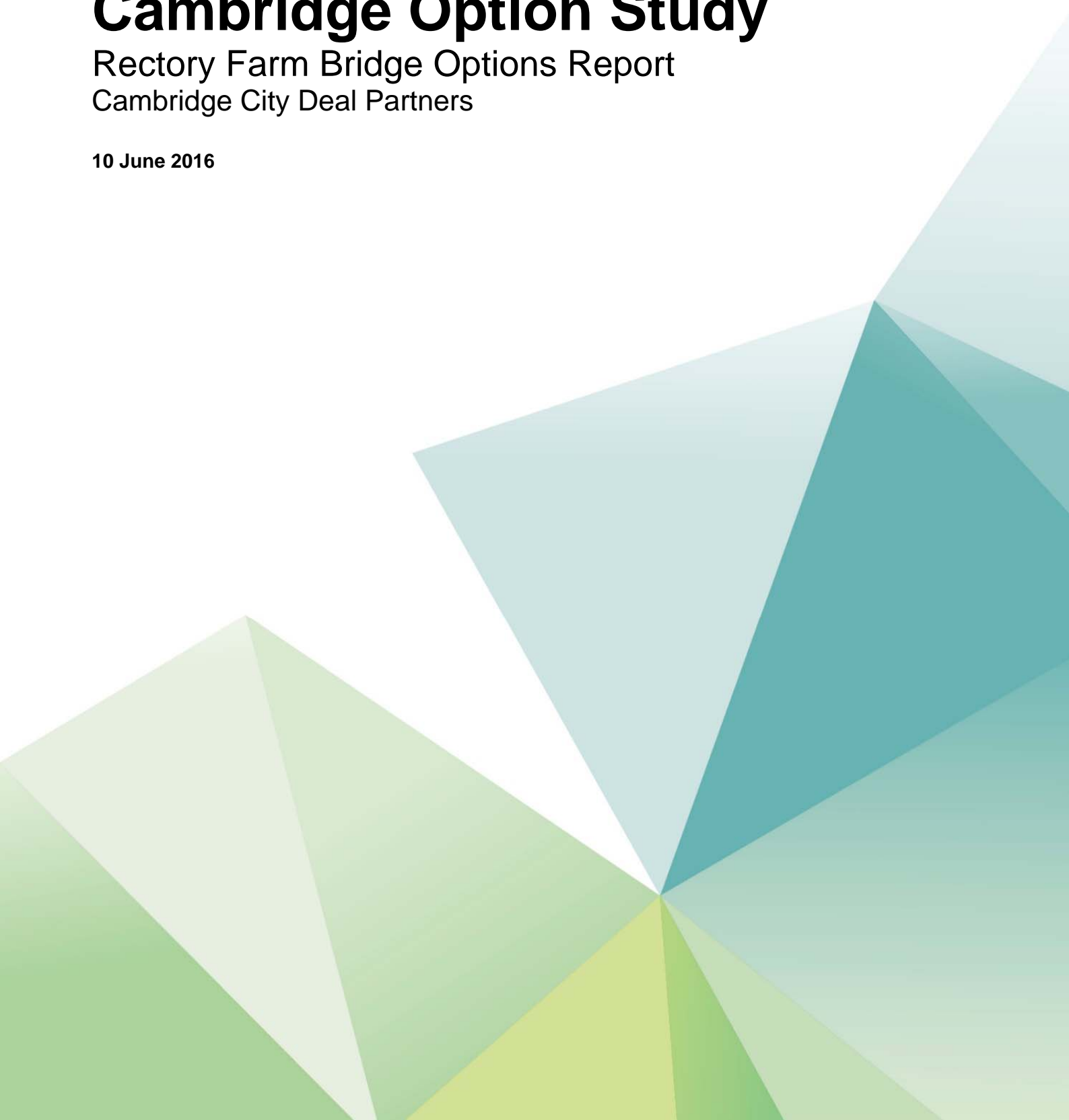


A428 Cambourne to Cambridge Option Study

Rectory Farm Bridge Options Report
Cambridge City Deal Partners

10 June 2016



Notice

This document and its contents have been prepared and are intended solely for the City Deal Partners' information and use in relation to the A428 Cambourne to Cambridge Option Study

ATKINS assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

This document has 28 pages including the cover.

Document history

Job number: 5134058			Document ref: 5134058/OR/001			
Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 1.0	For Client Review	VR	GRS	SBH	EM	10/06/16

Client signoff

Client	Cambridge City Deal Partners
Project	A428 Cambourne to Cambridge Option Study
Document title	Rectory Farm Bridge Options Report
Job no.	5134058
Copy no.	
Document reference	5134058/OR/001

Table of contents

Chapter	Pages
Executive summary	4
1. Introduction	5
2. Review of Existing Records	6
3. Site Visit	6
4. Structural Considerations	7
5. Geotechnical Considerations	8
6. Highway Considerations	9
7. Statutory Undertakers' Apparatus	10
8. Ecology and Environment Considerations	10
9. Land, Heritage and Archaeology Considerations	10
10. Options	11
10.1. Option 1 - Reassign the Lanes	11
10.2. Option 2 - Widening of Carriageway by Reducing the Verges	11
10.3. Option 3 - Widening the Bridge to the North	12
10.4. Option 4 - Widening the Bridge to the South	12
10.5. Option 5 - Constructing a New Bridge Adjacent to the Existing Bridge	13
11. Discussion of the Options	14
12. Estimated Cost	15
13. Conclusion	16
14. Recommendations	16
Appendices	17
Appendix A. General Arrangement Drawing of Existing Bridge	18
Appendix B. Photographs from Site Visit	19
Appendix C. Structural Review and Assessment of highway Structures – BD101 Form	25
Appendix D. Option Sketches	26
Appendix E. Level 1 Cost Estimates	27

Tables

Table 11-1	Summary of benefits and drawbacks	14
Table 11-2	Compatibility of Options	14
Table 11-3	Summary of Statutory Undertakers' Apparatus Diversions	15
Table 12-1	Cost Summary of Options Considered	15

Figures

Figure 1-1	Location Plan	5
------------	---------------------	---

Executive summary

This report presents the options for provision of a bus lane at Rectory Farm Bridge at the M11 Junction 13 in Cambridgeshire. This report is part of the A428 Cambourne to Cambridge option study for improving public transport along the corridor.

The options considered as part of this option study are:

- Option 1 - Reassigning the Lanes
- Option 2 - Widening the Carriageway by Reducing the Verges
- Option 3 - Widening the Bridge to the North
- Option 4 - Widening the Bridge to the South
- Option 5 - Constructing a New Bridge Adjacent to the Existing Bridge

All the above options have benefits and limitations and these are discussed within section 11 of this report. A preliminary assessment of the existing bridge based on the available records indicates the bridge deck could carry the additional fourth traffic lane. The effects on the bearings, piers, abutments and foundations have been reviewed and the implications are discussed.

Summary of the options are as below:

- Option 1 is the least expensive option and least disruptive to road users during construction. However, this option could lead to long queues during peak times.
- Option 2, the cost and disruption to road users during construction are moderate. The key drawback of this option is that it can lead to higher risks of accidents and greater congestion due to the narrow lanes.
- Options 3, 4 and 5A will provide four standard lanes, but are relatively expensive and most disruptive to road users during the construction phase. Standard lane widths have safety and maintenance benefits as listed in Table 11.1.
- Option 5B is relatively expensive and causes moderate disruption to road users during construction. Cyclists and pedestrians will have a safer means of crossing the M11.

1. Introduction

This option study focuses on the feasibility of five options for providing a bus lane either over or adjacent to Rectory Farm Bridge at M11 Junction 13. The report forms part of a wider options study that is being undertaken for improving public transport from Cambourne to Cambridge along the A428 corridor.

