

The reason for this is because of the nature of the scheme. There is already an existing single carriageway along the A500, and the proposal is to widen to a dual carriageway. The options are therefore limited to three; widening to the north, widening to the south and; a hybrid option that alternates between widening to the north and south. All options will use the existing carriageway and will tie into the existing junctions. The options are therefore already well defined, and in terms of engineering can proceed straight to a Stage 2 level assessment.

Constraints are identified in this report, as required by a Stage 1 scheme assessment. Generally they have not influenced the broadly defined improvement options, because of the limitations on what can be provided. But they have resulted in the hybrid option being included, which attempts to avoid the majority of constraints.

In terms of environment, the level of assessment is equivalent to Stage 2, but it is less detailed than what would normally be provided at this stage. The level of assessment is considered to be appropriate, and will identify the main factors that will influence the choice between the options.

A traffic and economic assessment has not been undertaken, which would normally be done at Stages 1 and 2. This is because the options that are being considered are very similar, and their performance in traffic and economic terms would not help to differentiate between the options. The scheme will also help to realise wider economic benefits, and not just the immediate benefits of improved traffic flows, which will be set out in the business case.

## 2 Existing Conditions and Constraints

### 2.1 Introduction

This section summarises the existing engineering and environmental conditions, within the 'A500, M6 to A5020' study area.

### 2.2 Study Area

Existing engineering conditions have been identified within a study area that includes the existing A500 between the A5020 and M6, and the immediate surrounding area.

Existing environmental conditions have been typically identified within an area 500m offset from the existing A500, but in some cases up to 2km from the proposed scheme. See report no. 'B1832076/OD/04 – Route Options Environmental Assessment Report for further details.

### 2.3 Constraints Map

A review of the study area has been undertaken to identify potential constraints to the proposed route. The existing Highways, Environmental, Geotechnical and Contaminated Land Constraints have been identified and the most important features are shown on the Constraints Plan on B1832076\_P\_1017 in Appendix A.

### 2.4 Existing Conditions and Constraints: Engineering

The following section presents a high level overview of the primary engineering conditions and constraints.

#### 2.4.1 Existing A500

Within the study area, the existing A500 is a single carriageway road, with a 3.65m wide lane in each direction. There are 1.0m hard-strips and approximately 2.5m wide verges on each side. At its western end it ties into a roundabout junction with the A5020 and A531, and then proceeds in an easterly direction. The road has a slight fall downhill eastwards, away from the roundabout.

Travelling eastwards from the junction, there are private accesses to fields on each side of the road after approximately 175m, and after a further 350m there is a layby on the northern side. Continuing 90m there are more private accesses to fields on either side of the road, and after a further 80m the road passes over Englesea Underpass and Englesea Brook Culvert. Both are box culverts, with the underpass at a higher level, used for agricultural purposes. Approximately 150m east of the culverts is a layby on the southern side of the road. There is also a low point in the road's vertical alignment at this location, following which the road begins to rise slowly upwards. This section of road from the junction is initially in cut but the majority is in fill.

The road continues to rise slowly upwards until approximately 1.1km east of the roundabout junction, where it begins to rise more steeply and enters a section of cut up to 14m deep. After a further 300m the road crosses Barthomley Brook, which is a culverted watercourse. The road continues to rise in cut, and then passes under Barthomley Road Underbridge approximately 1.6km from the western roundabout, and where there are properties 70m to the north (Orchard Cottage and Jasmine Cottage) and 60m to the south along Barthomley Road (Cyprus Cottage, Yew Tree Cottage and Poppy Cottage).

The road then begins to bend round to the right, and continues to do so over the following kilometre, where it remains in shallow cutting throughout with typical depths of 2m deep. There is also a property 50m north of the road (The Alms House) at Smithy Lane. The road rises less steeply to the east of the Barthomley Road Bridge, but does continue to rise all the way to M6 J16. There are private accesses to fields on either side of the road approximately 400m east of Barthomley Road Bridge.

Approximately 1.1km after Barthomley Road Overbridge, the A500 passes under Radway Green Road Overbridge. Immediately to the west of Radway Green Road Overbridge, Bluemire Farm is adjacent to the southern boundary of the A500 and is the closest property to the scheme.

The road then continues in cut up to M6 Junction 16, where recent improvements have been made to the A500 as part of Department for Transport's Pinch Point programme.

#### **2.4.2 Pinch Point Scheme**

The Pinch Point scheme was completed in 2015 with the purpose of improving the capacity of the A500 on the approach to M6 J16. The scheme commenced to the east of Radway Green Road Overbridge, and widened the carriageway to create two eastbound lanes on the approach to M6 Junction 16. It then widens out to three eastbound lanes approximately 80m before the junction give way line. The scheme also included the installation of new traffic signals at the junction.

In order to achieve the widened layout within the existing highway boundary, two retaining walls were constructed as part of the Pinch Point scheme. The first is on the northern side of the road starts approximately 45m east of Radway Green Overbridge, and is 220m long. The second is on the southern side of the road starts 240m west of M6 Junction 16, and continues westwards for 75m.

In total, the A500 is 3.3km long between the A5020 and M6 Junction 16.

#### **2.4.3 Topography and Land Use**

The land within the study area consists of the existing A500, including its embankment and cutting slopes and land to the north and south. The existing A500 is described in the section above, and this section describes the land to the north and south.

The land use is predominantly agricultural with areas of woodland, the local road network, a commercial development and residential properties.

At the western end of the study area the ground level lies at approximately 65m AOD and is gently undulating, falling towards Englesea Brook. The land use in this area is predominantly agricultural grassland, interspersed with hedgerows, ditches and the brook. There is an area of woodland immediately to the north of the A5020 roundabout, and approximately 280m east of the brook there is an area of woodland to the north and south of the A500.

To the east of the area of woodland are the most significant natural features along the scheme. Firstly there is a pond, known locally as the duckeries, which lies to the north of the A500. Secondly is a ridgeline that rises from a level of 60m AOD at the pond, up to a level of 80m AOD, and then back down to a level of 70m AOD at Barthomley Brook. This results in cuttings on the existing A500 up to a depth of approximately 14m. The land use in this area is predominantly agricultural grassland, interspersed with trees and hedgerows. The pond and its surroundings are located to the north of the A500, and; Barthomley Brook and its surrounding banks are on both sides of the A500.

To the immediate east of Barthomley Brook the land rises relatively steeply to approximately 80m AOD, and from then continues to gently undulate all the way to M6 Junction 16 at the eastern end of the A500, rising to a level of 92m AOD. The land use in this section is mainly agricultural grassland interspersed with hedgerows and trees. The existing road network is also crossed at Barthomley Road and Radway Green Road, and Smithy Lane lies immediately to the north of the A500. All three roads have adjacent properties, with Blue Mire Farm adjacent to Radway Green Road being the closest property to the route; The Alms House adjacent to Smithy Lane, and; Jasmine Cottage, Orchard Cottage, Cyprus Cottage, Yew Tree Cottage and Poppy Cottage all adjacent to Barthomley Road. There is also an existing commercial development to the northwest of M6 Junction 16, which includes a petrol station, hotel and restaurant.

#### **2.4.4 Geology, Made Ground and Soils**

The following section is a summary, and further information can be found in report no. 'B1832076/OD/06 – Preliminary Sources Study Report'.

##### Geology

The geological profile for the A500 shows that the site is dominated by superficial deposits, mostly glacial till and glacio-fluvial deposits underlain by the Wilkesley Halite member and the Wych / Byley Mudstone Formation.

##### Superficial Geology

The route is underlain by recent localised peat and alluvium deposits above the Devensian deposits of lacustrine clay, glacio-fluvial sands and gravels above the glacial till. Lacustrine (laminated lake) deposits are present in the western part of the site in the vicinity of Englesea Brook. Glacio-fluvial deposits consist of sands, sand and gravel and occasional clay layers. Glacial till underlies the whole site and is present at the surface in the central and eastern parts of the route.

Areas of peat are located underneath the existing embankment and west of the pond near Monneley Farm to the north west of the scheme. Borehole data describes the peat as being black to dark brown and fibrous with occasional pieces of wood. Lacustrine deposits (clay and silt) are also found in the west of the study area. A thin strip of alluvium (clay, silt, sand and gravel) is marked in the vicinity of the north-west trending brook on the western side of the scheme.



## Bedrock Geology

Previous records show that boreholes have been drilled close to the A500, and that they didn't encounter any bedrock. Exploratory boreholes drilled by Cheshire County Council extended up to 25m below ground level and did not encounter bedrock, and an archive BGS borehole SJ75SE298 located at the junction of the A500 and M6 was drilled to 59mbgl and did not encounter bedrock.

Although unproven, bedrock is expected at significant depth (at least 40m). The Mercia Mudstone Group is below the glacial deposits in the western side of the site, and consists of the Wilkesley Halite Member, composed of halite interbedded with red-brown mudstone. This unit is composed of approximately 25% mudstone and 75% halite.

The 1:10,000 scale geological map indicates the presence of subsidence features in the western part of the site, which may be associated with ground collapse due to brine subsidence. The pond located to the north of the A500 near to Monneley Farm, known as the duckaries, is described on the map as a subsidence crater. Directly to the southwest of this pond, linear subsidence features are shown to extend beneath the A500 and further to the south west, which are shown as ditches at ground level. The location of the subsidence features indicated by the 1:10,000 scale geological map are shown on the Constraints Plan on B1832076\_P\_1017 in Appendix A.

The east end of the study area is underlain by the Wych/Byley mudstones of the Mercia Mudstone Group, comprising of red-brown mudstone and siltstone which is mostly structureless. Nodules of gypsum and anhydrite are present throughout this unit.

## Made Ground

The A500 crosses a number of pre-existing roads, and therefore Made Ground will be encountered at these locations. BGS mapping shows an area of Made Ground in the vicinity of the northern slip road of the M6, but this is outside the scheme area and it is not expected that the proposed works will disturb this.

Historical mapping and Groundsure data indicate there have been numerous ponds and pits in the study area. Many of these are not shown on current mapping and aerial imagery, and therefore Made Ground may be present as infilled material.

There is also evidence of historical landfills in the vicinity of the A500. These are shown on the Constraints Plan on B1832076\_P\_1017 in Appendix A.

## Soils

The top soils present in the A500 and surrounding area are Clifton and Salwick soils which are described as stagnogleyic soils, Altcar soil which is 'an earthy fibrous peat soil' and the Newport soil composed of 'typical brown calcareous earths'.

## **2.4.5 Hydrology and Hydrogeology**

### Hydrology

There are three main brooks which intersect the A500: Englesea Brook, Barthomley Brook, and an un-named watercourse between the A5020 roundabout and Englesea Brook. They all flow from north to south and have localised alluvium deposits around



them. There are a number of drains in the surrounding area that feed into Englesea Brook, and it is likely these were installed as an attempt to control and dewater the surrounding land. The two brooks meet at a confluence to the north west of Old Park Road, approximately 1.75 km north-west of where Englesea Brook passes under the A500.

According to the Environment Agency Flood Risk for Planning Map three areas along the length of the A500 are at high risk of flooding. These are linked to the location of Englesea Brook.

An active abstraction point is located adjacent to Barthomley Brook and is downstream of the A500.

### Hydrogeology

Definitive groundwater levels have not been defined in previous ground investigations of the site. The Glacio-fluvial deposits which underlie most of the route are classified as a Secondary A Aquifer.

The Glacial Till in the vicinity of the A500 is classified as Unproductive Deposits, as the permeability is too low for the deposits to have a significant effect on river flow or water supply. It is likely that the Glacial Till will contain water bearing granular beds that may be discrete or continuous. It is also possible that perched water may exist within the granular Glacio-fluvial deposits overlying the Glacial Till.

There are three areas of the scheme which are classified by the Environment Agency as having soils with a High Leaching Potential (Minor Aquifer). The locations of these are linked to the presence of Glacio-fluvial material.

The entire study area falls within a Nitrate Vulnerable Zone.

### 2.4.6 Structures

The highway structures that have been identified as being affected by the scheme are as follows:

**Table 2.1 - Structures**

Structure	Approximate Chainage	OS Grid Reference	Description
Un-named Watercourse Culvert	270	374740 352462	Culvert
Englesea Brook Underpass	700	375144 352579	Reinforced concrete box underpass
Englesea Brook Culvert	700	375151 352581	Reinforced concrete box culvert
Barthomley Brook Culvert	1395	375800 352825	Reinforced concrete box culvert
Barthomley Road Bridge	1630	376012 352901	3 span concrete bridge
Radway Green Road Bridge	2690	377014 352665	3 span concrete bridge
Retaining Wall 1	2840	377150 352589	Brick faced retaining wall

Structure	Approximate Chainage	OS Grid Reference	Description
Retaining Wall 2	3140	377400 352429	Brick faced retaining wall

#### Un-named Watercourse Culvert

This culvert carries the A500 over an un-named watercourse, half way between the A5020 roundabout and Englesea Brook. No information is currently known about the culvert, and although it is named here as a structure, it may be that is classified as non-structural if its internal diameter is less than 900mm.

#### Englesea Brook Underpass

Englesea Brook Underpass is a farm accommodation underpass carrying the A500 over a farm access track. It is an in situ reinforced concrete box structure with an internal span of 4.0m and an internal height of 3.3m. The underpass is aligned square to the A500. The fill above the underpass, to the level of the highway, is approximately 0.5m. The reinforced concrete wingwalls have been provided with vertical feature grooves; they abut with the wingwalls of Englesea Brook Culvert to the east of the underpass and extend to the top of a 1 in 2 side slope to the west of the underpass.

#### Englesea Brook Culvert

Englesea Brook Culvert carries the A500 over Englesea Brook. It is an in situ reinforced concrete box structure with an internal span of 4.0m and an internal height of 4.0m. The culvert is aligned square to the A500. The fill above the culvert, to the level of the highway, is approximately 1.75m. The reinforced concrete wingwalls have been provided with vertical feature grooves; they abut with the wingwalls of Englesea Brook Underpass to the west of the culvert and extend to the top of a 1 in 2 side slope to the east of the culvert.

#### Barthomley Brook Culvert

Barthomley Brook Culvert carries the A500 over Barthomley Brook. It is an in situ reinforced concrete box structure with an internal span of 2.0m and an internal height of 2.0m. The culvert is aligned square to the A500. The fill above the culvert, to the level of the highway, is approximately 0.6m. There is no head wall to the culvert. The wingwalls are splayed at 45°; they are constructed from reinforced concrete and have been provided with a plain finish. On the northern, upstream entrance of the culvert a barrier has been constructed from scaffold poles and timbers, it is presumed that the barrier is intended to deter farm stock from entering the culvert. Also at the entrance and exit to the culvert 600mm diameter pipes running parallel with the A500 discharge water into the brook from the east. Immediately to the west of the culvert is a 600mm diameter pipe running parallel with the culvert beneath the highway, it is presumed that this is a mammal tunnel.

#### Barthomley Road Bridge

Barthomley Road Bridge is a three span (14.4m:18.0m:14.4m) bridge carrying Barthomley Road over the A500. The deck is constructed from pre-stressed, precast concrete inverted T beams with a reinforced concrete infill. Each span is simply supported. The substructure comprises two reinforced concrete leaf piers on

reinforced concrete spread footings and reinforced concrete bankseat abutments on spread footings. The reinforced concrete wingwalls are relatively short and cantilever from the bankseats.

At the site of the bridge Barthomley Road is straight and crosses the A500 at askew of approximately 14°. The A500 is in cut leading to the bridge being accessed by shallow approach embankments. At the end of the northern approach embankment residential properties are located on both sides of the highway. At the end of the southern approach embankment residential properties are located on western side of Barthomley Road only.

The cut slopes of the A500 at the site of the bridge are covered with semi-mature trees.

#### Radway Green Road Bridge

Radway Green Road Bridge is a three span (12.35m:13.1m:12.35m) bridge carrying Radway Green Road over the A500. The deck is constructed from pre-stressed, precast concrete inverted T beams with a reinforced concrete infill. Each span is simply supported. The substructure comprises two reinforced concrete leaf piers on reinforced concrete spread footings and reinforced concrete bankseat abutments on spread footings. The reinforced concrete wingwalls are relatively short and cantilever from the bankseats.

At the site of the bridge Radway Green Road is on a horizontal curve. The precast beams of the deck are straight but the skew of each deck has been adjusted to accommodate the curve and minimise the bridge deck width, the skew of the deck varies between approximately 0° and 11°. The A500 is in a shallow cut leading to the bridge being accessed by approach embankments. There are no residential properties immediately to the north of the bridge but to the south, on the west side of Radway Green Road there is a small development of residential and commercial properties.

The cut slopes of the A500 at the site of the bridge are covered with semi-mature trees.

#### Retaining Wall 1

Retaining Wall 1 is a recently constructed wall retaining the northern cutting slope of the A500. It is located some 45m to the east of Radway Green Road Bridge and extends for approximately 220m. The retained height is zero at either end rising to 2½m. The wall is brick faced with a concrete coping. A timber post and four rail fence has been positioned behind the wall.

#### Retaining Wall 2

Retaining Wall 2 is a recently constructed wall retaining the southern cutting slope of the A500. It is located to the west of Junction 16 of the M6 Motorway and extends for approximately 75m. The retained height is 1.8m. The wall is brick faced with a concrete coping.

### **2.4.7 Public Utilities**

Gattica Associates Ltd have been appointed to identify services within the scheme study area.

A number of Statutory Undertakers were contacted in relation to potential underground or overhead services. For the full list that were contacted see Gattica's full report 'Feasibility Report (Utilities) A500 Road Widening Scheme' and accompanying plans. To date, the following Statutory Undertakers have been found to have apparatus within the study area;

- Mainline Pipelines Ltd
- National Grid Gas
- National Grid Electric
- Western Power Distribution
- Zayo Group UK
- BT Openreach
- SP Energy Networks

## 2.5 Existing Conditions and Constraints: Environment

An assessment of the baseline environmental conditions has been undertaken in accordance with a 'simple' level assessment in Interim Advice Note 135/10 (IAN 135/10), and is summarised below. It includes a study area of up to 2km from the scheme. Further details can be found in report no. B1832076/OD/04 – Route Options Environmental Assessment Report'.

### 2.5.1 Landscape and Visual

#### Landscape

Topography in the study area is gently undulating between 105m Above Ordnance Datum (AOD) near the eastern end of the existing A500, and 60m AOD near the western end (this differs from the levels provided in section 2.4.2, because of the wider 'environmental' study area compared to the 'engineering' study area). Several ponds are found scattered within the farmland, including large ponds at Henbury Lee Meadows Local Wildlife Site and north of the A500 near Monneley Farm (the Duckaries). Two brooks cross the study area and flow beneath the A500; Englesea Brook which is towards the western end of the A500, and Barthomley Brook near Monneley Farm. A ridgeline runs through the study area between Bridgehouse Farm in the north and Englesea-Brook village in the south in the same north-south alignment as the two brooks. The ridgeline is at a height of between 70m and 83m AOD and where the A500 crosses the ridgeline it is in deep cutting. In addition to the two brooks, there are also smaller watercourses and ditches that the A500 cross.

#### Land Cover

Farmland to both sides of the A500 is predominantly made up of pastoral fields, with some scattered arable fields, and much of this farmland lies within the green belt. Field boundaries are often hedgerows with trees, which help to contribute to the 'well wooded' feel in the landscape. Other vegetation blocks are found along roads, railways and streams, at farms and villages and around ponds, and there is an area of ancient woodland 300m to the south of the A500 near Townhouse Farm. The

A500 is lined by vegetation for much of its course between the M6 and the A5020, and there are large blocks of woodland near Monneley Farm and at Meremoor Moss.

#### Landscape Pattern

Fields along the A500 are small to medium in size and semi-regular in shape. The field pattern is broken up by vegetation blocks, ponds and isolated farmsteads, and is crossed by linear infrastructure including the existing A500 and M6, and the railway between Crewe and Kidsgrove. Larger settlement is present at Barthomley, Weston and Englesea-Brook, all three of which contain Conservation Areas with Listed Buildings. The urban edge of Crewe is approximately 3km to the north-west, and there is a Registered Park and Garden at Crewe Hall 1km to the north-west.

#### Landscape Character

At a district level, the A500 lies within Cheshire County Council's Lower Farms and Woods 7, Barthomley Character Area. This is an area of gently undulating farmland with small to large, regular to irregular fields. Medieval and post-medieval fields have been adapted leading to loss of boundaries and an increase in field sizes in places. Settlement is of medium density with many nucleated or dispersed villages within farmland, as well as the built up area of Crewe, where golf courses, large warehouses and housing estates are noticeable. The area is influenced by transport infrastructure such as the M6, A500 and Crewe to Kidsgrove railway, and roadside planting is particularly conspicuous within the field pattern. Away from built up areas the landscape has a more rural and tranquil feel, with woodland blocks, hedgerows and hedgerow trees providing a sense of enclosure. The study area corresponds to the published landscape character assessment description.

#### Visual Amenity and Visual Receptors

In much of the study area there is a 'well wooded' feel, which in turn limits longer distance views. This is due to the presence of hedgerows, hedgerow trees and vegetation blocks. In less vegetated areas such as around Monneley Mere, or elevated areas such as along the ridgeline between Bridgehouse Farm and Englesea-Brook village, longer distance, open views are possible including eastwards towards the Peak District hills.

Transport infrastructure is a noticeable feature in many views, in particular the M6 corridor with its numerous overbridges. The A500 is relatively well contained by vegetation, and some of the road travels in cutting. This limits the number of available views towards traffic on the road. A pylon line crosses the study area from south-west to north-east, which is a detractor in the landscape.

There are a number of public rights of way (PRoW) and the Cheshire Cycleway Regional Route 70 that are within the immediate surroundings of the A500 and many of these PRoW's abut the road and would have the potential for views of the road. These are all shown on B1832076\_P\_1050 in Appendix B.

Potential visual receptors other than those listed above include:

- Farms including Meremoor Farm, Monneley Farm, Smith's Green Farm, Daisy Bank Farm, New Farm and Cherrytree Farm to the north, and Town House Farm, Old Hall Farm, Churchfield Farm and Bluemire Farm to the south.

- Residential properties at Smith's Green just north of the A500 (Smith's Green Cottages, Jasmine Cottage, Orchard Cottage, Duchy House).
- Residential properties at Smith's Green just south of the A500 (Cyprus Cottage, Poppy Cottage, Yew Tree Cottage).
- A residential property just north of A500 on Smithy Lane (The Alms House).
- Residential properties on the northern periphery of Barthomley within the Conservation Area.
- Residential properties on Radway Green Road west of Barthomley (Fir Tree Cottages, Hungerford Place).
- Residential properties on the north-western periphery of Englesea-Brook.
- Smith's Green Livery & Riding Centre at Smith's Green Farm, north of the scheme.
- The Travelodge at the M6 Junction 16 services.

There are unlikely to be views from Crewe Hall Registered Park and Garden or the Conservation Areas at Weston and Englesea-Brook.

### 2.5.2 Ecology

A desk study identified three statutory designated sites, ten non-statutory designated sites, and three ancient woodland sites within a study area up to 2km from the scheme.

An ecological walkover survey was also undertaken, and it identified 13 habitat types, and the potential for 12 species, or species groups to occur in the survey area. The habitats include water environments, different types of woodland, hedgerows, trees and farmland. Within those habitats, there is the potential for the following species;

- |              |                         |
|--------------|-------------------------|
| • Badger     | • Reptiles              |
| • Otter      | • Amphibians            |
| • Water Vole | • Fish                  |
| • Bats       | • White-clawed crayfish |
| • Birds      | • Other invertebrates   |
| • Barn owl   |                         |

The sites, habitats and species / species groups are described in more detail in report no. 'B1832024/OD/08 - A500 Widening, M6 to A5020 Preliminary Ecological Walkover Survey Report'.

### 2.5.3 Cultural Heritage

A total of 45 Heritage Assets have been identified within the study area. These are summarised below.

**Table 2.2 – Cultural Heritage Baseline**

Asset No.	Asset Name	Designation	Value
1138666	Crewe Hall, Crewe Green	Grade I Listed Building	High
1330063	The Church of St Bertoline, Barthomley	Grade I Listed Building	High
1138667	Former Stables at Crewe Hall, Crewe Green	Grade II* Listed Building	High
1312453	Hollyhedge Farmhouse, Weston	Grade II* Listed Building	High
1138707	Churchfield Farmhouse, Barthomley	Grade II* Listed Building	High
1138700	The White Lion Inn, Barthomley	Grade II* Listed Building	High
1038615	Audley Mill, Millend, Audley Rural	Grade II Listed Building	Medium
1138706	Cherry Tree Farmhouse, Barthomley	Grade II Listed Building	Medium
1136009	Mill Farmhouse, Barthomley	Grade II Listed Building	Medium
1330072	The Church of St Luke, Haslington	Grade II Listed Building	Medium
1138665	Bridgehouse Farm House, Crewe Green	Grade II Listed Building	Medium
1138671	Farm Buildings 40 metres North of Crewe Hall Farm House, Crewe Green	Grade II Listed Building	Medium
1330085	Farm Buildings 10 metres East of Crewe Hall Farm House, Crewe Green	Grade II Listed Building	Medium
1330084	Crewe Hall Farm House, Crewe Green	Grade II Listed Building	Medium
1137194	Stowford Lodge, Weston	Grade II Listed Building	Medium
1138477	Beach Tree Cottage Elm Tree Cottage Oak Tre Cottage Walnut Tree Cottage, Weston	Grade II Listed Building	Medium
1137182	Smithy Smithy Cottage, Weston	Grade II Listed Building	Medium
1330152	Magnolia Cottage Stowford Cottage, Weston	Grade II Listed Building	Medium
1137196	Golden Gates Lodge and Entrance Screen, Weston	Grade II Listed Building	Medium
1138669	Gate, Piers and Wall at North End of Crewe Hall Drive, Crewe Green	Grade II Listed Building	Medium
1137242	Signpost, Weston	Grade II Listed Building	Medium
1138475	Red Lion Farmhouse, Weston	Grade II Listed Building	Medium
1330191	Barn Cottage Elder Cottage, Weston	Grade II Listed Building	Medium
1137180	Gentian Cottage, Weston	Grade II Listed Building	Medium
1138476	41, Main Road, Weston	Grade II Listed Building	Medium
1312457	Weston House, Weston	Grade II Listed Building	Medium
1330190	Church of All Saints, Weston	Grade II Listed Building	Medium
1137175	White Lion Inn, Weston	Grade II Listed Building	Medium



Asset No.	Asset Name	Designation	Value
1330189	Monument to the Venerable High Bourne in Primitive Methodist Graveyard, Weston	Grade II Listed Building	Medium
1137132	Methodist Chapel and Sunday School, Weston	Grade II Listed Building	Medium
1330064	Manor Farmhouse, Barthomley	Grade II Listed Building	Medium
1330061	Town House Farmhouse, Barthomley	Grade II Listed Building	Medium
1138701	Old Hall Farmhouse, Barthomley	Grade II Listed Building	Medium
1330062	The Smithy, Barthomley	Grade II Listed Building	Medium
1138702	Fir Tree Cottages, Barthomley	Grade II Listed Building	Medium
1138704	Church Bank, Barthomley	Grade II Listed Building	Medium
1330060	The Former Rectory, Barthomley	Grade II Listed Building	Medium
1138703	Brookside Cottage, Barthomley	Grade II Listed Building	Medium
1136018	White Lion Cottages, Barthomley	Grade II Listed Building	Medium
1138705	Bank Cottage, Barthomley	Grade II Listed Building	Medium
1038612	Domvilles Farmhouse, Audley Rural	Grade II Listed Building	Medium
1000124	Crew Hall, Crewe Green	Grade II Registered Park and Garden	Medium
667	Barthomley Conservation Area	Conservation Area	Medium
676	Englesea Brook Conservation Area	Conservation Area	Medium
718	Weston Conservation Area	Conservation Area	Medium

In summary a total of 45 heritage assets consisting of 41 historic buildings, one historic park and gardens, and three Conservation Areas have been identified within the study area. These comprise of:

- 6 heritage assets of High value.
- 39 heritage assets of Medium value.

#### 2.5.4 Air Quality

Existing monitoring data collected by Cheshire East Council (CEC) within Crewe city centre indicates that measured concentrations of annual mean nitrogen dioxide (NO<sub>2</sub>) exceed the air quality objective limit value of 40µg/m<sup>3</sup>. The closest air quality monitoring site to the proposed scheme is located at Crewe Golf Club, approximately 3km north of the scheme. The most recent annual average was taken in 2013 and measured 14.6µg/m<sup>3</sup>, giving an indication that the air quality improves in open, rural areas outside of the urbanised city centre of Crewe.

There are three Air Quality Management Areas (AQMA) declared for Nitrogen Dioxide (NO<sub>2</sub>) within 5km of the scheme. The AQMA are located within the town centre of Crewe. The largest AQMA is located along a stretch of the A534 Crewe Road, between Ruskin Road and Gresty Road, west of Crewe train station. The second AQMA is located along a short stretch of Wisaston Road, at the signalised crossroads with Flag Lane. The third AQMA located within the centre of Crewe, along a stretch of the A532 adjacent to the Grand Junction Retail Park.



### 2.5.5 Noise and Vibration

The existing section of the A500 is used by a high number of private vehicles and HGVs due its close proximity to Crewe city centre to the west and its connection to M6 J16 at its eastern end. As a result, the existing A500 and the M6 are both current sources of traffic noise.

Most traffic noise, for traffic flowing freely at moderate to high speeds, comes from the interaction of tyres with the road surface, and noise levels are directly related to speed.

An area directly to the east of the M6, less than 1km north of the A500 is designated as a Noise Action Planning Important Area. This area has been identified as a result of national noise mapping by Defra as a noise 'hotspot'. It is the responsibility of Highway England to manage the level of noise within this area as a result of traffic moving along the M6.

A review of the current data available has identified a number of properties/buildings that may be susceptible to construction noise, vibration and operational noise. This review identified 6 buildings within a 100m extent of the existing A500 carriageway that would be susceptible to road noise effects. It is anticipated that around half of these are sufficiently close and will most likely be affected by some road related vibration effects.

### 2.5.6 The Water Environment

There are three watercourses that are crossed by the existing A500. The main watercourse is Englesea Brook, and the other two are tributaries of this brook. Englesea Brook flows from south to north through a culvert under the existing A500. The tributary to the east of the scheme is named as Barthomley Brook, as it flows through the village of Barthomley, then heads north, through a culvert under the A500 before joining Englesea Brook to the north of the scheme. The tributary to the west of the scheme is unnamed and flows from south to north, under the existing A500 through a culvert.

Approximately half of the existing A500 passes above a Secondary B Aquifer. This aquifer starts from the middle of the existing route and continues east, past the M6 J16. This aquifer is in the bedrock and sections of the aquifer are shown on the Environment Agency (EA) website to be highly vulnerable to groundwater contamination. In addition, nearly the whole length of the existing route passes above a Secondary undifferentiated aquifer in the superficial deposits. The EA website does not show the vulnerability of this aquifer.

### 2.5.7 Effects on All Travellers

The A500 is one of two strategic routes from Crewe to the M6 motorway, the other being the A534 which travels to the northeast of Crewe to M6 J17. The A500 also provides a west to east route from Nantwich to M6 J16, and then onwards turning south eastwards towards Stoke and 'the potteries'. To the west of Nantwich the A534 continues on towards Wrexham.

The A500 also provides a route for local traffic. The villages of Balterley, Chorlton, Weston and Barthomley are to the south and connect into the A5020 roundabout via local roads and the A531. Radway Green and Alsager are to the northeast of the scheme and connect into M6 J16 via local roads, including the B5078.

Details of the NMU network in the study area are provided in Paragraph 2.6.3.

### 2.5.8 Private and Community Assets

The villages of Barthomley, Oakhanger and Weston, within the Cheshire East Council Local Authority, and Balterley Green and Balterley Heath, located within the Staffordshire Local Authority, are within 2km of the proposed route options. There are a number of community assets located within the study area:

- Weston Village Primary School;
- Weston cricket club;
- Stepping Stones nursery, Weston;
- White Lion Hotel, Weston;
- Post Office, Weston;
- Wychwood Village Hall, Weston;
- All Saints Church, Weston;
- St Bertoline's Church, Barthomley; and
- The Church of St Luke, Oakhanger.

The private assets within the study area are primarily agricultural farmland and residential properties. The closest residential properties to the scheme are Jasmine Cottage, Orchard Cottage and Smith's Green Cottages off Barthomley Road to the north; Cyprus Cottage, Yew Tree Cottage and Poppy Cottage off Barthomley Road to the south; The Alms House (formerly Thadion House) off Smithy Lane to the north, and; Bluemire Farm off Radway Green Road to the south.

The other private assets within the 2km study area are:

- Crewe Hall registered park and garden; and
- Crewe/ Barthomley Travelodge Hotel.

## 2.6 Existing Conditions: Traffic

### 2.6.1 Mainline

At this stage of the scheme, current traffic data for the network is unavailable.

Highway England's Traffic Flow Data System (TRADs) includes some historic flow data along the A500, and 2005 is the last year for which a full set of data is available. It shows that the Annual Average Daily Traffic (AADT) figures for 2005 were;

- Eastbound 24 hour AADT = 13,757
- Westbound 24 hour AADT = 14,392

This gives a two way AADT flow of over 28,000 vehicles.

TA 46/97 (DMRB 5.1.3) gives example Congestion Reference Flows for different categories of road with average peak hour flows and average proportions of heavy vehicles. The Congestion Reference Flow is defined as the flow at which the carriageway is likely to be 'congested' in the peak periods on an average day. The example shows that a typical single carriageway principal road, like the A500, would reach its Congestion Reference Flow at 23,000 vehicles.

### 2.6.2 Collision Analysis

A study of collision data has been undertaken, looking at the A500 between the A5020 Roundabout to M6 Junction 16. Data from between July 2010 and June 2015 has been reviewed in order to try and identify any trends. A summary is provided below, and for further details see report no. 'B1832076/OD/10 – Collision Analysis Note'.

Any collisions on local roads and on the M6 have been omitted from the collision data received from Cheshire East Council, and so the following only considers the A500 mainline.

#### Collision Area 1 – A5020 Roundabout (including 200m east on the A500)

Four of the loss of control type collisions, which included two positive breath test collisions, have had the descriptions removed at source. It has therefore not been possible to identify any patterns with certainty for this collision type due to the lack of information available. However, the number of loss of control type collisions at the roundabout could suggest that approach speeds may be high. Three of the four collisions which didn't have a contributory factor of alcohol occurred on a weekend when flows may be lower and higher speeds could be obtained. A review of the street view imagery of the site shows changes to the central roundabout chevrons on both A500 approaches to the roundabout, from signs on standard steel posts to Chevreflex over recent years. Chevreflex are often installed if there is a history of vehicles over running the give way and damaging the signs, although maintenance records are not available at this time, and so it is not possible to confirm that this is the reason for their installation at this site. The images show that the sign on the westbound approach has been damaged since the installation of the Chevreflex. This may not be recorded in the collision data as it could be a result of non-injury collisions.

Additionally, it seems that the high friction surfacing on both approaches to the A500 give way at the roundabout have been removed approximately 4 years ago, although it is unknown if it has been replaced with a high PSV stone value appropriate for the approach.

These issues suggest that a review of the approach to the roundabout should be undertaken as part of the detailed design. A two lane approach may result in high speeds and care should be taken to ensure drivers are aware of the presence of the roundabout and adequate deflection is achieved to ensure drivers are slowed on the approach.

#### Collision Area 2 – A500 Carriageway

Seven nose-to-tail collisions are spread out along the length of the A500 between the two roundabouts. Four of the seven side impact collisions involved vehicles

accessing/egressing the A500 to/from farmers' fields or the laybys on either side of the A500.

The introduction of a central barrier will remove the possibility of undertaking U-turns and right turns from private accesses, removing these types of collisions.

#### Collision Area 3 – M6 Junction 16 Roundabout (including 200m west on the A500)

No patterns in collisions were identified in Collision Area 3.

### **2.6.3 Side Roads**

As part of this study, Automatic Traffic Counters (ATCs) were installed on Barthomley Road and Radway Green Road in the vicinity of the bridges, for a week during November 2015. The results showed the following average number of vehicles per day (7 day average);

- Barthomley Road
  - Northbound = 188
  - Southbound = 205
- Radway Green Road
  - Northbound = 617
  - Southbound = 551

### **2.6.4 Non-Motorised Users**

The existing NMU network is shown on B1832076\_P\_1050 in Appendix B. The following footpaths and cycle routes are located in the vicinity of the scheme;

- Barthomley FP04 – This footpath crosses the A500 approximately 450m east of Englesea Brook, where there is an at-grade uncontrolled crossing. Barthomley FP04 then continues in both a north-easterly and southerly direction away from the A500. To the northeast, it connects with Barthomley FP 27 and then continues to run almost parallel to the carriageway until it reaches Barthomley Road.
- Barthomley FP05 – This footpath starts at Barthomley Road, approximately 50m south of its bridge over the A500. The footpath then continues in a southerly direction along a track.
- National Cycle Network; Route 70 – This route runs north to south along Barthomley Road, and uses Barthomley Road Overbridge to cross the A500. To the south it continues along Barthomley Road, and to the north it turns north-eastwards along Mill Lane.
- Barthomley FP17 – This footpath crosses the A500 approximately 150m east of Barthomley Road Overbridge, where there is an at-grade uncontrolled crossing. It continues north-westerly to meet Mill Lane, and to the southeast continues as Barthomley FP 17.

- Barthomley FP18 – This footpath is to the north of the A500 and travels south from Daisy Bank Farm to cross the carriageway at Smithy Lane at an at-grade, uncontrolled crossing. To the south of the A500 the footpath splits into Barthomley FP33 and Barthomley FP7, which both continue in a southerly direction.
- Barthomley FP33 – See Barthomley FP18.
- Barthomley FP7 – See Barthomley FP18.
- Barthomley FP25 – This footpath starts on the north side of the A500 approximately 400m east of Radway Green Overbridge, and where there is an at-grade uncontrolled crossing to footpath Barthomley FP15 to the south of the A500. It continues north-westwards until it meets Radway Green Road.
- Barthomley FP15 – This footpath starts at Radway Green Road to the south of the A500, then goes eastwards approximately parallel to the A500 until it meets M6 Junction 16. Part way along the path there is an at-grade uncontrolled crossing over the A500 to footpath Barthomley FP25 to the north.

At this stage of the scheme, usage data for the NMU network is unavailable. NMU surveys will be undertaken during the preliminary design stage in order to assess NMU usage.

**PAGE NOT USED**

## 3 Description of the Route Options

### 3.1 Introduction

A Preliminary Cost Study Report was undertaken in January 2014, and it considered three options for widening the A500 – dual carriageway widening to the north, dual carriageway widening to the south, and a three lane single carriageway. The report didn't include any recommendations.

The dual carriageway options have been considered again in this report, but the single carriageway option has since been discounted, as described under section 3.9. A third dual carriageway option has been introduced that alternates between widening to the north and to the south, and was identified by the Project Team during this study as an alignment that would avoid the majority of the constraints.

The options included in this report are considered to be the only viable options to provide a dual carriageway, given the limitations of widening an existing single carriageway route. They have been developed sufficiently to enable them to be comparatively assessed.

The section below provides a high level description of the three options;

- Option 1 – Widening to the North,
- Option 2 – Widening to the South and
- Option 3 – Alternating between widening to the North and South (referred to as the Hybrid Option).

Included in each of the three options are the outline proposals for the tie-ins at M6 Junction 16 to the east, and to the west at the roundabout junction with the A5020. At this stage it has been assumed that no further modifications are required to the junctions to increase their capacity, but this will need to be determined at a later stage once traffic data is available.

Options have also been developed for the replacement of Barthomley Road Bridge and Radway Green Road Bridge, as described in Sections 3.5 and 3.6 below.

### 3.2 Option 1 – Widening to the North

Option 1 continues along the same route as the existing A500, and provides an additional carriageway to the north, as shown on B1832076\_P\_1003 to 1005 in Appendix C. The majority of the existing carriageway is retained, which will become the southern carriageway of a dual carriageway. The vertical profile of the new carriageway is the same as the existing.

In cross-section, each carriageway has two 3.65m wide lanes, with 1m hardstrips on both sides (D2AP in accordance with TD 27/05). A 6m wide central reserve has been provided between the two carriageways, widened to 9m at the two overbridges. The existing southern verge remains 2.5m wide, and the northern verge is 5.6m wide to accommodate a haul road during construction, to facilitate the movement of materials along the site.

The widening will impact both of the overbridges along the scheme, which will need to be extended to accommodate the proposed dual carriageway. Options have been developed for on-line and off-line replacements for the overbridges, and these are described in Sections 3.5 and 3.6. The two culverts and the underpass will also need to be extended, as described under Section 3.7.

At the eastern end of the scheme, the existing retaining wall to the north will be removed as it clashes with the proposed alignment. The second retaining wall to the south will remain in position as it is not impacted by the widening.

The large pond (known as the duckaries) situated approximately 500m upstream of Barthomley Road overbridge to the north of the A500 will be impacted by the proposed earthworks.

At the western end of the scheme, the dual carriageway will tie into the existing A5020 roundabout and will not require any modifications to the layout of the circulatory carriageway. At the eastern end, the eastbound carriageway will tie into the existing highway layout just before M6 Junction 16, and the westbound carriageway will tie in slightly to the south of the existing carriageway, but with no modifications to the layout of the existing circulatory carriageway.

### 3.3 Option 2 – Widening to the South

Option 2 continues along the same route as the existing A500, and provides an additional carriageway to the south, as shown on B1832076\_P\_1006 to 1008 in Appendix C. The majority of the existing carriageway is retained, which will become the northern carriageway of a dual carriageway. The vertical profile of the new carriageway is the same as the existing.

In cross-section, each carriageway has two 3.65m wide lanes, with 1m hard-strips on both sides (D2AP in accordance with TD 27/05). A 6m wide central reserve has been provided between the two carriageways, widened to 9m at the two overbridges. The existing northern verge remains 2.5m wide, and the southern verge is 5.6m wide to accommodate a haul road during construction, to facilitate the movement of materials along the site.

The widening will impact both of the overbridges along the scheme, which will need to be extended to accommodate the proposed dual carriageway. Options have been developed for on-line and off-line replacements for the overbridges, and these are described in Section 3.5 and 3.6. The two culverts and the underpass will also need to be extended, as described in Section 3.7.