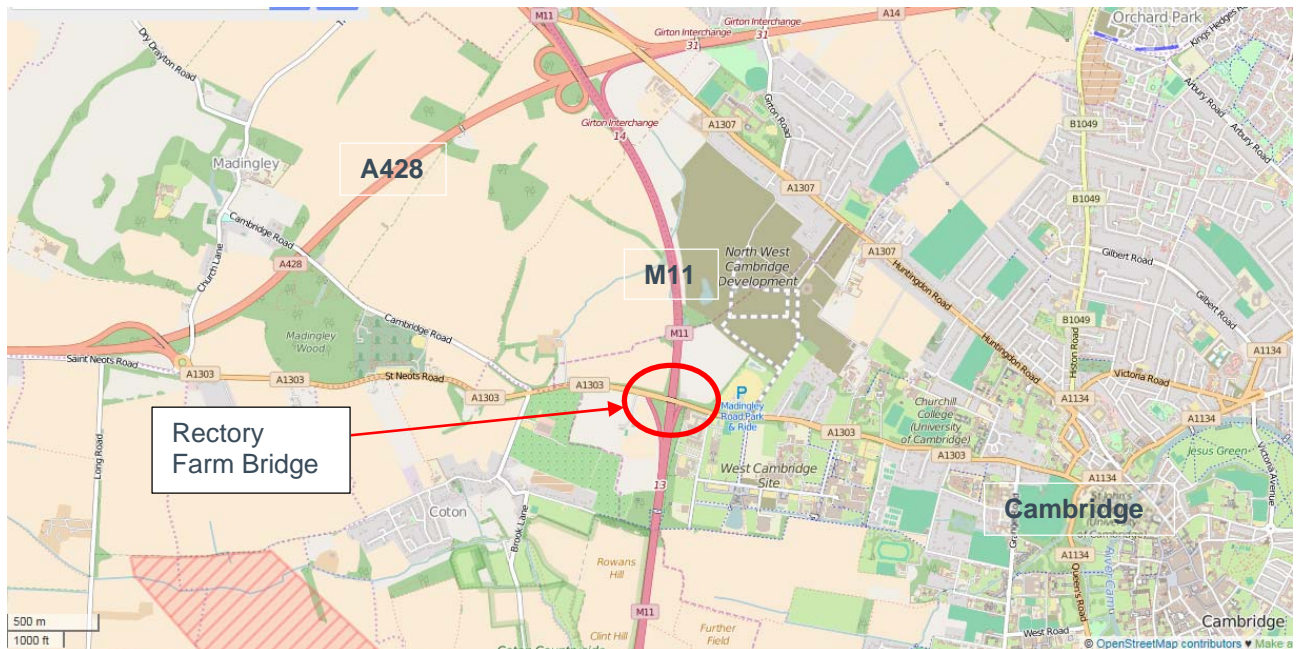


Figure 1-1 Location Plan

Rectory Farm Bridge carries the A1303 over the M11 at Junction 13 and is located at Ordnance Survey grid reference TL 542081E, 259380N. The bridge has four spans comprising a continuous reinforced concrete solid slab deck with a skew angle of $07^{\circ} 45'$. The structure is 16.6 m wide between parapets. The deck is simply supported over the abutments and intermediate piers.

The end supports are reinforced concrete bank seats founded on steel sheet piles and H piles. The intermediate supports are reinforced concrete piers, each comprising twin leaves with a common base on spread foundations. The parapets are P2/113 aluminium with wire mesh infill.

The bridge deck carries three lanes of the A1303. The carriageway is 10m wide, the North verge (footway/cycleway) varies from 3.0m to 3.1m and the South verge varies from 3.5m to 3.6m. There are service troughs in both verges carrying statutory undertakers' equipment.

A general arrangement drawing is included in Appendix A.

2. Review of Existing Records

A review has been undertaken of the existing structural records available on Highways England's structural database, Structures Management Information System (SMIS). The list of documents reviewed is below:

- i. Principal Inspection November 2015
- ii. Drawing No 1E/411/10/10/25/D1 – General Arrangement Drawing
- iii. Drawing No 1E/411/10/10/25/D2 – Measurement Drawing
- iv. Drawing No 1E/411/10/10/25/D3 – Setting Out Details Drawing
- v. Drawing No 1E/411/10/10/25/D4 – Abutment Piling Details Drawing
- vi. Drawing No 1E/411/10/10/25/D5 – Abutment and Wingwall Outlines Drawing
- vii. Drawing No 1E/411/10/10/25/D6 - Abutment and Wingwall Reinforcement Drawing
- viii. Drawing No 1E/411/10/10/25/D7 – Centre Pier Outline and Reinforcement Details Drawing
- ix. Drawing No 1E/411/10/10/25/D8 - Outside Pier Outline and Reinforcement Details Drawing
- x. Drawing No 1E/411/10/10//25/D9/1 – Deck Outlines Drawing
- xi. Drawing No 1E/411/10/10/25/D10 – Deck Reinforcement Drawing
- xii. Drawing No 1E/411/10/10/25/D11- Section Through Deck Showing Reinforcement Arrangement Drawing
- xiii. Roads 277 forms

Having reviewed the drawings, there is sufficient information to undertake a structural assessment and outline design. The only information missing is design data for the bridge bearings. This has been requested from Highways England their response is pending.

3. Site Visit

A site visit was undertaken in March 2016 to identify potential constraints and to verify the footway and carriageway widths. During the site visit a number of constraints were identified. The key constraints are listed below:

- Southbound on-slip and northbound off-slip of the M11.
- Access to the gas valve compound (GVC) to the North East of the existing bridge.
- Access to a construction site (Cambridge North West development) to the North East of the existing bridge.
- Deck drainage.
- Existing cycleway and footway on the Northern side.
- Existing statutory undertakers' apparatus within troughs in the footways.
- Existing statutory undertakers' apparatus on the North West approach verge.
- Existing streetlights.

- Existing hardstanding area to the North West of the bridge.
- Traffic signals at the A1303 junction with M11 Northbound off-slip.
- Trees on each side of the structure and its approaches.
- Low lying area (potential) water body to the North East of the bridge located adjacent to the Madingley Park and Ride access.

4. Structural Considerations

As part of this option study, a structural review was carried out in accordance with the Highways Agency, Design Manual for Roads and Bridges (DMRB). The standard for structural review and assessment of highway structures, BD 101/11, requires bridges to undergo a structural review if there are proposed changes in the operational load carrying requirements as defined in clause 2.2 of BD 101/11. A copy of the BD101 review form is included within Appendix B of this document.

No design or assessment certificates were located as part of the review of SMIS records. However, the Roads 277 form and the latest Principal Inspection records indicate that the bridge has a capacity of HA + 45 units HB loading in its current configuration.

A preliminary assessment of the structure was carried out to assess the feasibility of adding a fourth traffic lane over the existing bridge. The assessment results indicate that bridge deck can accommodate an additional lane of traffic, but the load capacity would be reduced to HA + 37.5 units HB. It is to be noted that, although the preliminary analysis has resulted in a marginal pass for HA + 37.5 units of HB loading, it will be necessary to undertake a detailed assessment including technical approval and consultation with Highways England prior to taking any of the options forward to the design phase. On the basis that the bridge deck can support HA + HB 37.5 units loading, an exercise of converting HB load rating to equivalent SV loading was undertaken in accordance with BD 86/11, which indicates the bridge deck can support SV 80 and SV100 loading. The converted equivalent loading complies with the requirements of IAN 124/11 for principal roads. The increase in the total load is in the region of 12% for the additional traffic lane and the approximate 2.5m widening of the existing bridge deck.

The effect of the increased loading on the piers and the abutments has been reviewed and is not considered to be large, although structural assessment has not been undertaken at this stage and there is a risk this could reveal deficiencies. The bearing design loads are not available nor are any details of the bearings and therefore, a comparative assessment could not be carried out at this stage. On the basis that adding an additional lane would increase the live load, it is possible the bearings will have to be replaced.

The piers, abutments and bearings will have to be fully assessed for structural adequacy due to the increase in number of traffic lanes as part of the development of the proposals. It has to be noted that the North parapet does not comply with the height requirement for a cycleway and should be replaced if the

cycleway route is to be maintained, even if no additional traffic lanes are provided over the existing bridge.

The expansion joints will require to be replaced to match the new surface profile.

As part of the option study, widening of the bridge is being considered along with the option of construction of a new bridge either to carry the bus lane or a combined cycleway and footway. If the existing bridge is to be widened, this would require extension of the piers, abutments and foundations. The form of construction and element sizes of the widened bridge will be similar to the existing bridge.

The form of construction, span and element sizes of the new bridge will be governed by the requirements for headroom clearance and the highway alignment. In addition, consideration should be given to minimising the need for traffic management and safety of the public during construction. A risk assessment should be carried out to evaluate the options in terms health and safety and environmental impact.

5. Geotechnical Considerations

A brief preliminary review of the foundations of the existing bridge and the potential impact of the increase in loading on them has been made. It is expected that the overall load may increase by up to 12% due to the addition of a bus lane over the existing Rectory Farm Bridge.

Records indicate that the bridge was built in the 1970s and is an insitu reinforced concrete bridge with a continuous solid slab deck and three intermediate piers founded on conventional spread footings. The abutments/bank seats are founded on sheet piles and raking H piles. The sheet piles are recorded as Larsen 4/20 piles, 9.5m in length, and the raking H piles as being 356x368 sections, 16m long raked at 1in1. Bridge inspection records do not indicate any defects relating to the foundations. There is no indication of the original foundation design, e.g. bearing pressures or settlement limits, given in the available records.

Interrogation of the Highways Agency Geotechnical Data Management System (HAGDMS) website has not identified any issues with the adjacent earthworks.

The 1:50,000 geological map of the area indicates the site and surrounding area is underlain by Gault Clay (Cretaceous), which is expected to be between 27-43m thick. It is a grey clay or marl with a highly calcareous upper part and the basal beds are commonly glauconitic sandy and pebbly. This is underlain by the Lower Greensand which is between 0-20m thick and a minor aquifer.

Four borehole records at the structure site have been identified dating from 1969, presumably for the purpose of the original design. All four holes indicate a stiff grey or grey brown clay, increasing in strength to very stiff within about 1m depth. This is interpreted as Gault Clay and was proved to the base of all the boreholes (to a maximum of 18.3 m depth). A superficial layer, of less than 1m, of Made Ground was recorded in some of the holes.

The increase in loading on the existing foundations varies dependant on the option adopted and it may be possible to consider using the existing foundations following a check on their capacity and likely induced settlements if the increase in total loading is less than 10-15%.

If it is not possible for the foundations to be used in unchanged form, extensions to them may be considered. Since settlement of the existing foundations will have completed or be close to complete (after 35+ years), particular consideration will need to be given to potential differential movements between the new and existing foundations. Alternatively, extensions to the foundations could be piled to reduce the movement. Additional ground investigation may be required for the reuse of foundations or the construction of extensions and/or new foundations. The construction of the cutting is likely to have caused elastic movement and heave due to stress relief and reduced the bearing capacity of the Gault Clay from the original ground conditions indicated in the 1969 boreholes.

As an alternative, a new bridge may be constructed to the North of the existing to carry the non-motorised traffic or the busway. This will be a new build structure and may not be of similar form since minimising disruption to the M11 traffic will be a high priority. New and separate foundations would be required for this option. It is considered likely that spread foundations will be possible for this new structure, but this would be subject to an adequate ground investigation at the new bridge site.

Construction of a new bridge to the south is not considered as part of this study since it would require modifications to the M11 slip roads.

6. Highway Considerations

The bridge is on a relatively straight alignment and will require little alteration to accommodate a new traffic lane. Any modification to the lane arrangement, numbers or widths should conform to current standards. There will be a need for modification to the existing highway alignment to provide a new bridge to the North.

To accommodate a new bus lane over the bridge, modifications/improvements will be required to drainage, footways and the hardstanding on the North Western approach.

If a new bridge is to be constructed to the North this will require detailed highway alignment design. It is most likely that the longitudinal and horizontal alignments will be governed by the headroom clearances for M11 and the levels of the existing approaches.

Widening of the existing bridge or the construction of the new bridge is likely to involve land purchase. This will be dictated by the extent of the highway envelope (including clear areas for sight visibility). It should also be noted that there may be a need for temporary acquisition of land for any accommodation works during construction.

If the bridge is not widened, only four narrow lanes of 3m can be accommodated. Studies have shown that a reduction in lane width from 3.65m to 3.00m can reduce traffic flow capacity by as much as 19%

(based upon two approach lanes). This is based upon driver perception of safety with available width. In addition, the risk of conflict between vehicles will increase due to their proximity to one another (i.e. room for manoeuvre is restricted when trying avoid hazards such as pot holes or errant pedestrians/cyclists)

7. Statutory Undertakers' Apparatus

There are several items of statutory undertakers' apparatus within both verges and statutory undertakers' apparatus in the North Western verge. Diversions will be required for constructing either a new traffic lane or a new bridge.

A summary of the requirements is detailed within section 11 of this report.

8. Ecology and Environment Considerations

There are tree belts on each side of the structure and water features to the North East. Rabbit burrows along the North embankment were noted during the site visit by the bridges team. No ecology or environment study has been undertaken as part of this options study. A desktop study and a site survey should be considered before taking any options forward.

9. Land, Heritage and Archaeology Considerations

The land to the verges immediately adjacent to and on each side of the structure is normally owned by Highways England and beyond this, it would either be owned by the local highway authority or a private land owner. The land owners will have to be identified and consultation should be undertaken regarding purchase of land, access rights etc. prior to the detailed design stage. Considering the structure is located close to Cambridge North West development, the land value could be very high.

The review of SMIS records has not indicated the structure is listed or otherwise protected.

No archeologically studies have been undertaken as part of this options study. A desktop study as a minimum should be considered before taking any options forward.

10. Options

The options considered are based on the principle of do nothing, do minimum and provide four standard lanes of traffic over M11. For the purpose of this report, the do nothing option will be discounted since it will not address the City Deal Partners' requirements. This report focuses on five main options which are discussed below. Sketches detailing the options are included within Appendix D:

10.1. Option 1 - Reassign the Lanes

This option involves marking one of the lanes as a bus priority lane with associated traffic signalling works to the West approach. The carriageway currently accommodates three lanes of traffic and there is an existing bus lane to the West of the Rectory Farm Bridge. A traffic island extending across the M11 Northbound off-slip junction will be constructed to allow buses to have signal free access over the Rectory Farm Bridge.

10.2. Option 2 - Widening of Carriageway by Reducing the Verges

This option will involve reducing the South verge and will provide four traffic lanes of reduced width over the bridge. As part of this option, the South verge will be reduced to 1.5m wide. The North cycleway/footway is 3m wide and cannot be reduced any further due to the acceptable minimum requirements for a combined cycleway/footway in accordance with TA 90/05.

The construction will include the works listed below:

- Reconstruction of part of the carriageway.
- Modification to the existing drainage and associated catch pits.
- Removal and reconstruction of the South verge
- Installation of new combined kerb and drainage units.
- Diversion of statutory undertakers' apparatus
- North parapet replacement.
- Replacement of the expansion joint and associated resurfacing works

10.3. Option 3 - Widening the Bridge to the North

This option will involve widening the bridge to the North and associated changes to the road layout. The widening will accommodate four standard lanes of traffic over the bridge.

The construction will include the works listed below:

- Reconstruction of part of the carriageway.
- Modification to the existing drainage and associated catch pits.
- Demolition of the edge of the existing bridge deck and extending it on the Northern side.
- Installation of new North parapets
- Extension of the Northern most leaf pier to support the new deck and an additional bearing. This will also require associated works to the foundations.
- Extension of the abutment, new wingwalls to the North and an additional bearing on each abutment. This will also require associated works to the foundation.
- Installation of new combined drainage units to both sides of the carriageway.
- Diversion of statutory undertakers' apparatus.
- Replacement of the expansion joint and associated resurfacing works
- Relocation of street lighting

10.4. Option 4 - Widening the Bridge to the South

This option will involve widening the bridge to the South and associated changes to the highway layout. The widening will accommodate four standard lanes of traffic over the bridge. This option will require minor modification to the M11 slip roads.