At the eastern end of the scheme, the existing retaining wall to the north will be retained in position as it is not impacted by the widening. The second retaining wall to the south will be removed as it clashes with the proposed alignment.

At the western end of the scheme, the dual carriageway will tie into the existing A5020 roundabout and will require the circulatory carriageway to be modified by extending it southwards by approximately 9m. At the eastern end, the eastbound carriageway will tie into the existing highway layout just west of M6 Junction 16, and the westbound carriageway will tie in slightly to the south of the existing carriageway, but with no modifications to the layout of the existing circulatory carriageway.



### 3.4 Option 3 – Widening to both the North and South (Hybrid)

Option 3 continues along the same route as the existing A500, and provides an additional carriageway which alternates between the north and south of the existing A500, and which crosses the existing carriageway along the route, as shown on B1832076\_P\_1009 to 1011 in Appendix C. Approximately half of the existing carriageway is retained, which will become either the northern or southern carriageway of a dual carriageway.

At the western end of the scheme the existing carriageway forms the northern half of the dual carriageway, and the new carriageway is to the south. Continuing eastwards the northern carriageway continues along the existing alignment until about ch.450, where it starts to deviate. It gradually moves to the north until, at approximately ch.1500, the southern carriageway ties into the existing, and the carriageway to the north is new.

Continuing eastwards, the southern carriageway remains on the alignment of the existing carriageway until about ch.2450, where it starts to deviate and move to the south. At about ch.3000 the northern carriageway almost ties into the existing, but moves away again on the approach to M6 J16.

The vertical profile of the new carriageway is broadly the same as the existing.

In cross-section, each carriageway has two 3.65m wide lanes, with 1m hard-strips on both sides (D2AP in accordance with TD 27/05). A 6m wide central reserve has been provided between the two carriageways, widened to 9m at the two overbridges. The existing verge, either on the north or south remains 2.5m wide, and the proposed new verge is 5.6m wide to accommodate a haul road during construction, to facilitate the movement of materials along the site.

The widening will impact both of the overbridges along the scheme, which will need to be extended to accommodate the proposed dual carriageway. Options have been developed for on-line and off-line replacements for the overbridges, and these are described in Section 3.5 and 3.6. The two culverts and the underpass will also need to be extended, as described in Section 3.7.

At the eastern end of the scheme, the existing retaining wall to the north will be partially removed, by approximately half, 110m, as it clashes with the proposed alignment. The second retaining wall to the south will be removed as it clashes with the proposed alignment.

The large pond (known as the duckaries) situated approximately 500m west of Barthomley Road overbridge to the north of the A500 will be slightly impacted by the proposed earthworks – the base of the earthworks will be at the pond edge.

At the western end of the scheme, the dual carriageway will tie into the existing A5020 roundabout and will require the circulatory carriageway to be modified by extending it southwards by approximately 9m. At the eastern end, the eastbound carriageway will tie into the existing highway layout just before M6 Junction 16, and the westbound carriageway will tie in slightly to the south of the existing carriageway, but with no modifications to the layout of the existing circulatory carriageway.

### 3.5 Barthomley Road Overbridge

As part of the proposed widening the existing Barthomley Road Bridge would need to be replaced by a longer structure that would span the dual carriageway. As such, the following options have been considered for on-line and off-line replacements of the bridge;

- Barthomley Option A – Off-line option to the west
- Barthomley Option B – Off-line option off Mill Lane
- Barthomley Option C – Off-line option to the east
- Barthomley Option D – On-line option

The three off-line options are shown on B1832076\_P\_1012 to 1014 in Appendix C. They have been designed to minimise disruption to the nearby properties off Barthomley Road.

The on-line option is shown on B1832076\_P\_1048 in Appendix C.

The cross-section of the new bridge has been designed to have two 3.65m lanes, 1m hardstrips and a 5.3m wide verge on one side. The verge would include a 3m wide shared footway, cycleway and equestrian facility, offset 1.8m from the carriageway edge. At this stage this is assumed to be a suitable facility to accommodate National Cycle Route 70, which travels along Barthomley Road, and any equestrians, given that there is a riding school approximately 300m to the north.

### 3.6 Radway Green Road Overbridge

Radway Green Bridge would also need to be lengthened to span the proposed dual carriageway. As such, the following options have been considered for on-line and off-line replacements of the bridge;

- Radway Green Option A – Off-line option to the west
- Radway Green option B – Off-line option to the east
- Radway Green Option C – On-line option

The two off-line options and one on-line option are shown in Appendix C on B1832076\_P\_1015 to 1016 and B1832076\_P\_1049.

The cross-section of the new bridge has been designed to have two 3.65m lanes, 1m hardstrips with 3.5m wide verge on one side. The verge includes a 2m wide footway/cycleway, offset 1m from the carriageway.

## 3.7 Culverts

### 3.7.1 Un-named Watercourse Culvert

As part of the proposed dual carriageway widening, the existing un-named watercourse culvert would need to be extended. However, there is no information currently available for the culvert, so it is currently not possible to comment on the proposed method of construction.

### 3.7.2 Englesea Brook Culvert

As part of the proposed dual carriageway widening, details required to extend the existing Englesea Brook Culvert have been considered for all mainline options. The extension would be adjacent to the direction of widening and would provide an in situ reinforced concrete box structure similar to the existing culvert with internal dimensions similar to the existing culvert.

For all options the top of the existing wingwalls and headwall would be cropped and new wingwalls and a headwall would be provided to the entrance of the extension similar to the existing layout.

### 3.7.3 Barthomley Brook Culvert

As part of the proposed dual carriageway widening, details required to extend the existing Barthomley Brook Culvert have been considered for all mainline options. The extension would be adjacent to the direction of widening and would be constructed from precast reinforced concrete box units, with 2m x 2m internal dimensions.

For all options reinforced concrete wingwalls will be provided, similar to the existing layout.

Option 3 would require further consideration depending on the relative position of the joint in the culvert joint and the carriageway. If this is the case, an in situ reinforced concrete transition may be cast to reduce differential settlement and a short reinforced concrete extension to the south would be provided.

## 3.8 Existing Drainage

There are no as-built records for the existing A500 drainage networks, except to the east where improvements have recently been made on the approach to M6 Junction 16 as part of the Highways England Pinch Point Programme.

Assumptions have been made about the existing drainage on the A500, which have been based on observations from site visits and conversations with Cheshire East Highways staff. As a brief summary, it has been assumed that the existing drainage for the A500 consists of filter drains in the verges and filter drains at the tops of cuttings and bases of embankments.

### 3.9 Discounted Options

A Preliminary Cost Study Report was undertaken in January 2014. It included the following options that have since been discounted, and are not considered in this assessment;

- An option was included for widening the existing carriageway to the north to create a single 10.95m wide carriageway, plus 1m hardstrips. The carriageway could then be marked as a 'Wide Single 2+1' road, i.e. two lanes in one direction and one lane in the other, which could be alternated part way along the route.

This option has since been discounted, primarily because it would not provide the same standard of road as the rest of the A500, and may therefore still act as an impediment to traffic flows and to the future development of Crewe. It would also not provide a road to the same standard of safety compared to the other proposed options, because it would not include a central reserve and barrier.

- The 2014 report assumed that there would be a new footbridge at approximately ch.3000, between Radway Green Road and M6 J16, to join footpaths Barthomley FP25 and FP15.

This report has assumed that there will not be a footbridge at this location, because the footpaths do not appear to be extensively used, and an alternative route via Radway Green Road Bridge would be provided which would require a diversion of less than 400m. On that basis the cost of a new footbridge at this location would not be justified.

However, this option should be re-assessed once the footpath usages have been determined during the later stages of the scheme.

### 3.10 Scheme Cost Estimate

The following section of this report summarises the cost estimates for each individual route option. The figures stated in this section allow for a comparison between the options and it is from these values that the feasibility of the schemes, from a financial perspective, can be assessed. It should be noted that the costs stated in this section are the outline scheme costs based upon this stage of the project, and as such are subject to change once the preferred route is established and the design is developed further.

#### 3.10.1 Basis of Construction Costs

The Cost Estimate for the A500 has been prepared using an elemental method for the major elements of the Works (Method of Measurement for Highway Works) that reflects the understanding of the proposed scheme, and can be split into these categories;

- Highway Works Estimate – costs associated at this stage, e.g. preliminaries, roadworks, structures and facilitating works.
- Risk Estimate – including design, construction and employer risk.

An allowance of 44% based on Treasury Optimism Bias has been included in this estimate for design development risks, construction risks, employer change risks and employer other risks.

This cost estimate has an accuracy level of -30% to +30%, which is reflected in the by the cost estimate range reported for each option.

Inflation has not been accounted for at this stage, as recommended in DMRB 37/93 Paragraph 4.3. For a detailed breakdown of the estimated scheme costs please refer to report no. 'B1832076/OD/02 - A500 Dualling and Widening Scheme – Options Estimate No. 1 – Construction Cost'.

An allowance for the diversion and protection of Statutory Undertakers equipment has not been included. Statutory Undertakers have not yet been contacted to provide an estimate for these works, but an estimate has been provided by Gattica Associates. In total, they estimate that the total cost of diversions and protections would be £6.72m for each mainline option. However, further investigation is needed to confirm the cost, including contacting the Statutory Undertakers to provide estimates for the work, and it is considered that there is significant uncertainty associated with this figure. It has therefore been excluded from the overall cost estimate figures.

Costs associated with land acquisition and Part 1 Claims are reported separately, under Section 3.11.2.

### 3.10.2 Assumptions

- Construction works will generally be undertaken during normal working hours unless specifically identified as being undertaken out of normal working hours (evenings and weekends).
- Access to the site is unrestricted.
- Works to water courses limited to the extension of the brook culverts.
- Barthomley Road Bridge is a four span bridge deck. Size 67.6m long x 14.0m wide.
- Radway Green Bridge is a four span bridge deck. Size 67.6m long x 12.3m wide.
- No lighting required to Barthomley Road or Radway Green Road.

### 3.10.3 Exclusions

- Toxic / hazardous material removal including removal of toxic or hazardous parts of building fabric and hazardous materials or components from existing services installations.
- Removal and/or treatment of contaminated ground material.
- Eradication of invasive plant growth.

- Ground gas venting measures including gas proof membranes, perforated collection pipes, proprietary gas dispersal fin layers, radon sumps and vent pipes.
- Soil stabilisation measures including cement or chemical grouting, electrochemical stabilisation, sand stowing, soil nailing, ground anchors, compacting, and freezing of groundwater and subsoil.
- Site dewatering and pumping to lower the ground water level of the site, including forming well points, filling, drain tubes and ring mains, sumps, pumps and pumping, off-site disposal of water, running costs and attendance.
- Extraordinary site investigation works including archaeological investigation, reptile/wildlife mitigation measures and other site investigation works.
- Any environmental mitigation measures.
- Works by Statutory Undertakers
- Works by Other Bodies.
- Accommodation Works.
- Charges, rates on temporary accommodation, licences in connection with hoardings, scaffolding, gantries and the like and licences in connection with crossovers, parking permits, parking bay suspension and the like.
- Decanting and relocation costs, temporary relocation costs, temporary accommodation, rents and other running costs.
- Employer finance costs, costs in connection with funding of project.
- Fixtures, fittings and equipment.

#### **3.10.4 Option 1 – North Estimate**

The cost estimate range (excluding inflation) for Option 1 - North is approximately £16.9 million to £31.3 million.

#### **3.10.5 Option 2 – South Estimate**

The cost estimate range (excluding inflation) for Option 2 - South is approximately £17.7 million to £32.9 million.

#### **3.10.6 Option 3 – Hybrid Estimate**

The cost estimate range (excluding inflation) for Option 3 - Hybrid is approximately £19.4 million to £36.0 million.

#### **3.10.7 Barthomley Road Bridge Estimates**

The cost estimate range (excluding inflation) for Barthomley Road Bridge Option A is approximately £4.5 million to £8.3 million.

The cost estimate range (excluding inflation) for Barthomley Road Bridge Option B is approximately £4.8 million to £8.8 million.

The cost estimate range (excluding inflation) for Barthomley Road Bridge Option C is approximately £4.1 million to £7.7 million.

The cost estimate range (excluding inflation) for Barthomley Road Bridge Option D is approximately £3.3 million to £6.2 million.

The above estimates do not include for the cost of a temporary bridge, which may be required depending on the method of construction, the construction programme, and the desire to maintain a through route for traffic during construction. It is estimated that the cost of a temporary bridge, temporary access roads and reinstatement once the bridge has been taken down would be £1.3 million (including Optimum Bias).

The on-line bridge option (Option D) is considered the most likely to need a temporary bridge. The other off-line bridges (Options A, B and C) could be constructed before the existing bridge is demolished. So although Option D has the lowest cost estimate, if the cost of a temporary bridge is included it has a similar cost to the other options.

### **3.10.8 Radway Green Road Bridge Estimates**

The cost estimate range (excluding inflation) for Radway Green Road Bridge Option A is approximately £4.3 million to £7.9 million.

The cost estimate range (excluding inflation) for Radway Green Road Bridge Option B is approximately £4.5 million to £8.3 million.

The cost estimate range (excluding inflation) for Radway Green Road Bridge Option C is approximately £3.0 million to £5.6 million.

The above estimates do not include for the cost of a temporary bridge, which may be required, and is estimated to be £1.3 million (including Optimum Bias).

The on-line bridge option (Option C) is considered the most likely to need a temporary bridge, so although Option C has the lowest cost estimate, if the cost of a temporary bridge is included it has a similar cost to the other options.

## **3.11 Land**

### **3.11.1 Land Ownership and Land Tenancy**

For a detailed plan with land ownership references, see the Land Ownership Plans in Appendix D on B1832076\_P\_5006 to 5008.

The land use adjacent to the A500 is predominately agricultural land, the majority of which is in the ownership of the Duchy of Lancaster and therefore Crown Land. At the western end of the scheme, plots to the north and south are under the ownership of the Co-op, and there are a number of privately owned properties to the north and south of the A500 along the scheme.

Land owned by the Duchy and the Co-op is let under farm tenancies.

### 3.11.2 Land Acquisition and Part 1 Claims

An assessment has been made of the potential land take compensation liability associated with each mainline option. It includes an allowance for the market value of any land take, inclusive of any severance, injurious affection, disturbance, loss payments, fees and Part 1 Claims. For full details of the assessment, refer to report no. 'B1832076/OD/03 – Likely Compensation Assessment Report'.

The potential compensation liability for each option is;

- Option 1 - £815,000
- Option 2 - £832,000
- Option 3 - £830,000



## 4 Engineering Assessment

### 4.1 Design Standards

The geometric design of the route options and side road options have been developed in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 6 (Road Geometry), with particular reference to the following design standards:

- TD9/93 – Highway Link Design.
- TD27/05 – Cross-Sections and Headrooms.
- TD16/07 – Geometric Design of Roundabouts.

The three mainline options have a Design Speed of 120kph. In cross-section they have a dual 2 lane carriageway (D2AP - 7.3m carriageways and 1.0m hard-strips), as shown on B1832076\_P\_1002 in Appendix E. The verges are 2.5m wide, except the nearside verge on the new carriageway side which has been made 5.6m wide to accommodate a haul road during the construction phase.

Each route option includes a minimum 6m wide central reserve, widened to 9m at the overbridges. The rationale is that this width will allow a temporary safety barrier to be installed in the existing carriageway verge, and then the majority of construction activities can take place behind the barrier, including the construction of the permanent concrete barrier and the overbridge central piers. This will have the least impact on traffic flows, because once the temporary barrier is in place, traffic on the A500 can continue at the national speed limit. Once the new carriageway is complete, two-way traffic can be switched onto it to allow the existing carriageway to be re-surfaced and finishing works to the central reserve.

The Design Speed for Barthomley Road is 60kph, and for Radway Green Road is 70kph. In cross-section they have a 7.3m wide single carriageway.

The four side road options at Barthomley Road include a shared footway/cycleway and equestrian facility on one side. The verge is 5.3m wide, which includes the 3m wide shared facility offset 1.8m from the carriageway edge.

The three side road options at Radway Green Road have a 3.5m verge on one side, which includes a 2m footway/cycleway offset 1m from the carriageway edge.

### 4.2 Topography and Land Use

All three mainline options run broadly along and parallel to the existing A500, whose topography and adjacent land use is described in Section 2.4 above. All options have been designed to have the same vertical profile as the existing A500. As such, the proposed earthworks are generally a widening of the existing embankments and cuttings.

At the western end of the scheme all options would pass through agricultural land, beginning at the A5020 roundabout in shallow cut then travelling eastwards for approximately 200m, before moving onto embankment up to 4m high at Englesea

Brook. After the brook the options would continue on embankment through agricultural land and then woodland, with Option 1 reaching a height of 7.2m, Option 2 4.2m and Option 3 7.6m. Within the woodland, Option 1 would require land from an existing pond (known as the duckaries), and the embankment of Option 3 would go up to the edge of the pond. Constructing through this pond is likely to be difficult, but that issue has not been considered here, but under 'Section 4.3 – Geology, Geomorphology and Ground Conditions' below.

Continuing eastwards, all options would enter a section of deep cutting up to 10.7m deep for a distance of approximately 180m, before moving onto shallow embankment over Barthomley Brook, and back into cutting up to 6.4m deep up to Barthomley Road Bridge. Options 1 and 2 would require cut and fill on either the north or south, whereas Option 3 would require cut and fill on both sides. The land is agricultural in this section, and the existing cutting slopes have well established vegetation and trees.

To the east of Barthomley Road Bridge all options continue in shallow cut to Radway Green Road Bridge, and then alternate between slight cut and slight fill up to M6 J16. The majority of the land is agricultural through this section, except to the south of Radway Green Road Bridge where there is a residential / commercial property, Bluemire Farm. However, the impact on Bluemire Farm is not considered here, but under 'Section 5.10 – Community and Private Assets'.

Overall, the topography and land use is very similar for all options, and is not a differentiating factor.

**Table 4.1 : Topography and Land Use Rankings**

Option 1	Option 2	Option 3
Equal	Equal	Equal

### 4.3 Geology, Geomorphology and Ground Conditions

A number of geotechnical risks have been identified associated with the scheme, which are detailed in report no. 'B1832076-OD-06 – Preliminary Sources Study Report'. These include;

- Constructing the embankment at the western end of the scheme, between the A5020 roundabout and Englesea Brook, which would be above an area of peat.
- Achieving an earthworks balance, so that excessive import or export of materials is not required.
- The excavated materials are likely to be sensitive to moisture content changes, potentially changing them from acceptable to unacceptable in terms of embankment fill.
- The presence of subsidence features in the western part of the site in the area of the pond known as the duckaries, and spanning to the north and south of the A500. These features may be associated with ground collapse due to brine subsidence, and could present significant engineering or

constructability issues. The existing A500 was successfully constructed through this area, although during consultations (see Section 7) it was noted that several people independently said that construction of the original A500 experienced difficulties in this area, and large amounts of imported fill were required.

These features extend to the north and south of the A500, and so will affect all the widening options. However, the duckaries pond located to the north of the A500 is described as a crater subsidence and could present significant additional engineering issues. During consultations, the pond was said anecdotally to be very deep.

- Encountering historic landfills.
- The impact of constructing new structures adjacent to existing assets.

Therefore, Option 1, which passes over the crater subsidence, is the least preferred option. Option 2 avoids the crater subsidence and is therefore the preferred option. Option 3 passes over the edge of the crater subsidence, but to a lesser extent than Option 1.

**Table 4.2 : Geology, Geomorphology and Ground Conditions Rankings**

Option 1	Option 2	Option 3
3 <sup>rd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>

## 4.4 Departures from Standards

### 4.4.1 Mainline

The Design Speed for the mainline is 120kph.

All of the mainline options have a sub-standard horizontal curve immediately to the west of M6 J16. Option 1 has a 510m radius curve, which is a 2 step relaxation; Option 2 has a 720m curve (1 step relaxation) leading to a 510m curve, and; Option 3 has a 720m radius curve.

All options have reduced visibility for vehicles travelling eastbound on the right hand curve between the two overbridges. Visibility is restricted by the central reserve barrier, and for all options a minimum stopping sight distance of 215m is achieved, which is 1 step below Desirable Minimum and is a relaxation.

Vehicles travelling westbound between the two overbridges also have reduced visibility. Visibility is restricted by the cutting slopes, and for all options a minimum stopping sight distance of 215m is achieved. For 'Option 1 – Widening to the North', the nearside westbound lane of the dual carriageway is the same as the existing A500 westbound lane. On this basis, it has been assumed that this relaxation is acceptable, and has been adopted for all the options.

On the eastbound approach to M6 J16, the visibility is restricted by the back of verge to the north, as the road curves around to the left. For Options 1 and 3, a minimum stopping sight distance of 120m is achieved, which is 3 steps below

Desirable Minimum. For Option 2 a minimum stopping sight distance of 160m is achieved, which is 2 steps below Desirable Minimum. In all cases this constitutes a Departure, because design standards require that full visibility is achieved on the approach to a junction. A full justification for this departure would need to be provided as the scheme progresses, but at this stage it is assumed that it would be acceptable because the existing A500 provides a similar level of visibility and the accident data doesn't suggest that there is a problem.

The visibility on the westbound exit from M6 J16 is restricted by the safety barrier in the central reserve, as the road bends to the right. For all options a minimum stopping sight distance of 160m is achieved, which is 2 steps below Desirable Minimum and in combination with the sub-standard horizontal curve constitutes a Departure. A full justification for this departure would need to be provided as the scheme progresses, but at this stage it is assumed that it would be acceptable because it is on the immediate exit from the junction, where vehicle speeds will be low.

In terms of Departures and Relaxations from standards, all of the mainline options are broadly the same. Therefore there is no preferred option.

**Table 4.3 : Departure from Standards Rankings**

Option 1	Option 2	Option 3
Equal	Equal	Equal

#### 4.4.2 Barthomley Road

A design Speed of 60kph has been used for Barthomley Road.

From the south, Barthomley Road Option A uses a 90m radius curve, which is 3 steps below Desirable Minimum. For vehicles travelling in a southbound direction, visibility is restricted to 70m by the back of the verge, which is 1 step below Desirable Minimum. These are both relaxations in their own right, but as a combination they constitute a Departure.

Continuing northwards, Barthomley Road Option A has a vertical crest curve of  $K = 13$  from ch.116 to ch.301. This is a relaxation, until its northern end where it is in combination with another 90m horizontal curve, and with visibility which is restricted to 50m in the southbound direction, which is 2 steps below Desirable Minimum SSD. These are all relaxations in their own right, but as combinations they are Departures. The curve and reduced visibility are a result of the road passing Jasmine Cottage.

There are no relaxations or departures associated with Barthomley Road Option B.

From the south, Barthomley Road Option C has a 70m radius horizontal curve up to ch.40, which 1 step below Desirable Minimum. There is also a vertical sag curve of  $K = 9$  from ch.7 to ch.61, which is 1 step below Absolute Minimum. These are acceptable relaxations in their own right, but constitute a Departure in combination.

Continuing north, Barthomley Road Option C uses a 127m horizontal curve where it spans the mainline, which is 2 steps below Desirable Minimum. There is also a vertical crest curve of  $K = 10$  from ch.61 to ch.183, which is 1 step below Desirable Minimum. Visibility is also restricted by the bridge parapet and approach barrier in the northbound direction, and reaches a minimum of 50m from ch.114 to ch.188,

which is 2 steps below Desirable Minimum. These are all allowable relaxations in their own right, but constitute a Departure where they are in combination.

Where the route ties into existing at Jasmine Cottage, Barthomley Road Option C has a vertical crest sag of  $K = 9$  from ch.183 to ch.217, which is 1 step below Absolute Minimum. There is also restricted visibility past the bridge parapet, and achieves a minimum of 70m from ch.190 to ch.201. These are both relaxations.

Barthomley Road Option D follows the existing road. It is on a horizontal straight over the mainline, and to the south ties has a 90m radius curve.

#### 4.4.3 Radway Green Road

A Design Speed of 70kph has been used for Radway Green Road.

At its southern tie-in, Radway Green Road Option A has a 180m radius horizontal curve up to ch.54, which is 2 steps below Desirable Minimum. There is also a vertical crest curve of  $K = 25$ , which is approximately a  $\frac{1}{2}$  step below Desirable Minimum. Visibility is restricted in the northbound direction up to ch.25, and achieves a minimum of 90m which is 1 step below Desirable Minimum SSD. These would be allowable relaxations on their own, but the combination of the vertical curve with the other sub-standard features constitutes a Departure.

Continuing northwards, Radway Green Option A uses a 300m horizontal radius curve to the southwest of Bluemire Farm, which is approximately a  $\frac{1}{2}$  step below Desirable Minimum and is a relaxation. Further north, vehicles travelling in the southbound direction would have restricted visibility from ch.247 to ch.213 because of the bridge parapet and approach barrier. A minimum visibility of 90m is achieved, which is 1 step below Desirable Minimum SSD and is a relaxation.

Radway Green Option B has a 180m horizontal curve at its southern end, up to ch.48, which is 2 steps below Desirable Minimum and a relaxation. It also has a 165m horizontal curve where it spans the mainline, from ch.191 to ch.331, which is over 2 steps below Desirable Minimum, and a relaxation. Visibility is restricted to 80m in the northbound direction from ch.80 to ch.160, and in the southbound direction is restricted to 90m between ch.120 to ch.130, and again from ch.250 to ch.260. These are all allowable relaxations.

At its northern tie-in, Radway Green Option B has a 136m horizontal curve, which is almost 3 steps below Desirable Minimum. Visibility is also restricted, achieving 80m in the northbound direction (1  $\frac{1}{2}$  steps below Desirable Minimum) and 90m in the southbound direction (1 step below Desirable Minimum). These are acceptable relaxations in their own right, but constitute a Departure in combination.

Radway Green Option C would continue along its existing route, which has an approximate 150m radius horizontal curve spanning the mainline.

#### 4.5 Public Utilities

Gattica Associates Ltd have been commissioned to identify all Statutory Undertaker's apparatus within the study area. Full details are in their report 'Feasibility Report (Utilities) A500 Road Widening Scheme', and the plans are included in Appendix F.

There are several areas where Statutory Undertaker apparatus crosses the proposed A500 Widening options, some of which are on the two overbridges. The most notable of these are a mainline fuel pipeline to the east of Englesea Brook; a national high pressure gas main half way between Barthomley Road and Smithy Lane, and; another national high pressure gas main just west of Smithy Lane.

There is no apparatus within the verges of the existing A500, except for an electricity cable immediately adjacent to the commercial development at the eastern end of the scheme. There is, however, some apparatus that runs parallel to the northern edge of the existing A500 between Smithy Lane and M6 J16 (underground BT cable between Smithy Lane and Radway Green Road, and underground electricity cables to the west of M6 J16).

The table below gives a brief summary of which utility company's apparatus would be affected by each option;

**Table 4.4 – Public Utilities Affected**

Utility Company	Type	Affected by Option 1 North	Affected by Option 2 South	Affected by Option 3 Hybrid	Affected by Over-bridges
<b>SP Energy Networks</b>	Electricity	Yes	Yes	Yes	No
<b>Western Power Distribution</b>	Electricity	Yes (M6 J16 Rbt)	No	No	No
<b>National Grid (Gas)</b>	Gas	No	Yes (West of the A5020 Rbt)	Yes (West of the A5020 Rbt)	No
<b>National Grid (Transmission)</b>	Gas	Yes	Yes	Yes	No
<b>Mainline Pipelines</b>	Fuel	Yes	Yes	Yes	No
<b>United Utilities</b>	Potable Water	Yes	Yes	Yes	Yes
<b>BT Openreach</b>	Telecom	Yes	No	No	Yes
<b>Zayo</b>	Telecom	Yes	Yes	Yes	No

The affected apparatus will be similar for all of the proposed options due to the majority of the apparatus crossing the scheme in a north-south direction. The only differentiating factor is the apparatus running to the north of the existing A500 between Smithy Lane and M6 J16. The least preferred option is therefore Option 1, which would need these services to be diverted. Option 3 also impacts on this apparatus, but to a lesser extent. Option 2 is the preferred option in terms of public utilities.

**Table 4.5 – Public Utility Rankings**

Option 1	Option 2	Option 3
3 <sup>rd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>

## 4.6 Structures

### 4.6.1 Introduction

Eight existing structures that would be affected by the scheme have been identified and are summarised below:

- Un-named Watercourse Culvert - Unknown
- Englesea Brook Underpass – Reinforced concrete box underpass
- Englesea Brook Culvert – Reinforced concrete box culvert
- Barthomley Brook Culvert – Reinforced concrete box culvert
- Barthomley Road Bridge – 3 span concrete bridge
- Radway Green Road Bridge – 3 span concrete bridge
- Retaining Wall 1 – Brick faced retaining wall
- Retaining Wall 2 – Brick faced retaining wall

A detailed description of each structure is presented in Section 2.4.6.

The alternative treatments available at each structure for the various main line options are described and discussed in this section. Recommendations are made as appropriate. Where feasible, prefabricated structural elements will be proposed as this would reduce the duration of construction and may lead to an overall shortening of the construction programme.

### 4.6.2 Un-named Watercourse Culvert

The main features of the un-named watercourse culvert are currently unknown.

Main Line Option 1 would require an extension to the north of the culvert. Main Line Options 2 and 3 would require an extension to the south of the culvert. It is unknown what the method of construction would be, due to the current lack of information.

### 4.6.3 Englesea Brook Underpass

The main features of Englesea Brook Underpass are:

- It carries the A500 over a farm access track.
- It is an in situ reinforced concrete box structure with an internal span of 4.0m and an internal height of 3.3m.
- The underpass is aligned square to the A500.
- The fill above the underpass is approximately 0.5m.
- The reinforced concrete wingwalls abut with the wingwalls of Englesea Brook Culvert to the east of the underpass and extend to the top of a 1 in 2 side slope to the west of the underpass.
- Peat deposits have been found in the locality of the underpass, these could give rise to large total and differential settlements.

Main Line Option 1 would require an extension of the underpass to the north of the underpass. Main Line Options 2 and 3 would require an extension to the south of the underpass. An extension to the north would be treated in exactly the same way as an extension to the south and so the following extension descriptions are applicable to all main line options.



The extension would be an in situ reinforced concrete box structure similar to the existing underpass, the internal dimensions would be the same as the existing. One set of wingwalls and headwall would be buried by the new highway embankment. The tops of the buried walls would be cropped to avoid hard spots in the fill and to allow transverse passage of service ducts. New wingwalls and a headwall at the new entrance of the extension would be similar to the existing.

The advantage of providing an in situ concrete extension is that the articulation would be the same as the existing. This would reduce the risk of secondary forces being generated at the joint and would allow the consideration of providing continuity at the joint, which would improve durability.

Using a proprietary precast concrete modular box structure was considered but the articulation would be different from the existing, which may give rise to secondary forces at the joint between the existing underpass and the extension. Also the system would be more flexible and prone to distortion caused by total and differential settlements, given the presence of peat this was a major consideration.

#### 4.6.4 Englesea Brook Culvert

Englesea Brook Culvert is separated from Englesea Brook Underpass by 5.8m of highway embankment. The two structures are similar with the main features of Englesea Brook Culvert being:

- It carries the A500 over Englesea Brook.
- It is an in situ reinforced concrete box structure with an internal span of 4.0m and an internal height of 4.0m.
- The culvert is aligned square to the A500.
- The fill above the culvert is approximately 1.75m.
- The reinforced concrete wingwalls abut with the wingwalls of Englesea Brook Underpass to the west of the culvert and extend to the top of a 1 in 2 side slope to the east of the culvert.
- Peat deposits have been found in the locality of the underpass, these could give rise to large total and differential settlements.

All the comments made about the adjacent underpass are applicable to the culvert and are summarised as:

- An extension to the north for Main Line Option 1 would be similar to a southern extension required for Options 2 and 3.
- The extension would be an in situ reinforced concrete box structure with internal dimensions being the same as the existing culvert.
- The cropping of existing wingwalls and the headwall would be undertaken as for underpass.
- New wingwalls and a headwall would be provided as for the underpass.
- A proprietary precast concrete modular box structure would not be appropriate.

In addition the inlet or outlet apron would be constructed from in situ reinforced concrete.

#### 4.6.5 Barthomley Brook Culvert

The main features of Barthomley Brook Culvert are:



- It carries the A500 over Barthomley Brook.
- It is an in situ reinforced concrete box structure with an internal span of 2.0m and an internal height of 2.0m.
- The culvert is aligned square to the A500.
- The fill above the culvert, to the level of the highway, is approximately 0.6m.
- There is no head wall to the culvert and the reinforced concrete wingwalls are splayed at 45°.
- At both entrances a 600mm diameter pipe running parallel with the A500 discharges water into the brook from the east.
- Immediately to the west of the culvert is a 600mm diameter pipe running parallel with the culvert beneath the highway, it is believed that this is a mammal tunnel.

Main Line Options 1 would extend the culvert downstream of the existing, because of the gradient of the natural stream bed the exit details may need special consideration. Main Line Option 2 would extend the culvert upstream of the existing, because of the natural gradient of the stream bed the entry details may require special consideration. Apart from this, an extension to the north would be similar to an extension to the south.

For Main Line Option 3 the culvert lies in the transition zone from widening to the south of the existing main line to widening to the north of the existing main line. The extension to the north would be in the order of 13m whereas that to the south would be approximately 1.5m.

The culvert extension for Main Line Options 1 and 2 would utilise precast reinforced concrete box units. The inlet or outlet aprons would be in situ reinforced concrete, as would the wingwalls.

The northern extension for Main Line Option 3 would similarly utilise precast reinforced concrete box units. The joint between the existing culvert and the northern extension would be very close to or beneath the carriageway, with the low cover there would be a risk of any differential movement causing cracks in the carriageway surface. This risk will be considered in some detail and if appropriate a short in situ concrete section will be designed to minimise the risk.

The southern extension for Main Line Option 3 would be short and current proposals show the joint between the existing culvert and the extension as being beneath the verge. If feasible a precast reinforced concrete box unit would be used for the extension otherwise an in situ concrete extension would be provided.

As with the other main line options the aprons and wingwalls would be in situ reinforced concrete.

#### **4.6.6 Barthomley Road Bridge and Radway Green Road Bridge**

The existing and proposed Barthomley Road Bridge and Radway Green Road Bridge are similar and can be considered together. The existing bridges are both three span structures and are described in Section 4.2.5.

All options will require the demolition of the existing bridges.

The proposed bridges will span the two carriageways of the proposed widened A500. Different span arrangements have been considered and are briefly described below:

- Crossing both carriageways in a single span. It is a requirement that traffic be maintained on the A500 at all times. To fulfil this condition and construct a single span over both carriageways would require the provision of temporary mid span supports for the deck beams. There would be the risk that the temporary supports would be impacted and demolished by a vehicle. This risk could be reduced by suitable protection but it could not be eliminated. By rejecting the single span option the risk could be eliminated and so this option was not considered further.
- Providing a support in the central reserve and considering the following span options:
  - 4 spans with a central pier, two side piers and bankseat abutments.
  - 2 spans with a central pier and bankseat abutments.
  - 2 spans with a central pier and full height abutments behind the verges.

On the basis of cost, ease of construction and environmental considerations the 4 span option has been assumed at this stage.

The deck would be continuous with no expansion joints except at the bankseat supports, where a semi integral abutment would be provided. The spans over the A500 would be about 17m and the side spans would be up to 17m depending on the side road vertical alignment. Both steel beams with a reinforced concrete deck and pre-stressed precast concrete beams with a reinforced concrete deck would be suitable for this length of span. It is therefore appropriate to defer a decision on the type of deck until more information is available. If steel girders were to be used weathering steel would be proposed.

The side road options for Barthomley Road are described in section 3.5, those for Radway Green Road are described in section 3.6. In both cases an on line option is being considered.

For all side road options the bridges would be accessed by approach embankments. In most cases the main line would also be in a cut and so the heights of the embankments would depend on the depth of the cut. The lengths of the side spans would be a function of the depth of cut, height of embankment and the vertical alignment of the side road. The proposed four span bridge option is sufficiently flexible to cater for the foreseen variation in each of the side road options.

The side road horizontal alignment options produce crossings varying from the straight to those with significant horizontal curves. Again, the four span bridge option provides sufficient flexibility to cater for the variation amongst the side road options proposed.

It should be noted that pre-stressed concrete beams can only be produced in straight lengths. A curved horizontal alignment would favour a steel girder deck over a concrete beam deck as the steel girders could be shaped to follow the horizontal and vertical alignments of the deck. This is not so with a concrete beam deck, where the deck would have to be over-widened to accommodate the highway curvature or the deck would have to be staggered in a series of straights.

The existing bridges are supported on spread footings and it is anticipated that the proposed bridges would also be supported on spread footings. The existing bridge decks are simply supported, which is an arrangement more tolerant of differential

settlement than a continuous deck. If the differential settlements with spread footings are too large for a continuous deck piled foundations would be provided.

#### 4.6.7 Retaining Walls 1 and 2

Both these walls are at the eastern end of the main line, near the junction with the M6 Motorway. A brief description of each wall is presented in Section 2.4.6. Wall 1 retains the northern cutting slope and Wall 2 retains the southern cutting slope.

Main Line Option 1, the widening to the north, would require the demolition of Wall 1. Because of the proximity to the M6 Junction and the approach alignment it is also likely that Wall 2 would also be demolished.

Main Line Option 2, the widening to the south, would require the demolition of Wall 2. It is unlikely that Wall 1 would be affected, though it is close to the M6 Junction and may be affected by the approach alignment towards the roundabout of the junction.

Main Line Option 3, the hybrid option, would require the demolition of Wall 2. There is the likelihood that the western end of Wall 1 would be affected but the detailed design may be able to avoid this.

Whether or not the demolished walls would be replaced would depend on the available land. It is not anticipated that there would be any technical reasons why the walls could not be replaced, but at this stage it has been assumed that they wouldn't be, and the widened road will be accommodated by normal earthwork cuttings.

There are feasible solutions to construct all of the structures along the scheme, for all the mainline and side road options. In terms of the overbridges and retaining walls, there is no preference for which mainline option is chosen from a structural point of view. In terms of the culverts and underpasses, the preference would be to extend on only one side and not both, and therefore Option 3 is the least preferred option. Therefore, overall Options 1 and 2 are preferred.

**Table 4.6 : Structure Rankings**

Option 1	Option 2	Option 3
1 <sup>st</sup>	1 <sup>st</sup>	3 <sup>rd</sup>

#### 4.7 Reputation

Overall, the construction of any of the mainline options is likely to enhance the reputation of Cheshire East Council, by removing congestion and providing a free-flowing link. However, the M6 J16 Pinch Point scheme has only recently been constructed, and any significant alterations may give the perception of poor infrastructure planning, and have the potential to damage the reputation of the Council.

The retaining walls are one of the most visible and recognisable aspects of the Pinch Point scheme. As described in Section 4.6 above Option 1 would require the demolition of the retaining wall to the north, which is the longer of the two walls. Option 2 would require the demolition of the retaining wall to the south. Option 3

would require the partial demolition of the retaining wall to the north (approximately 100m at its western end), and the demolition of the wall to the south.

Option 1 is therefore the least preferred option, because the full length of the wall to the north would need to be demolished, and has the potential to cause most reputational damage to the Council. Option 2 is the preferred option because only the shorter southern wall would need to be demolished.

**Table 4.7 : Reputation Rankings**

Option 1	Option 2	Option 3
3 <sup>rd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>

## 4.8 Constructability

Jackson Civil Engineering have been appointed to provide constructability advice in relation to the different options. They produced a report 'A500 Dualling and Widening Scheme – Option Construction and Methodology Report No. 1', which identified the various factors that need to be considered in relation to the construction of the scheme, and states which are the preferred options in terms of constructability. Their report is summarised below.

### 4.8.1 Earthworks Balance

Earthwork quantities have been derived for each of the mainline options. However, LIDAR data has been used as the ground model, and it is considered that it has not accurately modelled the cut and embankment slopes of the existing A500. An attempt has been made to compensate for this by creating a model of the existing A500. The earthwork quantities for each option have then been calculated as the difference between the 'option' model and the 'existing' model.

As a result, it is considered that the derived earthwork quantities will be the correct order of magnitude, but that when determining a preference between the options they should not be given too much weighting because they may not be accurate.

The material excavated on site is assumed to produce material suitable to be re-used as embankment fill (Class 1 and 2), as well as unsuitable fill (Classes 4, U1 and U2), some of which may become suitable if treated.

Option 1 currently shows a shortfall of material, even taking into account treatment of unsuitable fill. It would therefore need materials to be imported to site, which would be expensive. It also requires works in the existing pond at ch.1100, which would involve extra work and costs. Option 1 is therefore the least preferred option.

Option 2 has a surplus of Class 1 and 2 materials. Therefore, costs associated with improving unsuitable fill are avoided. However, it would require the surplus material to be disposed of, preferably on site otherwise disposal costs would be significant.

Option 3 also has a small deficit of Class 1 and 2 materials, and so would require approximately 8,000m<sup>3</sup> of unsuitable material to be improved. However, it has significantly less material to be disposed of compared to Option 2, and therefore Option 3 is the preferred option in terms of earthworks balance.

#### 4.8.2 Embankment Options

The embankment at the western end of the scheme between the A5020 roundabout and Englesea Brook will be constructed in an area of peat. The method of construction in this area could be staged construction, whereby the embankment is built in increments of 1.5m deep, and left for a period of 6 to 9 months between each stage to allow for settlement. An alternative method would be to use piles beneath the embankment.

The preferred method would be to use piles, specifically Controlled Modulus Columns. This would allow a much quicker programme, avoid the costs associated with being on site for longer, and would also avoid the risk of causing the existing A500 embankment to settle.

The area of peat is common to all three mainline options, and so does not differentiate the choice between the options.

#### 4.8.3 Traffic Management

Mainline Options 1 and 2 are very similar with regard to traffic management and the effect upon the public throughout construction. Both Options would employ a simple system of traffic management which will have minimal influence upon the flow of the traffic along the existing A500 carriageway during the course of construction.

The traffic management for Mainline Option 3 would be more complicated, because the existing carriageway crosses the path of the new carriageways. Plant crossings would therefore be required, which would likely consist of manually operated temporary traffic signals. This would have a significant impact on the flow of traffic, and would be an impediment to construction activities, particularly the haul of bulk earthwork materials.

#### 4.8.4 Haul Road at Overbridges

All three mainline options include a widened verge on the new carriageway side, to act as a haul route during construction. At the two overbridges it would be possible to accommodate the haul roads past the structure without demolishing them, but would require traffic management due to its proximity to the existing carriageway. This would go against the methodology of the design, and the principle for providing a widened central reserve, which is to allow the free movement of traffic as much as possible during construction.

Another approach would be to provide ramps up to the side roads, and so the overbridge structures would be avoided. Traffic management would be required on the side roads, which would likely be manned crossings. The best approach in terms of hauling materials would be to demolish the two overbridges early during construction. However, the current approach is to keep the two roads open, and so would require temporary bridges to be put in place at significant cost.

#### 4.8.5 Bridge Options

All of the off-line options are preferred over the on-line Barthomley Road Bridge Option D and Radway Green Road Bridge Option C for the following reasons:

- The likelihood that a temporary bridge access would need to be provided, requiring additional construction activity

- The extra road closures, time and cost involved in constructing, launching, and subsequent removal of the temporary bridges
- The extra work and cost of providing temporary approach roads together with subsequent removal and making good
- The extra TM required.

In terms of sequencing the main line construction there is no preference for which off-line Bridge Option is chosen. The extra construction work required prior to demolish the existing bridges would impact on the start to the new embankment works.

#### 4.8.6 Programme

Options 1 and 2 are preferred, and are estimated to have a 67 week construction programme, assuming that the embankment in the area of peat is constructed using Controlled Modulus Columns. This compares to Option 3 which has a 94 week construction period using the same method of construction.

#### 4.8.7 Retention and Re-use of Existing Carriageway

Options 1 and 2 are preferred for maximising the amount of existing infrastructure that is re-used.

Option 3 loses a significant amount of existing carriageway beneath the proposed central reserve, and a significant amount of existing drainage would need to be abandoned. It would also lead to long lengths of existing carriageway less than 2m wide, where it would be difficult to retain the structural integrity. At the cross-over locations the existing carriageway would need to be re-profiled to suit the cross-fall of the new carriageway. Tying into existing carriageway and drainage infrastructure could lead to unexpected problems if the condition is not as anticipated.

#### 4.8.8 Duckaries Pond

The duckaries pond to the north of the A500 is an area that would present significant construction challenges. The area immediately to the south of the A500 is also in area of potential subsidence so also presents challenging conditions, but not to the same extent as the northern side where it is thought significant subsidence has already taken place. However, this issue has already been taken into account under 'Section 4.3 - Geology, Geomorphology and Ground Conditions', so has not been considered as a factor in this category.

Overall, Option 2 is preferred in terms of its constructability, closely followed by Option 1. Option 2 is preferred because of its earthworks balance but, as noted above, there shouldn't be too great a significance placed on the earthwork quantities due to the inaccuracies of the survey data. Therefore, Options 1 and 2 are considered to be equally preferred. Option 3 is the least preferred.

**Table 4.8 : Constructability Rankings**

Option 1	Option 2	Option 3
1 <sup>st</sup>	1 <sup>st</sup>	3 <sup>rd</sup>

## 4.9 Operational Safety

A study of collision data has been undertaken and is described in Section 2.7.

Widening the A500 to a dual carriageway with a central barrier may affect traffic in a number of ways, potentially preventing collisions but also potentially increasing risk in other areas. The central barrier will remove the ability to undertake right turns and U-turns on the A500 from private accesses and lay-bys, preventing a number of collision types. However widening the A500 making it a dual carriageway may inadvertently promote higher speeds, which could result in an increase in loss of control and nose to tail collisions especially on the approach to and on the roundabouts. Further investigations into the PSV value on the roundabouts is required to establish if the surface provides an adequate skid resistance. Additional signing could be introduced to further highlight the roundabouts, especially during the hours of darkness.

These potential operational safety analysis are common to all three mainline options, and so there is not a preferred route.

For further information, see the report no. 'B1832076-OD-10 – Collision Analysis Note'.

**Table 4.9 : Operational Safety Rankings**

Option 1	Option 2	Option 3
Equal	Equal	Equal

**PAGE NOT USED**



## 5 Environmental Assessment

### 5.1 Introduction

This chapter outlines the potential impacts on the environmental topics for the three route alignment options and the two overbridges. The environmental constraints are shown on B1832076\_P\_1020 in Appendix A and for the full report see 'B1832076-OD-04 – Route Options Environmental Assessment Report'.

### 5.2 Landscape

#### 5.2.1 Mainline

There is unlikely to be an effect on the green belt designation due to the presence of the existing road in the landscape. No ancient woodland blocks would be affected by the three options.

Options 1 – 3 would result in new earthworks to the north and/or south of the existing road, but these would be of a similar character to existing; therefore all three options would have a neutral effect on topography. Options 1 and 3 would result in the partial loss of the duckaries pond to the north of the existing A500, resulting in an effect on the hydrology, otherwise effects on hydrology would be barely perceptible in the wider landscape. All three options would have an effect on land cover due to the loss of vegetation to the north and/or south of the A500. It is likely that Option 3 would result in the greatest amount of vegetation removal as the widening occurs to both the north and south in some locations, so vegetation would be lost to both sides of the road.

Effects on landscape pattern would be barely perceptible for all three options due to the presence of the existing road in the landscape. All three options would result in an effect on the Barthomley Character Area primarily due to the loss of vegetation, but also the reduction in the 'well wooded' feel of the landscape. Option 3 is likely to result in the greatest change.

The greatest change in views due to Option 1 would be from receptors to the north of the A500. In particular, receptors at Smith's Green to the north of the A500 would experience a large adverse effect due to the loss of vegetation, which would change the character of views and result in taller traffic and road infrastructure being visible. Conversely, the greatest change in views due to Option 2 would be from receptors to the south of the A500. In particular, receptors at Smith's Green to the south of the A500 and at Bluemire Farm would experience a large adverse effect due to the loss of vegetation, which would open up views of the road and taller moving vehicles. Option 3 is likely to result in the greatest change in views because a larger number of receptors would notice a change in their view compared to Option 1 or 2. As for Option 1, receptors at Smith's Green to the north of the A500 would experience a large adverse effect. In addition, there would be a moderate adverse effect on views from Barthomley FP15, Bluemire Farm and receptors at Barthomley FP18, Daisy Bank Farm and The Alms House, predominantly due to vegetation loss along the road.

### 5.2.2 Barthomley Road Overbridge

There is unlikely to be an effect on the green belt designation due to the presence of the existing road in the landscape. No ancient woodland blocks would be affected by the three offline bridge options and the fourth of an online bridge option.

Options A, B and D would have a neutral effect on topography as the extent of new earthworks would not be significantly different to the existing bridge. Option B is likely to have the greatest effect on topography as the bridge would form a wider footprint in the landscape, resulting in a slight adverse effect. Options A, C and D would have a neutral effect on hydrology as no features would be affected. Option B would have a slight adverse effect on hydrology as a section of a pond would be lost. Options A – C would have a slight adverse effect on land cover as the new bridge would result in the partial loss of tree belts along the A500 and hedgerow boundaries in adjacent fields. Options B and C are likely to result in the greatest amount of vegetation removal due to the wider footprint of Option B, there is also vegetation loss along Barthomley Road for Option C.

Options A, C and D would have a neutral effect on landscape pattern as the new bridge would not result in a significant change to the adjacent field pattern. However, Option B would alter the size and shape of several fields as it would be located to the east of the existing bridge, resulting in a slight adverse effect. Options A, C and D would have a neutral effect on the Barthomley Character Area due to the localised nature of the changes. Option B would result in a slight adverse effect due to its location further east in the landscape, leading to changes in topography and landscape pattern.

Visual effects for all options would be relatively localised, and Option D would result in only neutral effects due to the use of the existing bridge. Option B is likely to result in the greatest change in views, although some of the changes would be beneficial. Receptors at Smith's Green to the north and south of the A500 are likely to experience a slight beneficial effect due to the bridge and road being located further away. Conversely, receptors at Barthomley FP18, Daisy Bank Farm and The Alms House, at the residential properties on the northern periphery of Barthomley within the Conservation Area, Barthomley FP7 and Barthomley FP6 and, finally, at the residential properties on Radway Green Road west of Barthomley (Fir Tree Cottages, Hungerford Place) and Old Hall Farm would experience a slight adverse effect as the bridge would move closer. Option A would result in a slight adverse effect on views from receptors at Smith's Green to the north and south of the A500, primarily due to vegetation removal being noticeable. Receptors at Smith's Green to the north would experience a similar effect for Option C as for Option A. However, those to the south would experience a moderate adverse effect due to the proximity of new earthworks and vegetation loss along Barthomley Road.

### 5.2.3 Radway Green Road Overbridge

There is unlikely to be an effect on the green belt designation due to the presence of the existing road in the landscape. No ancient woodland blocks would be affected by the three options.

All options would have a neutral effect on topography as the extent of new earthworks would not be significantly different to the existing bridge. Option B would result in a slight adverse effect on hydrology due to the loss of a small pond east of Radway Green Road, but there would be a neutral effect in the case of Options A and C. There would be limited vegetation removal for Option C, therefore, there would be a neutral effect on land cover. However, Options A and B would result in

vegetation removal along the A500 and the bisection of some hedgerow field boundaries, resulting in a slight adverse effect.

All options would have a neutral effect on landscape pattern as the new bridge would not result in a significant change to the adjacent field pattern. Similarly, all options would result in a neutral effect on the Barthomley Character Area due to the localised nature of the changes.

Visual effects for all options would be relatively localised, and Option C would result in only neutral effects due to the use of the existing bridge. Option B is likely to result in the greatest change in views, as Barthomley FP15 would be crossed by the bridge, resulting in close range views and a moderate adverse effect. There would also be a slight adverse effect on views from receptors at New Farm, Cherrytree Farm, Barthomley FP14 and Barthomley FP25 due to the new bridge being closer, and at Bluemire Farm as vegetation removal and new earthworks would be noticeable. Option A is likely to result in a slight adverse effect on views from Barthomley FP18, Daisy Bank Farm and The Alms House and New Farm, Cherrytree Farm, Barthomley FP14 and Barthomley FP25 in the north due to the new bridge being in closer proximity, residential properties on the northern periphery of Barthomley within the Conservation Area, Barthomley FP7 and Barthomley FP6 at Barthomley due to the bridge being closer in views directly north and at Bluemire Farm due to the bridge being visible in relatively undeveloped views.

**Table 5.2 : Landscape Rankings**

Option 1	Option 2	Option 3
1 <sup>st</sup>	1 <sup>st</sup>	3 <sup>rd</sup>

## 5.3 Ecology

### 5.3.1 Mainline

The three main line options all involve widening an existing section of road and therefore the direct impacts are only slightly different.

For the designated site ecological features, the different options are unlikely to have a discernible difference in terms of impacts or likely effects.

Option 1 directly impacts the most habitat features identified, Option 2 impacts the least, and Option 3 impacts an intermediate number, but doesn't impact standing water or broad-leaved semi-natural woodland.

The extent to which each option impacts each habitat features is also not consistent. The key differences primarily relate to the extent that water habitat features are impacted. Option 1 would directly impact two sections of running water and one pond. Option 2 would directly impact two sections of running water and one pond; and Option 3 would directly impact three sections of running water and one pond.

All three options are considered likely to impact all 12 species features identified as potentially present in the survey area. The scale of the impact will be informed by the presence and distribution of the species potentially present. This will be identified in future Phase 2 Ecological Surveys and assessed, and reported, for the preferred option in an Environmental Impact Assessment. At this stage, the likely scale of the impacts has been identified based on the extent and location of suitable

habitats impacted. This has identified key differences in the scale of likely impacts for five of the species features, namely: water vole; bats; amphibians; fish; and white-clawed crayfish.

Although Option 1 requires the removal of a small area of broadleaved semi-natural woodland, the extent of the broadleaved plantation woodland impacted in the centre of the scheme (at a potential key crossing location) under Option 1, would mostly be restricted to one side of the carriageway. Option 2 would be the reverse of Option 1, and would require the removal of a small area of broadleaved semi-natural woodland to the south of the existing carriageway. Although additional mitigation (in the form of connective habitat planting) would be likely to be required, this may allow the retention of a potential bat crossing point in this location. Option 3 would not allow this retention, even on only one side of the carriageway.

Because of the way that the water habitat features are impacted, potential water vole, fish, great crested newts and white-clawed crayfish habitat is impacted to a greater extent by Option 3, than Option 1 or Option 2.

There were fewer ponds identified (8) on the north side of the proposed scheme than on the south side (17) of the scheme. Great crested newts can travel up to 1.3 km from breeding sites but the area up to 500 m from a breeding pond is generally considered the core terrestrial great crested newt habitat. The amount of this area impacted is therefore key to identifying the potential impact to great crested newts.

A Stakeholder Workshop was held on 16th February 2017 (see Section 7) to gain initial views and route option preferences from key stakeholders who will be consulted throughout the development of the scheme design. The Principal Nature Conservation Officer from Cheshire East and the Evidence and Planning Manager from Cheshire Wildlife Trust (CWT) were in attendance. Both indicated a slight preference for widening to the south (Option 2) due to the ecological importance of the duckeries area and associated habitats to the north of the A500, which they advised may support priority wet woodland habitat. Townhouse Wood to the south of the A500 has been identified as a potential Local Wildlife Site, although part of the woodland consists of hybrid poplar plantation. It was also noted after the meeting by CWT that a large area of land to the east of the scheme, adjacent to the southern side of the A500 and west of the M6 has been identified by Natural England as priority habitat. Using aerial photography, CWT concluded that this habitat may be of lower quality than the duckeries and associated habitats and therefore option 2 would lead to a smaller area of semi-natural priority wet woodland lost to the scheme.

These potential areas of priority habitat are unconfirmed and current status would be determined on completion of the full Extended Phase 1 Survey.

### **5.3.2 Barthomley Road and Radway Green Road Overbridges**

It has been assumed that the works required for Radway Bridge Option C and Barthomley Bridge Option D would be relatively close to the existing bridges, and therefore these options are likely to cause the least ecological impact. As such these options have not been further assessed below.

For the designated site ecological features, the different options are unlikely to have a discernible difference in terms of impacts or likely effects.

Radway Bridge Option B and Barthomley Bridge Option C both directly impact the most habitat features identified.

The key difference between the impacts to habitat ecological features associated with the Radway Bridge options and the Barthomley Bridge options relate to the potential impact to standing water. Radway Bridge Option B and Barthomley Bridge Option B would directly impact one pond each. Barthomley Bridge Option C would also impact broadleaved plantation woodland and scattered broad-leaved trees which are not affected by the other Barthomley Bridge Options.

A badger sett has been identified in the vicinity of the southern end of Barthomley Bridge Option B while all three Barthomley Bridge options have the potential to impact the badgers using this sett, the proximity of Option B is likely to cause licensable disturbance.

The loss of mature vegetation near the road as a result of Radway Bridge Option B and all of the Barthomley Bridge options may impact the bats ability to cross the road in these locations. However, if Main Line Option 1 is chosen, the additional vegetation clearance (in this key location) required to facilitate Barthomley Bridge Option C is likely to be minor.

The impact to water vole, amphibians, and white-clawed crayfish as a result of Radway Bridge Option B or Barthomley Bridge Option B is likely to be higher than other options due to the loss of a pond.

No other differences between the two Radway Bridge options or the three Barthomley Bridge Options were identified.

**Table 5.3 : Ecology Rankings**

Option 1	Option 2	Option 3
2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>

## 5.4 Cultural Heritage

### 5.4.1 Mainline

None of the route options would result in substantial harm to any designated assets identified in the study area.

As no designated assets are located within the footprint of any of the route options, the proposed scheme would not have a physical impact on any of the assets identified in this assessment.

The construction of the three route options may have an impact on the setting of 15 designated assets through either noise and or visual intrusion due to the proximity of the route to these assets. Most of these assets are located to the south of the proposed scheme within the village of Barthomley which has been designated as a Conservation Area, and includes one Grade I Listed Building, two Grade II\* Listed Buildings and 8 Grade II Listed Buildings. There is one further Grade II listed building located to the south of the scheme, west of Barthomley Conservation Area. There are also two Grade II assets located to the north of the proposed scheme.

During construction of any of the three route options there is the potential for adverse noise impacts associated with the construction traffic. There is also the potential for visual intrusion as a result of the removal of existing trees and vegetation to facilitate the construction of the new carriageway. These would be limited to the construction phase, as the new carriageway would be 'cut in' and sunk at lower levels than the heritage assets, thus removing its wider visibility and construction traffic would vacate the site once the construction phase has been completed. The construction phase of any of the three Options may also have an impact on archaeological remains which are present below ground, as the scheme would involve additional land take to the north or south of the existing carriageway. Thus the excavation works would cause physical damage to any buried archaeological remains, if present. The potential discovery of significant unknown archaeological remains poses a risk to the scheme.

No impacts are predicted to occur to the remaining 30 designated assets identified in this assessment during both the construction and operation phase. This is due to the fact that these assets are located a significant distance from all three route options (beyond 500m) and existing trees, vegetation and/or structures between the assets and the proposed scheme, prevent open views to the proposals.

During operation, Option 1 would bring traffic and its associated visual, noise and air quality impacts closer north to two Grade II listed buildings (Mill Farm and Cherry Tree Farm) which may affect the setting of these listed buildings during the operation of the scheme. Option 2 would move traffic and its associated visual, noise and air quality impacts further south and in closer proximity to Barthomley Conservation area, its associated listed buildings and a Grade II Listed Building, Town House Farm to the west of Barthomley Conservation Area. Option 3 would move traffic further south at the eastern and western ends of the scheme and traffic would be moved north in the central section of the scheme. Option 3 would therefore have fewer air, noise and visual impacts on the setting of Barthomley Conservation Area than Option 2, but more impact than Option 1. Option 1 would therefore have the fewest effects on the assets identified within the study area, however due to the relatively small difference in the distances between these assets and the three route options, the level of difference between these effects would be relatively small.

**Table 5.4 : Cultural Heritage Rankings**

Option 1	Option 2	Option 3
1 <sup>st</sup>	3 <sup>rd</sup>	2 <sup>nd</sup>

#### 5.4.2 Barthomley Road Overbridge

None of the three options for Barthomley Road Overbridge scheme would have a substantial harm to any designated assets identified in this assessment. There would potentially be temporary noise and visual intrusion to six assets during construction. There are not considered to be any significant impacts during operation.

#### 5.4.3 Radway Green Road Overbridge

For all of the bridge options, the construction phase has the potential for temporary noise and visual impacts on 13 assets. During operation, all of the bridge options have the potential to impact on 7 assets, although they would be replacing the existing bridge and so the significance of the impact would be reduced.



## 5.5 Air Quality

### 5.5.1 Mainline

For the assessment of air quality effects due to the three route options, the location of sensitive receptors has been considered, in terms of impacts from construction and operation.

Construction phase impacts are unknown at this stage. There is likely to be dust related impacts to residential areas close to the widening works, which would be the same for all three options. However this impact would be minimised with the adoption of best practice measures.

During operation it is expected that for each of the route options, the same number of air quality receptors would experience a minor adverse impact as a result of increased traffic flowing closer to the residential receptors as the result of the dualled carriageway. Dualling is also likely to increase daily average speed due to the reduction in congestion, which could have an adverse impact on air quality within 200m of the road. There are approximately nine properties within 200m of the road that would potentially be affected.

Existing air quality conditions are assumed to be good due to the open, rural location and it is considered very unlikely that any of the three dualling options would result in concentrations of any pollutant equal to or exceeding any the Air Quality Objective level of 40 µg/m<sup>3</sup> for nitrogen dioxide.

**Table 5.5 : Air Quality Rankings**

Option 1	Option 2	Option 3
Equal	Equal	Equal

### 5.5.2 Barthomley Road and Radway Green Road Overbridges

The existing air quality conditions would not be affected by the overbridge options. Therefore all the options would have a neutral effect on air quality.

## 5.6 Greenhouse Gases

### 5.6.1 Mainline

All three dualling options would increase embedded carbon (as significant construction works would be required) and reduce efficiency (as vehicle speed is expected to increase, which would increase fuel per vehicle/km). This would be the same for all three alignment options and would cause a slight adverse effect. There would be no beneficial impacts to offset these adverse impacts, such as an increase in public transport.

**Table 5.6 : Greenhouse Gas Rankings**

Option 1	Option 2	Option 3
Equal	Equal	Equal

## 5.6.2 Barthomley Road and Radway Green Road Overbridges

For the overbridge options it is assumed that the alteration to the existing bridge (namely Barthomley Road option D and Radway Green option C), would require less construction and therefore less new materials. As a consequence, less embedded carbon would be required. Therefore, there would be slight less greenhouse gas created by the construction of these options.

A detailed assessment of carbon production due to the construction of the preferred option would be carried out as part of the air quality assessment.

## 5.7 Noise and Vibration

### 5.7.1 Mainline

For the assessment of noise and vibration effects due to the three route options, the location of sensitive receptors has been considered, in terms of impacts from construction and operation.

For each proposed route widening option, where the route would be widened to the north, traffic would move closer to properties located on the northern side of the existing road. Where the route would be widened to the south, traffic would move closer to properties located on the southern side of the existing road. However, each route option has a similar number of sensitive receptors within 100m of the proposed scheme as the receptors are at broadly similar distances for each of the three options. There is likely to be very little difference in terms of construction and operation noise impact between the three route options due to the close proximity of the sensitive receptors on either side of the road.

**Table 5.7 : Noise and Vibration Rankings**

Option 1	Option 2	Option 3
Equal	Equal	Equal

### 5.7.2 Barthomley Road Overbridge

Option A would have a minor reduction in noise levels from vehicles for Cyprus Cottage, Poppy Cottage and Yew Tree Cottage as the overbridge is moved further away from these properties. Jasmine Cottage and Smith's Green Cottages would experience no change in noise levels.

For Option B, Cyprus Cottage, Poppy Cottage and Yew Tree Cottage, Jasmine Cottage and Smith's Green Cottages would experience a reduction in noise levels as the overbridge is moved further east away from these properties.

There would be a minor increase in noise experienced for Duchy House as overbridge is moved closer towards this property.

Option C would have no change in noise levels for nearby properties.

The widening of the existing overbridge, Option D is unlikely to have a significant impact existing noise levels.



There would be no significant changes in noise levels for properties affected by any of the overbridge options.

### 5.7.3 Radway Green Road Overbridge

Option A would provide a slight reduction in noise for Bluemire Farm as the road would be located further west, away from the property.

There would be a negligible reduction in noise for Bluemire farm for Option B, as the bridge will be moved slightly east.

Option C, to widen the existing overbridge, is unlikely to have a significant impact on existing noise levels.

There would be no significant changes in noise levels for properties affected by any of the overbridge options.

## 5.8 The Water Environment

As the scheme progresses to the next stage, assessments will be undertaken to determine the requirements for attenuating the rate of flow from the new highway drainage systems, and for treating water to improve its quality before discharge into receiving watercourses. It is likely that a vegetative treatment system will be incorporated into the design to attenuate and treat the flow, and at this stage it has been assumed that attenuation ponds will be provided either side of Englesea Brook and to the east of Barthomley Brook, as shown on plans B1832076\_P\_1045 to 1047 in Appendix G. The requirement would be the same for all three options, and so there is no preference in relation to this aspect. The pond at Barthomley Brook may present some engineering difficulties, because of the steep sided slopes on either side, but the problem is not considered to be insurmountable, and is common to all options. For further details see report no. 'B1832076/OD/12 - Drainage Strategy Report'.

The three existing watercourses will be crossed by each of the three widening options. All of the proposed route options would require the same types of construction activities; there are no activities that are unique to one of the Route Options. In addition, all the Route Options would involve construction works and operational activities that would affect the same watercourses. To cross these watercourses, the existing culverts would be extended to the north for Option 1 and the south for Option 2. For Option 3, the unnamed tributary culvert would be extended south, Englesea Brook's culvert would be extended to the north and south, and Barthomley Brook's culvert would be extended to the north. As a result, Option 3 is the least favourable option as it would involve extending Englesea Brook's culvert to the north and south. Potential slight adverse effects to water quality and geomorphology are likely to result from these construction works.

The construction of all three options would involve constructing the carriageway on land designated as Flood Zone 3 with a 1 in 100 or greater annual probability of river flooding. Englesea Brook has the widest floodplain of the three watercourses that are crossed by the A500. This would have a moderate adverse effect on floodplain storage for all three options.

All three of the route options would require areas of cut. The quality of the water within any aquifers present could be adversely impacted during construction as a result of accidental spillages during such earthworks. Groundwater supply may also

be affected if the works require dewatering. During operation, any discharges to groundwater could also have an adverse impact on these aquifers. However, with appropriate mitigation in place adverse impacts during construction and operation are unlikely to occur.

**Table 5.8 : Water Environment Rankings**

Option 1	Option 2	Option 3
1 <sup>st</sup>	1 <sup>st</sup>	3 <sup>rd</sup>

## 5.9 Effects on All Travellers

### 5.9.1 Vehicle Travellers

With the introduction of any of the route options, traffic flow would improve along the A500. The scheme would reduce congestion, thereby creating a beneficial impact on driver stress due to overall reductions in driver frustration and fear of accidents.

As the existing route is predominantly in cutting, it is unlikely that there will be any change to drivers' views from the road for any of the widening options.

Once operational, the scheme is anticipated to improve traffic flows along the A500, which would improve journey times for public transport services. As a result it is anticipated that the scheme would have a slight beneficial effect on public transport.

### 5.9.2 Non-motorised Users

Option 1 would widen the existing route to the north and would impact on a number of sections of footpath adjacent to the north of the existing route. The footpaths affected would be Barthomley FP4, Barthomley FP17, Barthomley FP18 and Barthomley FP25.

Widening to the south of the existing route for Option 2 would impact on a number of sections of footpath adjacent to the south of the existing route. The footpaths affected would be Barthomley FP15, Barthomley FP7, Barthomley FP33, Barthomley FP17 and Barthomley FP4.

For Option 3 where there would be proposed widening to sections to the north and south, this would sever the following footpaths: sections of Barthomley FP4 adjacent to the south and north of the existing route alignment; a section of FP17 north of existing route alignment; and a section of FP15, south of the existing route alignment.

None of the widening options would have an impact on regional cycle route 70.

To improve safety for NMUs, Barthomley FP4, FP17 and FP18, which currently have at grade uncontrolled crossings, will be diverted over the closest preferred overbridge option to provide a safer route to cross the A500.

**Table 5.9 : Effects on All Travellers Rankings**

Option 1	Option 2	Option 3
Equal	Equal	Equal

### 5.9.3 Barthomley Road and Radway Green Road Overbridges

Regional cycle route 70 would require diverting over the preferred Barthomley overbridge option once this has determined.

The widening of the A500 and its bridges would lead to long term significant beneficial effects for Non-Motorised Users (NMUs) as a result of improvements to Public Rights of Way (PRoW) connectivity, improved safety and improved amenity throughout the study area.

## 5.10 Community and Private Assets

### 5.10.1 Mainline

During construction, there would be no change to the level of community severance between the surrounding communities as the existing A500 would stay open whilst the widened section would be constructed offline. There may be disruptions to traffic flow whilst the new alignment is tied into the existing road network.

Overall, all three route options are expected to relieve congestion on the A500, thereby improving the ease of access to each of the nearby communities. During the construction and operation of any of the route options, there would be no loss of land used by the community.

None of the route options would require the demolition of any private properties or have any impacts on access to private properties during construction. However, Option 2 would require an area of land take from the garden of Bluemire Farm, and is the only residential property directly impacted by any of the proposed options. Permanent agricultural land take would be required for all three options. Options 1 and 3 are therefore considered to have a neutral effect on private properties. Option 2 is considered to have an adverse impact on private properties.

None of the route options would require the demolition of any commercial properties. There are currently no areas of land designated for development adjacent to the proposed route options.

Each of the three route options would have a long-term significant effect on agricultural land. A full agricultural assessment would be carried out at the next stage of assessment for the preferred route option. The assessment would be used to determine the exact effect of the proposed scheme on the Agricultural Land Classification (ALC) grades, determine the use of each field, current and future access to fields, gates and tracks that may be affected and consult with the farmers to gain their views and suggestions.

Potential agricultural effects not considered at this stage include disruption to field drainage (both in ditches and piped) and the potential effects of the contractor's compound, temporary diversion routes during construction, construction site drainage, dust etc. These would be addressed at the preferred route assessment stage.

Option 2 is therefore the least preferred option, based on the impact it has on Bluemire Farm.

**Table 5.10 : Community and Private Asset Rankings**

Option 1	Option 2	Option 3
1 <sup>st</sup>	3 <sup>rd</sup>	1 <sup>st</sup>

### 5.10.2 Barthomley Road Overbridge

The four options are unlikely to have any major impacts on community assets as access will be maintained between communities.

All four options would have an effect on agricultural land, with option two having the largest agricultural land take. The agricultural assessment would determine the full extent of this impact for the preferred bridge option.

### 5.10.3 Radway Green Road Overbridge

The three options are unlikely to have any major impacts on community assets as access will be maintained between communities.

All three options would have an effect on agricultural land. The agricultural assessment would determine the full extent of this impact for the preferred bridge option.

## 5.11 Planning

### 5.11.1 Mainline

The layout of the proposed scheme will need to reflect the following planning and environmental constraints in order to be compatible with the policies of the Crewe and Nantwich Local Plan and national planning policy.

It is extremely important to demonstrate that the proposed route represents the practical option that minimises the impact of the development on the openness of the Green Belt. The scheme must also minimise any impacts on the setting of nearby Conservation Areas and Listed Buildings.

**Table 5.11 : Planning Rankings**

Option 1	Option 2	Option 3
Equal	Equal	Equal

### 5.11.2 Barthomley Road and Radway Green Road Overbridges

Within the planning policy context set out above, a range of overbridge options are potentially acceptable, subject to the requirement to preserve the openness of the Green Belt as far as it is possible to do so.

## 6 Ranking Summary and Scoring

### 6.1 Ranking Summary

A summary of the rankings outlined in Section 4, and rankings of the cost estimate ranges in Section 3, are shown in Table 6.1 below.

Element	Option 1	Option 2	Option 3
Scheme Cost Estimate*	Equal	Equal	Equal
Topography and Land Use	Equal	Equal	Equal
Geology, Geomorphology and Ground Conditions	3 <sup>rd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>
Departures from Standards	Equal	Equal	Equal
Public Utilities	3 <sup>rd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>
Structures	1 <sup>st</sup>	1 <sup>st</sup>	3 <sup>rd</sup>
Reputation	3 <sup>rd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>
Constructability	1 <sup>st</sup>	1 <sup>st</sup>	3 <sup>rd</sup>
Operational Safety	Equal	Equal	Equal
Landscape	1 <sup>st</sup>	1 <sup>st</sup>	3 <sup>rd</sup>
Ecology	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>
Cultural Heritage	1 <sup>st</sup>	3 <sup>rd</sup>	2 <sup>nd</sup>
Air Quality	Equal	Equal	Equal
Greenhouse Gases	Equal	Equal	Equal
Noise and Vibration	Equal	Equal	Equal
The Water Environment	1 <sup>st</sup>	1 <sup>st</sup>	3 <sup>rd</sup>
All Travellers	Equal	Equal	Equal
Community and Private Assets	1 <sup>st</sup>	3 <sup>rd</sup>	1 <sup>st</sup>
Planning	Equal	Equal	Equal

**Table 6.1: Ranking Summary**

\* Given that there is a significant overlap between the options' cost estimate ranges, they are considered to be equal.

It is clear that overall Option 3 is the least preferred option. It is not the preferred option in any category, except where it is equally preferred with another option. It has a number of disadvantages compared to the other options, including creating areas where trees and vegetation are removed on both sides of the A500, and introducing crossings of the construction site over the A500, which creates problems for the flow of construction and highway traffic. Option 3 will therefore now be discounted and not taken forward for further assessment.

The clear choice is between Options 1 and 2, and these are taken forward for direct comparison in the section below.

## 6.2 Scoring

Options 1 and 2 are shown together in Table 6.2 below. Their ranks have been adjusted to reflect the fact that Option 3 has been discounted – they are now ranked 1<sup>st</sup>, 2<sup>nd</sup>, or equal.

Each ranking has now also been given a corresponding score, using the following points scoring system;

- 1<sup>st</sup> Ranking – 2 points
- 2<sup>nd</sup> Ranking – 1 points
- Where the options are ranked equally, they are both given a score of 2 points

These are the ‘unweighted’ scores, and have been summed to give an overall score and ranking, as shown on the left hand side of Table 6.2.

Weighting has also been assigned to each assessment element so that the relative importance of each could be established, i.e. so that the factors considered most important had a larger influence on the overall assessment.

The weighting for each element is shown in the central column of Table 6.2, and an explanation of the weightings is given in Section 6.3 below the table. The unweighted scores are multiplied by the weighting, to give the weighted scores as shown in the columns on the right hand side of Table 6.2.

Element	Unweighted Rankings / Scores		Weighting	Weighted Scores	
	Option 1	Option 2		Option 1	Option 2
Scheme Cost Estimate	Equal (2)	Equal (2)	1	2	2
Topography and Land Use	Equal (2)	Equal (2)	1	2	2
Geology, Geomorphology and Ground Conditions	2 <sup>rd</sup> (1)	1 <sup>st</sup> (2)	2	2	4
Departures from Standards	Equal (2)	Equal (2)	0.5	1	1
Public Utilities	2 <sup>rd</sup> (1)	1 <sup>st</sup> (2)	1	1	2
Structures	Equal (2)	Equal (2)	0	0	0
Reputation	2 <sup>rd</sup> (1)	1 <sup>st</sup> (2)	0.5	0.5	1
Constructability	Equal (2)	Equal (2)	1	2	2
Operational Safety	Equal (2)	Equal (2)	1	2	2
Landscape	Equal (2)	Equal (2)	0.4	0.8	0.8
Ecology	2 <sup>rd</sup> (1)	1 <sup>st</sup> (2)	0.4	0.4	0.8
Cultural Heritage	1 <sup>st</sup> (2)	2 <sup>rd</sup> (1)	0.2	0.4	0.2
Air Quality	Equal (2)	Equal (2)	0.2	0.4	0.4
Greenhouse Gases	Equal (2)	Equal (2)	0.2	0.4	0.4
Noise and Vibration	Equal (2)	Equal (2)	0.2	0.4	0.4
The Water Environment	Equal (2)	Equal (2)	0.4	0.8	0.8
All Travellers	Equal (2)	Equal (2)	0.2	0.4	0.4
Community and Private Assets	1 <sup>st</sup> (2)	2 <sup>rd</sup> (1)	0.6	1.2	0.6
Planning	Equal (2)	Equal (2)	0.2	0.4	0.4
<b>OVERALL</b>	<b>2<sup>nd</sup> (34)</b>	<b>1<sup>st</sup> (36)</b>		<b>2<sup>nd</sup> (18.1)</b>	<b>1<sup>st</sup> (21.2)</b>

Table 6.2 : Option Comparison Rankings and Scores

The assessments undertaken in this report show that 'Option 2 – Widening to the South' is the preferred option.

### 6.3 Explanation of Weighting

It should be appreciated that assigning weighting to the assessment elements is subjective. The weighting system has been developed so that the factors considered by the Project Team to be most important in delivering the project and achieving the scheme objectives are given a higher weighting to reflect their relative importance. All assessment elements have been given a weighting score of between 0 and 2.

**Scheme Cost Estimate** has been given a weighting of 1. All of the options will provide very similar financial benefits, and so a lower cost scheme will improve its value for money. However, it's noted that the Scheme Cost Estimates are also very similar for each option, and so it is not a differentiating factor.

**Topography and Land Use** has been given a weighting of 1. The impact of including additional land owners in the scheme could be significant in terms of the land acquisition process, particularly for residential properties.

**Geology, Geomorphology and Ground Conditions** has been given a weighting of 2. From an engineering perspective, one of the most significant features along the route is the duckaries pond. Anecdotally it is thought to have provided a significant challenge during the construction of the original A500. It is therefore an important factor and has been given a weighting of 2.

**Departures from Standards** has been given a weighting of 0.5. A road designed fully to standards is likely to provide the safest standard of road. However, there are not expected to be any major Departures from Standards for any of the mainline options.

**Public Utilities** has been given a weighting of 1. There are some significant utilities that cross the scheme, and could result in significant costs and delay.

**Structures** has been given a weighting of 0. There are not considered to be any significant technical challenges in providing the structures, so this shouldn't be a factor in determining between the options.

**Reputation** has been given a weighting of 0.5. Although the reputation of the Council and the perception of the public are important, it is only a temporary matter, to be managed by the Council, and is therefore not given as much weighting as other more important factors.

**Constructability** has been given a weighting of 1. All of the mainline options are considered to be feasible in terms of their construction, and so shouldn't be a factor in determining between the options. However, this element also takes programme into consideration, and this is an important factor in limiting the disruption to drivers and local residents.

**Operational Safety** has been given a weighting of 1. Safety is an important factor. However, all route options will be designed to current standards, which indicates that operational safety will not likely be an issue. In addition, there is already a category for Departures from Standards with a weighting of 0.5.

The remaining ten assessment elements are collectively classed as **Environmental Impacts**. These elements have all been given weightings, so that collectively Environmental Impacts has a weighting of 3. The collective weighting of 3 reflects



the fact that collectively the Environmental Impacts are considered a key factor in the assessment. It is considered that;

- Community and Private Assets is the most important environmental factor, because it takes into account the impact on property, and in particular Bluemire Farm which is the closest property to the scheme. It has therefore been given a weighting of 0.6.
- 'Ecology', 'The Water Environment' and 'Landscape' follow as the next most important environmental factors. They have been given a weighting of 0.4.
- The other Environmental Impacts are considered to have equal importance and so have been given a weighting of 0.2 to bring the overall weighting of Environmental Impacts to 3.

#### 6.4 Score Weightings Sensitivity Analysis

A sensitivity analysis has been undertaken on the weightings, and is included in Appendix H. In the analysis, the weightings applied in Table 6.2 above have been altered based on alternative scenarios, as described in the appendix.

The analysis shows that in most scenarios Option 2 is always the preferred option. There is one scenario where Option 1 is the preferred option, and that is where the two elements in which it scores best ('Cultural Heritage' and 'Community and Private Assets') are given a weighting of 2. In this scenario Option 1 is the preferred option by a margin of only 0.1.

There is an argument for giving the 'Community and Private Assets' element a weighting of 2, because it takes into consideration the impact on Bluemire Farm. However it is not considered to be appropriate to give the 'Cultural Heritage' element a score of 2, given that the Barthomley Conservation Area and the listed buildings in Barthomley are some distance away from the road.

## 7 Consultations

### 7.1 Consultations on the Options

A number of consultations have been held from December 2016 to March 2017, in order to get feedback from key stakeholders.

Only two of the mainline options were taken for consultation, 'Option 1 – Widening to the North' and 'Option 2 - Widening to the South', because Option 3 was discounted for the reasons given under Section 6.1. All of the bridge options for Barthomley Road Bridge and Radway Green Bridge were also taken for consultation.

#### 7.1.1 Meeting with Highways England

Highway England are the highway authority for M6 J16, the M6, and the A500 to the east of M6 J16. They are therefore a key stakeholder, and any change to the flow of traffic as a result of this scheme will affect the trunk road network.

A meeting was held with Highways England on the 12th December 2016. Overall they are supportive of the scheme, and had no preference for either of the two mainline widening options.

#### 7.1.2 Meetings with Land Owners and Tenants

Meetings have been held with a number of landowners and tenants along the scheme who would be directly affected by the proposed options. The focus has been to meet with owners and tenants who have land on both sides of the A500, who therefore would be affected by Option 1 and Option 2. There are some farm tenants along the scheme who have not been consulted, but they have land on only one side of the A500 so it is assumed that their preference would be for the road to be widened on the opposite side.

There was no clear consensus from these consultations in relation to the preferred mainline option, as shown in the table below.

Option 1 - Widening to the North	Option 2 – Widening to the South	No preference
Preference of landowners and tenants who were consulted		
3	1	3
Assumed preference of farm tenants but with land on one side, but who were not consulted		
1	2	0
<b>TOTAL</b>		
<b>4</b>	<b>3</b>	<b>3</b>

**Table 7.1: Preferred Mainline Option of Landowners and Farm Tenants**

With regard to the bridge options, there was a clear consensus from the farm tenants who would be directly affected by the different options. The preference was

for the bridges to be replaced on their existing alignments, because of the impact that the other options would have on farm land.

### 7.1.3 Stakeholder Workshop

The Key Stakeholders Workshop was held on 16<sup>th</sup> February 2017 at Cheshire East Council's offices at Delamere House in Crewe. The following people were invited;

Stakeholder	Attendance
Local Enterprise Partnership	Unable to attend
Natural England	Unable to attend
Cheshire Wildlife Trust	Attended
Sustrans	Unable to attend
Shell	Chose not to attend
Little Chef	Chose not to attend
Travelodge	Chose not to attend
Freight Transport Association	Unable to attend
Barthomley Parish Council representative	Attended
Weston and Basford Parish Council representative	Attended
Barthomley Action Group	Attended
Chamber of Commerce and Industry – South Cheshire	Unable to attend
Ramblers Association	Attended
Cheshire East Local Access Forum	Unable to attend (views were represented by the CEC Countryside Access Development Officer)
Cheshire Association of Local Councils	Unable to attend, but a follow up meeting was arranged
CEC Countryside Access Development Officer	Attended
CEC Flood Risk Manager	Unable to attend
CEC Nature Conservation Officer	Attended
CEC Environment Lead / Landscape specialist	Attended
CEC Planning Policy & CIL Manager	Attended
CEC Environmental Protection & Air Quality officer	Attended
CEC Project Sponsor	Attended
Jacobs Project Manager	Attended
Jacobs Highway Engineer	Attended

**Table 7.2: Stakeholder Workshop Invitees**

A range of views were expressed at the workshop, with some people preferring mainline Option 1, and others Option 2. Reasons given for preferring Option 1 were that it would be further away from Barthomley village, so have less impact on the landscape as viewed from the village, and less impact on the conservation area. From an ecological point of view, it was said that Option 2 was slightly preferred,

because it would avoid the duckaries pond and have slightly less impact on the area along Englesea Brook.

With regard to the bridge options, there was a consensus that the preferred options were for Barthomley Bridge and Radway Green Bridge to be replaced on their existing alignments.