The construction will include the works listed below:

- Reconstruction of part of the carriageway.
- Modification to the existing drainage and associated catch pits.
- Demolition, extending the bridge deck on the Southern side and associated works.
- North parapet replacement.
- Extension of the Northern most leaf pier to support the new deck sections and bearings. This also includes associated works to the foundation.
- Extension of the abutment, new wingwalls to the North and an additional bearing on each abutment. This will also require associated works to the foundation.
- Installation of new combined drainage units to both sides of the carriageway.
- Diversion of statutory undertakers' apparatus.
- Replacement of the expansion joint and associated resurfacing works.

10.5. Option 5 - Constructing a New Bridge Adjacent to the Existing Bridge

This option will involve constructing a new bridge adjacent to the existing bridge either to carry an additional traffic lane over the M11 or to carry the combined footway and cycleway.

The details of the two sub-options considered are as below:

10.5.1. Constructing a New Vehicular Bridge Adjacent to the Existing Bridge

This option will retain the existing bridge and involve construction of a new bridge to carry a proposed guided busway and maintenance track. If the cycleway is to be retained over the existing structure, the North parapet should be replaced with parapets of compliant height.

The construction will include the works listed below:

- Construct a new bridge approximately 9m wide that carries a guided bus lane and associated maintenance track (shared use with cyclists and pedestrians).
- Modification to the highway layout to the East of the existing bridge
- Diversion of the cycleway onto the new maintenance track.

10.5.2. Constructing a New Combined Cycleway and Footway Bridge Adjacent to the Existing Bridge

This option will include the construction of a new cycleway/footway bridge and modifications to the existing bridge to provide four lanes of 3.65m width each.

The construction will include the works listed below:

- Construct a new bridge approximately 3.5m wide to the North of the existing bridge that carries the cycleway and footway.
- Modification to the cycleway/footway to the East of the existing bridge
- Reconstruction of part of the carriageway.
- Modification to the existing drainage and associated catch pits.
- Removal and reconstruction of the North and South verges
- Installation of new combined drainage units.
- Diversion of statutory undertakers' apparatus.
- Replacement of the expansion joint and associated resurfacing works.

11. Discussion of the Options

All the above options have benefits and drawbacks, these are summarised in the table below:

Table 11-1 Summary of benefits and drawbacks

Benefits /Drawbacks	Option 1	Option 2	Option 3	Option 4	Option 5
Bus lane provided along the entire length of the structure		✓	✓	✓	✓
Buses interact with other traffic on the structure	✓				
Narrow traffic lanes		✓			
Standard lane widths	✓		✓	✓	✓
Free movement of buses without affecting normal traffic			✓	✓	✓
Potential to increase normal traffic delays	✓	✓			
Increased risk of accidents		✓			
Driver confidence due to wide lanes			✓	✓	✓
High capital cost upfront			✓	✓	✓
Higher cost due to delays, accidents etc.		✓			
Lane closures/reduced traffic lanes for maintenance in the verge (E.g. maintenance by statutory undertakers)	✓	✓			
Short construction period	✓	✓			

The above options should also be checked for compatibility with the main option study for construction of a bus route between Cambourne and Cambridge. A comparison of the options are as below:

Table 11-2 Compatibility of Options

	Option 1	Option 2	Option 3	Option 4	Option 5A	Option 5B
Main Options 1C2N	✓	✓	✓	✓	✓	✓
Main Options 1N2C	✓	✓	✓	✓	✓	✓
Main Options 1S2S	NA	NA	NA	NA	NA	NA
Main Options 1(BC)2C	✓	✓	✓	✓	✓	✓
Main Options 1S2C	NA	NA	NA	NA	NA	NA

Note: Main options are detailed in separate report.

Table 11-3 Summary of Statutory Undertakers' Apparatus Diversions

Stats/Options		Option 1	Option 2	Option 3	Option 4	Option 5A	Option 5B
North Verge	South Verge						
National Grid Gas				✓			✓
Virgin Media				✓			✓
Anglian Foul Sewer				✓			✓
	Vodafone		✓	✓	✓		✓
	British Telecommunications		✓	✓	✓		✓
	Cambridge Water		✓	✓	✓		✓
	Anglian Surface Water		✓	✓	✓		✓

12. Estimated Cost

A level 1 estimate of the various options is listed below:

Table 12-1 Cost Summary of Options Considered

Options	Description	Cost (£)
Option 1	Reassign Lanes	£276,000
Option 2	Widening of Carriageway by Reducing Verges	£632,000
Option 3	Widening the Bridge to the North	£4,150,000
Option 4	Widening the Bridge to the South	£4,738,000
Option 5A	Constructing a New, Single Lane Bridge Adjacent to the Existing Bridge	£6,401,000
Option 5B	Constructing a New, Pedestrian and Cycle Bridge Adjacent to the Existing Bridge	£2,262,000

It has to be noted that the prices quoted above are at 2010 prices and exclude VAT

13. Conclusion

- Option 1 is the least expensive option and least disruptive to road users during construction. However, this option could lead to long queues during peak times.
- For Option 2, the cost and disruption to road users during construction are moderate. However, diversion of statutory undertakers' apparatus can influence the duration of construction and the completion date. This option will also most likely involve replacement of bearings which could be expensive due to high cost of traffic management on the M11. The key drawback of this option is that it can lead to higher risks of accidents and greater congestion due to narrow lanes.
- Options 3, 4 and 5A will provide four standard lanes, but are relatively expensive and most disruptive to road users during the construction phase. These options will involve diversion of statutory undertakers' apparatus which can influence the duration of construction and the completion date. However, these options will provide 3.65m wide lanes which has safety and maintenance benefits as listed in Table 11.1.
- Option 5B is relatively expensive and causes moderate disruption to road users during construction. This option will provide 3.65m standard lanes which has safety and maintenance benefits as listed in Table 11.1. In addition, cyclists and pedestrians will have a safer means of crossing the M11. However, diversion of statutory undertakers' apparatus can influence the duration of construction and the completion dates.

14. Recommendations

Further work should be undertaken prior to identifying the best option to be taken forward to detailed design. The following work is required:

- Engage with Highways England to discuss the options that are being considered.
- Engage with statutory undertakers to identify their constraints, timescales and cost of diverting their apparatus.
- Engage with land owners to discuss options of land purchase and maintenance rights.
- Undertake a full assessment of the existing bridge.
- Undertake ecology, archaeological and environmental desktop studies.
- Undertake detailed traffic flow modelling of the above options to establish the best value for money option.
- Organise a risk workshop with stakeholders to identify the safest, most suitable and economically viable option.