Generally, people were supportive of the scheme.

#### **7.1.4 Parish Council Briefings**

The Project Team attended a Barthomley Parish Council meeting on 14<sup>th</sup> March 2017, and a Weston & Basford Parish council meeting on 16<sup>th</sup> March. They provided a briefing on the scheme, and took plans of mainline Option 1 and Option 2, and plans of all the bridge options.

The parish councils were generally supportive of the scheme.

## **7.2 Other Comments Raised During the Consultations**

The following comments were also raised during the consultations;

- There was a widely held view that people would not want to see development in the local area as a result of the road widening scheme.
- Several people independently said that difficult ground conditions were encountered at the duckaries pond during the construction of the original A500 road. It was said that a significant amount of material was imported to site for this area, and that the pond was very deep.
- The duckaries pond is valued as an amenity by local people, and as an ecological feature by Cheshire Wildlife Trust and CEC's Nature Conservation Officer.
- The Englesea Brook corridor is valued as an ecological feature by Cheshire Wildlife Trust and CEC's Nature Conservation Officer.
- There was a concern that there would be rat running on the local road network during the construction of the road widening, because of congestion caused by traffic management on the A500, and because of deliveries to the site.
- There was a concern about the impact caused by removing the well-established trees alongside the A500, on whichever side the road was to be widened. In particular, the impact on views and noise levels from Barthomley if the widening is to be to the south.
- The local footpath network should be given appropriate consideration during the design of the road widening scheme
- The central reserve width shown on the option plans seemed to be quite wide.

- Access over the bridges would need to be maintained during construction to access farm land on both sides
- Appropriate road surfacing materials and noise fencing to be included in the design, to minimise noise impacts.
- It was asked if the bridge parapets could be designed in a way that was more sympathetic to the local environment, compared to the existing parapets.

### 7.3 Consultations Summary

The people involved in the consultation exercise were generally supportive of the scheme.

Overall there was no consensus on the preferred mainline option. There was a consensus on the bridge options; the on-line options for Barthomley Bridge and Radway Green Bridge were preferred.

A number of other comments were raised during the consultations, and these will be taken into consideration as the scheme design is developed. Further consultations will take place as the scheme is progressed.

## 8 Conclusion

Based on the findings from this report, it is considered that all three of the mainline options are viable solutions, and deliverable from an engineering perspective. The estimated scheme cost is not considered to be prohibitively expensive for any of the options.

The engineering and environmental assessments show that 'Option 3 – Hybrid' is clearly the least preferred option. The decision between 'Option 1 – Widening to the North' and 'Option 2 – Widening to the South' is a finely balanced one, but the assessments conclude that Option 2 is the preferred option.

Consultations were undertaken with selected stakeholders on Option 1 and Option 2. There was no consensus on which is the preferred option. Therefore, the results from the engineering and environmental assessments are not contested, and Option 2 will be taken forward as the preferred option.

All of the options for the replacement of Barthomley Road Bridge and Radway Green Road Bridge are considered to be viable, and deliverable from an engineering perspective.

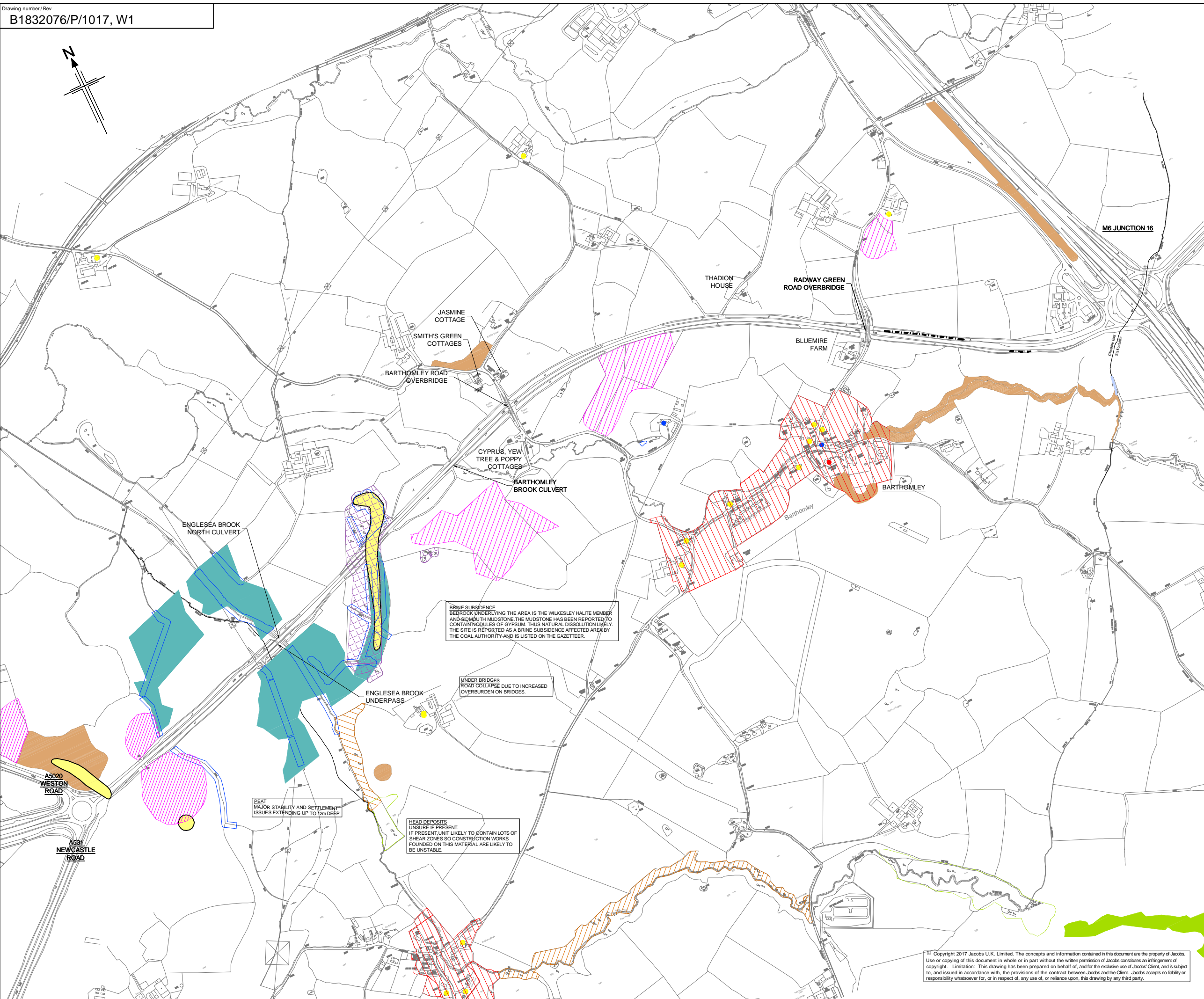
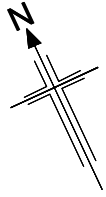
The engineering assessment identifies certain advantages with the off-line options during the construction period. However, consultations with selected stakeholders show that there is a clear consensus that the on-line bridge options are preferred. Therefore, 'Barthomley Road Bridge – Option D' and 'Radway Green Road Bridge – Option C' will be taken forward as the preferred options.

A number of other comments were raised during the consultations, and these will be taken into consideration as the scheme design is developed.

**Page Not Used**

## Appendix A – Constraints Plan

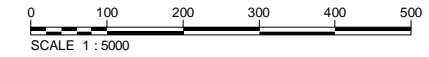




**NOTES:**  
 1. All dimensions are in meters, unless stated otherwise.

- NOTES:**
- OS Base Plan
  - M6 Junction 16 Pinch Point Scheme
  - M6 Junction 16 Pinch Point Retaining Wall
  - Footpath
  - Cycle Route - R70
  - Watercourses and Waterbodies
  - Historical Landfill
  - I
  - II
  - II'
  - Broadleaved woodland - plantation
  - Broadleaved woodland - semi-natural
  - Ancient semi-natural woodland
  - Ancient replanted woodland
  - Local conservative areas
  - Environment Agency - Flood Zone
  - Subsidence feature

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W1	07/04/2017	DRAFT - FOR INFORMATION	EL	JH	DT	DT
W0	02/12/2015	DRAFT - FOR INFORMATION	PS	SS	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com



Client  
**Cheshire East Council**

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME OVERALL CONSTRAINTS PLAN**

Drawing status  
**FOR INFORMATION**

Scale	1:5000	DO NOT SCALE
Jacobs No.	B1832076	
Client no.		

Drawing number  
**B1832076/P/1017**

Rev  
**W1**

BRINE SUBSIDENCE  
 BEDROCK UNDERLYING THE AREA IS THE WILKESLEY HALITE MEMBER AND SOUTHWEST MUDSTONE. THE MUDSTONE HAS BEEN REPORTED TO CONTAIN NODULES OF GYPSUM. THIS NATURAL DISSOLUTION LIKELY. THE SITE IS REPORTED AS A BRINE SUBSIDENCE AFFECTED AREA BY THE COAL AUTHORITY AND IS LISTED ON THE GAZETTEER.

UNDER BRIDGES  
 ROAD COLLAPSE DUE TO INCREASED OVERBURDEN ON BRIDGES.

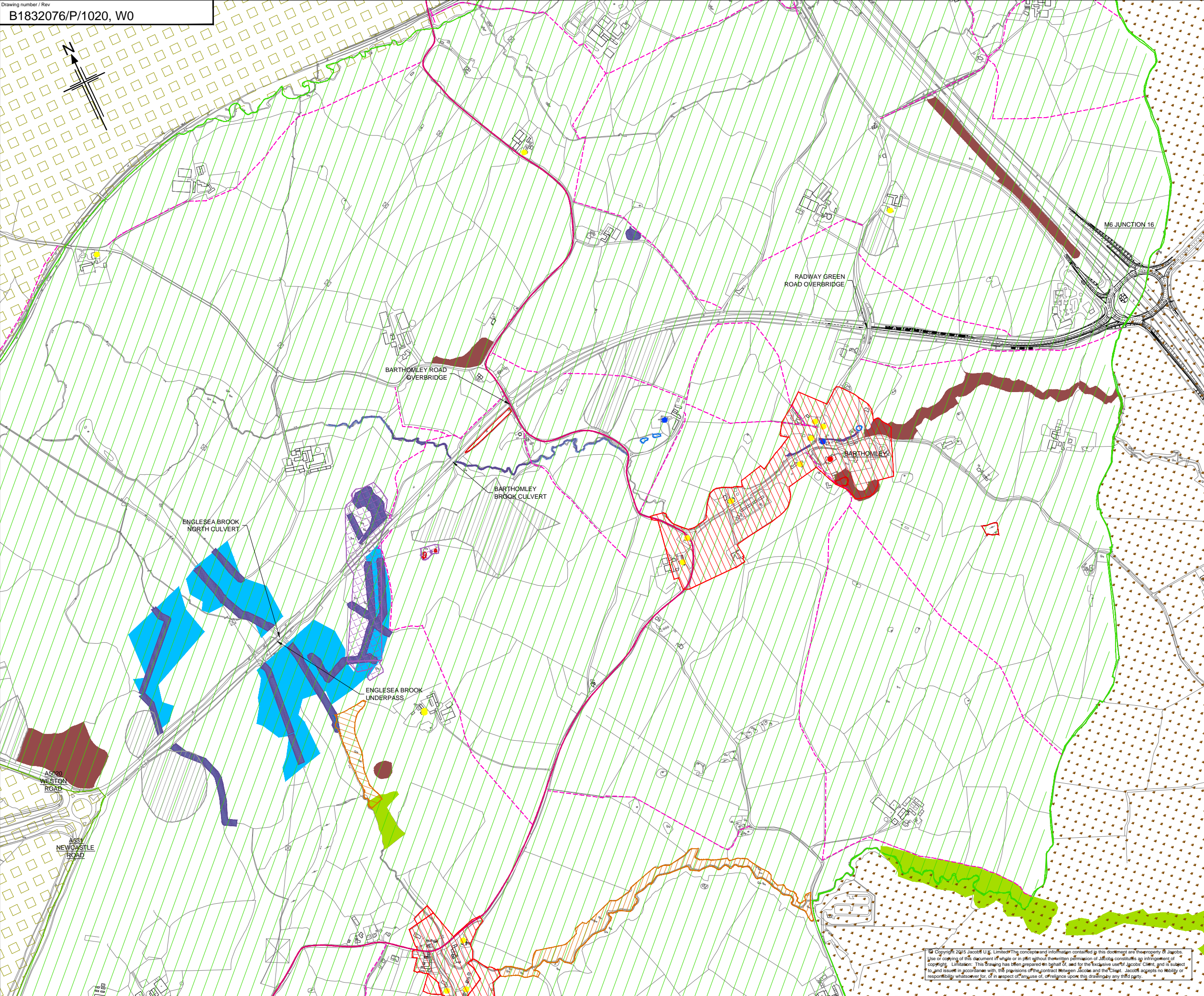
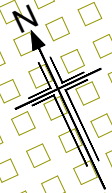
PEAT  
 MAJOR STABILITY AND SETTLEMENT ISSUES EXTENDING UP TO 12m DEEP

HEAD DEPOSITS  
 UNSURE IF PRESENT. IF PRESENT, UNLIKELY TO CONTAIN LOTS OF SHEAR ZONES SO CONSTRUCTION WORKS FOUNDED ON THIS MATERIAL ARE LIKELY TO BE UNSTABLE.

© Copyright 2017 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of, Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.



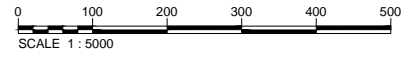
Drawing number / Rev  
**B1832076/P/1020, W0**



**NOTES:**  
 1. All dimensions are in meters, unless stated otherwise.

- LEGEND:**
- OS Base Plan
  - M6 Junction 16 Pinch Point Scheme
  - M6 Junction 16 Pinch Point Retaining Wall
  - I Listed Building (Grade)
  - II
  - II\*
  - Landfill - Inert
  - Ancient Clay Farmlands
  - Green Belt
  - Lower Farms & Woods
  - Broadleaved woodland - plantation
  - Broadleaved woodland - semi-natural
  - Ancient semi-natural woodland
  - Ancient replanted woodland
  - OS Surface ater features
  - OS Surface water feature areas
  - Local conservation areas
  - Environment Agency - Flood Zone
  - Buildings
  - Public Rights of Way
  - Regional Cycle Route

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W0	02/12/2015	DRAFT - FOR INFORMATION	PS	SS	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com



**A500 WIDENING SCHEME**

**Drawing title**  
**A500 DUALLING AND WIDENING SCHEME**  
**ENVIRONMENTAL CONSTRAINTS PLAN**

**Drawing status**  
**FOR INFORMATION**

Scale: 1:5000 DO NOT SCALE  
 Jacobs No. B1832076

Client no.  
**Drawing number**  
**B1832076/P/1020**

Rev  
**W0**

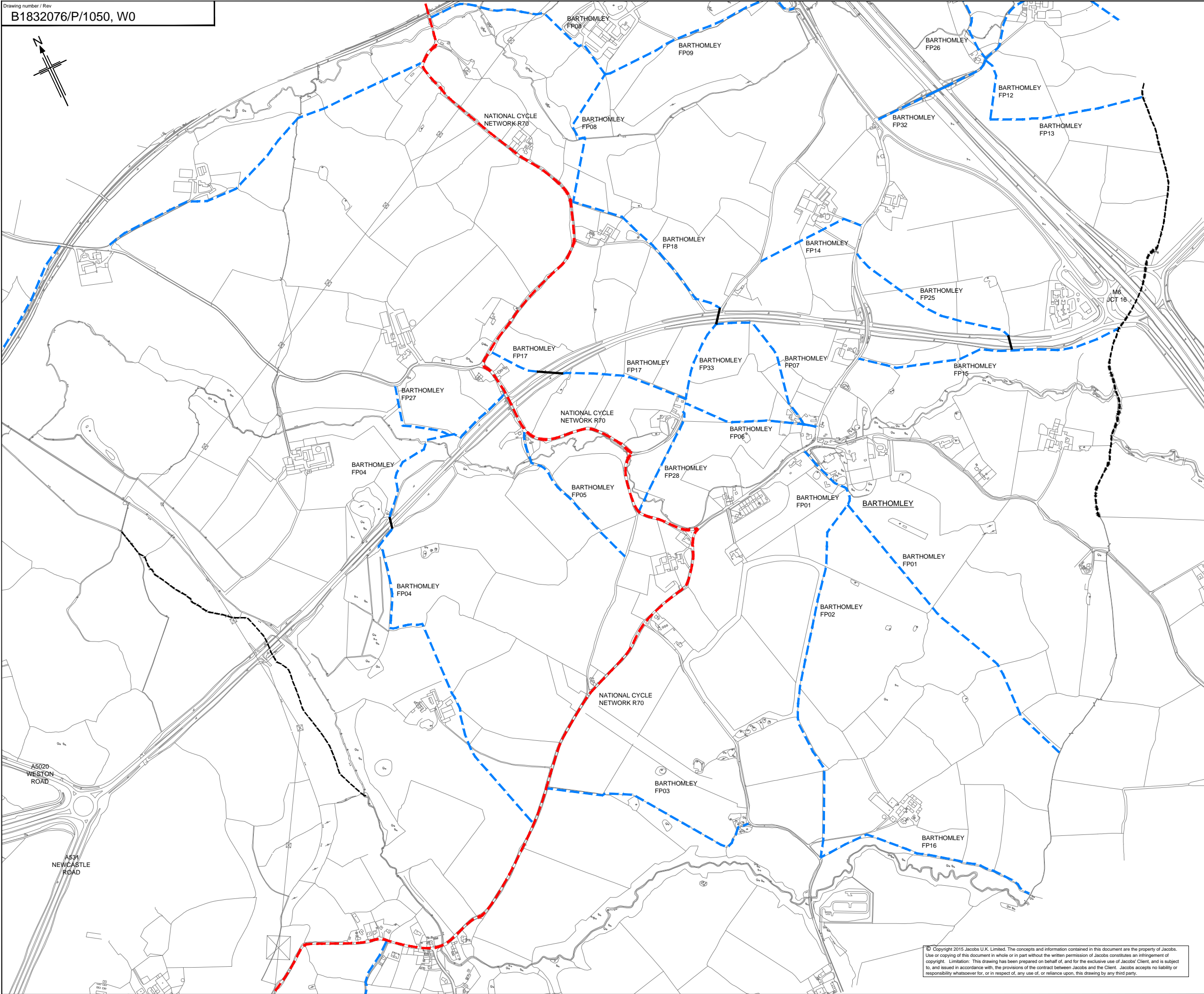
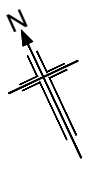
© Copyright 2015 Jacobs U.K. Limited. The copyright and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of, Jacobs' Client, and is subject to and issued in accordance with the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

## Appendix B – Public Rights of Way Plan



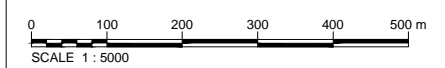




**NOTES:**  
 1. All dimensions are in meters, unless stated otherwise.

- LEGEND:**
- Parish / district boundary
  - Footpath
  - Cycleway
  - At-grade uncontrolled crossings

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



WO	30/03/2016	FIRST ISSUE	KH	DT	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Approved

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com

Client

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 PUBLIC RIGHTS OF WAY**

Drawing status  
**FOR INFORMATION**

Scale  
 1:5000 @ A1      DO NOT SCALE

Jacobs No.      B1832076

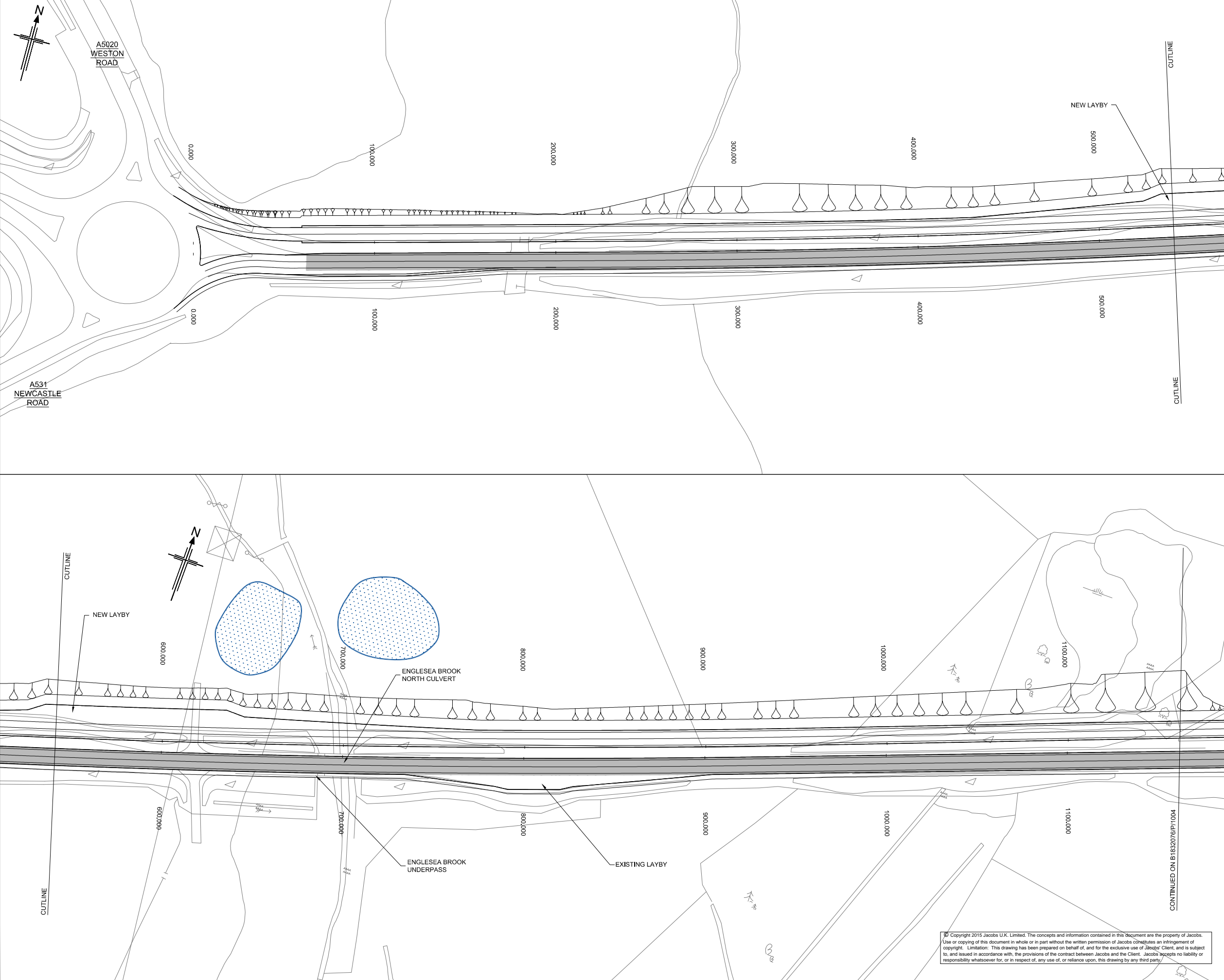
Drawing number  
**B1832076/P/1050**      Rev  
**W0**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

## Appendix C – General Arrangement Plans

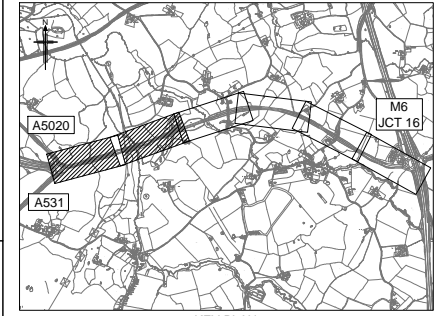


B1832076/P/1003, W2

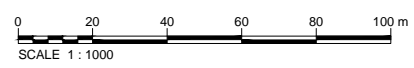


- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1012 - General Arrangement Barthomley Option A
    - Dwg No. B1832076/P/1013 - General Arrangement Barthomley Option B
    - Dwg No. B1832076/P/1014 - General Arrangement Barthomley Option C
    - Dwg No. B1832076/P/1015 - General Arrangement Radway Green Option A
    - Dwg No. B1832076/P/1016 - General Arrangement Radway Green Option B

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway
  - Proposed Attenuation Ponds



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W2	18/03/2016	ADDITION OF PROPOSED PONDS & BRIDGE OPTIONS RENAMED	KJH	DT	DT	SK
W1	21/01/2016	REVISED - FOR INFORMATION	BS	KJH	DT	SK
W0	18/09/2015	DRAFT - FOR INFORMATION	KJH	DT	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Approv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com



Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 OPTION 1: NORTH - SHEET 1 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

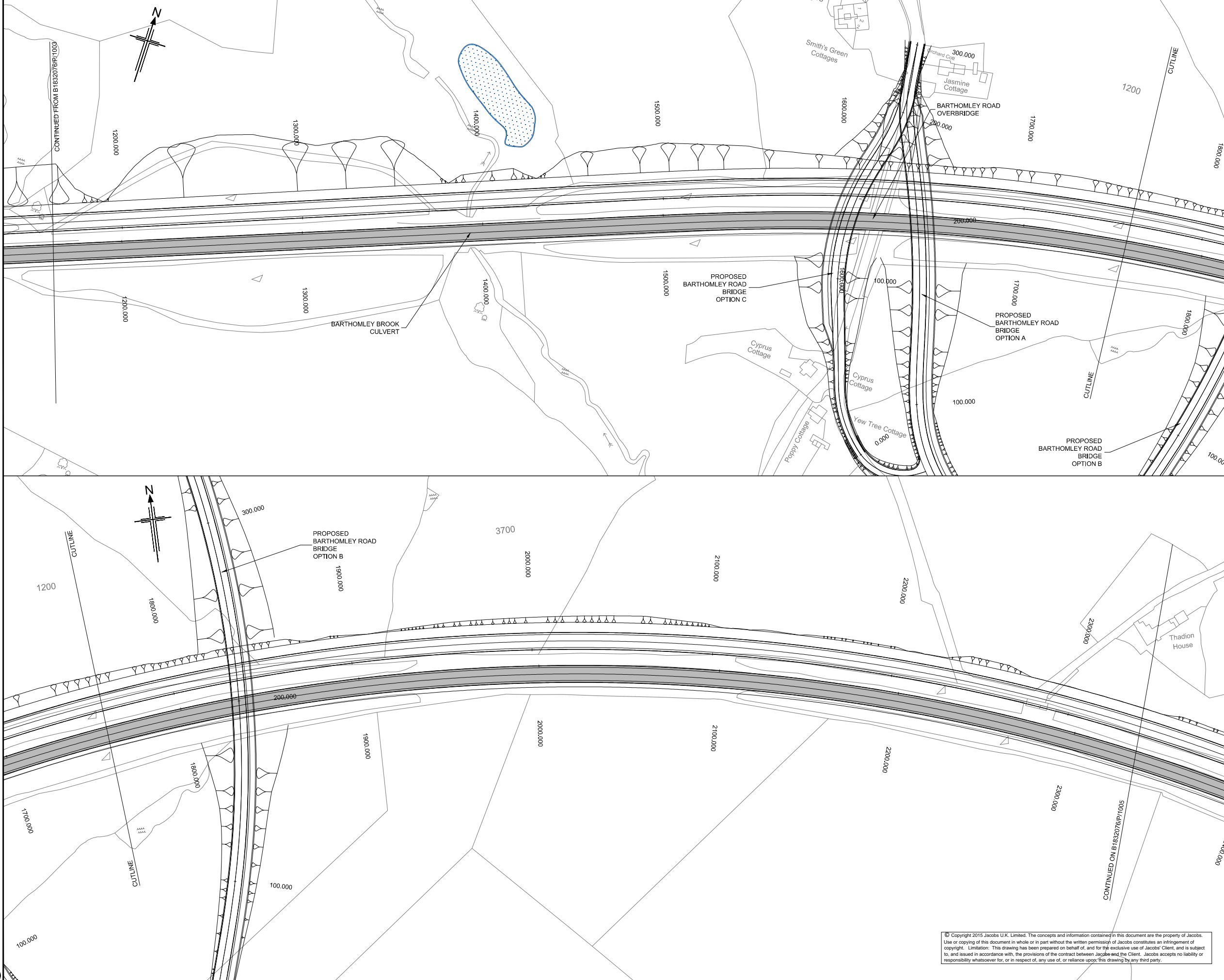
Jacobs No.  
 B1832076

Client no.  
 Drawing number  
**B1832076/P/1003** Rev  
**W2**

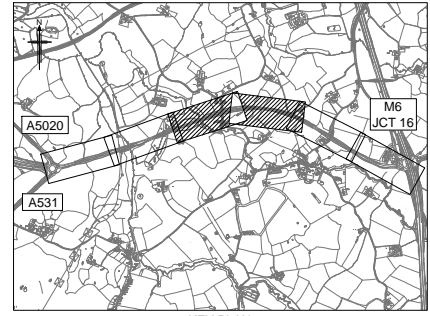
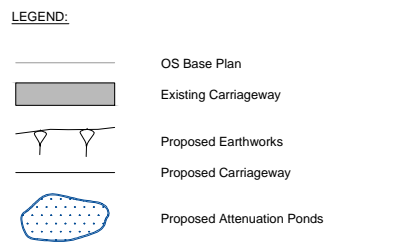
© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

V:\1832076\1832076\_P1003\_W2.dwg - 18/03/2016 10:27:41 - 1832076\_P1003\_W2.dwg - 18/03/2016 10:27:41 - 1832076\_P1003\_W2.dwg

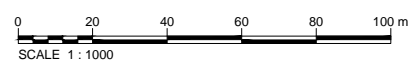




- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1012 - General Arrangement Barthomley Option A
    - Dwg No. B1832076/P/1013 - General Arrangement Barthomley Option B
    - Dwg No. B1832076/P/1014 - General Arrangement Barthomley Option C
    - Dwg No. B1832076/P/1015 - General Arrangement Radway Green Option A
    - Dwg No. B1832076/P/1016 - General Arrangement Radway Green Option B



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W2	18/03/2016	ADDITION OF PROPOSED PONDS & BRIDGE OPTIONS RENAMED	KJH	DT	DT	SK
W1	21/01/2016	REVISED - FOR INFORMATION	BS	KJH	DT	SK
W0	18/09/2015	DRAFT - FOR INFORMATION	KJH	DT	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd



Client  
 Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 OPTION 1: NORTH - SHEET 2 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

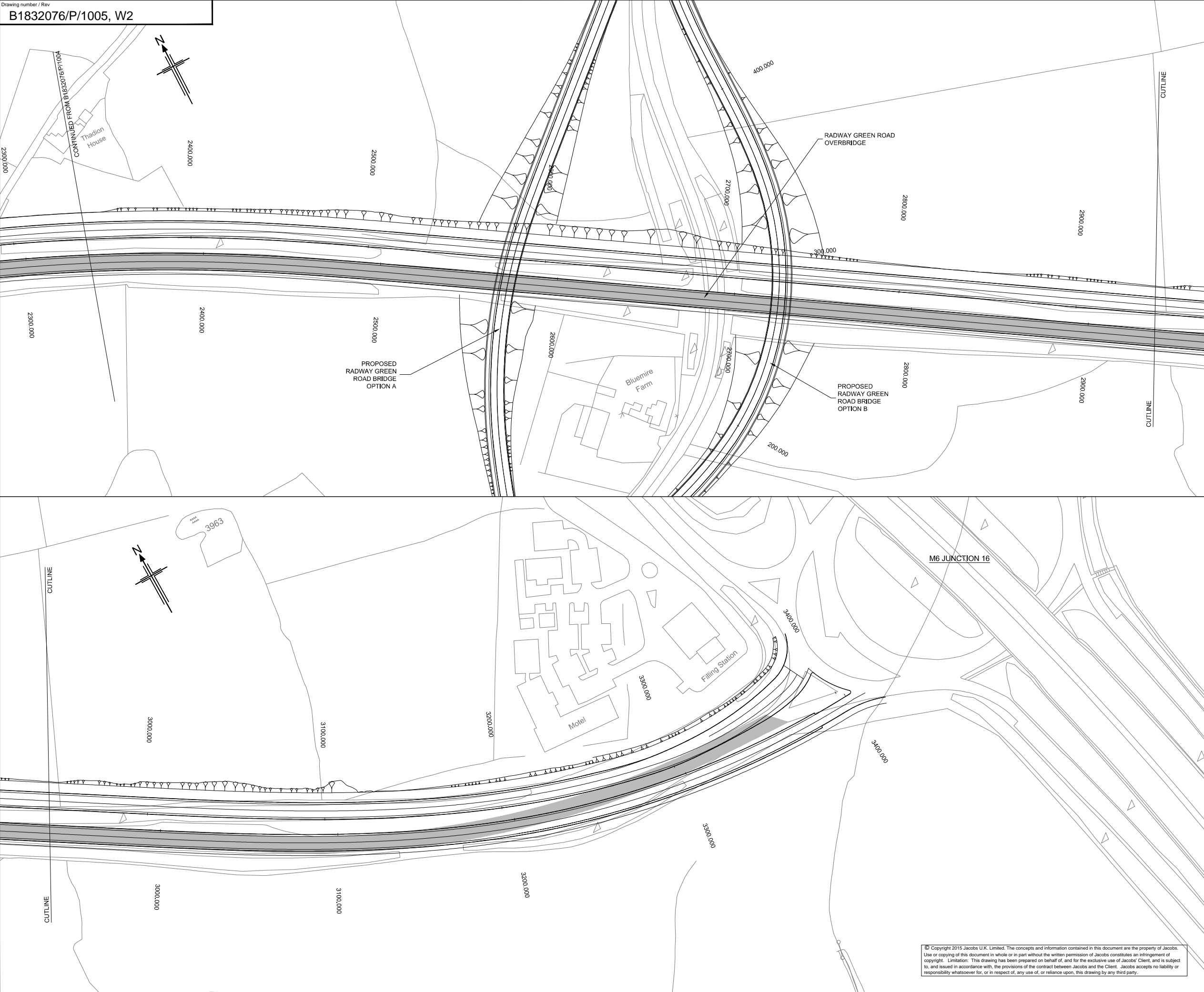
Jacobs No.  
 B1832076

Drawing number  
**B1832076/P/1004**

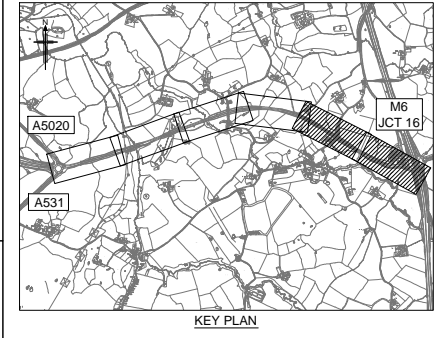
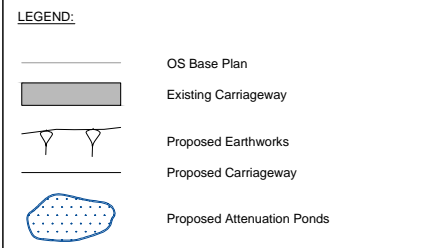
Rev  
**W2**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

Part 1: 18/03/2016 - 18/03/2016  
 Part 2: 21/01/2016 - 21/01/2016  
 Part 3: 18/09/2015 - 18/09/2015  
 Part 4: 18/03/2016 - 18/03/2016  
 Part 5: 21/01/2016 - 21/01/2016  
 Part 6: 18/09/2015 - 18/09/2015  
 Part 7: 18/03/2016 - 18/03/2016  
 Part 8: 21/01/2016 - 21/01/2016  
 Part 9: 18/09/2015 - 18/09/2015  
 Part 10: 18/03/2016 - 18/03/2016  
 Part 11: 21/01/2016 - 21/01/2016  
 Part 12: 18/09/2015 - 18/09/2015  
 Part 13: 18/03/2016 - 18/03/2016  
 Part 14: 21/01/2016 - 21/01/2016  
 Part 15: 18/09/2015 - 18/09/2015  
 Part 16: 18/03/2016 - 18/03/2016  
 Part 17: 21/01/2016 - 21/01/2016  
 Part 18: 18/09/2015 - 18/09/2015  
 Part 19: 18/03/2016 - 18/03/2016  
 Part 20: 21/01/2016 - 21/01/2016  
 Part 21: 18/09/2015 - 18/09/2015  
 Part 22: 18/03/2016 - 18/03/2016  
 Part 23: 21/01/2016 - 21/01/2016  
 Part 24: 18/09/2015 - 18/09/2015  
 Part 25: 18/03/2016 - 18/03/2016  
 Part 26: 21/01/2016 - 21/01/2016  
 Part 27: 18/09/2015 - 18/09/2015  
 Part 28: 18/03/2016 - 18/03/2016  
 Part 29: 21/01/2016 - 21/01/2016  
 Part 30: 18/09/2015 - 18/09/2015  
 Part 31: 18/03/2016 - 18/03/2016  
 Part 32: 21/01/2016 - 21/01/2016  
 Part 33: 18/09/2015 - 18/09/2015  
 Part 34: 18/03/2016 - 18/03/2016  
 Part 35: 21/01/2016 - 21/01/2016  
 Part 36: 18/09/2015 - 18/09/2015  
 Part 37: 18/03/2016 - 18/03/2016  
 Part 38: 21/01/2016 - 21/01/2016  
 Part 39: 18/09/2015 - 18/09/2015  
 Part 40: 18/03/2016 - 18/03/2016  
 Part 41: 21/01/2016 - 21/01/2016  
 Part 42: 18/09/2015 - 18/09/2015  
 Part 43: 18/03/2016 - 18/03/2016  
 Part 44: 21/01/2016 - 21/01/2016  
 Part 45: 18/09/2015 - 18/09/2015  
 Part 46: 18/03/2016 - 18/03/2016  
 Part 47: 21/01/2016 - 21/01/2016  
 Part 48: 18/09/2015 - 18/09/2015  
 Part 49: 18/03/2016 - 18/03/2016  
 Part 50: 21/01/2016 - 21/01/2016  
 Part 51: 18/09/2015 - 18/09/2015  
 Part 52: 18/03/2016 - 18/03/2016  
 Part 53: 21/01/2016 - 21/01/2016  
 Part 54: 18/09/2015 - 18/09/2015  
 Part 55: 18/03/2016 - 18/03/2016  
 Part 56: 21/01/2016 - 21/01/2016  
 Part 57: 18/09/2015 - 18/09/2015  
 Part 58: 18/03/2016 - 18/03/2016  
 Part 59: 21/01/2016 - 21/01/2016  
 Part 60: 18/09/2015 - 18/09/2015  
 Part 61: 18/03/2016 - 18/03/2016  
 Part 62: 21/01/2016 - 21/01/2016  
 Part 63: 18/09/2015 - 18/09/2015  
 Part 64: 18/03/2016 - 18/03/2016  
 Part 65: 21/01/2016 - 21/01/2016  
 Part 66: 18/09/2015 - 18/09/2015  
 Part 67: 18/03/2016 - 18/03/2016  
 Part 68: 21/01/2016 - 21/01/2016  
 Part 69: 18/09/2015 - 18/09/2015  
 Part 70: 18/03/2016 - 18/03/2016  
 Part 71: 21/01/2016 - 21/01/2016  
 Part 72: 18/09/2015 - 18/09/2015  
 Part 73: 18/03/2016 - 18/03/2016  
 Part 74: 21/01/2016 - 21/01/2016  
 Part 75: 18/09/2015 - 18/09/2015  
 Part 76: 18/03/2016 - 18/03/2016  
 Part 77: 21/01/2016 - 21/01/2016  
 Part 78: 18/09/2015 - 18/09/2015  
 Part 79: 18/03/2016 - 18/03/2016  
 Part 80: 21/01/2016 - 21/01/2016  
 Part 81: 18/09/2015 - 18/09/2015  
 Part 82: 18/03/2016 - 18/03/2016  
 Part 83: 21/01/2016 - 21/01/2016  
 Part 84: 18/09/2015 - 18/09/2015  
 Part 85: 18/03/2016 - 18/03/2016  
 Part 86: 21/01/2016 - 21/01/2016  
 Part 87: 18/09/2015 - 18/09/2015  
 Part 88: 18/03/2016 - 18/03/2016  
 Part 89: 21/01/2016 - 21/01/2016  
 Part 90: 18/09/2015 - 18/09/2015  
 Part 91: 18/03/2016 - 18/03/2016  
 Part 92: 21/01/2016 - 21/01/2016  
 Part 93: 18/09/2015 - 18/09/2015  
 Part 94: 18/03/2016 - 18/03/2016  
 Part 95: 21/01/2016 - 21/01/2016  
 Part 96: 18/09/2015 - 18/09/2015  
 Part 97: 18/03/2016 - 18/03/2016  
 Part 98: 21/01/2016 - 21/01/2016  
 Part 99: 18/09/2015 - 18/09/2015  
 Part 100: 18/03/2016 - 18/03/2016



- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1012 - General Arrangement Barthomley Option A
    - Dwg No. B1832076/P/1013 - General Arrangement Barthomley Option B
    - Dwg No. B1832076/P/1014 - General Arrangement Barthomley Option C
    - Dwg No. B1832076/P/1015 - General Arrangement Radway Green Option A
    - Dwg No. B1832076/P/1016 - General Arrangement Radway Green Option B



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015

SCALE 1 : 1000

W2	18/03/2016	ADDITION OF PROPOSED PONDS & BRIDGE OPTIONS RENAMED	KJH	DT	DT	SK
W1	21/01/2016	REVISED - FOR INFORMATION	BS	KJH	DT	SK
W0	18/09/2015	DRAFT - FOR INFORMATION	KJH	DT	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com

Client

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 OPTION 1: NORTH - SHEET 3 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

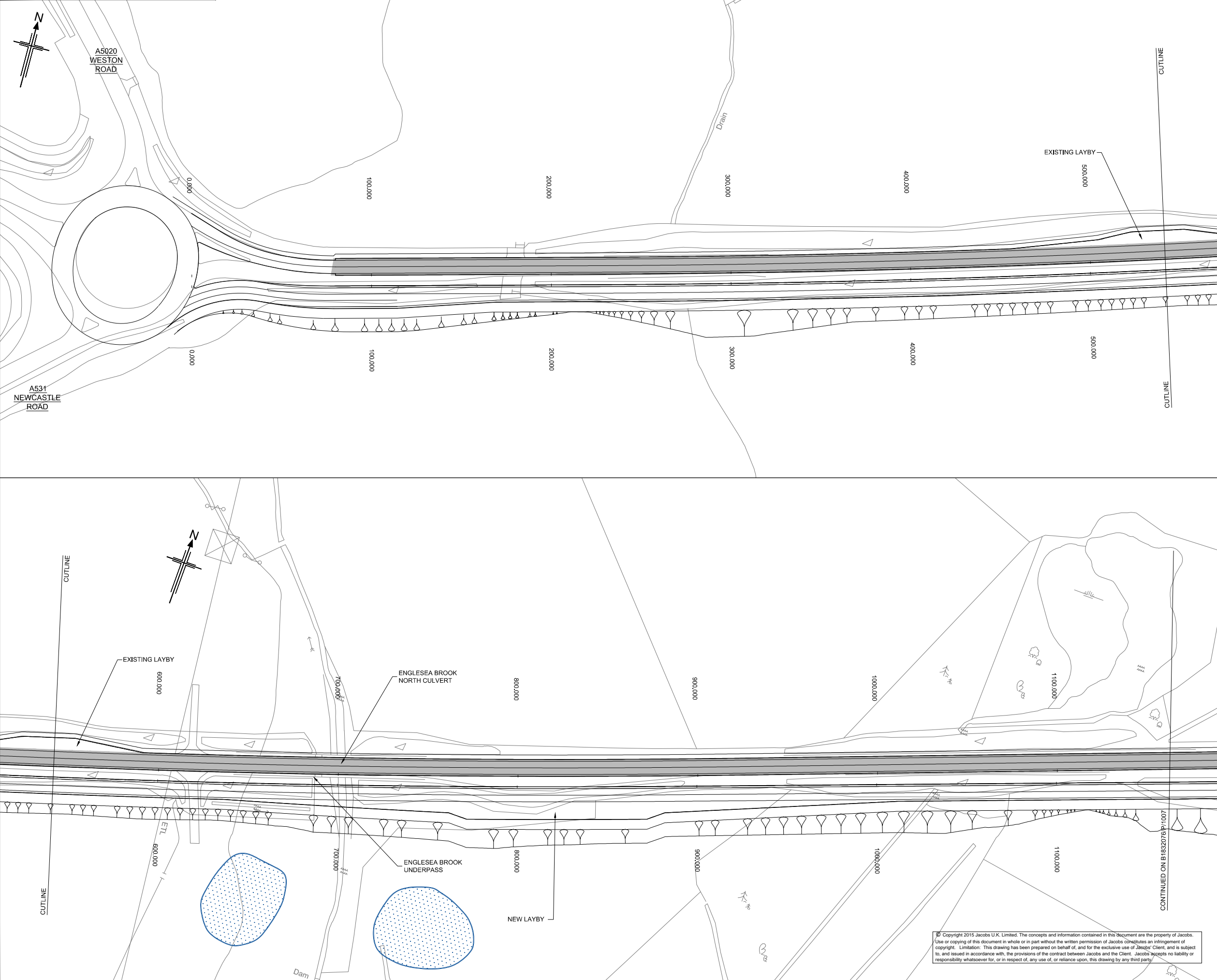
Jacobs No. B1832076

Drawing number  
**B1832076/P/1005** Rev  
**W2**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

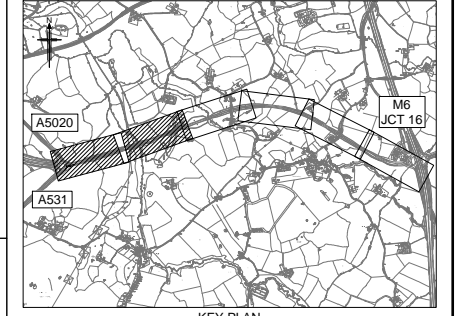
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.





- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1012 - General Arrangement Barthomley Option A
    - Dwg No. B1832076/P/1013 - General Arrangement Barthomley Option B
    - Dwg No. B1832076/P/1014 - General Arrangement Barthomley Option C
    - Dwg No. B1832076/P/1015 - General Arrangement Radway Green Option A
    - Dwg No. B1832076/P/1016 - General Arrangement Radway Green Option B

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway
  - Proposed Attenuation Ponds



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015

SCALE 1 : 1000

W2	18/03/2016	ADDITION OF PROPOSED PONDS & BRIDGE OPTIONS RENAMED	KJH	DT	DT	SK
W1	21/01/2016	REVISED - FOR INFORMATION	BS	KJH	DT	SK
W0	18/09/2015	DRAFT - FOR INFORMATION	KJH	DT	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel:+44(0)161 235 6000 Fax:+44(0)161 235 6001  
 www.jacobs.com



Client  
**Cheshire East Council**

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 OPTION 2: SOUTH - SHEET 1 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1      DO NOT SCALE

Jacobs No.      B1832076

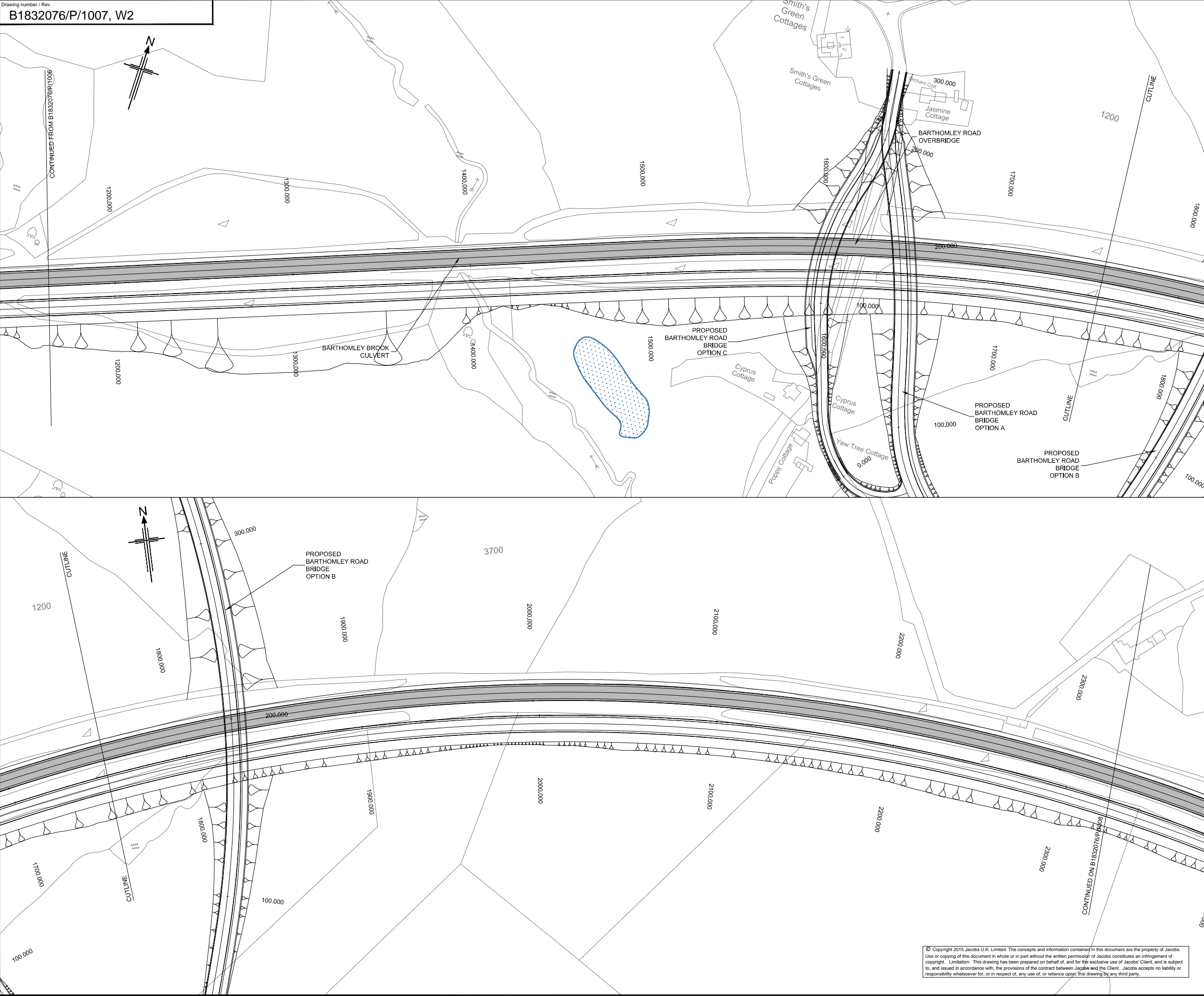
Client no.

Drawing number  
**B1832076/P/1006**

Rev  
**W2**

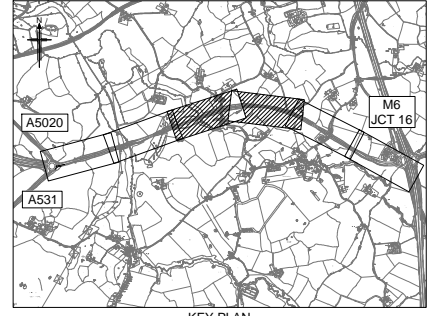
© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

R:\Projects\A500\Drawings\A500\_WIDENING\_SCHEME\OPTION\_2\_SOUTH\_SHEET\_1\_OF\_3.dwg

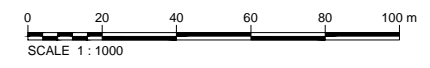


- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1012 - General Arrangement Barthomley Option A
    - Dwg No. B1832076/P/1013 - General Arrangement Barthomley Option B
    - Dwg No. B1832076/P/1014 - General Arrangement Barthomley Option C
    - Dwg No. B1832076/P/1015 - General Arrangement Radway Green Option A
    - Dwg No. B1832076/P/1016 - General Arrangement Radway Green Option B

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway
  - Proposed Attenuation Ponds



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W2	18/03/2016	ADDITION OF PROPOSED PONDS & BRIDGE OPTIONS RENAMED	KJH	DT	DT	SK
W1	21/01/2016	REVISED - FOR INFORMATION	BS	KJH	DT	SK
W0	18/09/2015	DRAFT - FOR INFORMATION	KJH	DT	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Revd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com

**Cheshire East Council**

Client  
 Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 OPTION 2: SOUTH - SHEET 2 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

Jacobs No. B1832076  
 Client no.

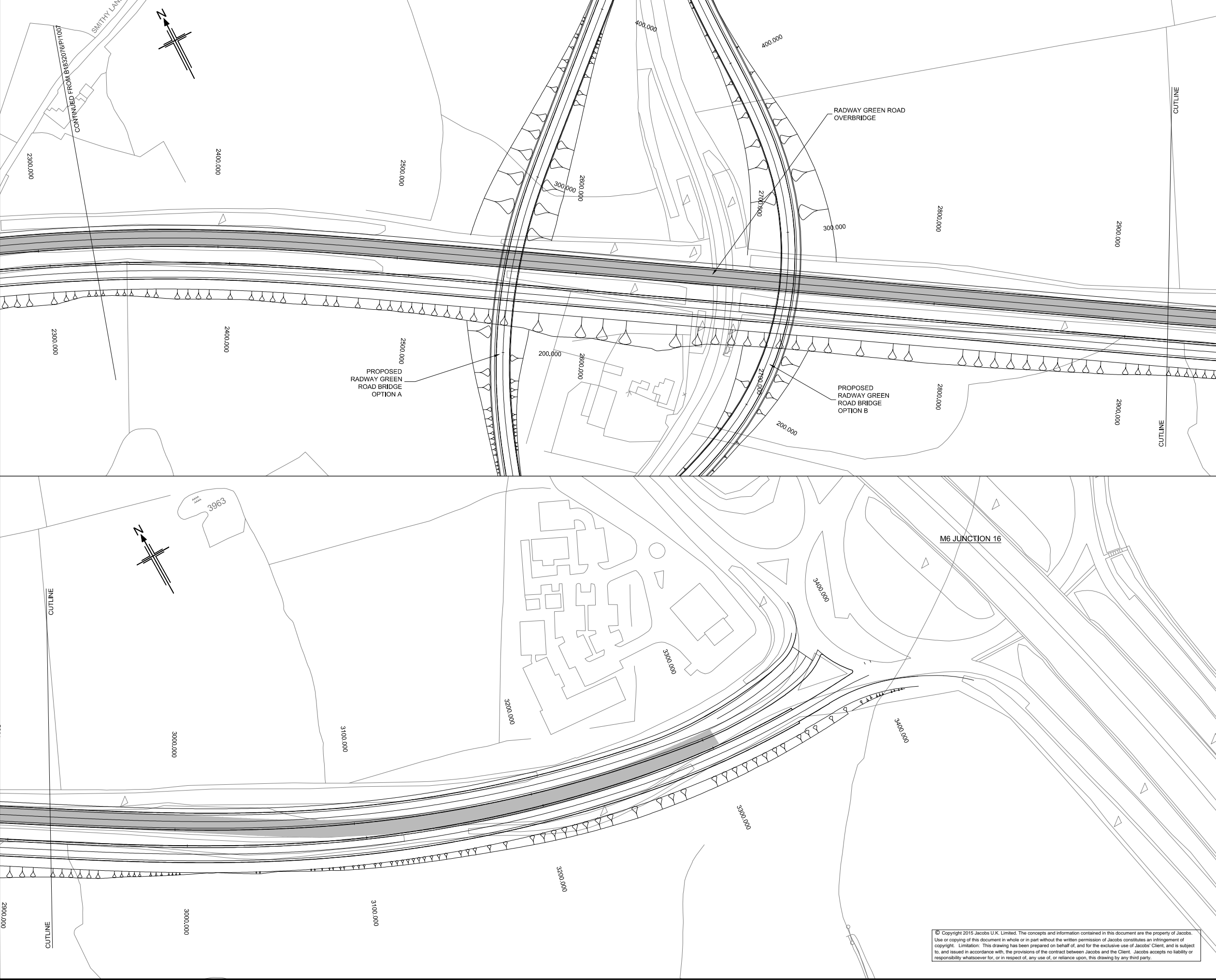
Drawing number  
**B1832076/P/1007** Rev  
**W2**

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

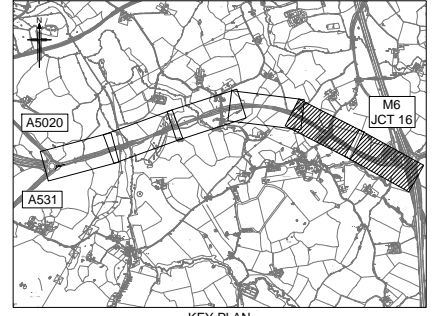


Drawing number / Rev  
**B1832076/P/1008, W2**

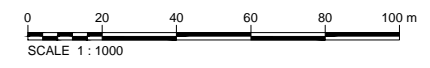


- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1012 - General Arrangement Barthomley Option A
    - Dwg No. B1832076/P/1013 - General Arrangement Barthomley Option B
    - Dwg No. B1832076/P/1014 - General Arrangement Barthomley Option C
    - Dwg No. B1832076/P/1015 - General Arrangement Radway Green Option A
    - Dwg No. B1832076/P/1016 - General Arrangement Radway Green Option B

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway
  - Proposed Attenuation Ponds



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W2	18/03/2016	ADDITION OF PROPOSED PONDS & BRIDGE OPTIONS RENAMED	KJH	DT	DT	SK
W1	21/01/2016	REVISED - FOR INFORMATION	BS	KJH	DT	SK
W0	18/09/2015	DRAFT - FOR INFORMATION	KJH	DT	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Revd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com



Client  
**Cheshire East Council**

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 OPTION 2: SOUTH - SHEET 3 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1      **DO NOT SCALE**

Jacobs No.      B1832076

Client no.

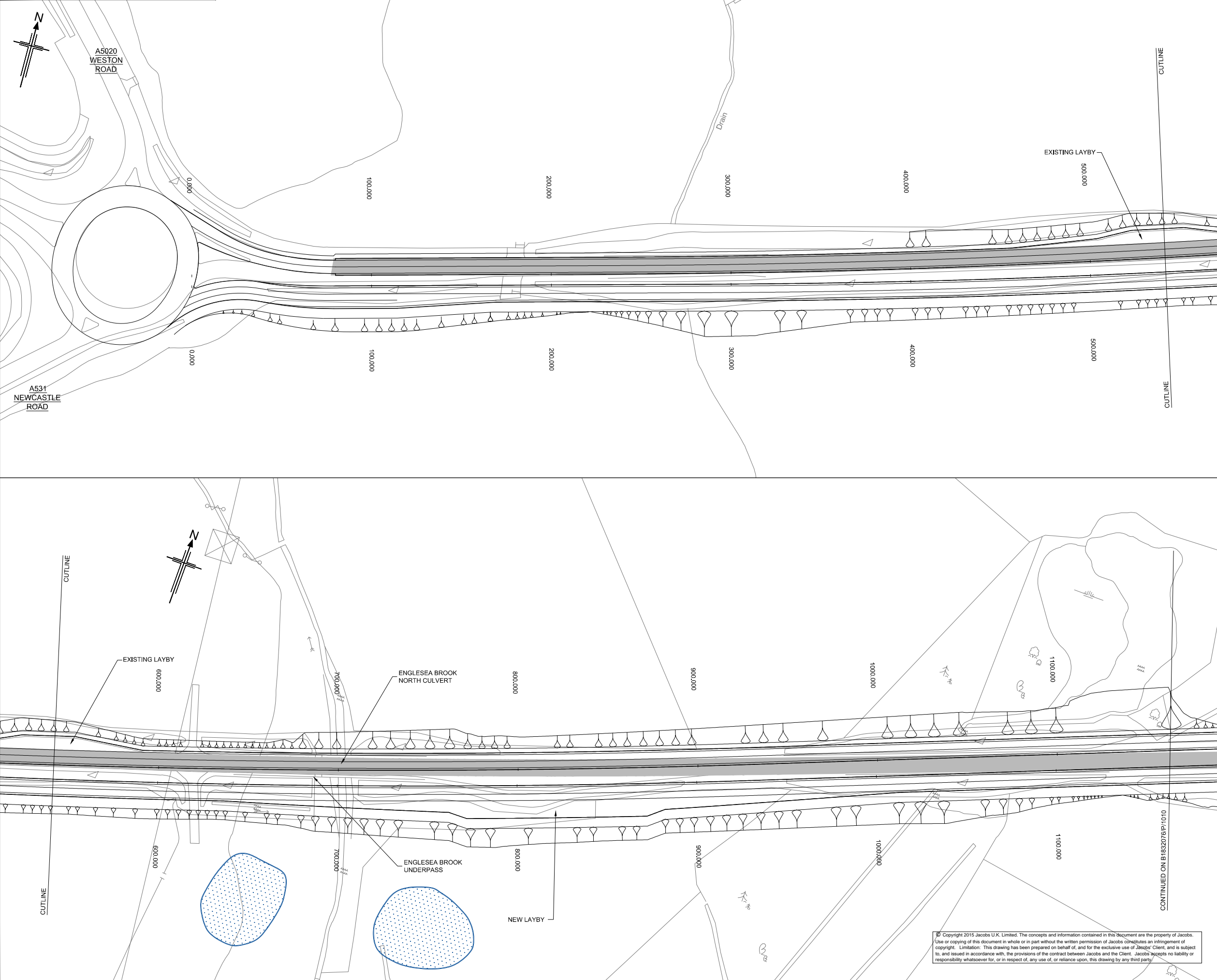
Drawing number  
**B1832076/P/1008**

Rev  
**W2**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

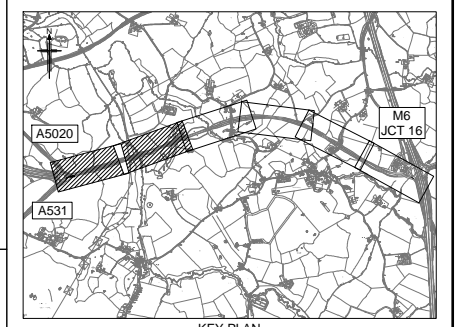
A:\Projects\1832076\1832076\_P\1008\1008\_W2.dwg    18/03/2016 14:52:11    KJH    DT    DT    SK

Drawing number / Rev  
**B1832076/P/1009, W1**



- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1012 - General Arrangement Barthomley Option A
    - Dwg No. B1832076/P/1013 - General Arrangement Barthomley Option B
    - Dwg No. B1832076/P/1014 - General Arrangement Barthomley Option C
    - Dwg No. B1832076/P/1015 - General Arrangement Radway Green Option A
    - Dwg No. B1832076/P/1016 - General Arrangement Radway Green Option B

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway
  - Proposed Attenuation Ponds



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015

0 20 40 60 80 100 m  
 SCALE 1 : 1000

W1	18/03/2016	ADDITION OF PROPOSED PONDS & BRIDGE OPTIONS RENAMED	KJH	DT	DT	SK
W0	21/01/2016	DRAFT - FOR INFORMATION	BS	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Revd	Apprvd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com



Client  
 Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 OPTION 3: HYBRID - SHEET 1 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1  
**DO NOT SCALE**

Jacobs No.  
 B1832076

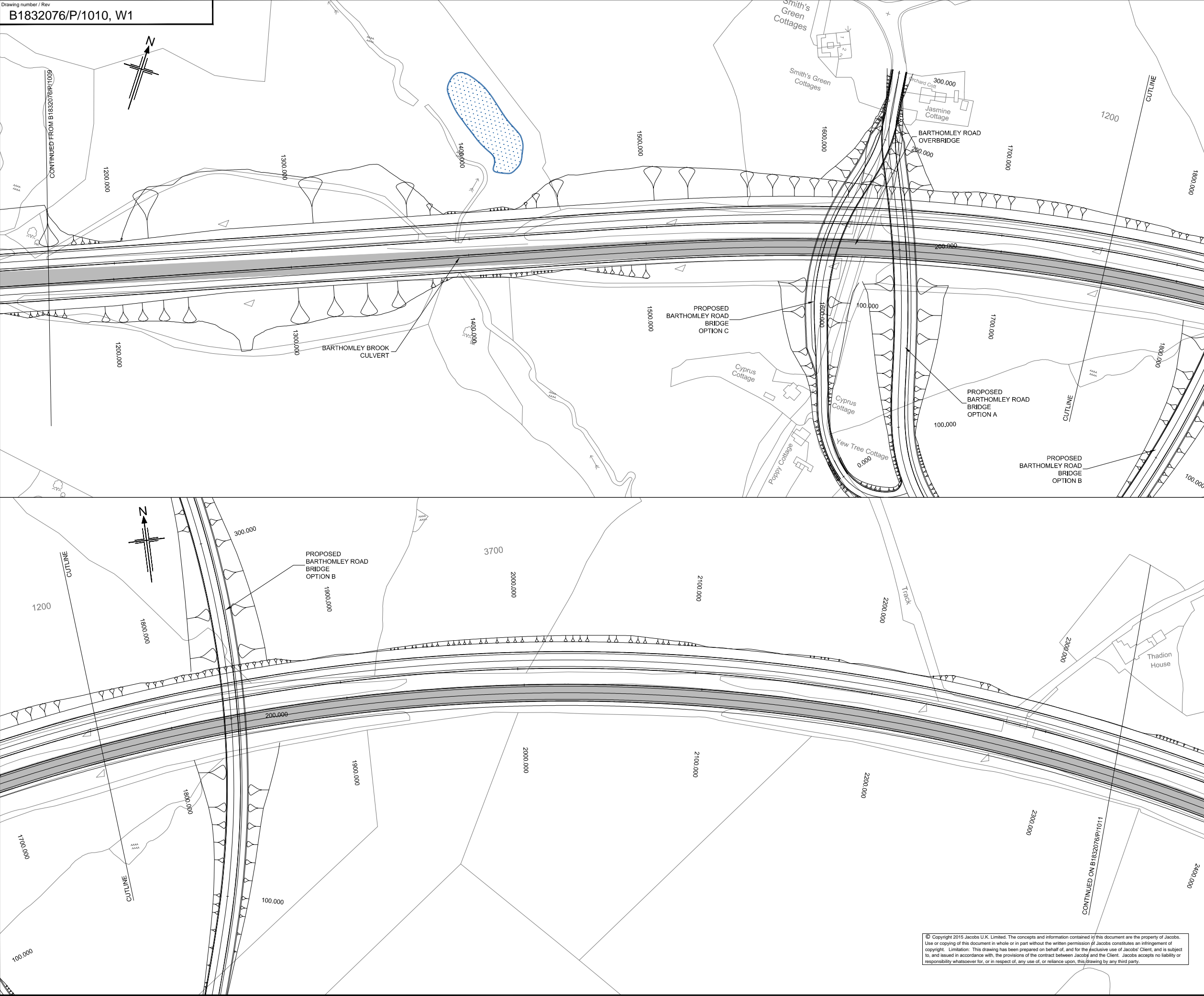
Drawing number  
**B1832076/P/1009**

Rev  
**W1**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

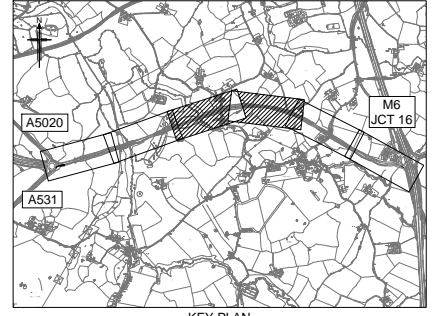
B:\Projects\1832076\1832076\_P\1009\1009\_W1.dwg - 18/03/2016 10:00:00 - User: jacobson



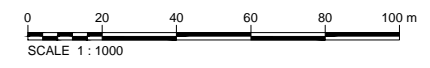


- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1012 - General Arrangement Barthomley Option A
    - Dwg No. B1832076/P/1013 - General Arrangement Barthomley Option B
    - Dwg No. B1832076/P/1014 - General Arrangement Barthomley Option C
    - Dwg No. B1832076/P/1015 - General Arrangement Railway Green Option A
    - Dwg No. B1832076/P/1016 - General Arrangement Railway Green Option B

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway
  - Proposed Attenuation Ponds



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W1	18/03/2016	ADDITION OF PROPOSED PONDS & BRIDGE OPTIONS RENAMED	KJH	DT	DT	SK
W0	21/01/2016	DRAFT - FOR INFORMATION	BS	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Revd	Apprvd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com



Client  
**Cheshire East Council**

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 OPTION 3: HYBRID - SHEET 2 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1      DO NOT SCALE

Jacobs No.      B1832076

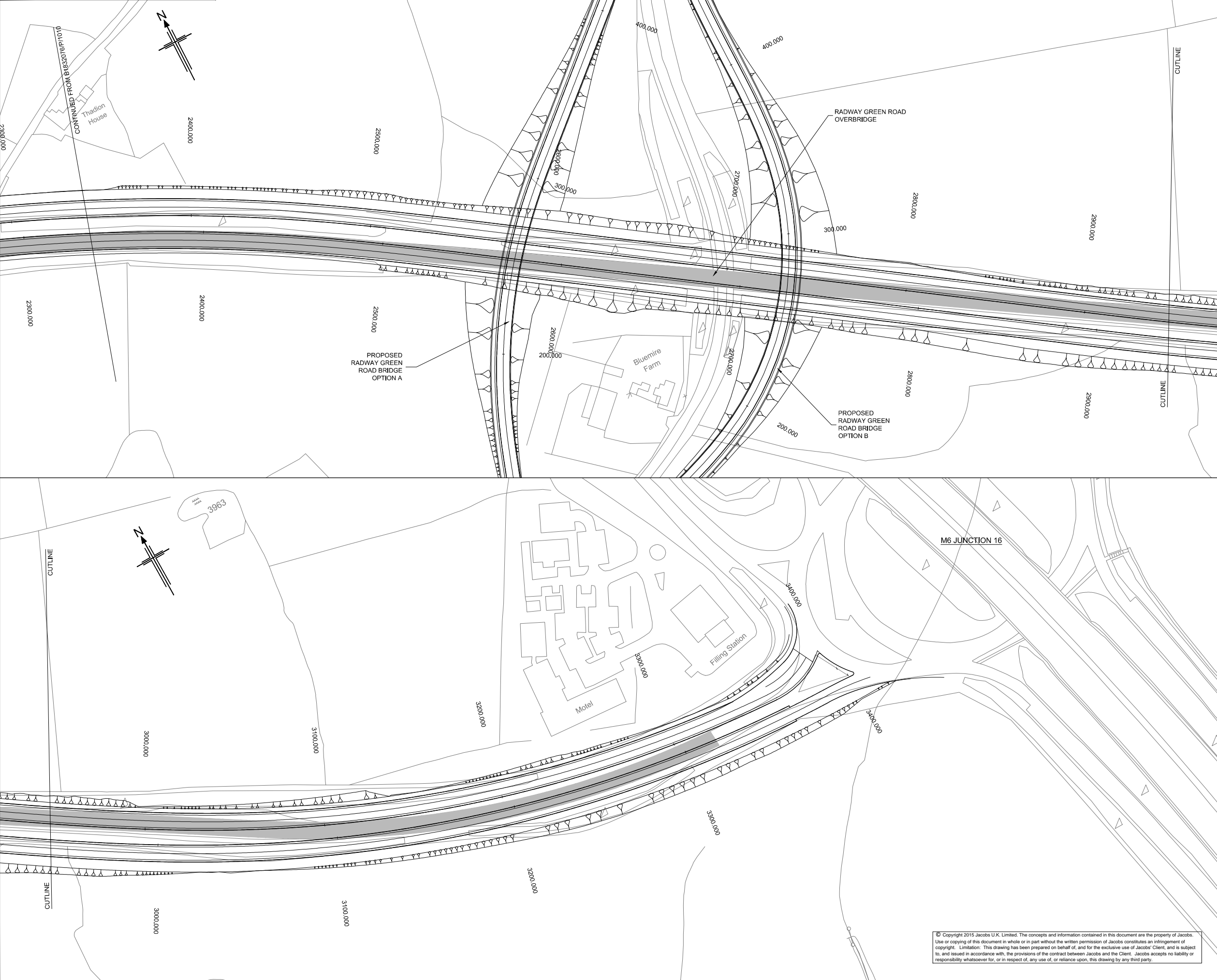
Client no.

Drawing number  
**B1832076/P/1010**

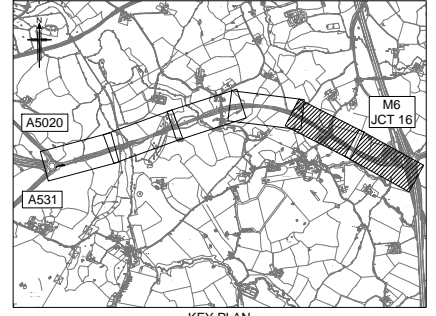
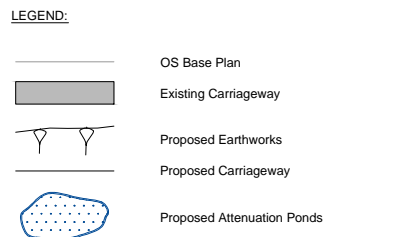
Rev  
**W1**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of, Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

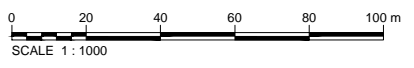
A:\Projects\1832076\1832076\_P1010\1832076\_P1010\_W1.dwg - 18/03/2016 14:00:00 - User: jacobson



- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1012 - General Arrangement Barthomley Option A
    - Dwg No. B1832076/P/1013 - General Arrangement Barthomley Option B
    - Dwg No. B1832076/P/1014 - General Arrangement Barthomley Option C
    - Dwg No. B1832076/P/1015 - General Arrangement Radway Green Option A
    - Dwg No. B1832076/P/1016 - General Arrangement Radway Green Option B



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W1	18/03/2016	ADDITION OF PROPOSED PONDS & BRIDGE OPTIONS RENAMED	KJH	DT	DT	SK
W0	21/01/2016	DRAFT - FOR INFORMATION	BS	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Revd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com

**Cheshire East Council**

Client  
 Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 OPTION 3: HYBRID - SHEET 3 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1  
**DO NOT SCALE**

Jacobs No.  
 B1832076

Client no.

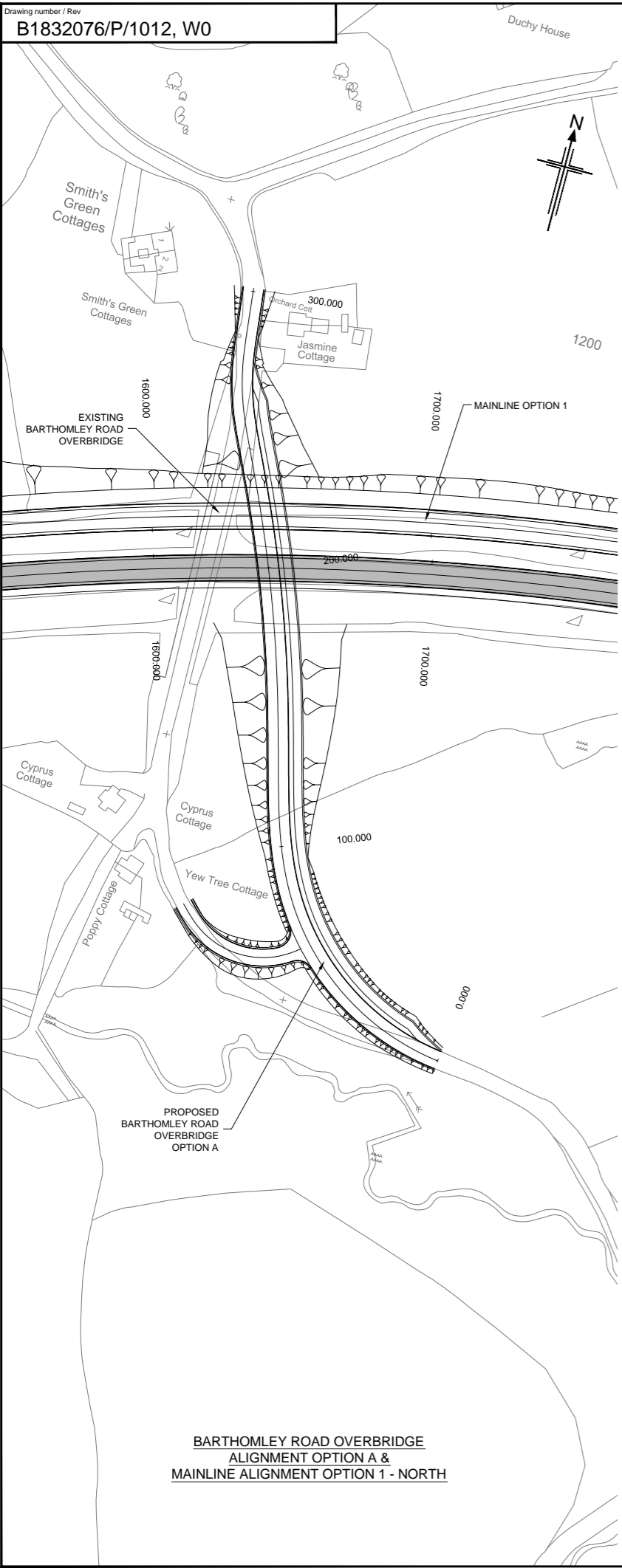
Drawing number  
**B1832076/P/1011**

Rev  
**W1**

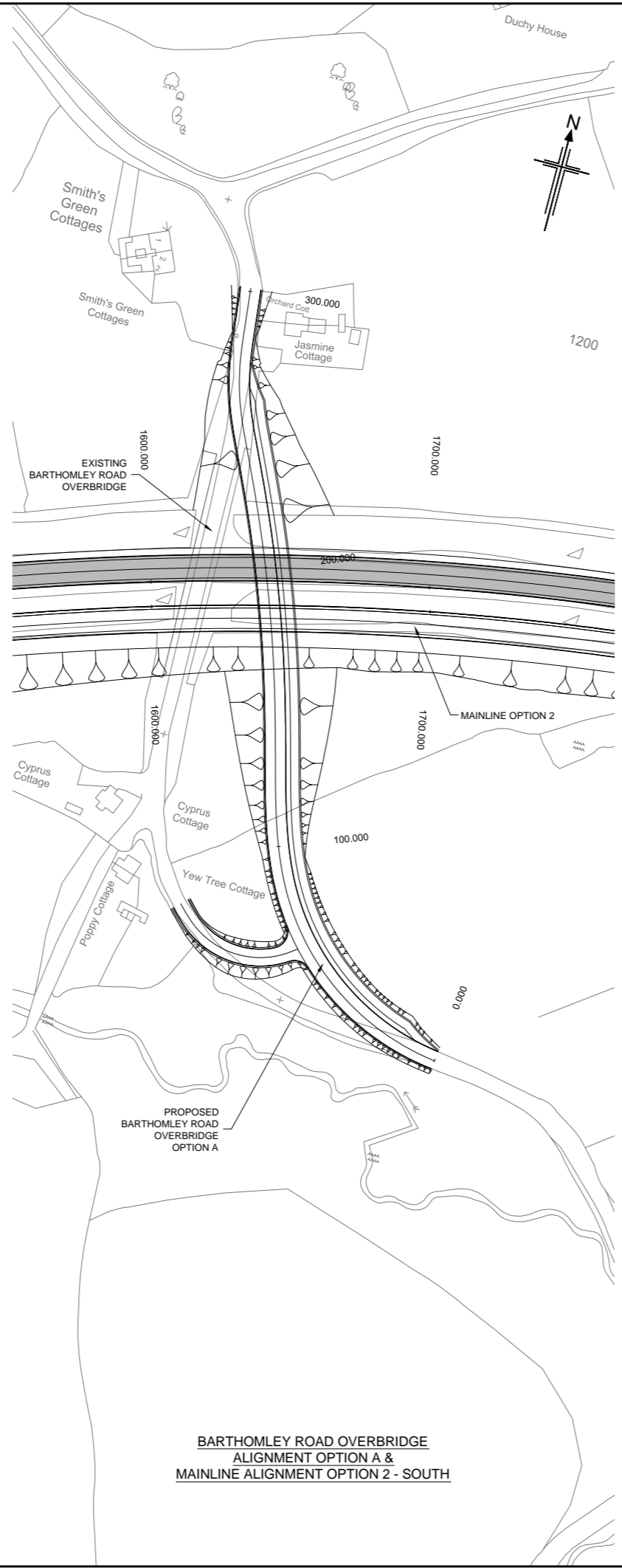
© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

A:\projects\1832076\1832076\_P\1011\1011\_W1.dwg - 18/03/2016 10:00:00 - User: jacobson

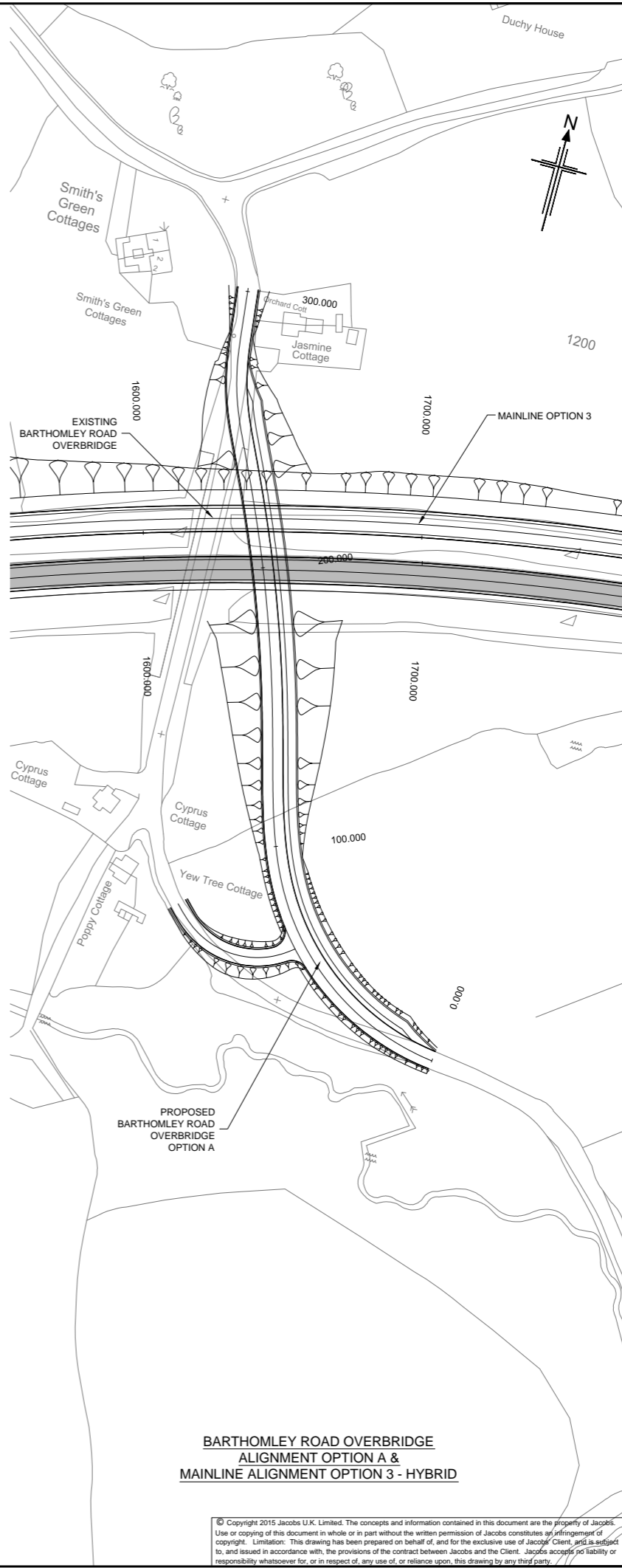




**BARTHOMLEY ROAD OVERBRIDGE  
 ALIGNMENT OPTION A &  
 MAINLINE ALIGNMENT OPTION 1 - NORTH**



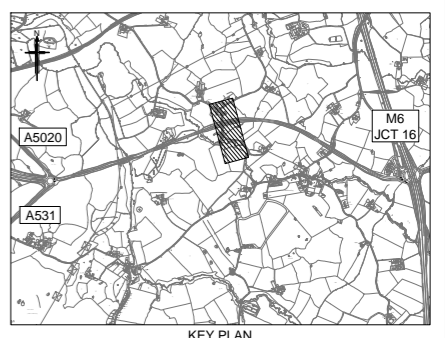
**BARTHOMLEY ROAD OVERBRIDGE  
 ALIGNMENT OPTION A &  
 MAINLINE ALIGNMENT OPTION 2 - SOUTH**