Appendices



Appendix A. General Arrangement Drawing of Existing Bridge

Appendix B. Photographs from Site Visit



Photo 1 – View Over Rectory Farm Bridge Looking East



Photo 2 – View of M11 On-slip Junction



Photo 3 – View of M11 Off-slip Junction



Photo 4 – View of A1303 Traffic Signals at M11 Off-slip Junction



Photo 5 – View of Embankment and M11 to the North of Rectory Farm Bridge



Photo 6 – View of Embankment and M11 to the South of Rectory Farm Bridge



Photo 7 – Access to GVC Approximately 60m North East of Rectory Farm Bridge



Photo 8 – Access to GVC Approximately 60m North East of Rectory Farm Bridge



Photo 9 – Potential Location for a New Bridge



Photo 10 – Utilities with in the North West Verge

Appendix C. Structural Review and Assessment of highway Structures – BD101 Form

ANNEX B RECORD OF STRUCTURAL REVIEW FORM

1	Structure Details		
	Structure Name	Rectory Farm Bridge	
	Structure Number	M11/88.6	
	Structure Key	3130	
	Date Commissioned	1979	
	Obstacles Crossed	M11 - 2 lane dual carriageway motorway	
	Bridge Carries	A1303 all-purpose Principal road	
	Brief Description of Structure		
	<p>Rectory Farm Bridge carries the A1303 over the M11 at Junction 13 and is located at Ordnance Survey grid reference TL 542081E, 259380N. The bridge has four spans comprising a continuous reinforced concrete solid slab deck with a skew angle of 07° 45'. The structure is 16.6 m wide between parapets. The deck is simply supported on the abutments and intermediate piers.</p> <p>The end supports are reinforced concrete bank seats founded on steel sheet piles and H piles. The intermediate supports are reinforced concrete piers each comprising twin leaves with a common base on spread foundations. The parapets are P2/113 aluminium, 1.0m high with wire mesh infill.</p> <p>The bridge deck carries three lanes of the A1303. The carriageway is 10m wide, the north verge (footway/cycleway) varies between 3.0m to 3.1m and the south verge varies between 3.5m and 3.6m. There are service troughs in both verges carrying statutory undertakers' equipment.</p>		
	Elements to be Reviewed (where not the whole structure)		
	Whole structure		
	Reason for Structural Review	To assist Cambridgeshire County Council in determining options for bus lane provision over the M11 at Junction 13	
2	Existing Assessment Details or Design Records		
	Inspection for Assessment Date	Records not found on SMIS	Recorded Condition Not Available
	AIP for Assessment	Records not found on SMIS	Status Not Available
	Assessment Date	Records not found on SMIS	Report Number Not Available
	Current Assessed/Design Capacity (include Reserve Factors)		
	HA/ALL	The latest Principal Inspection report and the Form Roads 277 indicate the bridge has been designed for HA + 45 units of HB	SV/STGO/SO Not Available
	Critical Elements	Reinforced concrete deck, bearings, piers and abutment.	
	Parapet	Aluminum P2/113 with mesh infill	
	Pier Impact	Records not found on SMIS	
	Certification	Records not found on SMIS	
	Calculations	Records not found on SMIS	
	As built drawings	Records available on SMIS	
	Comments on Assessment or Design		
	No certificates for the design have been located on SMIS		
3	Evaluation		
	Inspection Date	Last Principal Inspection was carried out on 11 th November 2015	
	Change In Condition	<p>No major structural defects have been reported.</p> <p>The expansion joint is reported to have deteriorated and the bearings on the west and east abutments have been reported as heavily corroded.</p>	

	Change In Standards	The bridge was built in 1979 to the then current standards. The current standards for assessment are BD 21/01 and BD 86/11.
	Change In Loading	<p>As part of a proposal for bus lane provision on the A1303, different options for modifying the carriageway layout on the bridge are being considered. There is no record of assessment for STGO or SO vehicles.</p> <p>The options being considered are:</p> <ol style="list-style-type: none"> 1. Reassigning the Lanes <p>This option involves marking one of the lanes as a bus priority lane with associated traffic signalling works.</p> 2. Widening the Carriageway by Reducing the Verge Width <p>This option will involve reducing the width of south verge and widening the carriageway. This option would provide four lanes of traffic with reduced lane widths over the bridge.</p> 3. Widening the Bridge to the North <p>This option will involve widening the bridge to the north, and associated changes to the road layout. The widening will accommodate four standard width lanes of traffic over the bridge.</p> 4. Widening the Bridge to the South <p>This option will involve widening the bridge to the south, and associated changes to the road layout. The widening will accommodate four standard width lanes of traffic over the bridge. This option will require minor modification to the M11 slip roads.</p> 5. Constructing a New Bridge Adjacent to the Existing Bridge <p>This option will involve constructing a new bridge adjacent to the north of the existing bridge either to carry a dedicated bus lane over the M11 or to carry the combined footway and cycleway.</p> <p>Options 2, 3, 4 and 5 could affect the current load capacity of the structure.</p> <p>Option 1 will not have any effect on the load capacity.</p>
	Conclusion	<p>No records of previous design certification or any assessment are available on SMIS. However, the bridge is relatively modern and the loading stated in the bridge records is consistent with the design standards applicable at the time of its construction. The A1301 is classed as a Principal road and hence 37.5 units of HB loading would apply.</p> <p>Option 2 and 5 could affect the current load capacity of the structure. Hence, assessment is required in accordance with BD 21/01, BD 86/11 and BD 44/15.</p> <p>Options 1 will not affect the load rating of the structure, as there is no change to the loading.</p>

		<p>Options 3 and 4 involve widening the bridge deck, the piers and the abutments, including new foundations. The impact of the widening on the load capacity of the existing structural elements will require consideration as part of the design. The connection between the existing elements and new elements will require assessment to Eurocodes. Where an existing structural element cannot be demonstrated to be adequate using Eurocodes, assessment standards may be used to re-examine particular elements/load effects for which failure is determined with the agreement of TAA.</p> <p>Option 5 involves the construction of a new bridge. The new bridge either could be designed to carry the new bus lane or the cycleway/footway. Where the bridge is designed to carry the cycleway/footway, the existing cycleway/footway to the north and the south verge will require to be narrowed to accommodate a new bus lane over the existing bridge.</p> <p>Since the road is not on the heavy load route network but a principal road, the structure need not be assessed for SV load models (STGO vehicles) 80 and 100. However if the route carried by the bridge changes in the due course then, assessment for STGO or SO vehicles should be undertaken in conjunction with any assessment for Construction and Use (C&U) and Authorised Weight (AW) vehicles instead of HB loading, which is being phased out.</p> <p>There is no change in condition that is likely to reduce the load capacity.</p> <p>The parapet has adequate containment capacity for each of the proposed layouts. However, the north parapet does not comply with the height required for the adjacent NMU route. If option 3 is taken forward, then the new north parapet will require to be 1.4m high N2, containment in accordance with the TD 19/06 requirements for parapets to cycleways. For the other options where the existing northern footway / cycleway is retained, a risk assessment should be undertaken to determine whether retention of the current substandard provision is acceptable. If deemed unacceptable, the north parapet will require replacing with a 1.4m high, N2 containment parapet.</p> <p>The proposed changes to the carriageway layout above will not affect the risk of pier impact from traffic on the M11 below.</p>
<p>4</p>	<p>Recommendation (delete and complete as applicable)</p>	<p>For options 2 and 5, undertake assessment to current standards since the number of traffic lanes is proposed to be increased from three to four.</p> <p>For options 3 and 4 a two stage assessment/design should be undertaken, as below:</p> <ol style="list-style-type: none"> 1. Undertake the assessment and design of the widened bridge to Eurocodes. 2. If any existing structural elements are found to be inadequate in accordance with Eurocodes, with the agreement of the TAA, assessment standards should be used to re-examine the particular elements and load effects for which failure is determined. The sections of new widened deck, piers, abutments and wing walls should be designed to comply with Eurocodes. <p>A risk assessment should be undertaken to determine whether the existing substandard height north parapet height can be retained. If deemed unacceptable the parapet should be replaced with a 1.4m high N2 parapet.</p> <p>Maintenance work to bearings should be undertaken by Highways England. If, as a result of</p>

	<p>assessment, the bearing are found to have inadequate load capacity for the proposed new lane configuration, then the possibility jointly funding for their replacement should be discussed between Cambridgeshire County Council and Highways England.</p> <p>The corrosion to the bearings appears to be related to water seepage through the joint on the west abutment and water dripping from a drainage hole on the east abutment, both of these issues should be addressed as a high priority to reduce the rate of deterioration of the bearings. This is the responsibility of Highways England who own and maintain the structure.</p>
--	--

5. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed _____

Name _____ Graham Stevens _____

Reviewer

Engineering Qualifications _____²

Name of Organisation _____

Date _____

**6. THE ABOVE IS REJECTED/ AGREED¹ SUBJECT TO THE AMENDMENTS AND
CONDITIONS SHOWN BELOW³**

Signed _____

Name _____

Engineering Qualifications _____²

TAA _____

Date _____

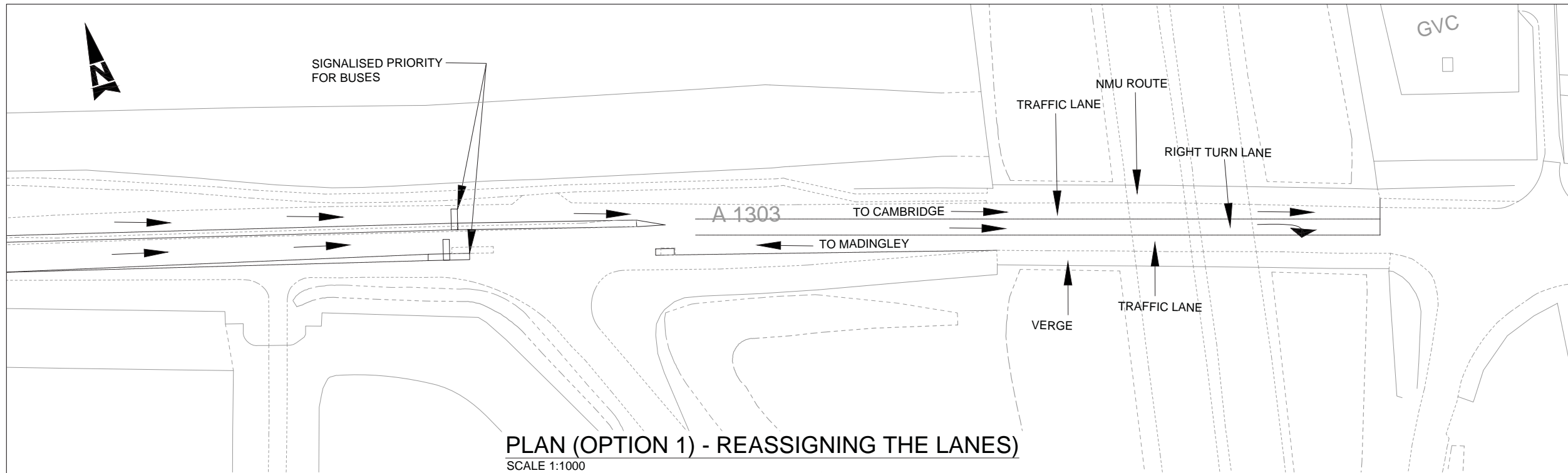
1 Delete as appropriate

2 CEng, MICE, MIStructE or equivalent

3 Agreement is valid for three years after the date of agreement by the TAA. If the recommendation has not been implemented within this period, the Record of Structural Review Form must be re-submitted to the TAA for review

Appendix D. Option Sketches

Millimetres
100
0
DONOT SCALE



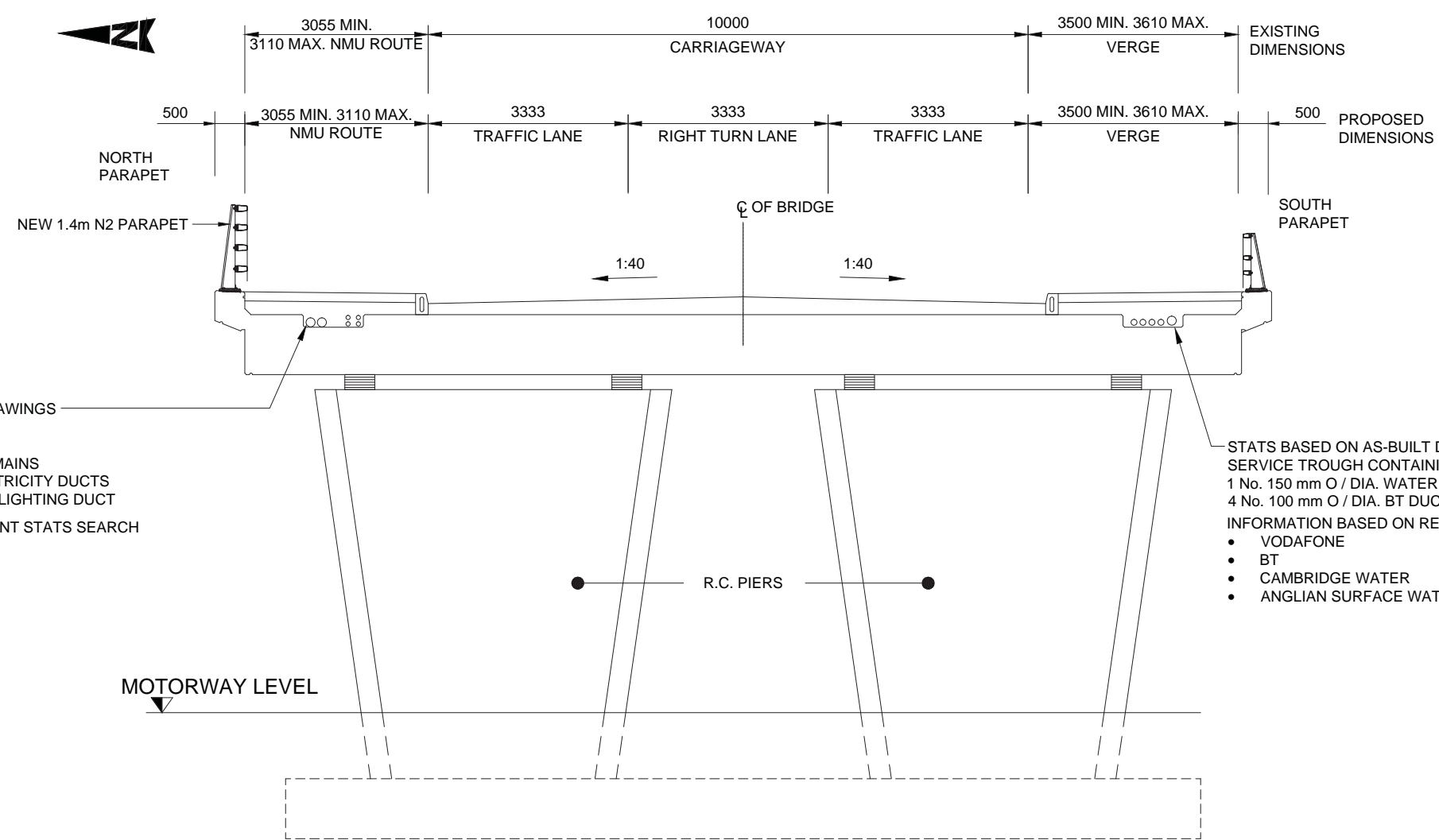
PLAN (OPTION 1) - REASSIGNING THE LANES
SCALE 1:1000

NOTE:
1). ALL DIMENSIONS SHOWN IN MILLIMETRES UNLESS OTHERWISE STATED

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction	None.
Maintenance / Cleaning	None.
Use	None.
Decommissioning / Demolition	None.



SECTION A-A (OPTION - 1) - REASSIGNING THE LANES
SCALE 1:100

- STATS BASED ON AS-BUILT DRAWINGS
SERVICE TROUGH 1000 x 210
CONTAINING -
- 2 No. 150 mm O / DIA. GAS MAINS
 - 3 No. 100 mm O / DIA. ELECTRICITY DUCTS
 - 1 No. 100 mm O / DIA P.V.C. LIGHTING DUCT
- INFORMATION BASED ON RECENT STATS SEARCH
- NATIONAL GAS LP x2
 - VIRGIN MEDIA
 - ANGLIAN FOWL SEWER

- STATS BASED ON AS-BUILT DRAWINGS
SERVICE TROUGH CONTAINING -
- 1 No. 150 mm O / DIA. WATER MAIN
 - 4 No. 100 mm O / DIA. BT DUCTS
- INFORMATION BASED ON RECENT STATS SEARCH
- VODAFONE
 - BT
 - CAMBRIDGE WATER
 - ANGLIAN SURFACE WATER

P03					
First Issue					
Rev	Drawn / Des	Checked	Approved	Date	

Drawing Status	FOR REVIEW AND COMMENT	Suitability	S3
----------------	------------------------	-------------	----

ATKINS 5 Wellbrook Court
Girton Road
Cambridge
CB3 0NA
Tel: +44 1223 276002
www.atkinsglobal.com

Copyright © Atkins Limited (2016)