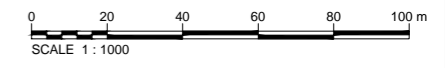
**BARTHOMLEY ROAD OVERBRIDGE  
 ALIGNMENT OPTION A &  
 MAINLINE ALIGNMENT OPTION 3 - HYBRID**

- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1003-1005 - General Arrangement Option 1 - Sheets 1 to 3
    - Dwg No. B1832076/P/1006-1008 - General Arrangement Option 2 - Sheets 1 to 3
    - Dwg No. B1832076/P/1009-1011 - General Arrangement Option 3 - Sheets 1 to 3

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



WO	21/01/2016	DRAFT - FOR INFORMATION	BS	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com



Client  
 Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 BARTHOMLEY OPTION A**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

Jacobs No.  
 B1832076

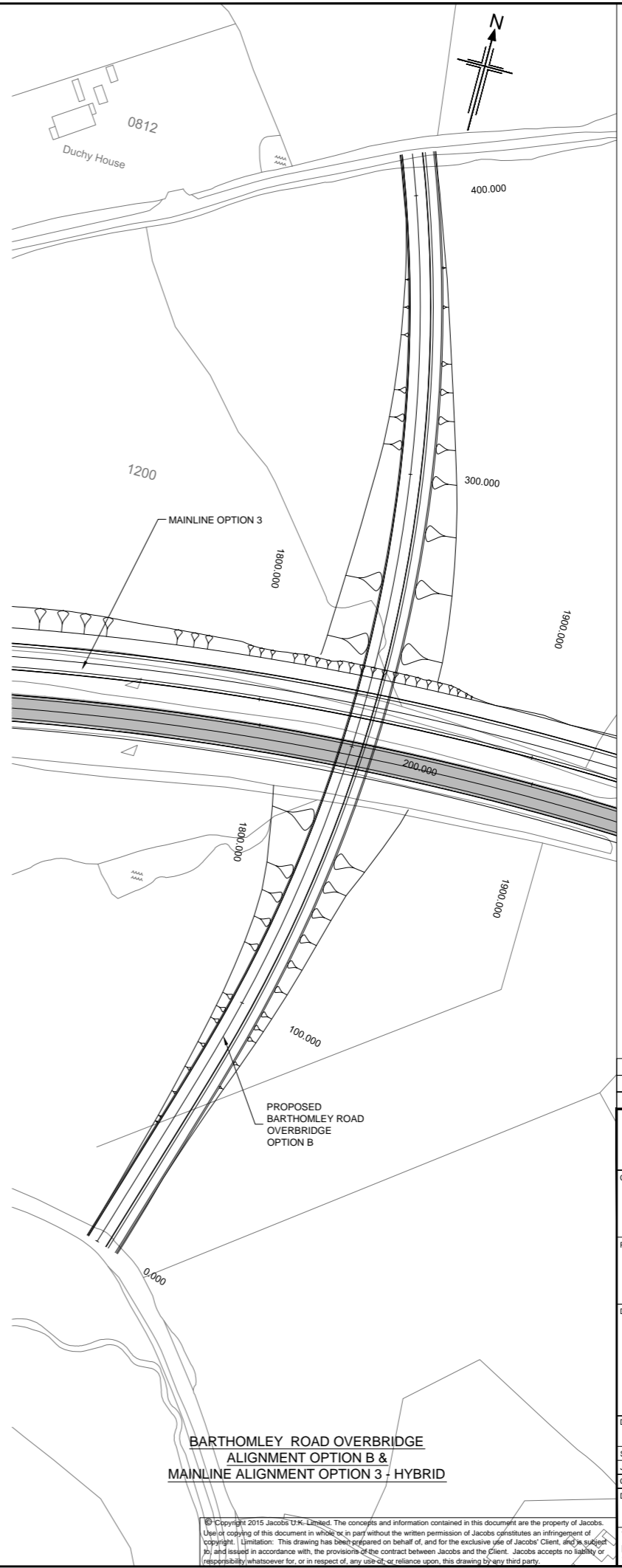
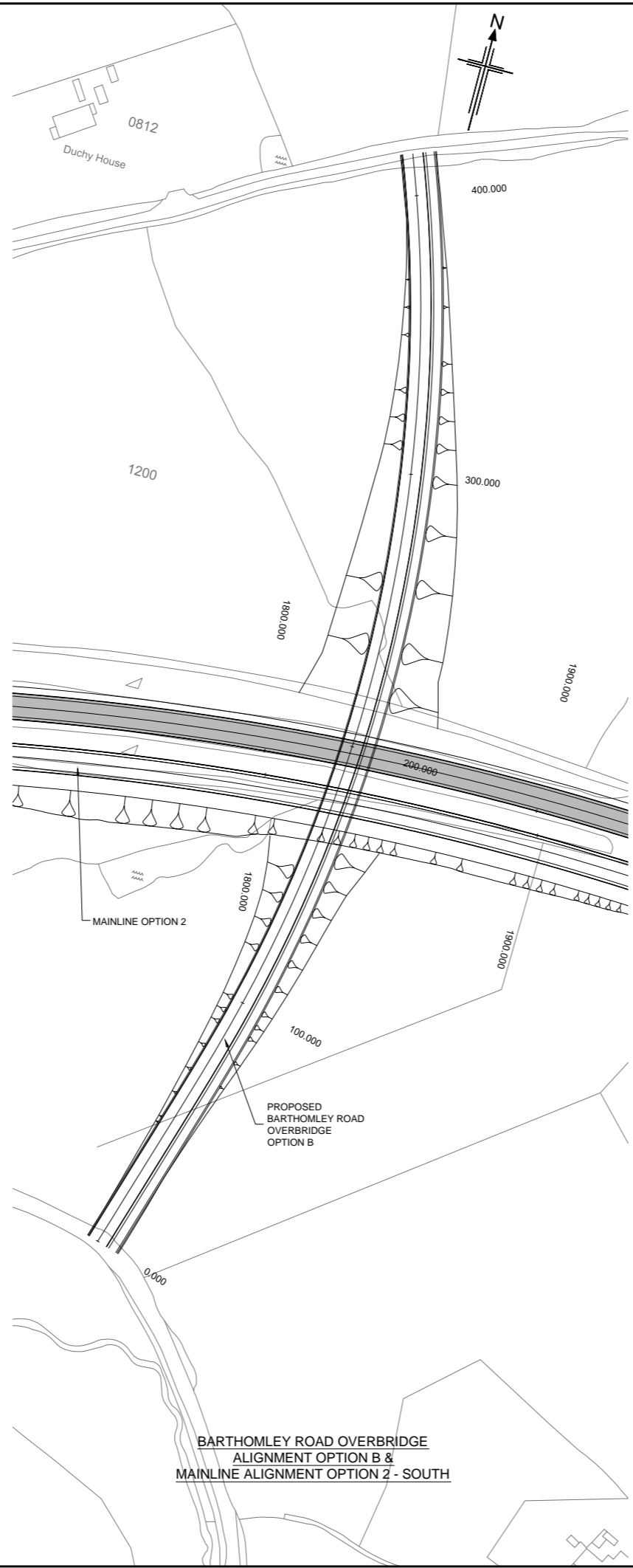
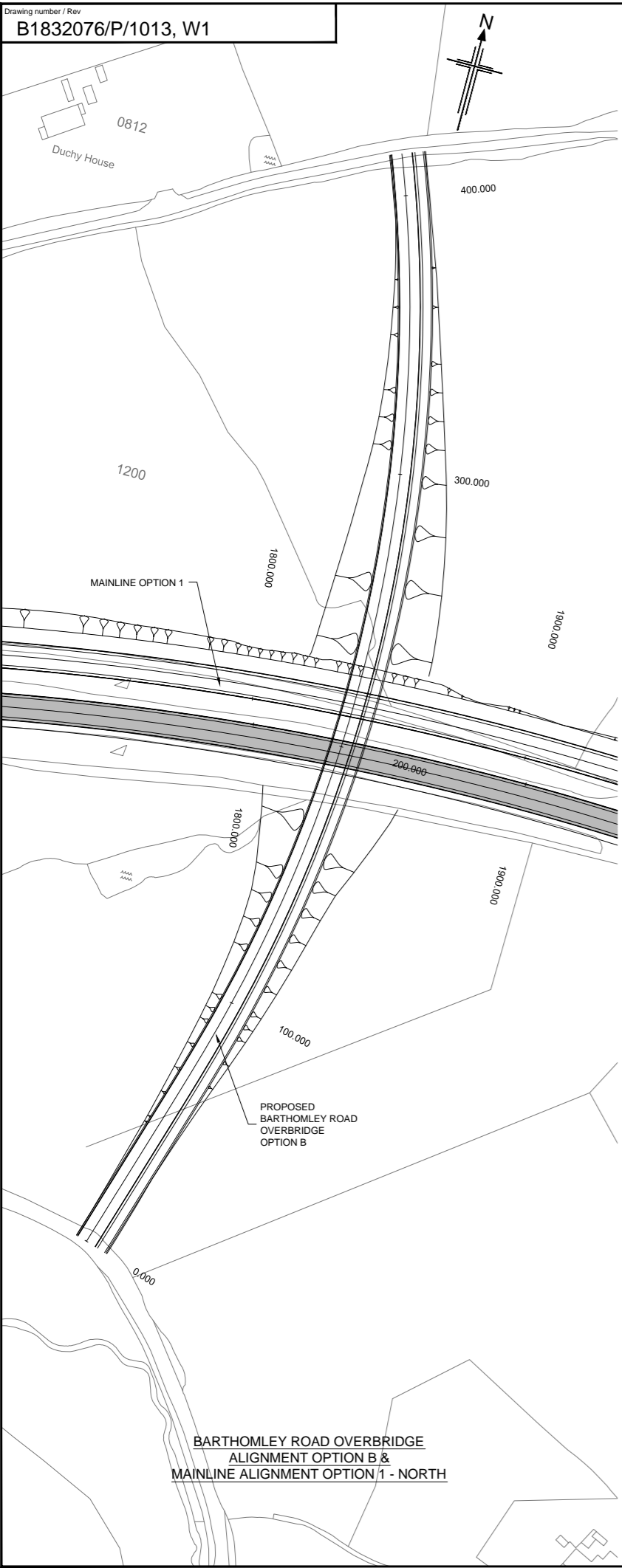
Client no.

Drawing number  
**B1832076/P/1012**

Rev  
**W0**

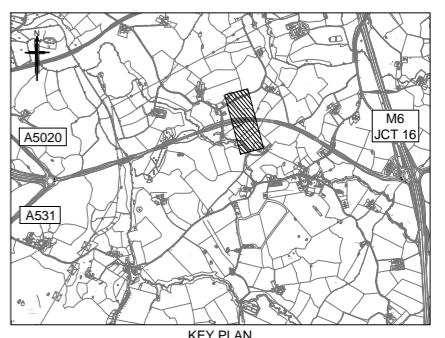
© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of, the Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

Neurope\_jacobs.com\LEEDS\Projects\B1832076 - Highway\B1832076\_P\_1012\_W0 - General Arrangement Barthomley Option A.dwg - 31/03/2016 14:00:23 - B1832076\_P\_1012 - huxleyk

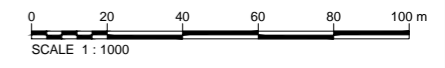


- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1003-1005 - General Arrangement Option 1 - Sheets 1 to 3
    - Dwg No. B1832076/P/1006-1008 - General Arrangement Option 2 - Sheets 1 to 3
    - Dwg No. B1832076/P/1009-1011 - General Arrangement Option 3 - Sheets 1 to 3

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W1	29/02/2016	MINOR TITLE AMENDMENT	KJH	DT	DT	SK
W0	21/01/2016	DRAFT - FOR INFORMATION	BS	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com



Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 BARTHOMLEY OPTION B**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

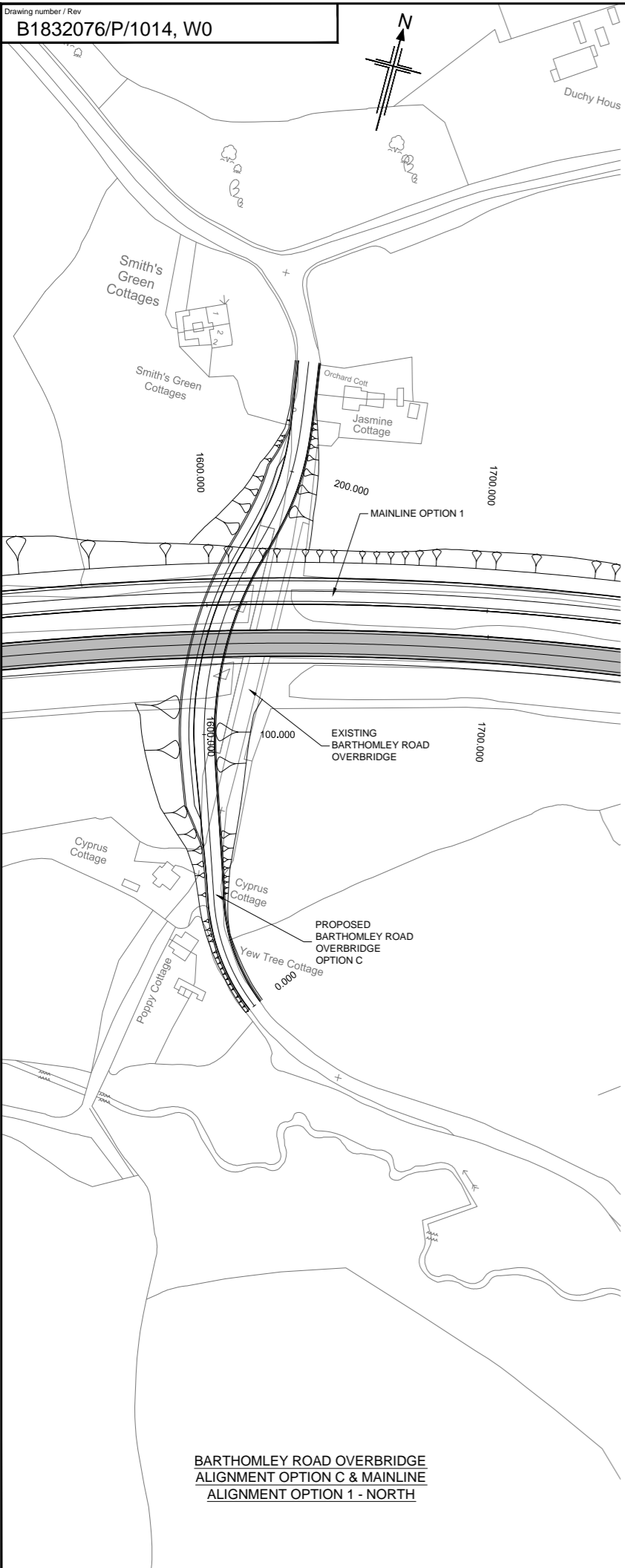
Jacobs No.  
 B1832076

Drawing number  
**B1832076/P/1013**

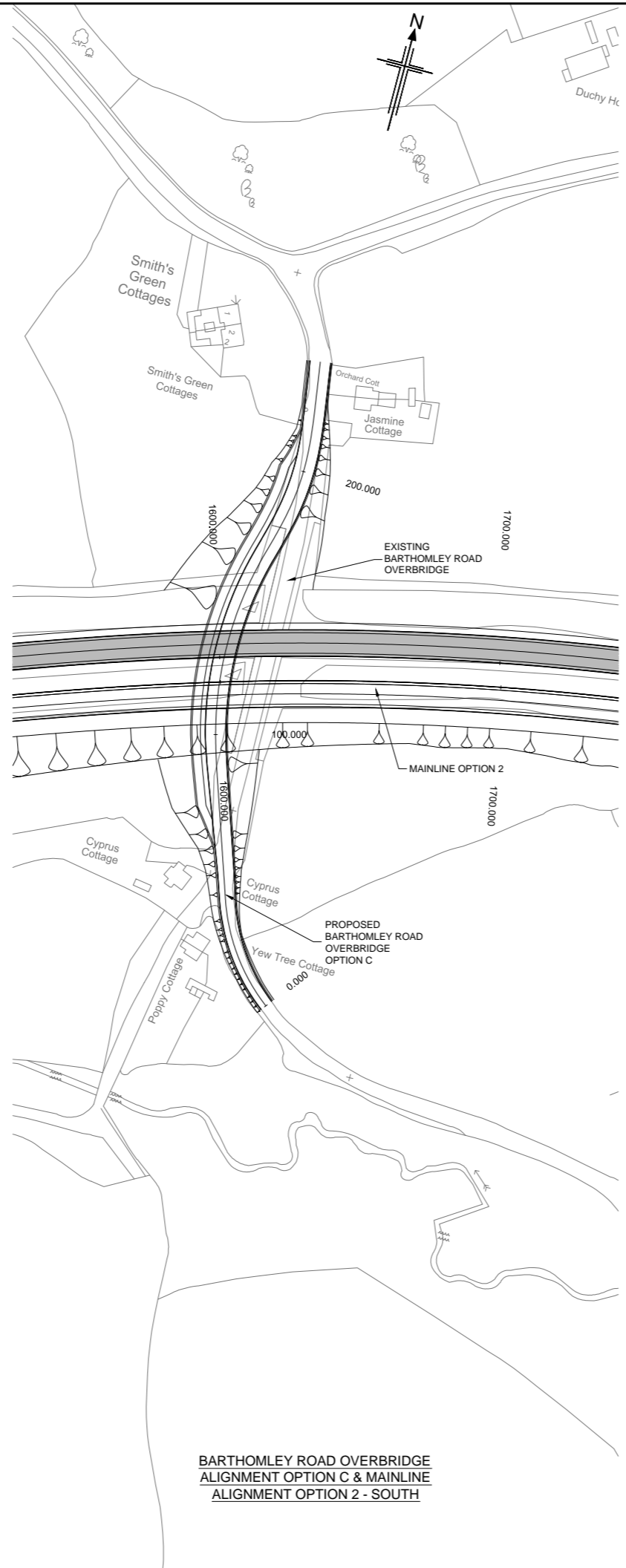
Rev  
**W1**

© Copyright 2015 Jacobs UK Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of, Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

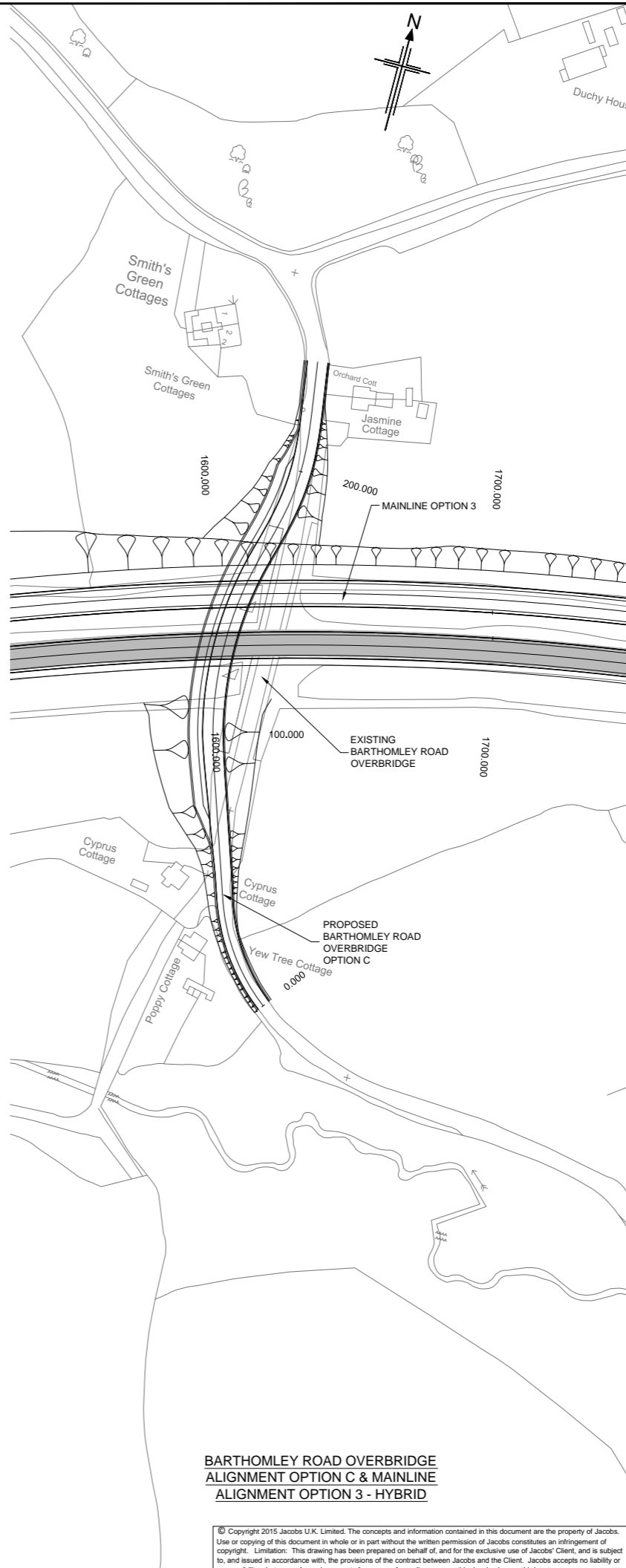




**BARTHOMLEY ROAD OVERBRIDGE  
 ALIGNMENT OPTION C & MAINLINE  
 ALIGNMENT OPTION 1 - NORTH**



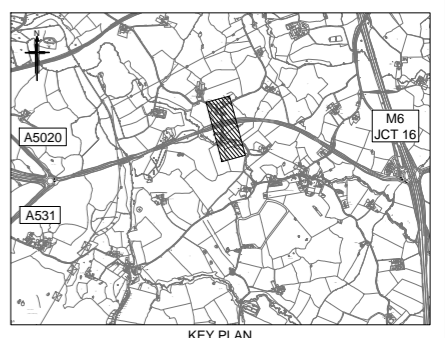
**BARTHOMLEY ROAD OVERBRIDGE  
 ALIGNMENT OPTION C & MAINLINE  
 ALIGNMENT OPTION 2 - SOUTH**



**BARTHOMLEY ROAD OVERBRIDGE  
 ALIGNMENT OPTION C & MAINLINE  
 ALIGNMENT OPTION 3 - HYBRID**

- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1003-1005 - General Arrangement Option 1 - Sheets 1 to 3
    - Dwg No. B1832076/P/1006-1008 - General Arrangement Option 2 - Sheets 1 to 3
    - Dwg No. B1832076/P/1009-1011 - General Arrangement Option 3 - Sheets 1 to 3

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015

0 20 40 60 80 100 m  
 SCALE 1 : 1000

W0	21/01/2016	DRAFT - FOR INFORMATION	BS	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com

**Cheshire East Council**

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 BARTHOMLEY OPTION C**

Drawing status  
**FOR INFORMATION**

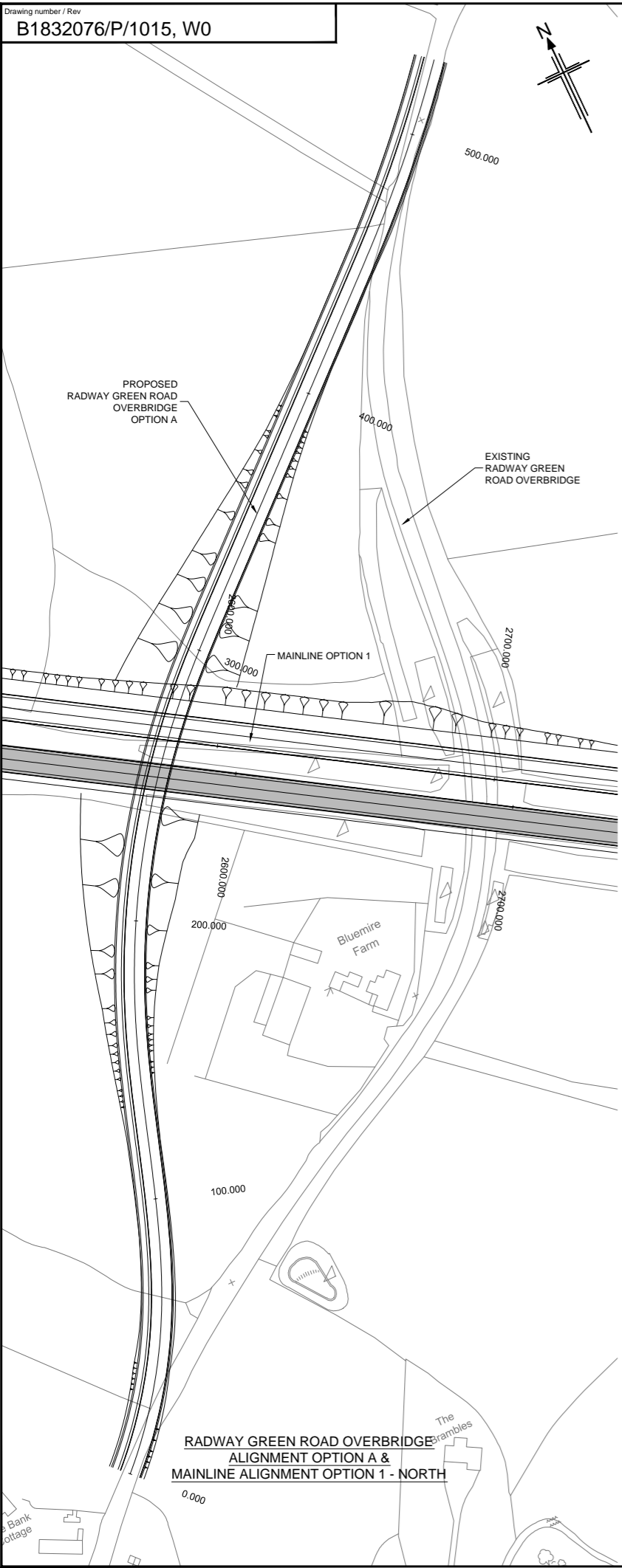
Scale  
 1:1000 @ A1 DO NOT SCALE

Jacobs No.  
 B1832076

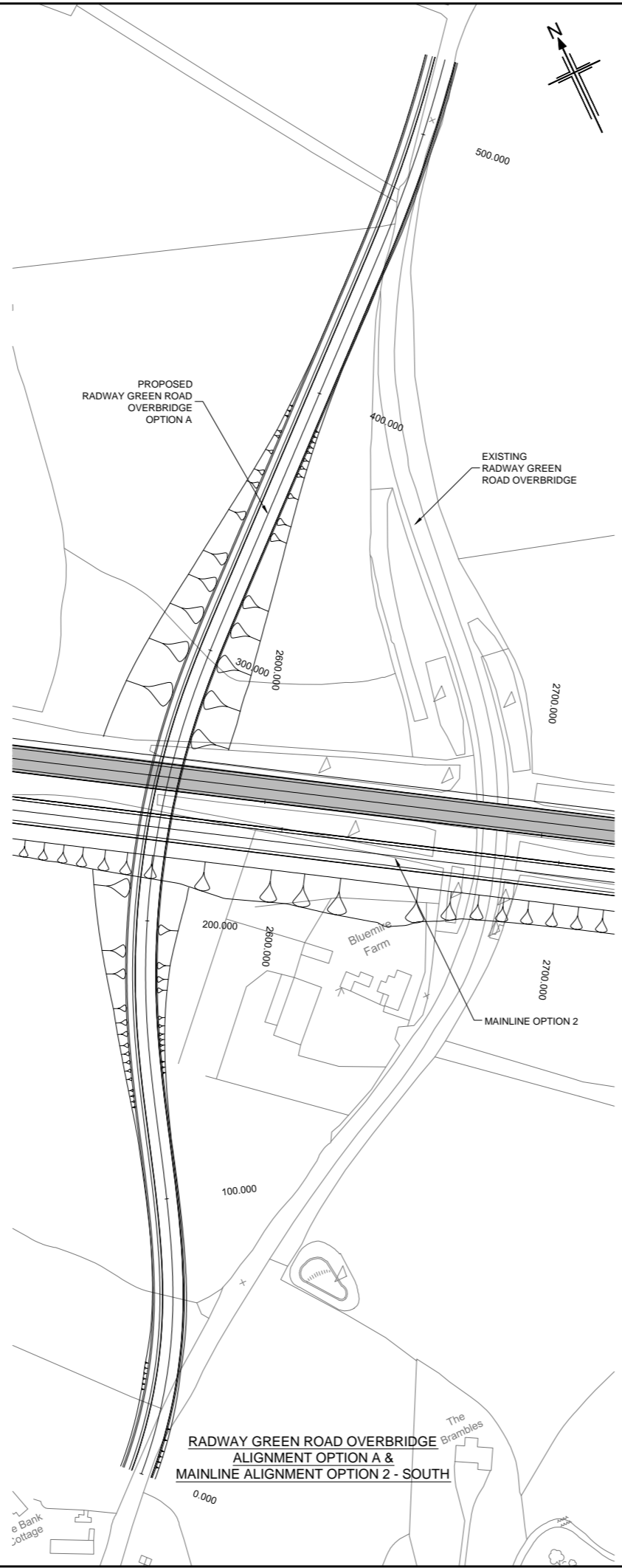
Drawing number  
**B1832076/P/1014** Rev  
**W0**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

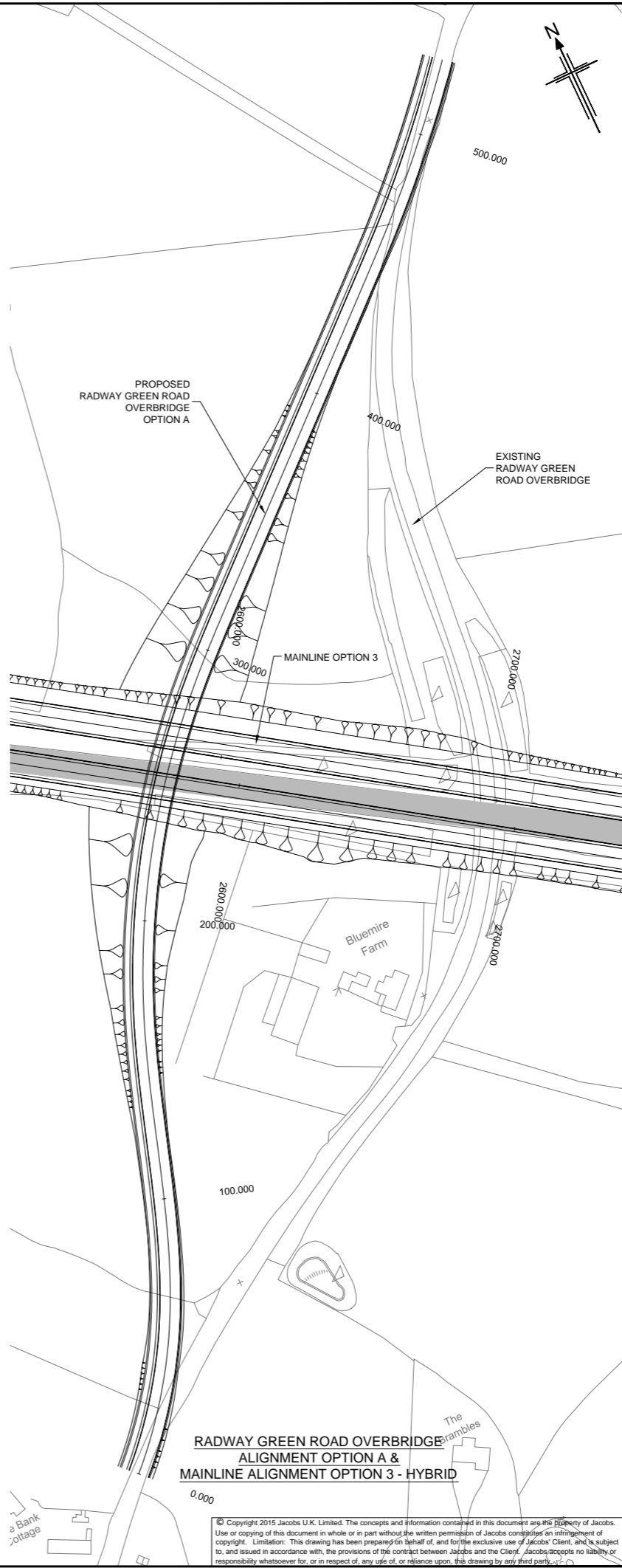
Neurope.jacobs.com \ LEEDS \ Projects \ B1832076 - Highway \ M6 to A5020 \ Drawings \ 1000 - A500-M6 to A5020 \ Drawings \ 1000 - Highway \ B1832076 - P\_1014 - W0 - General Arrangement Barthomley Option C.dwg - 31/03/2016 13:54:55 - B1832076\_P\_1014 - huxleyk



**RADWAY GREEN ROAD OVERBRIDGE  
 ALIGNMENT OPTION A &  
 MAINLINE ALIGNMENT OPTION 1 - NORTH**



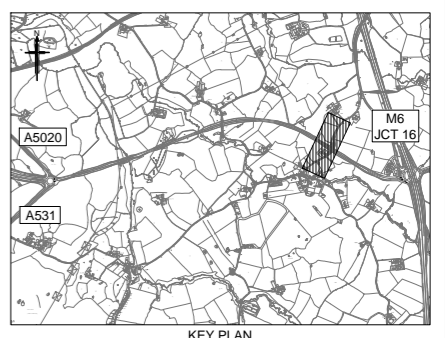
**RADWAY GREEN ROAD OVERBRIDGE  
 ALIGNMENT OPTION A &  
 MAINLINE ALIGNMENT OPTION 2 - SOUTH**



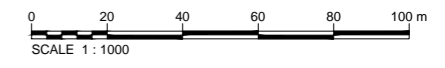
**RADWAY GREEN ROAD OVERBRIDGE  
 ALIGNMENT OPTION A &  
 MAINLINE ALIGNMENT OPTION 3 - HYBRID**

- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1003-1005 - General Arrangement Option 1 - Sheets 1 to 3
    - Dwg No. B1832076/P/1006-1008 - General Arrangement Option 2 - Sheets 1 to 3
    - Dwg No. B1832076/P/1009-1011 - General Arrangement Option 3 - Sheets 1 to 3

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W0	21/01/2016	DRAFT - FOR INFORMATION	BS	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com

**Cheshire East Council**

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 RADWAY GREEN OPTION A**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

Jacobs No.  
 B1832076

Client no.

Drawing number  
**B1832076/P/1015**

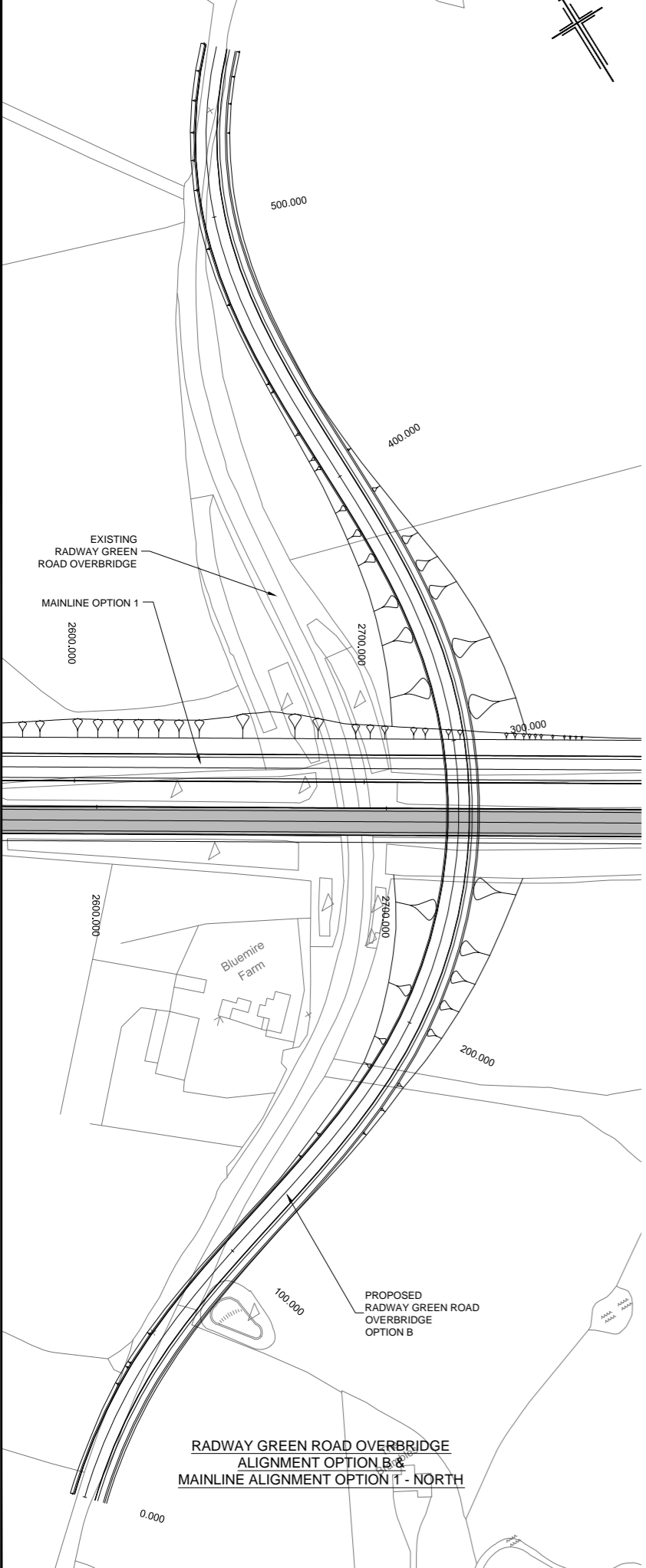
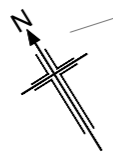
Rev  
**W0**

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

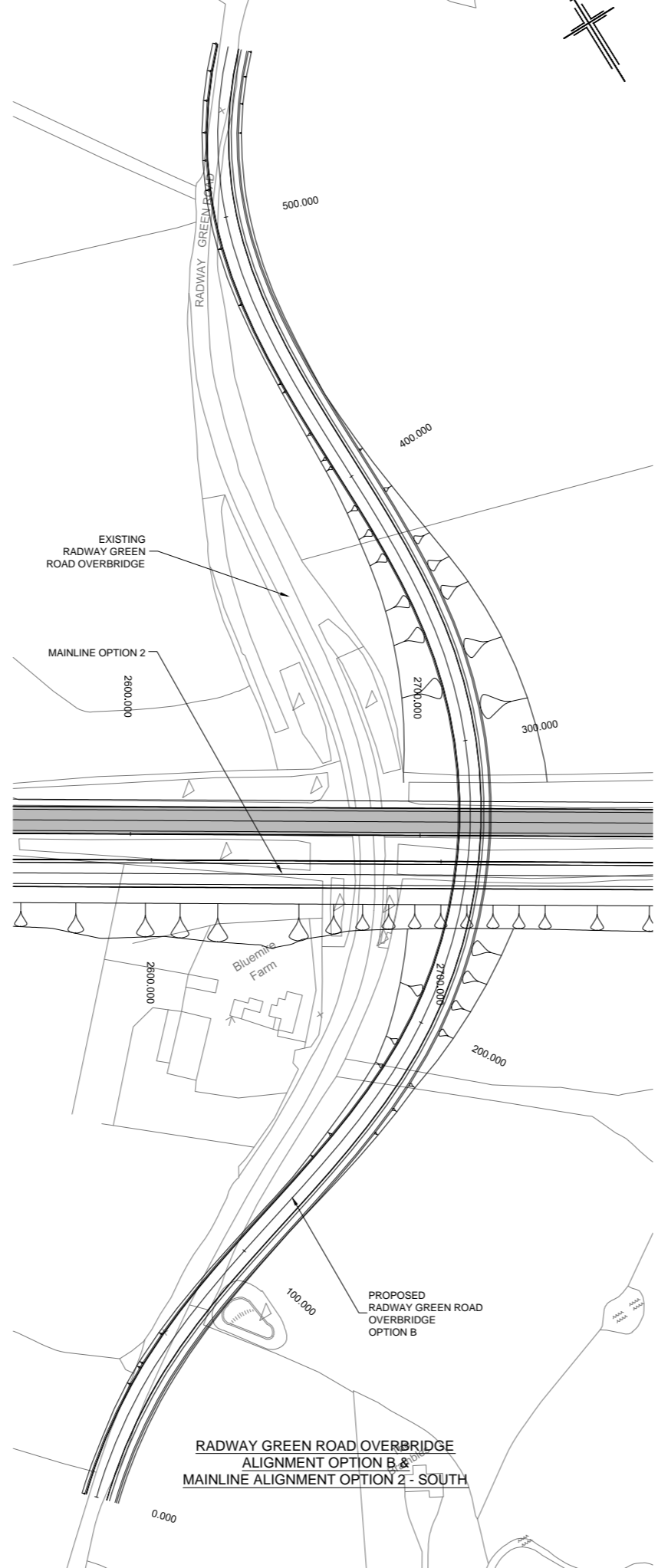
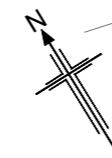
Neurope jacobs.com \ LEEDS \ Projects \ B1832076 - A500-M6 to A5020 \ Drawings \ 1000 - Highway \ B1832076\_P\_1015\_W0 - General Arrangement\_Radway Green\_Option A.dwg - 31/03/2016 13:48:14 - B1832076\_P\_1015 - hudleyk

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of, Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