Client
CAMBRIDGE CITY DEAL PARTNERS

Project Title
A428 Corridor Study

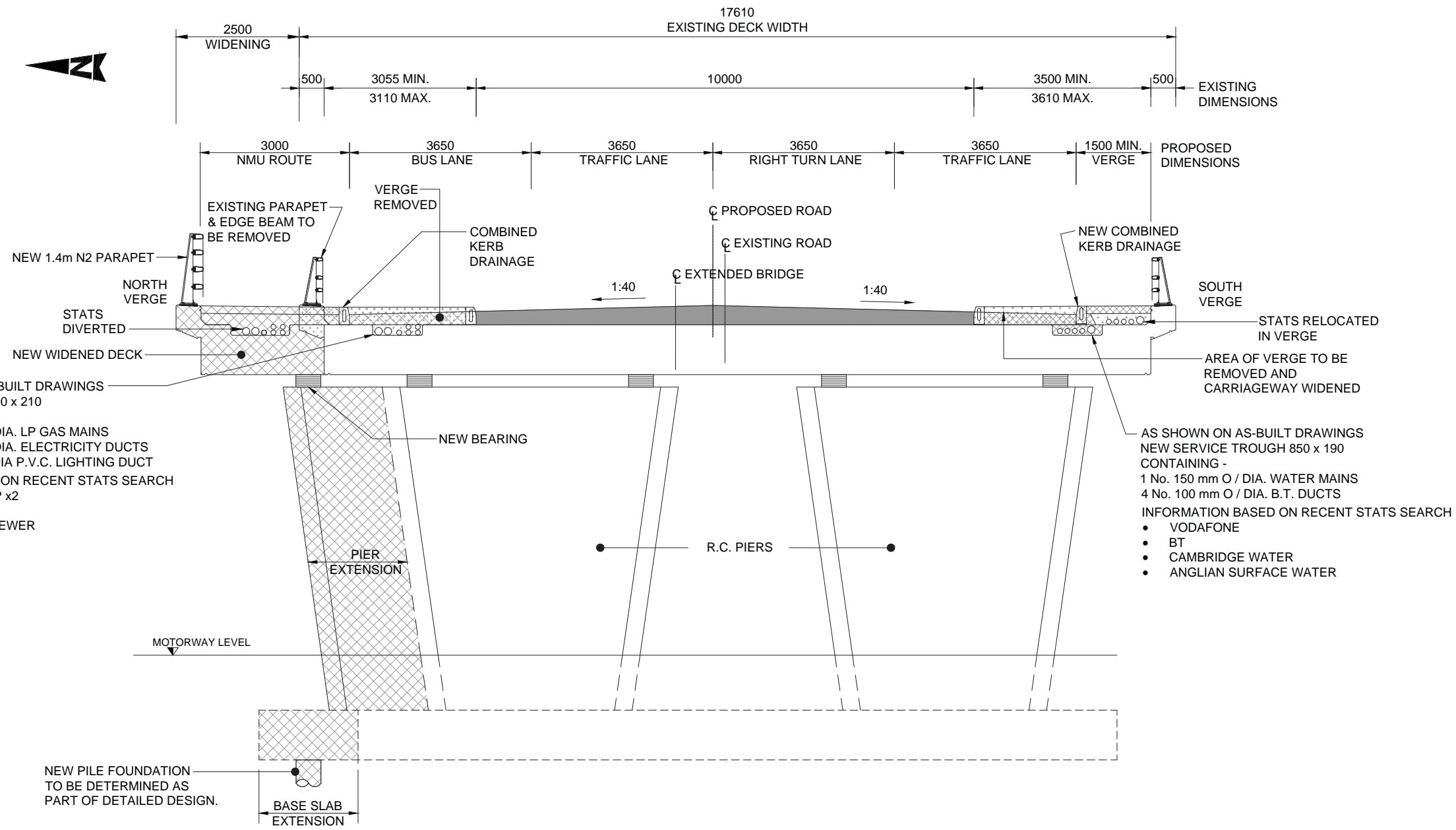
Drawing Title
SCHEME OPTION 1

Scale	AS SHOWN	Designed / Drawn	Checked	Approved	Authorised
Original Size	A3	RG	VR	VR	GRS
Date	25/05/16	26/05/16	03/06/16	09/06/16	

Drawing Number	Project	Originator	Volume	Job No.
A428 - ATK - STR - RF - SK - P - 0001				5134058
Location	Type	Role	Number	Revision
				P03

Plotted: Jun 10, 2016 - 2:01pm by: GRIG6182

100
Millimetres
0 10
DONOT SCALE



- STATS BASED ON AS-BUILT DRAWINGS
SERVICE TROUGH 1000 x 210
CONTAINING -
- 2 No. 150 mm O / DIA. LP GAS MAINS
 - 3 No. 100 mm O / DIA. ELECTRICITY DUCTS
 - 1 No. 100 mm O / DIA P.V.C. LIGHTING DUCT
- INFORMATION BASED ON RECENT STATS SEARCH
- NATIONAL GAS LP x2
 - VIRGIN MEDIA
 - ANGLIAN FOWL SEWER

- AS SHOWN ON AS-BUILT DRAWINGS
NEW SERVICE TROUGH 850 x 190
CONTAINING -
- 1 No. 150 mm O / DIA. WATER MAINS
 - 4 No. 100 mm O / DIA. B.T. DUCTS
- INFORMATION BASED ON RECENT STATS SEARCH
- VODAFONE
 - BT
 - CAMBRIDGE WATER
 - ANGLIAN SURFACE WATER

SECTION A-A (OPTION - 3) - WIDENING THE BRIDGE TO THE NORTH
SCALE 1:100

WORKS KEY:

- NEW CONSTRUCTION AREA
- EXISTING CONSTRUCTION TO BE REMOVED
- DETAILS OF PROFILE PLANING AND IN-LAY TO BE DETERMINED AT DETAILED DESIGN STAGE

NOTE:

1). ALL DIMENSIONS SHOWN IN MILLIMETRES UNLESS OTHERWISE STATED

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
Work involves risks associated with hydrodemolition.

Maintenance / Cleaning
None.

Use
None.

Decommissioning / Demolition
None.

P03	RG	VR	VR	GRS
-----	----	----	----	-----

First Issue

Rev	Drawn / Des	Checked	Approved	Date
-----	-------------	---------	----------	------

Description

FOR REVIEW AND COMMENT	S3
------------------------	----

ATKINS 5 Wellbrook Court
Girton Road
Cambridge
CB3 0NA

Tel: +44 1223 276002
www.atkinsglobal.com

Copyright © Atkins Limited (2016)