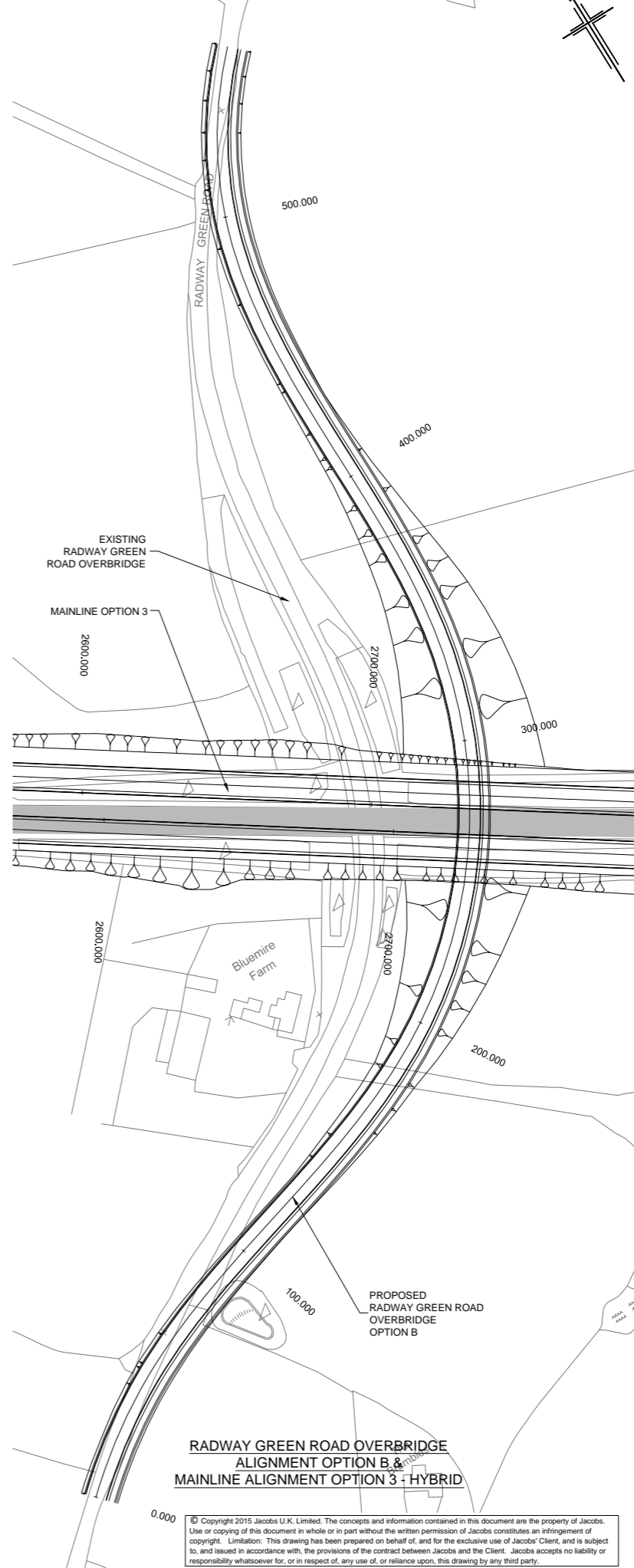
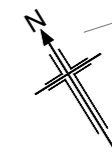




**RADWAY GREEN ROAD OVERBRIDGE  
 ALIGNMENT OPTION B &  
 MAINLINE ALIGNMENT OPTION 1 - NORTH**



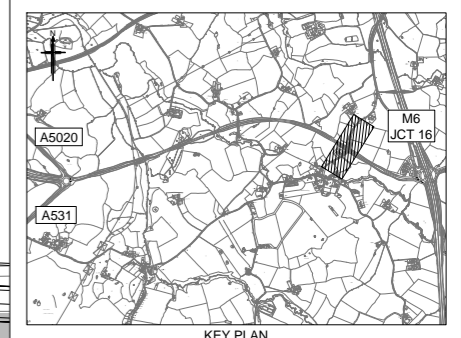
**RADWAY GREEN ROAD OVERBRIDGE  
 ALIGNMENT OPTION B &  
 MAINLINE ALIGNMENT OPTION 2 - SOUTH**



**RADWAY GREEN ROAD OVERBRIDGE  
 ALIGNMENT OPTION B &  
 MAINLINE ALIGNMENT OPTION 3 - HYBRID**

- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1003-1005 - General Arrangement Option 1 - Sheets 1 to 3
    - Dwg No. B1832076/P/1006-1008 - General Arrangement Option 2 - Sheets 1 to 3
    - Dwg No. B1832076/P/1009-1011 - General Arrangement Option 3 - Sheets 1 to 3

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015

0 20 40 60 80 100 m  
 SCALE 1 : 1000

W0	21/01/2016	DRAFT - FOR INFORMATION	BS	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com

**Cheshire East Council**

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 RADWAY GREEN OPTION B**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

Jacobs No.  
 B1832076

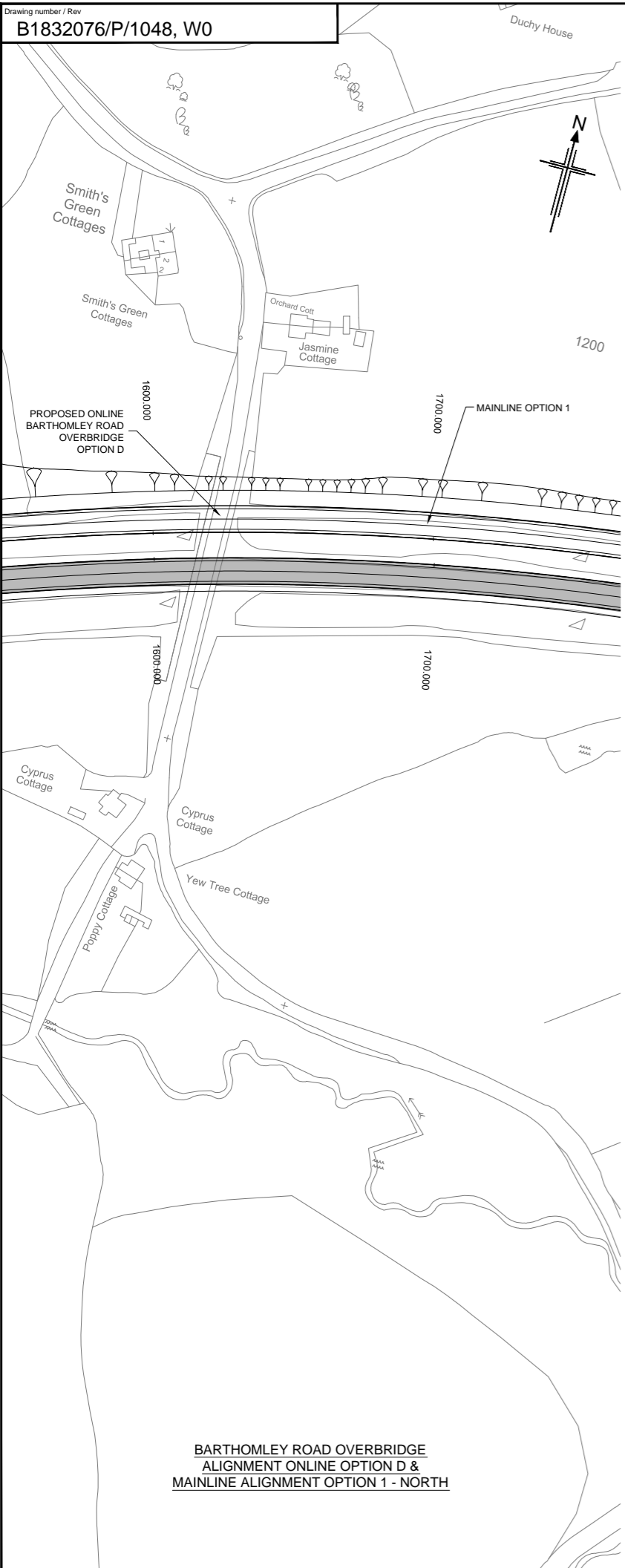
Client no.

Drawing number  
**B1832076/P/1016**

Rev  
**W0**

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

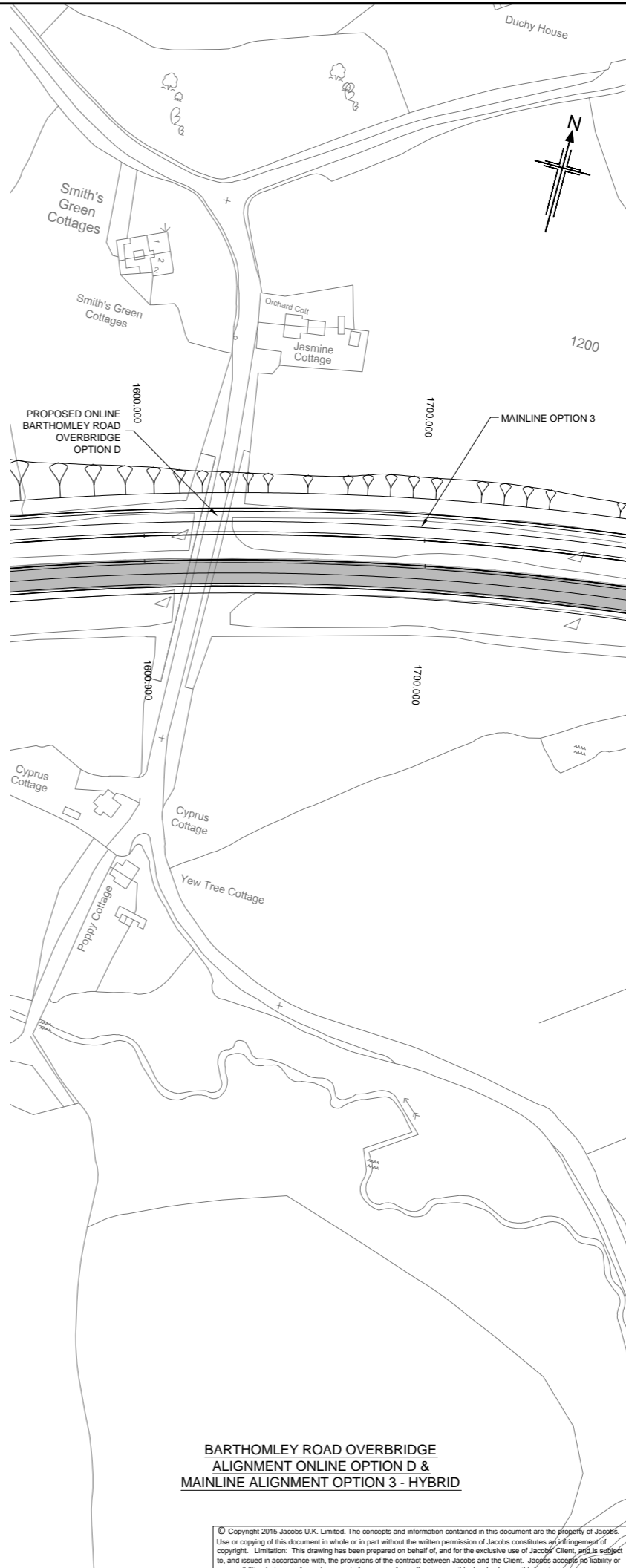
© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to and issued in accordance with the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.



**BARTHOMLEY ROAD OVERBRIDGE  
 ALIGNMENT ONLINE OPTION D &  
 MAINLINE ALIGNMENT OPTION 1 - NORTH**



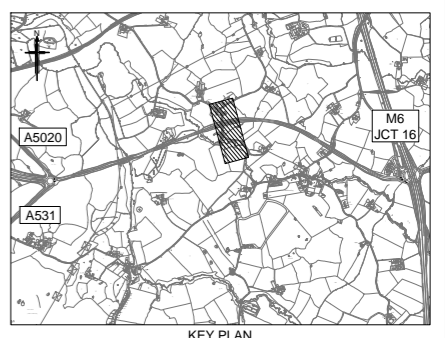
**BARTHOMLEY ROAD OVERBRIDGE  
 ALIGNMENT ONLINE OPTION D &  
 MAINLINE ALIGNMENT OPTION 2 - SOUTH**



**BARTHOMLEY ROAD OVERBRIDGE  
 ALIGNMENT ONLINE OPTION D &  
 MAINLINE ALIGNMENT OPTION 3 - HYBRID**

- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1003-1005 - General Arrangement Option 1 - Sheets 1 to 3
    - Dwg No. B1832076/P/1006-1008 - General Arrangement Option 2 - Sheets 1 to 3
    - Dwg No. B1832076/P/1009-1011 - General Arrangement Option 3 - Sheets 1 to 3

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015

SCALE 1 : 1000

W0	21/01/2016	DRAFT - FOR INFORMATION	BS	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com



Client  
 Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 BARTHOMLEY OPTION D**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

Jacobs No.  
 B1832076

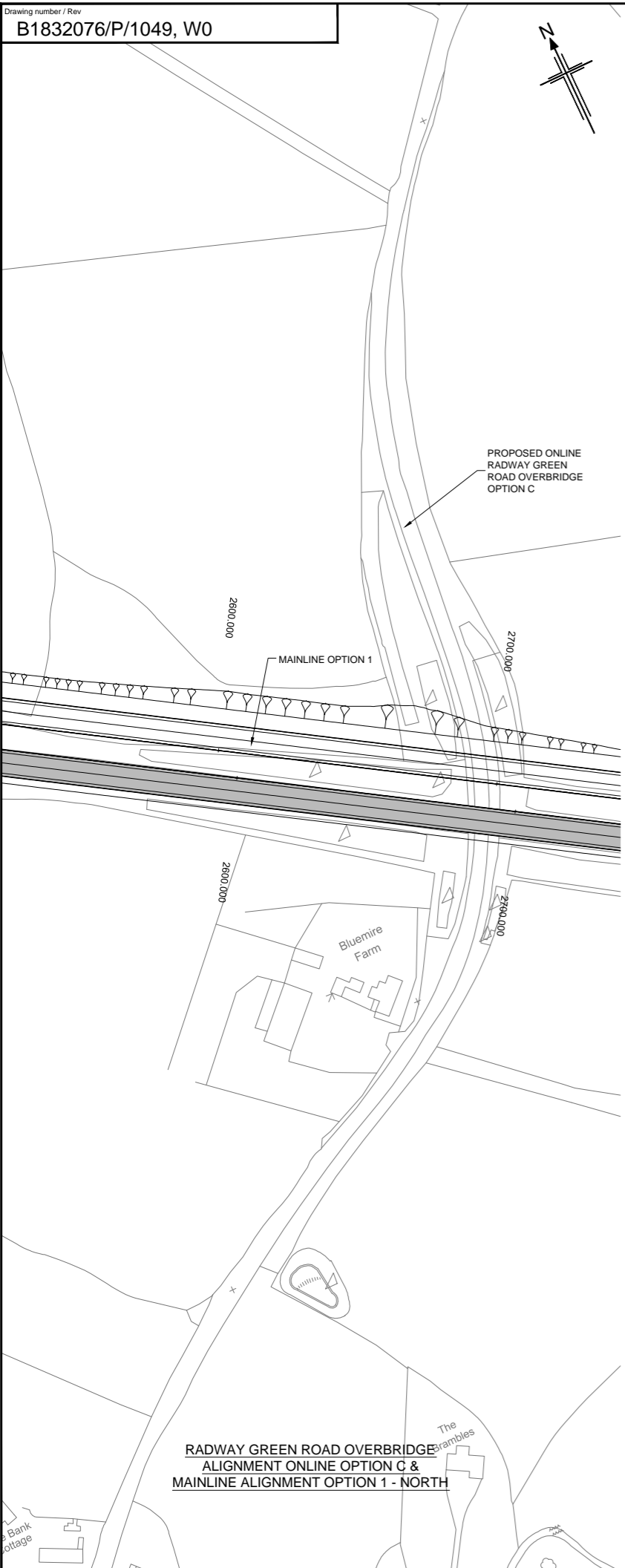
Client no.

Drawing number  
**B1832076/P/1048**

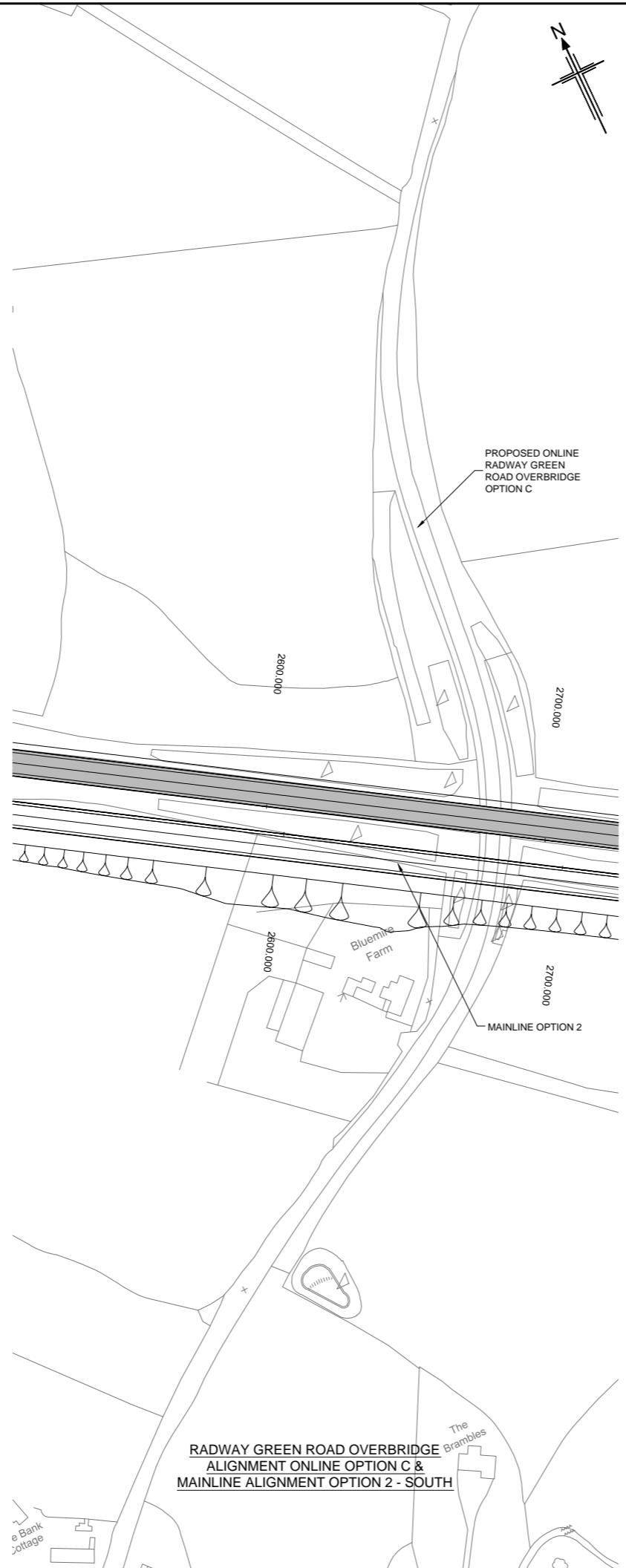
Rev  
**W0**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of, Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

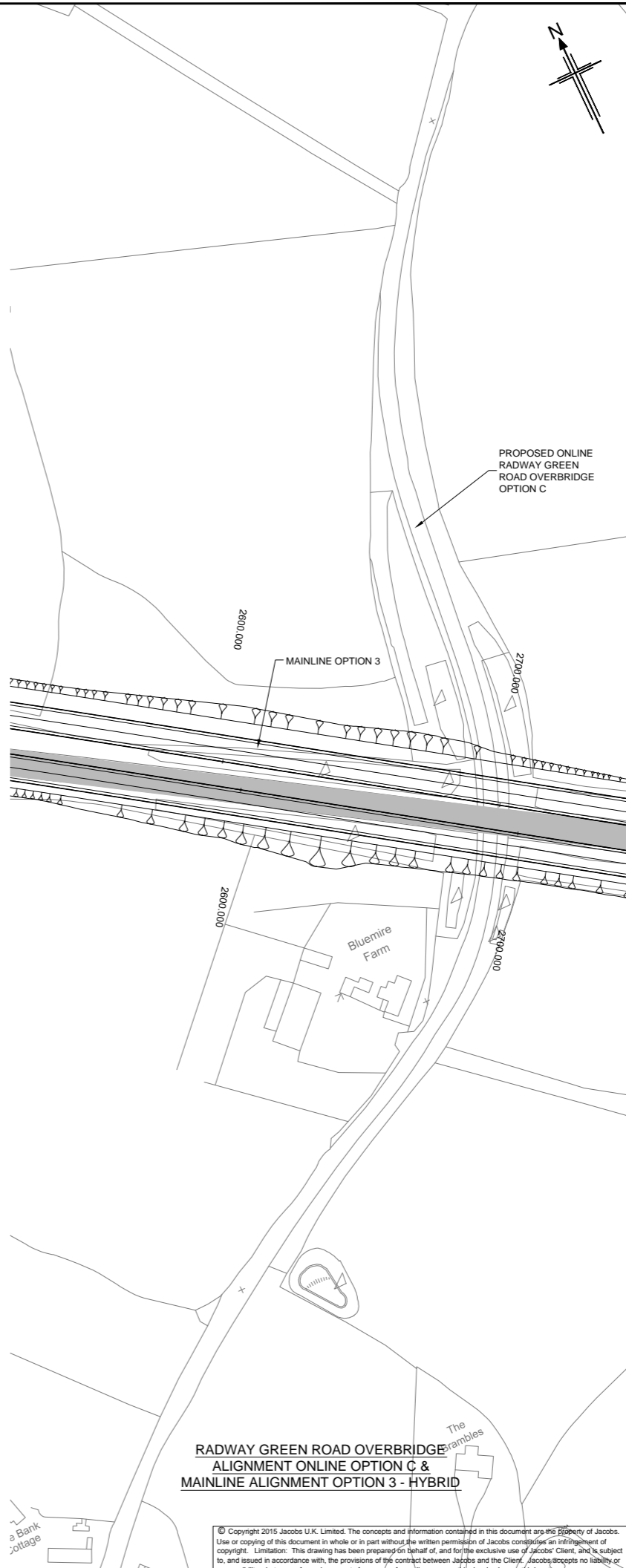




**RADWAY GREEN ROAD OVERBRIDGE  
 ALIGNMENT ONLINE OPTION C &  
 MAINLINE ALIGNMENT OPTION 1 - NORTH**



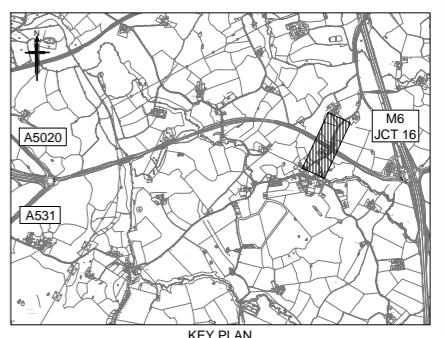
**RADWAY GREEN ROAD OVERBRIDGE  
 ALIGNMENT ONLINE OPTION C &  
 MAINLINE ALIGNMENT OPTION 2 - SOUTH**



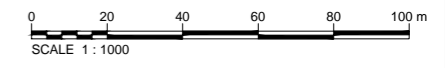
**RADWAY GREEN ROAD OVERBRIDGE  
 ALIGNMENT ONLINE OPTION C &  
 MAINLINE ALIGNMENT OPTION 3 - HYBRID**

- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For further details see:
    - Dwg No. B1832076/WD/0001 - Study Extents
    - Dwg No. B1832076/P/1001 - Existing Cross Section
    - Dwg No. B1832076/P/1002 - Proposed Cross Sections
    - Dwg No. B1832076/P/1003-1005 - General Arrangement Option 1 - Sheets 1 to 3
    - Dwg No. B1832076/P/1006-1008 - General Arrangement Option 2 - Sheets 1 to 3
    - Dwg No. B1832076/P/1009-1011 - General Arrangement Option 3 - Sheets 1 to 3

- LEGEND:**
- OS Base Plan
  - Existing Carriageway
  - Proposed Earthworks
  - Proposed Carriageway



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W0	21/01/2016	DRAFT - FOR INFORMATION	BS	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel:+44(0)161 235 6000 Fax:+44(0)161 235 6001  
 www.jacobs.com

**Cheshire East Council**

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 GENERAL ARRANGEMENT  
 RADWAY GREEN OPTION C**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

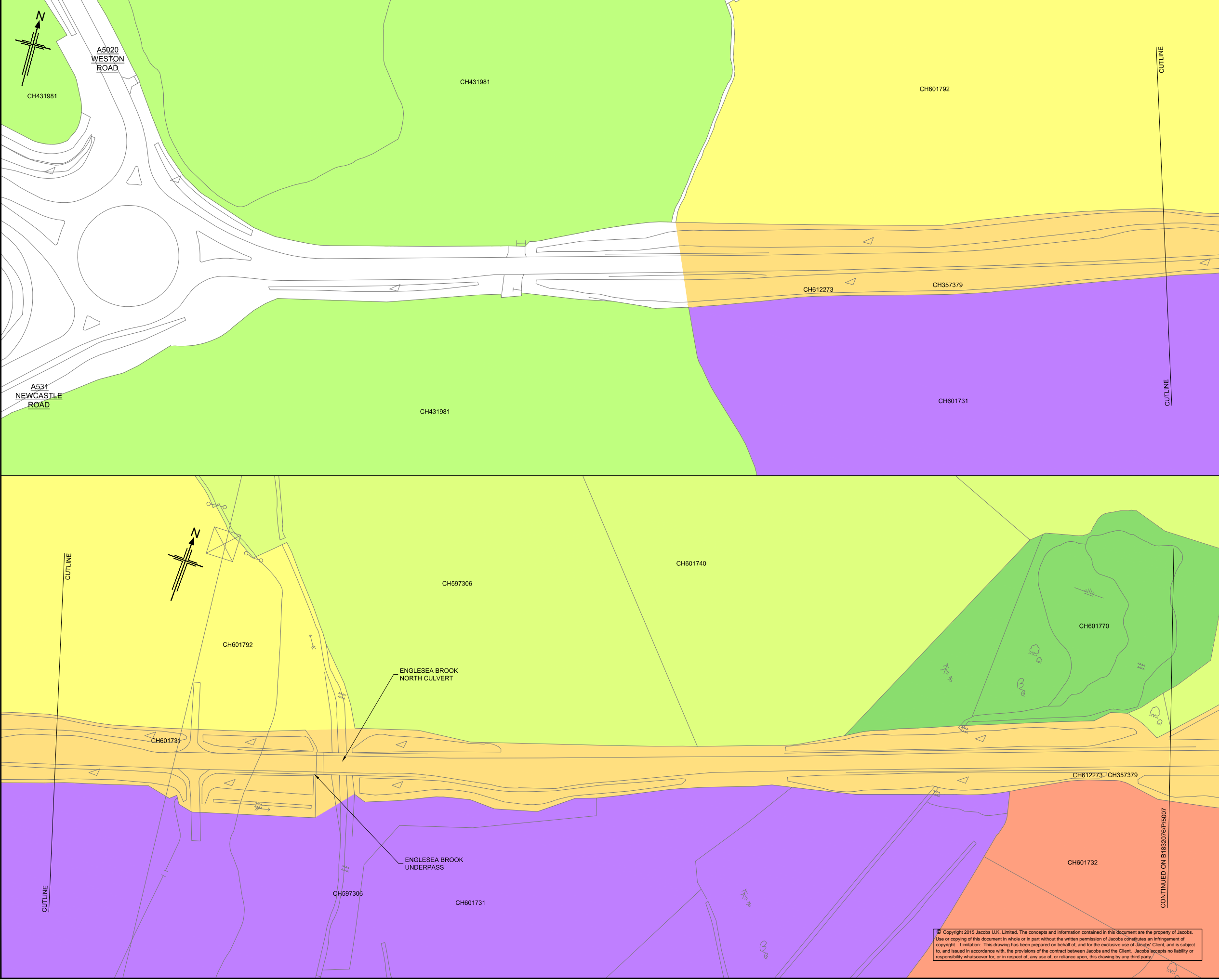
Jacobs No. B1832076  
 Client no.

Drawing number  
**B1832076/P/1049** Rev  
**W0**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of, Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

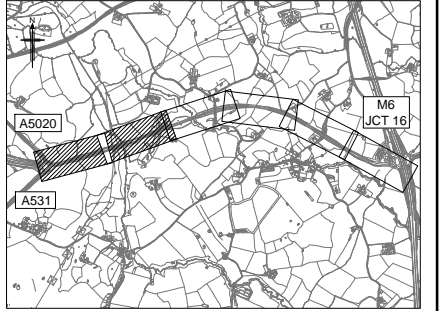
Neurope jacobs.com\LEEDS\Projects\B1500000\B1832076 - A500-M6 to A5020\Drawings\1000 - Highway\B1832076\_P\_1049\_W0 - General Arrangement\_Radway Green\_Online 3.dwg - 31/03/2016 13:19:12 - B1832076\_P\_1049 - huxleyk

## Appendix D – Land Ownership Plan



**NOTES:**  
 1. All dimensions are in meters, unless stated otherwise.

**LAND REFERENCES:**  
 CH357379 - Highways England  
 CH431981 - Co-op  
 CH597306 - Mainline Pipes Limited  
 CH601731 - Duchy  
 CH601740 - Duchy  
 CH601770 - Duchy  
 CH601792 - Duchy  
 CH612273 - Duchy



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015

0 20 40 60 80 100 m  
 SCALE 1 : 1000

W0	02/03/2016	DRAFT - FOR INFORMATION	MH	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Approv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel:+44(0)161 235 6000 Fax:+44(0)161 235 6001  
 www.jacobs.com



Client  
 Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 LAND OWNERSHIP PLANS  
 SHEET 1 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

Jacobs No.  
 B1832076

Client no.

Drawing number  
**B1832076/P/5006**

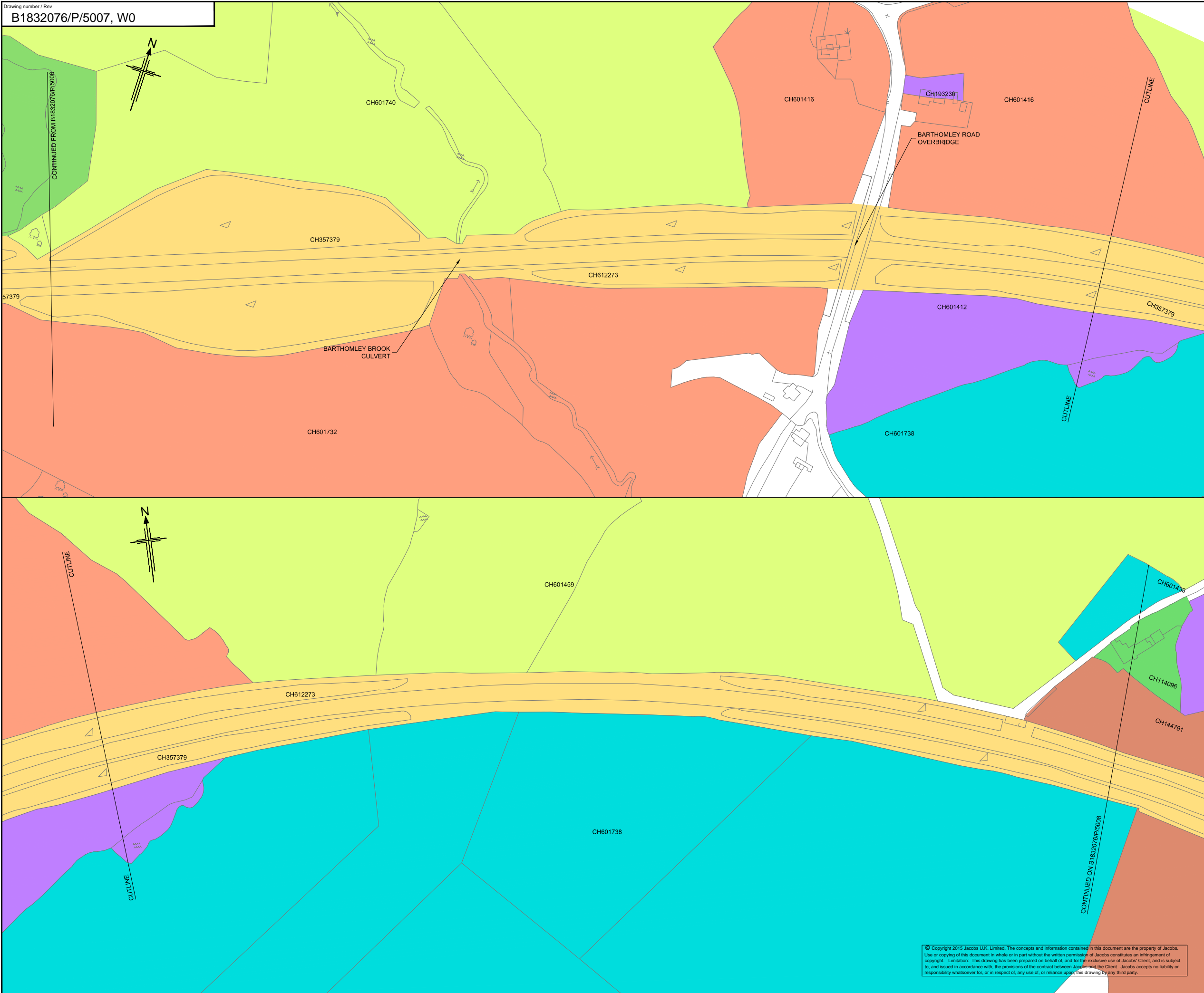
Rev  
**W0**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of, Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

CONTINUED ON B1832076/P/5007

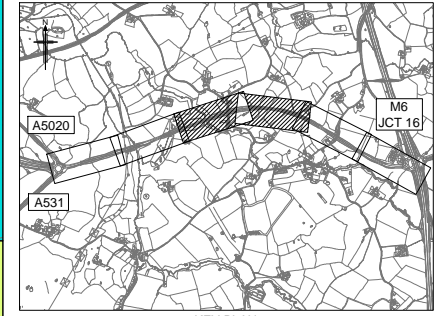
\\managers\projects\B1832076\B1832076\_P5006\Drawings\DWG\B1832076\_P5006\_W0.dwg - 21/03/2016 14:25:00 - 01/03/2016 14:25:00 - 11/03/2016 14:25:00

Drawing number / Rev  
**B1832076/P/5007, W0**



**NOTES:**  
 1. All dimensions are in meters, unless stated otherwise.

**LAND REFERENCES:**  
 CH193230 - Thomas Watson Wilde  
 CH357379 - Highways England  
 CH601412 - Duchy  
 CH601416 - Duchy  
 CH601459 - Duchy  
 CH601732 - Duchy  
 CH601738 - Duchy  
 CH601740 - Duchy  
 CH612273 - Duchy



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015

0 20 40 60 80 100 m  
 SCALE 1 : 1000

W0	02/03/2016	DRAFT - FOR INFORMATION	MH	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel:+44(0)161 235 6000 Fax:+44(0)161 235 6001  
 www.jacobs.com

Client

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 LAND OWNERSHIP PLANS  
 SHEET 2 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1 DO NOT SCALE

Jacobs No.  
 B1832076

Client no.

Drawing number  
**B1832076/P/5007**

Rev  
**W0**

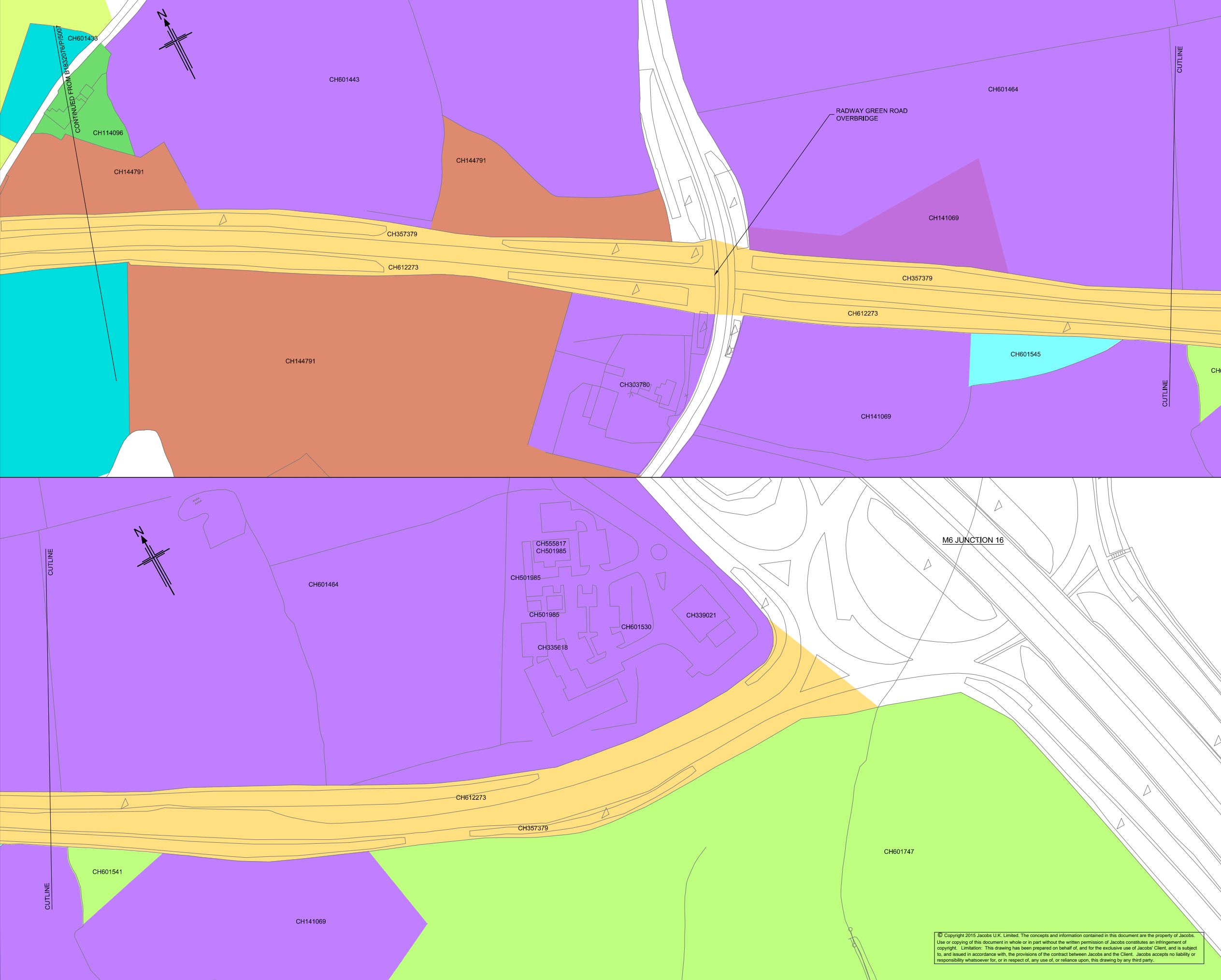
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

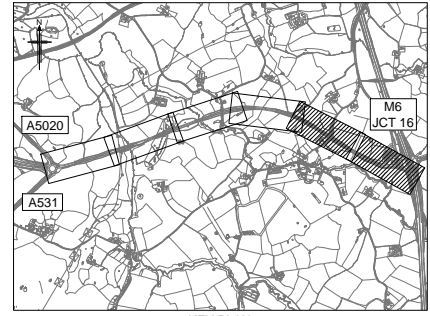
B:\1832076\1832076\_P\5007\1832076\_P\_5007.dwg - 21/03/2016 14:32:10 - 01832076\_P\_5007 - 11/04/2016



Drawing number / Rev  
**B1832076/P/5008, W0**



- NOTES:**
- All dimensions are in meters, unless stated otherwise.
- LAND REFERENCES:**
- CH114096 - Robert Ernest Oulton
  - CH144791 - Harry Brian Whittaker
  - CH141069 - Duchy
  - CH335618 - Shell Service Station
  - CH339021 - Shell Service Station
  - CH357379 - Highways England
  - CH455406 - Mathew Galbraith
  - CH501985 - Travelodge Hotels Limited
  - CH555817 - N/A
  - CH601443 - Duchy
  - CH601464 - Duchy
  - CH601530 - Duchy
  - CH601541 - Duchy
  - CH601545 - Duchy
  - CH601747 - Duchy
  - CH612273 - Duchy



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015

SCALE 1 : 1000

W0	02/03/2016	DRAFT - FOR INFORMATION	MH	KJH	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel:+44(0)161 235 6000 Fax:+44(0)161 235 6001  
 www.jacobs.com



Client  
**Cheshire East Council**

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 LAND OWNERSHIP PLANS  
 SHEET 3 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1      DO NOT SCALE

Jacobs No.  
 B1832076

Client no.

Drawing number  
**B1832076/P/5008**

Rev  
**W0**

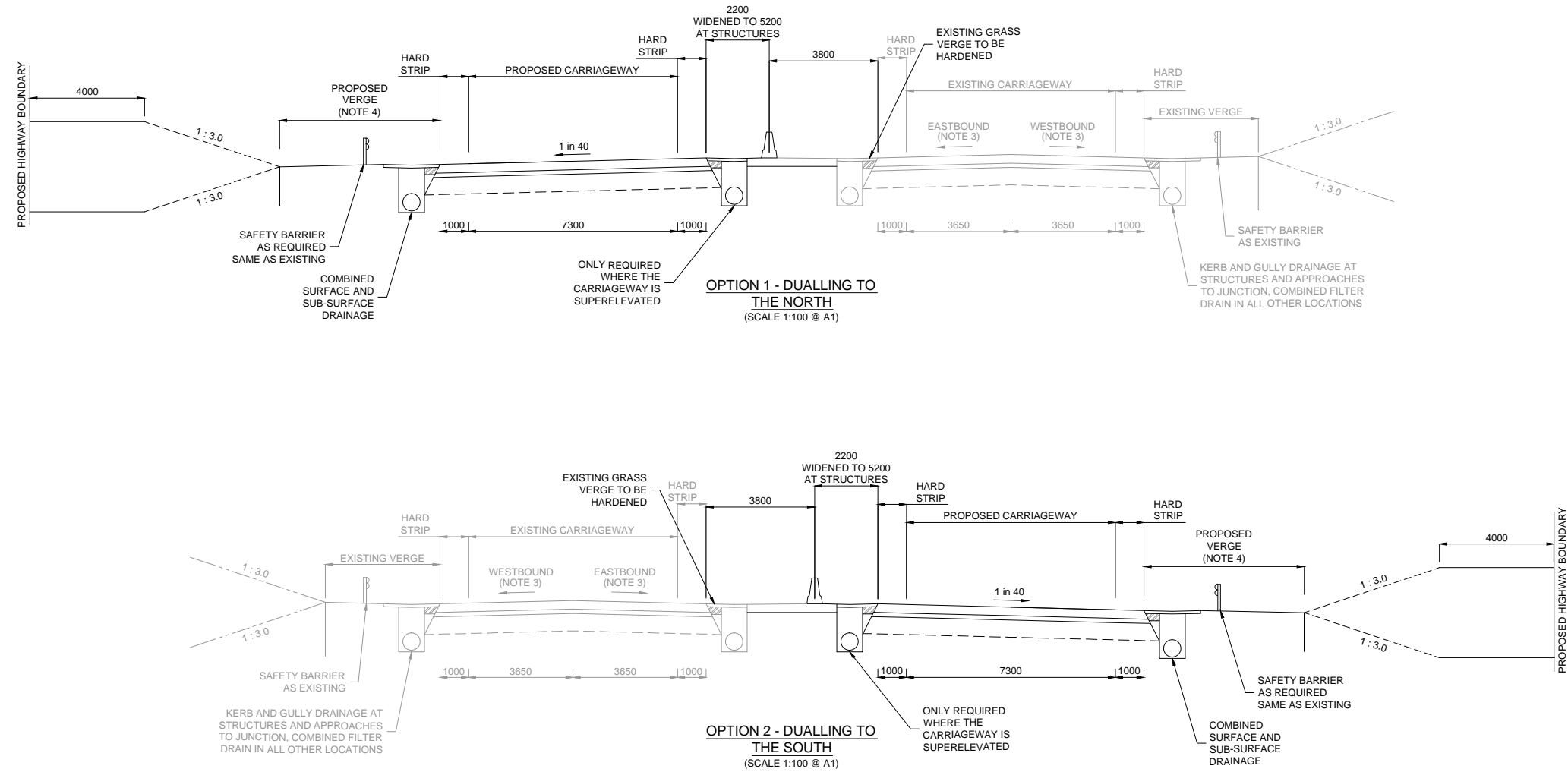
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

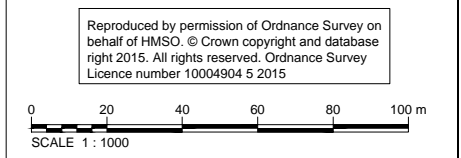
B:\1832076\1832076\_P\5008\1832076\_P\_5008\_W0.dwg    21/03/2016 10:23:14    1832076\_P\_5008\_W0.dwg    1832076\_P\_5008\_W0.dwg

## Appendix E – Proposed Cross-section Plans





- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - All assumptions for cross-section dimensions and information have been taken from Ordnance Survey.
  - A normal crossfall of 1:40 has been assumed, except where a superelevation is applied.
  - A widened verge of 5.6m has been proposed throughout, this will act as a haul road during construction.



- ASSUMPTIONS**
- SEE DRAWING NO. B1832076/P/1001 FOR ASSUMPTIONS ABOUT THE EXISTING CARRIAGEWAY CROSS-SECTION.
  - THE NEW CARRIAGEWAY WILL HAVE A 'D2AP' CROSS-SECTION.
  - THE NEW CARRIAGEWAY WILL BE DRAINED BY COMBINED SURFACE AND SUB-SURFACE FILTER DRAINS.
  - THE CENTRAL RESERVE WILL HAVE A CONCRETE BARRIER, WITH A WORKING WIDTH 'W2' 0.8m.
  - THE CENTRAL RESERVE BARRIER IS OFFSET A MINIMUM OF 0.5m FROM ADJACENT FILTER DRAINS.
  - NEW EARTHWORK SLOPES ARE AT 1 IN 3.
  - NEW VERGES ARE 5.6m WIDE AND WILL ACT AS A HAUL ROAD DURING CONSTRUCTION.

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

1	01/02/2016	REVISED CROSS-SECTIONS	K,JH	DT	DT	SK
0	10/09/2015	DRAFT - FOR INFORMATION	K,JH	DT	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd
 Number One Building, 5 First Street, Manchester, M15 4GU Tel:+44(0)161 235 6000 Fax:+44(0)161 235 6001 www.jacobs.com						
Client						
 <b>Cheshire East Council</b>						
Project						
A500 WIDENING SCHEME						
Drawing title						
<b>A500 DUALLING AND WIDENING SCHEME          PROPOSED CARRIAGEWAY CROSS-SECTIONS</b>						
Drawing status						
FOR INFORMATION						
Scale		1:100 @ A1		DO NOT SCALE		
Jacobs No.		B1832076				
Client no.						
Drawing number						Rev
<b>B1832076/P/1002</b>						<b>W1</b>
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.						

## Appendix F – Statutory Undertaker Plans

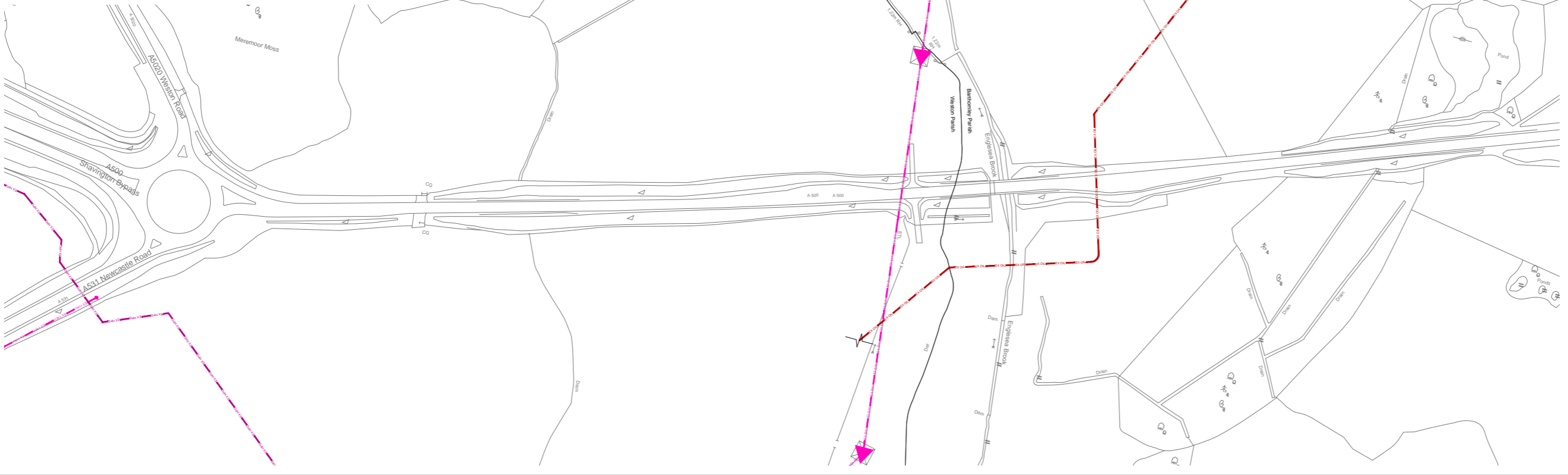


**NOTES**

1. THE LAYOUT OF MAINS IS GENERALLY IN ACCORDANCE WITH THE REPORT OF JOINT COMMITTEE ON LOCATION OF UNDERGROUND SERVICES PUBLISHED BY THE INSTITUTION OF CIVIL ENGINEERS.
2. THE DIMENSIONS SHOWN REPRESENT THE PROPOSED ARRANGEMENT IN STRAIGHT PORTIONS ON REGULAR SPACING. VARIATIONS MAY BE NECESSARY AT CORNERS AND CHANGES OF GRADIENT.
3. THE SPACE ALLOCATED IS CONSIDERED TO BE THE ABSOLUTE MINIMUM AND IN CERTAIN CIRCUMSTANCES E.G. WHERE BOTH HV AND LV CABLES ARE LAD, THE LV CABLE SHALL BE LAD IN THE ALTERNATIVE POSITION AND ADDITIONAL WIDTH MAY BE REQUIRED.
4. WHERE SERVICES ARE TO BE CONNECTED TO GAS MAINS A MINIMUM DISTANCE OF 300mm IS REQUIRED BETWEEN THE BUILDING AND THE CENTRE LINE OF THE MAIN.
5. REVISIONS IN LINE WITH CERTIFICATES:  
DEPTH OF COVER OF GAS MAINS IN FOOTWAY - 600mm  
DEPTH OF COVER OF GAS MAINS IN ROADWAY - 750mm
6. MINIMUM DISTANCE OF ANY SERVICE TO ANY SURFACE POOL WATER STRUCTURE IS 300mm.
7. ALL PIPE DIAMETERS AND DEPTHS ON GATTICA DRAWING WITH OR WITHOUT P.E.C. ARE ESTIMATED AND SHOULD BE TREATED AS A GUIDE ONLY. CONFIRMED DIMENSIONS.
8. WATER MAINS HAVE BEEN BURIED AS SHOWN DEPENDING ON A MEDIAN BETWEEN THE 1000mm MAXIMUM BURRY DEPTH DEPENDING ON THE DIMENSIONS AS REQUIRED.

PREPARED LAYOUT FOR MAINS IN ALL METRE WIDE FOOTWAY

TYPICAL ARRANGEMENT OF MAINS IN A CARRIAGEWAY



- NOTES**
1. Do not scale from this drawing.
  2. The information provided on this drawing about the existing utility services is based on historic records provided by the statutory utilities. The actual position and status of any mains and services must be verified and established on site. This drawing is provided for information only.
  3. The information on this drawing is given without obligation or warranty. No liability of any kind whatsoever is accepted by Gattica Associates Ltd., its agents or servants for any errors or omissions.
  4. Services to buildings are not shown but it must be assumed that any existing building is served with live supplies until proven otherwise. Written confirmation that a supply is dead must be obtained from the relevant utility.
  5. Cables to street lighting, road signs and illuminated bollards are not shown but must be assumed to exist.
  6. The location of any mains and services must be undertaken by hand dug trial holes. The approval of the appropriate utility must be sought before any mechanical plant is used.
  7. Underground services must be located in accordance with HSE Guidance note HS (G) 47.
  8. Overhead power lines must be dealt with in accordance with HSE Guidance note GS 6 (Third edition).
  9. For clarity existing plant is represented by single lines. Please note, this does not indicate the number of cables, ducts and pipes that may exist in the location indicated.

**DRAWING KEY**

--- LIMIT (UTILITIES BEYOND THIS POINT)

--- POINT OF CONNECTION (APPLIES TO GAS AND WATER CONNECTIONS)

**EXISTING ELECTRICITY KEY**

- EX LV --- EX LV --- OVERHEAD LOW VOLTAGE CABLE
- EX LV --- EX LV --- BURIED LOW VOLTAGE CABLE
- EX 11KV --- EX 11KV --- OVERHEAD 11kVA HIGH VOLTAGE CABLE
- EX 11KV --- EX 11KV --- BURIED 11kVA HIGH VOLTAGE CABLE
- EX EHV --- EX EHV --- 132kVA EXTRA HIGH VOLTAGE CABLE
- Pylon --- Pylon --- Pylon
- Pole --- Pole --- POLE (POSSIBLE POLE MOUNTED TRANSFORMER)

**EXISTING GAS / OIL KEY**

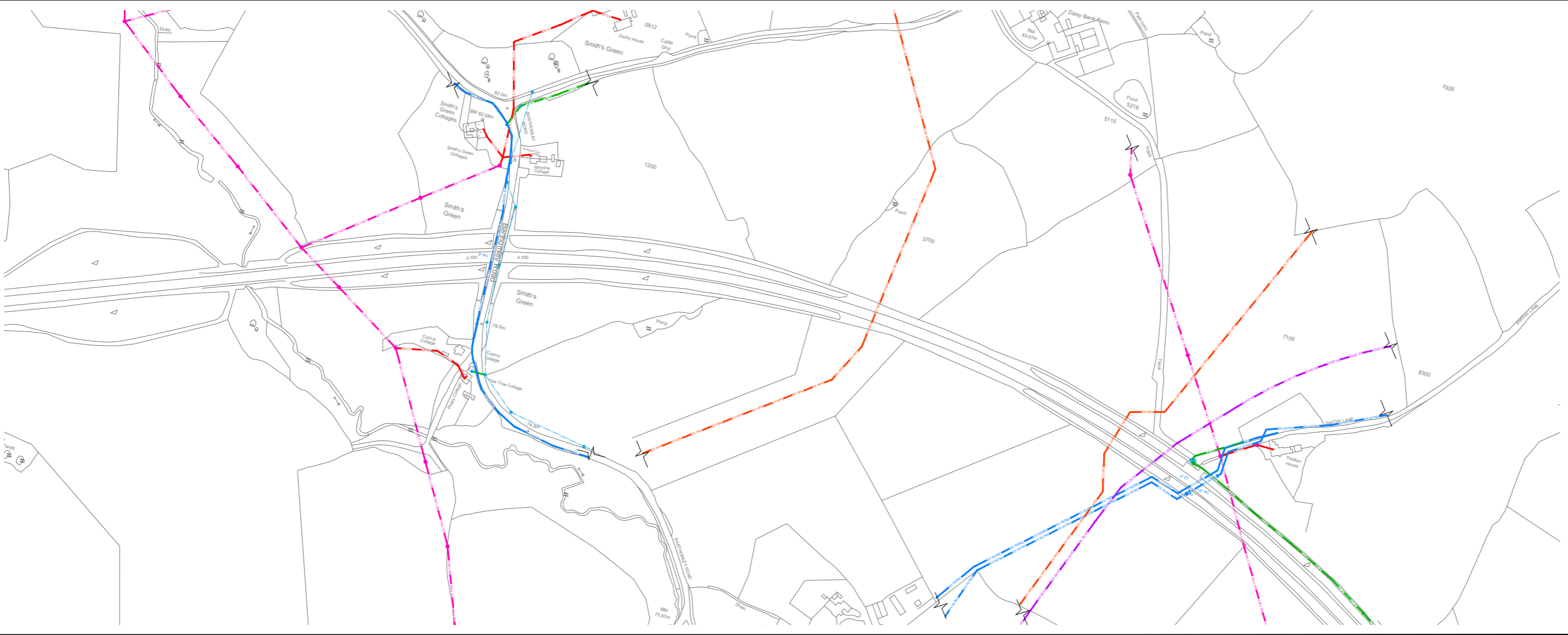
- EX HPG --- EX HPG --- LOCAL HIGH PRESSURE GAS MAIN
- EX HPG --- EX HPG --- NATIONAL HIGH PRESSURE GAS MAIN
- EX OIL --- EX OIL --- MAINLINE FUEL PIPELINE

**EXISTING COMMUNICATIONS KEY**

- EX BT --- EX BT --- UNDERGROUND BT PLANT
- BT JOINTING CHAMBER ---
- EX BT --- EX BT --- OVERHEAD BT PLANT
- BT TELEGRAPH POLE (UNDERGROUND BT CAN RUN TO AND FROM THE POLE) ---
- EX ZAYO --- EX ZAYO --- UNDERGROUND ZAYO PLANT

**EXISTING WATER KEY**

- EX W(DM) --- EX W(DM) --- POTABLE WATER DISTRIBUTION MAIN
- EX W(TM) --- EX W(TM) --- POTABLE WATER TRUNK MAIN
- WATER VALVE ---
- FH --- FIRE HYDRANT



**Drawing Layout**

**References**

Background: Xref\_B1832076 - OS Base Mapping

Rev	Description	Drawn	Date

SCALING NOTE: Do NOT scale from this drawing. If in doubt, ask.

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

**FOR INFORMATION**

Location  
**A500 ROAD WIDENING SCHEME**  
**CREWE, CW2**  
 NGR: X: 376006 Y: 352911

Title  
**EXISTING SERVICES DRAWING**

Client  
**JACOBS**

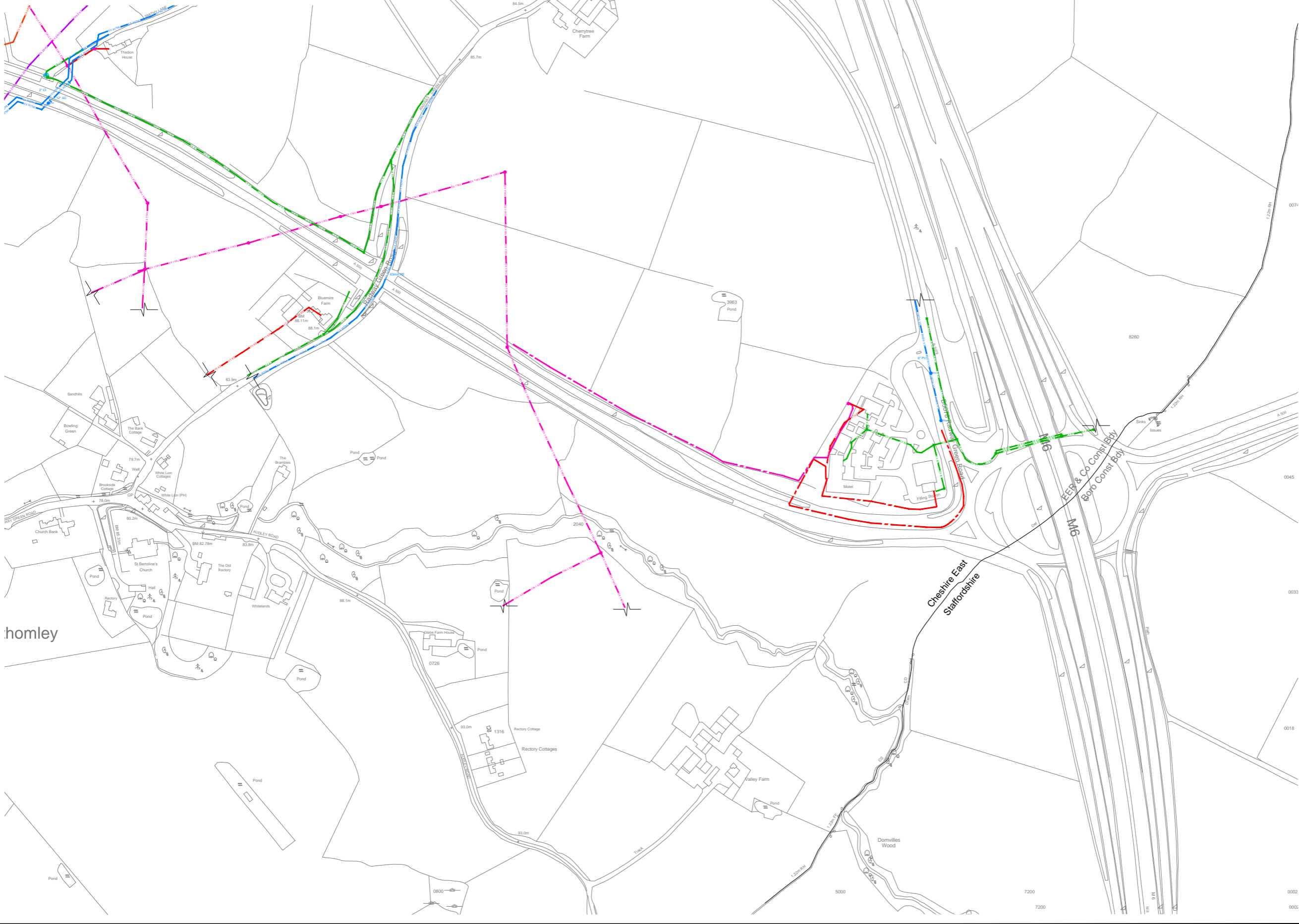
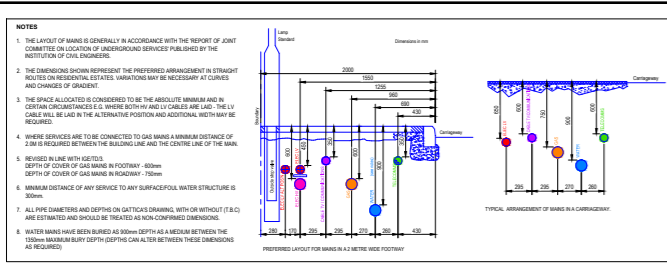
Date of 1st issue: 26/11/2015  
 Drawn by: AJ  
 Scale: 1:2000  
 Checked by: RG

Drawing Number: GAL140043-GAL-VUT-SC-MULTI-DR-C-0001

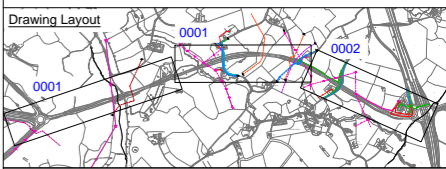
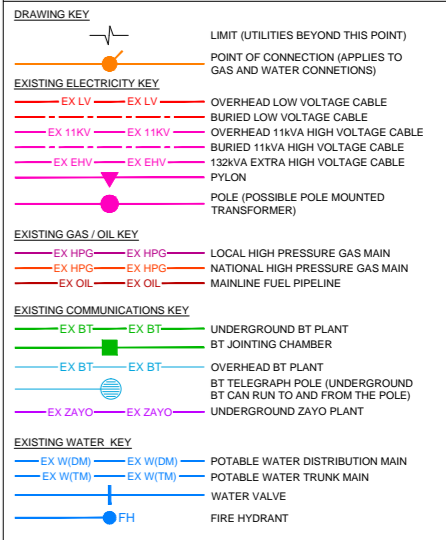
Revision: -

Unit F3 Cumberland Business Park  
 Northumberland Road  
 Southsea  
 Hampshire  
 PO5 1DS  
 Tel: +44 (0)1428 648873  
 Email: info@gatticaassociates.co.uk  
 www.gatticaassociates.co.uk





- NOTES**
1. Do not scale from this drawing.
  2. The information provided on this drawing about the existing utility services is based on historic records provided by the statutory utilities. The actual position and status of any mains and services must be verified and established on site. This drawing is provided for information only.
  3. The information on this drawing is given without obligation or warranty. No liability of any kind whatsoever is accepted by Gattica Associates Ltd., its agents or servants for any errors or omissions.
  4. Services to buildings are not shown but it must be assumed that any existing building is served with live supplies until proven otherwise. Written confirmation that a supply is dead must be obtained from the relevant utility.
  5. Cables to street lighting, road signs and illuminated bollards are not shown but must be assumed to exist.
  6. The location of any mains and services must be undertaken by hand dug trial holes. The approval of the appropriate utility must be sought before any mechanical plant is used.
  7. Underground services must be located in accordance with HSE Guidance note HS (G) 47.
  8. Overhead power lines must be dealt with in accordance with HSE Guidance note GS 6 (Third edition).
  9. For clarity existing plant is represented by single lines. Please note, this does not indicate the number of cables, ducts and pipes that may exist in the location indicated.



**References**  
 Background: Xref\_B1832076 - OS Base Mapping

SCALING NOTE: Do NOT scale from this drawing. If in doubt, ask.  
 UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

**FOR INFORMATION**

Location  
**A500 ROAD WIDENING SCHEME**  
**CREWE, CW2**  
 NGR: X: 376006 Y: 352911

Title  
**EXISTING SERVICES DRAWING**

Client <b>JACOBS</b>		gattica associates 1181178	
Date of 1st issue 26/11/2015	Drawn by AJ	Checked by RG	Revision -
Scale 1:2000		Drawing Number GAL140043-GAL-VUT-SC-MULTI-M2-C-0002	
Unit F3 Cumberland Business Park Northumberland Road Southsea Hampshire PO5 1DS		Tel: +44 (0)1428 648873 Email: info@gatticaassociates.co.uk www.gatticaassociates.co.uk	

homley

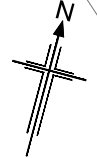
Cheshire East  
Staffordshire

FER & Co Const Bdy  
 8000 Const Bdy

## Appendix G – Assumed Drainage Plans



Drawing number / Rev  
**B1832076/P/1045, W0**



A5020  
WESTON  
ROAD

A531  
NEWCASTLE  
ROAD

CUTLINE

CUTLINE

**NOTES:**

- 1. All dimensions are in meters, unless stated otherwise.
- 2. For other information relating to the scheme see:
  - Dwg No. B1832076/WD/0001 - Study Extents
  - Dwg No. B1832076/P/1001 - Existing Cross Section
- 3. The layout shown is indicative. All existing filter drains are assumed and shown in the verge or at either the top or toe of embankments. This is based on site observations and discussions with Cheshire East Highways staff. A survey is needed to confirm the layout.

**LEGEND:**

- Existing Drainage
- Existing Carriageway
- Existing Water Features
- Existing Culvert

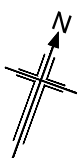


KEY PLAN

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



CUTLINE



PROBABLE POND LOCATIONS FOR 'OPTION 1 - WIDENING TO THE NORTH'

ENGLESEA BROOK NORTH CULVERT

ENGLESEA BROOK UNDERPASS

CONTINUED ON B1832076/P/1046

CUTLINE

PROBABLE POND LOCATIONS FOR 'OPTION 2 - WIDENING TO THE SOUTH' & 'OPTION 3 - HYBRID OPTION'

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd
W0	24/02/2016	DRAFT - FOR INFORMATION	KJH	DT	DT	SK

**JACOBS**  
Number One Building, 5 First Street, Manchester, M15 4GU  
Tel:+44(0)161 235 6000 Fax:+44(0)161 235 6001  
www.jacobs.com



Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
ASSUMED EXISTING DRAINAGE  
SHEET 1 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
1:1000 @ A1  
DO NOT SCALE

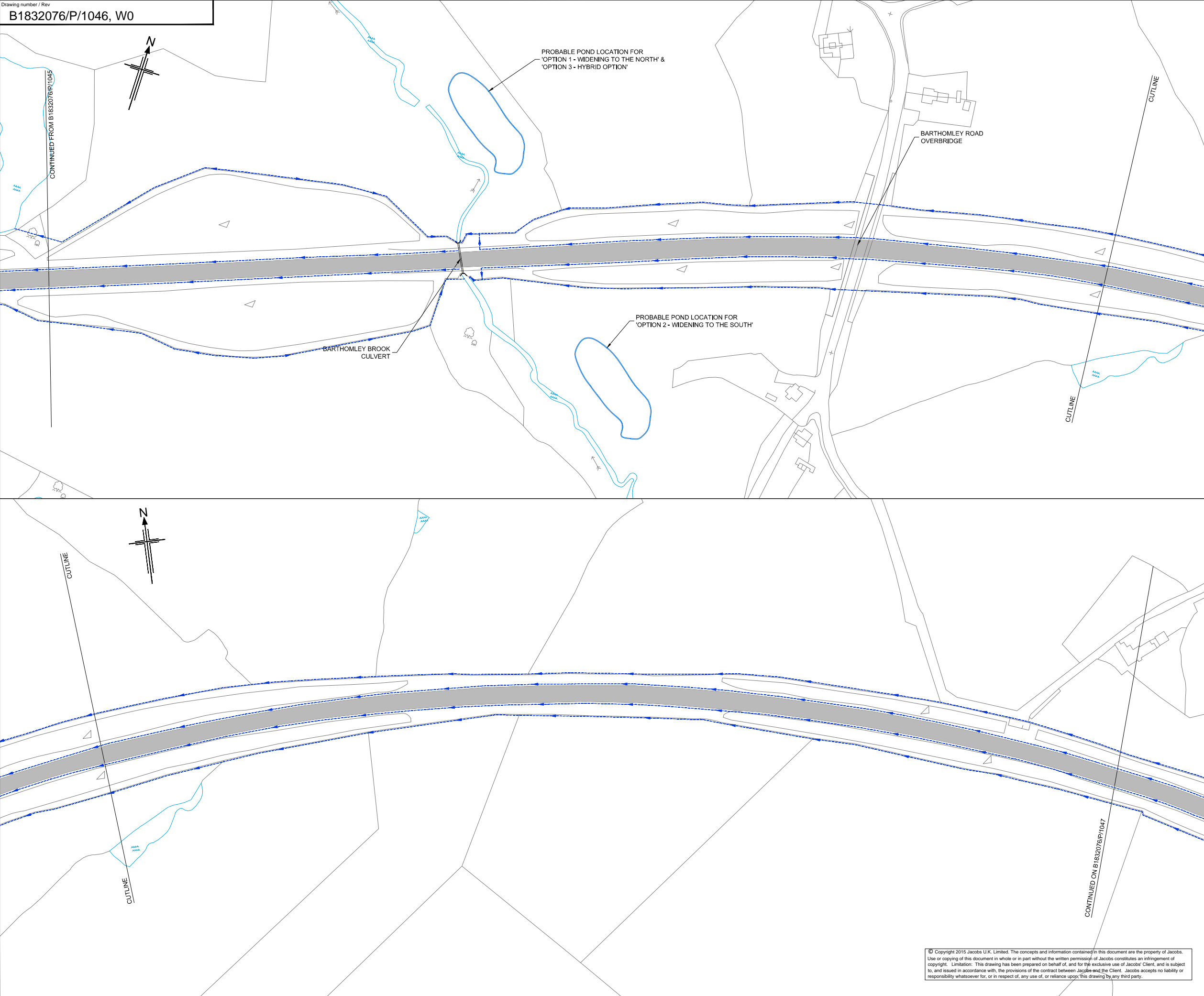
Jacobs No.  
B1832076

Drawing number  
**B1832076/P/1045**

Rev  
**W0**

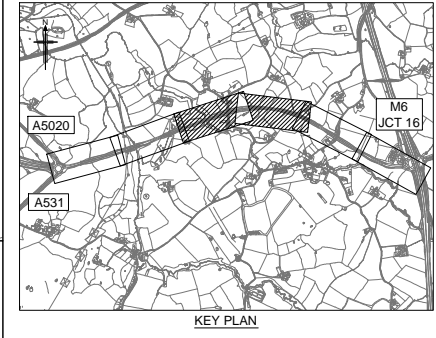
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.





- NOTES:**
- All dimensions are in meters, unless stated otherwise.
  - For other information relating to the scheme see:  
 - Dwg No. B1832076/WD/0001 - Study Extents  
 - Dwg No. B1832076/P/1001 - Existing Cross Section
  - The layout shown is indicative. All existing filter drains are assumed and shown in the verge or at either the top or toe of embankments. This is based on site observations and discussions with Cheshire East Highways staff. A survey is needed to confirm the layout.

- LEGEND:**
- Existing Drainage
  - Existing Carriageway
  - Existing Water Features
  - Existing Culvert



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015

SCALE 1 : 1000

W0	24/02/2016	DRAFT - FOR INFORMATION	KJH	DT	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel:+44(0)161 235 6000 Fax:+44(0)161 235 6001  
 www.jacobs.com



Client  
 Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 ASSUMED EXISTING DRAINAGE  
 SHEET 2 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1      DO NOT SCALE

Jacobs No.  
 B1832076

Client no.

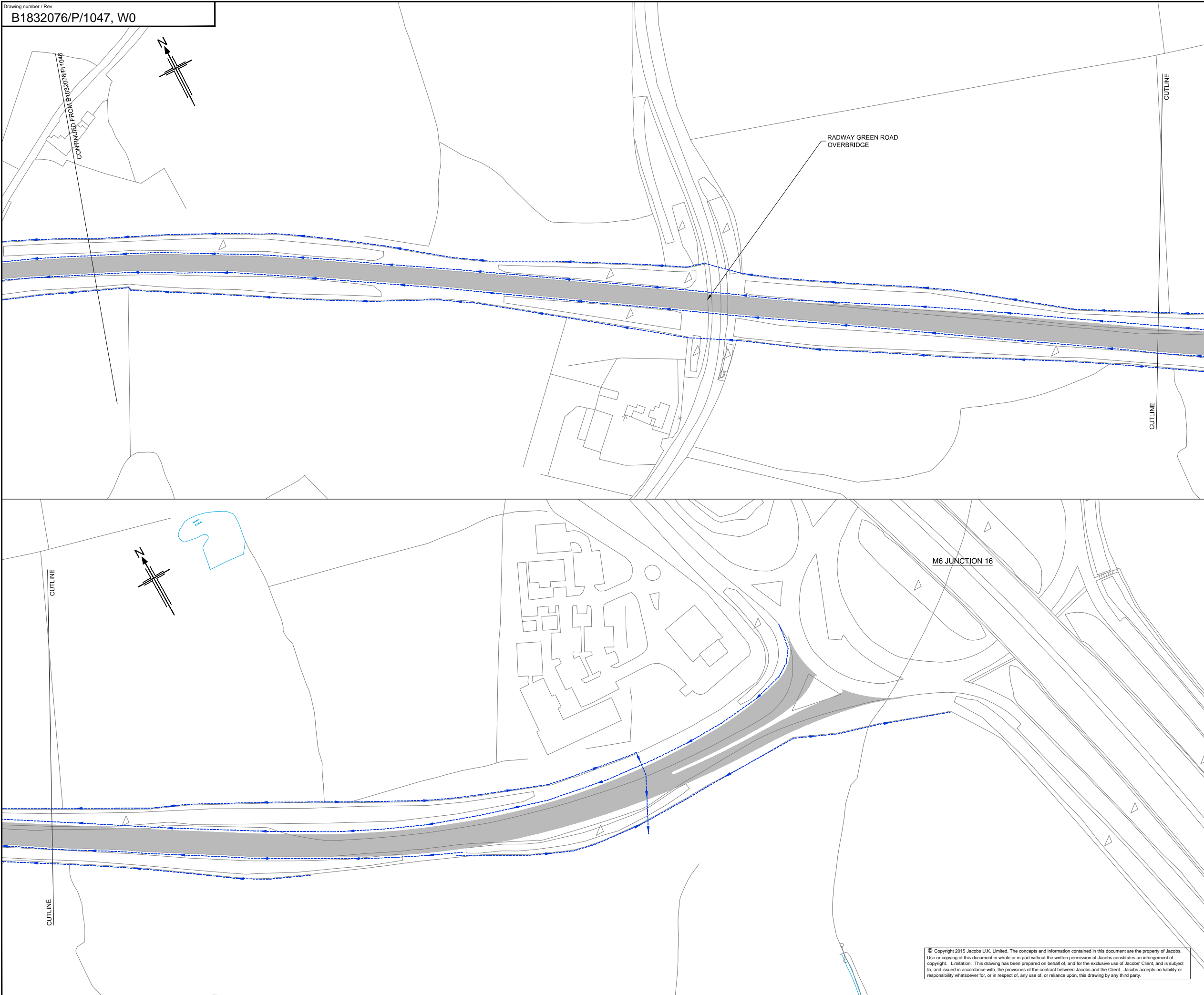
Drawing number  
**B1832076/P/1046**

Rev  
**W0**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Drawing number / Rev  
**B1832076/P/1047, W0**



**NOTES:**

1. All dimensions are in meters, unless stated otherwise.
2. For other information relating to the scheme see:  
 - Dwg No. B1832076/WD/0001 - Study Extents  
 - Dwg No. B1832076/P/1001 - Existing Cross Section
3. The layout shown is indicative. All existing filter drains are assumed and shown in the verge or at either the top or toe of embankments. This is based on site observations and discussions with Cheshire East Highways staff. A survey is needed to confirm the layout.

**LEGEND:**

- Existing Drainage
- Existing Carriageway
- Existing Water Features
- Existing Culvert



KEY PLAN

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 10004904 5 2015



W0	24/02/2015	DRAFT - FOR INFORMATION	KJH	DT	DT	SK
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd

**JACOBS**  
 Number One Building, 5 First Street, Manchester, M15 4GU  
 Tel: +44(0)161 235 6000 Fax: +44(0)161 235 6001  
 www.jacobs.com



Client  
**Cheshire East Council**

Project  
**A500 WIDENING SCHEME**

Drawing title  
**A500 DUALLING AND WIDENING SCHEME  
 ASSUMED EXISTING DRAINAGE  
 SHEET 3 OF 3**

Drawing status  
**FOR INFORMATION**

Scale  
 1:1000 @ A1      DO NOT SCALE

Jacobs No.  
 B1832076

Drawing number  
**B1832076/P/1047**      Rev  
**W0**

© Copyright 2015 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

## Appendix H – Score Weightings Sensitivity Analysis

**B1832076/OD/01 - Scheme Assessment Report**  
**Appendix H - Score Weightings Sensitivity Analysis**

The tables below take Table 6.2 from the main report and apply different weightings. The rationale behind the weightings is described for each scenario.

**Scenario 1:** Original Scenario, as included in the main report

Element	Unweighted Rankings / Scores		Weighting	Weighted Scores	
	Option 1	Option 2		Option 1	Option 2
Scheme Cost Estimate	2	2	1	2	2
Topography and Land Use	2	2	1	2	2
Geology, Geomorphology and Ground Conditions	1	2	2	2	4
Departures from Standards	2	2	0.5	1	1
Public Utilities	1	2	1	1	2
Structures	2	2	0	0	0
Reputation	1	2	0.5	0.5	1
Constructability	2	2	1	2	2
Operational Safety	2	2	1	2	2
Landscape	2	2	0.4	0.8	0.8
Ecology	1	2	0.4	0.4	0.8
Cultural Heritage	2	1	0.2	0.4	0.2
Air Quality	2	2	0.2	0.4	0.4
Greenhouse Gases	2	2	0.2	0.4	0.4
Noise and Vibration	2	2	0.2	0.4	0.4
The Water Environment	2	2	0.4	0.8	0.8
All Travellers	2	2	0.2	0.4	0.4
Community and Private Assets	2	1	0.6	1.2	0.6
Planning	2	2	0.2	0.4	0.4
<b>OVERALL</b>	<b>34</b>	<b>36</b>		<b>18.1</b>	<b>21.2</b>

Scenario 2: Weighting of environmental factors doubled

Element	Unweighted Rankings / Scores			Weighted Scores	
	Option 1	Option 2	Weighting	Option 1	Option 2
Scheme Cost Estimate	2	2	1	2	2
Topography and Land Use	2	2	1	2	2
Geology, Geomorphology and Ground Conditions	1	2	2	2	4
Departures from Standards	2	2	0.5	1	1
Public Utilities	1	2	1	1	2
Structures	2	2	0	0	0
Reputation	1	2	0.5	0.5	1
Constructability	2	2	1	2	2
Operational Safety	2	2	1	2	2
Landscape	2	2	0.8	1.6	1.6
Ecology	1	2	0.8	0.8	1.6
Cultural Heritage	2	1	0.4	0.8	0.4
Air Quality	2	2	0.4	0.8	0.8
Greenhouse Gases	2	2	0.4	0.8	0.8
Noise and Vibration	2	2	0.4	0.8	0.8
The Water Environment	2	2	0.8	1.6	1.6
All Travellers	2	2	0.4	0.8	0.8
Community and Private Assets	2	1	1.2	2.4	1.2
Planning	2	2	0.4	0.8	0.8
<b>OVERALL</b>	<b>34</b>	<b>36</b>		<b>23.7</b>	<b>26.4</b>



**Scenario 3:** 'Community and Private Assets element', which factors in the impact on Bluemire Farm, given a weighting of 2, and 'Geology, Geomorphology and Ground Conditions', which factors in the difficulties of constructing through the duckaries pond, given a weighting of 1

Element	Unweighted Rankings / Scores			Weighted Scores	
	Option 1	Option 2	Weighting	Option 1	Option 2
Scheme Cost Estimate	2	2	1	2	2
Topography and Land Use	2	2	1	2	2
Geology, Geomorphology and Ground Conditions	1	2	1	1	2
Departures from Standards	2	2	0.5	1	1
Public Utilities	1	2	1	1	2
Structures	2	2	0	0	0
Reputation	1	2	0.5	0.5	1
Constructability	2	2	1	2	2
Operational Safety	2	2	1	2	2
Landscape	2	2	0.4	0.8	0.8
Ecology	1	2	0.4	0.4	0.8
Cultural Heritage	2	1	0.2	0.4	0.2
Air Quality	2	2	0.2	0.4	0.4
Greenhouse Gases	2	2	0.2	0.4	0.4
Noise and Vibration	2	2	0.2	0.4	0.4
The Water Environment	2	2	0.4	0.8	0.8
All Travellers	2	2	0.2	0.4	0.4
Community and Private Assets	2	1	2	4	2
Planning	2	2	0.2	0.4	0.4
<b>OVERALL</b>	<b>34</b>	<b>36</b>		<b>19.9</b>	<b>20.6</b>

Scenario 4: 'Cultural Heritage' and 'Community and Private Assets' elements given a weighting of 2

Element	Unweighted Rankings / Scores		Weighting	Weighted Scores	
	Option 1	Option 2		Option 1	Option 2
Scheme Cost Estimate	2	2	1	2	2
Topography and Land Use	2	2	1	2	2
Geology, Geomorphology and Ground Conditions	1	2	2	2	4
Departures from Standards	2	2	0.5	1	1
Public Utilities	1	2	1	1	2
Structures	2	2	0	0	0
Reputation	1	2	0.5	0.5	1
Constructability	2	2	1	2	2
Operational Safety	2	2	1	2	2
Landscape	2	2	0.4	0.8	0.8
Ecology	1	2	0.4	0.4	0.8
Cultural Heritage	2	1	2	4	2
Air Quality	2	2	0.2	0.4	0.4
Greenhouse Gases	2	2	0.2	0.4	0.4
Noise and Vibration	2	2	0.2	0.4	0.4
The Water Environment	2	2	0.4	0.8	0.8
All Travellers	2	2	0.2	0.4	0.4
Community and Private Assets	2	1	2	4	2
Planning	2	2	0.2	0.4	0.4
<b>OVERALL</b>	<b>34</b>	<b>36</b>		<b>24.5</b>	<b>24.4</b>

**Scenario 5:** Factors that take the duckaries into account, i.e. 'Geology, Geomorphology and Ground Conditions' and 'Ecology', given a weighting of 2

Element	Unweighted Rankings / Scores		Weighting	Weighted Scores	
	Option 1	Option 2		Option 1	Option 2
Scheme Cost Estimate	2	2	1	2	2
Topography and Land Use	2	2	1	2	2
Geology, Geomorphology and Ground Conditions	1	2	2	2	4
Departures from Standards	2	2	0.5	1	1
Public Utilities	1	2	1	1	2
Structures	2	2	0	0	0
Reputation	1	2	0.5	0.5	1
Constructability	2	2	1	2	2
Operational Safety	2	2	1	2	2
Landscape	2	2	0.4	0.8	0.8
Ecology	1	2	2	2	4
Cultural Heritage	2	1	0.2	0.4	0.2
Air Quality	2	2	0.2	0.4	0.4
Greenhouse Gases	2	2	0.2	0.4	0.4
Noise and Vibration	2	2	0.2	0.4	0.4
The Water Environment	2	2	0.4	0.8	0.8
All Travellers	2	2	0.2	0.4	0.4
Community and Private Assets	2	1	0.6	1.2	0.6
Planning	2	2	0.2	0.4	0.4
<b>OVERALL</b>	<b>34</b>	<b>36</b>		<b>19.7</b>	<b>24.4</b>