Client
CAMBRIDGE CITY DEAL PARTNERS

Project Title
A428 Corridor Study

Drawing Title
RECTORY FARM BRIDGE SCHEME OPTION 3

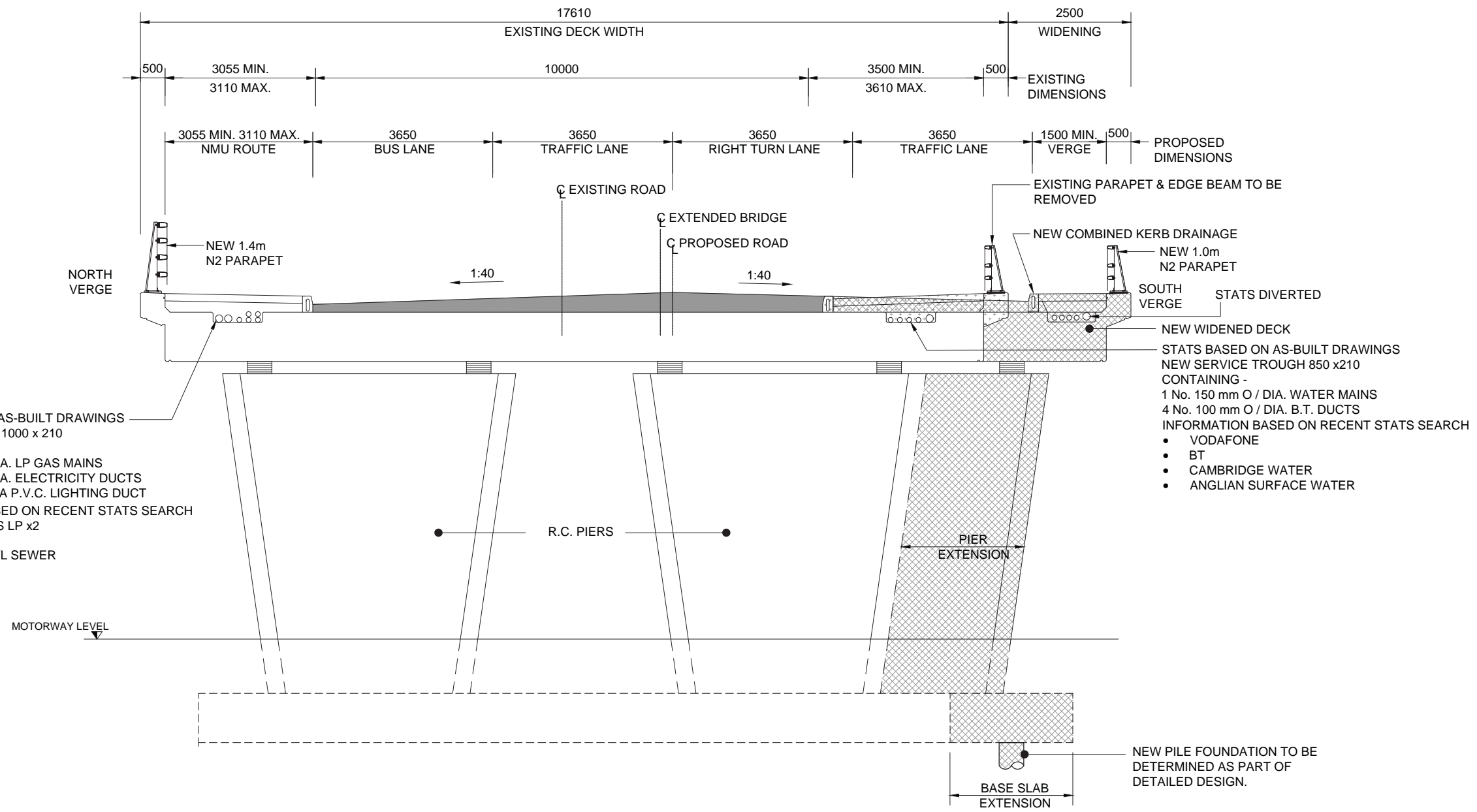
Scale	Designed / Drawn	Checked	Approved	Authorised
AS SHOWN	RG	VR	VR	GRS

Original Size	Date	Date	Date	Date
A3	25/05/16	27/05/16	03/06/2016	09/03/16

Drawing Number	Project	Originator	Volume	Job No.
A428 - ATK - STR - RF - SK - P - 0003				5134058

Location	Type	Role	Number	Revision
				P03

100
Millimetres
0 10
DONOT SCALE



STATS BASED ON AS-BUILT DRAWINGS
SERVICE TROUGH 1000 x 210
CONTAINING -
2 No. 150 mm O / DIA. LP GAS MAINS
3 No. 100 mm O / DIA. ELECTRICITY DUCTS
1 No. 100 mm O / DIA P.V.C. LIGHTING DUCT
INFORMATION BASED ON RECENT STATS SEARCH
• NATIONAL GAS LP x2
• VIRGIN MEDIA
• ANGLIAN FOWL SEWER

STATS BASED ON AS-BUILT DRAWINGS
NEW SERVICE TROUGH 850 x 210
CONTAINING -
1 No. 150 mm O / DIA. WATER MAINS
4 No. 100 mm O / DIA. B.T. DUCTS
INFORMATION BASED ON RECENT STATS SEARCH
• VODAFONE
• BT
• CAMBRIDGE WATER
• ANGLIAN SURFACE WATER

SECTION A-A (OPTION - 4) - WIDENING THE BRIDGE TO THE SOUTH
SCALE 1:100

WORKS KEY:

- NEW CONSTRUCTION AREA
- EXISTING CONSTRUCTION TO BE REMOVED
- DETAILS OF PROFILE PLANNING AND IN-LAY TO BE DETERMINED AT DETAILED DESIGN STAGE

NOTE:
1). ALL DIMENSIONS SHOWN IN MILLIMETRES UNLESS OTHERWISE STATED

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction	Work involves risks associated with hydrodemolition.
Maintenance / Cleaning	None.
Use	None.
Decommissioning / Demolition	None.

P03	RG	VR	VR	GRS
-----	----	----	----	-----

Rev	Drawn / Des	Checked	Approved	Date
-----	-------------	---------	----------	------

Drawing Status	Suitability
FOR REVIEW AND COMMENT	S3

ATKINS 5 Wellbrook Court
Girton Road
Cambridge
CB3 0NA
Tel: +44 1223 276002
www.atkinsglobal.com

Client
CAMBRIDGE CITY DEAL PARTNERS

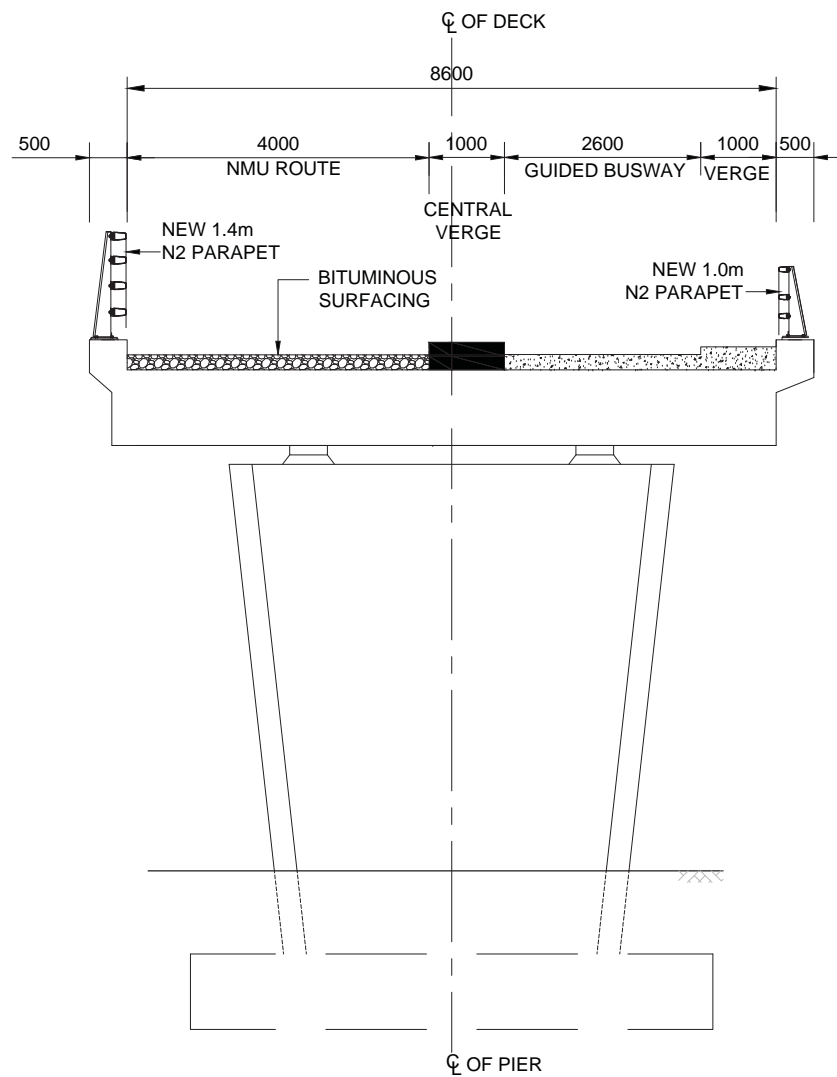
Project Title
A428 Corridor Study

Drawing Title
RECTORY FARM BRIDGE SCHEME OPTION 4

Scale	AS SHOWN	Designed / Drawn	Checked	Approved	Authorised
Original Size	A3	RG	VR	VR	GRS
Date	25/05/16	26/05/16	03/06/2016		09/03/16

Drawing Number	Project	Originator	Volume	Job No.
A428 - ATK - STR - RF - SK - P - 0004				5134058
Location	Type	Role	Number	Revision
				P03

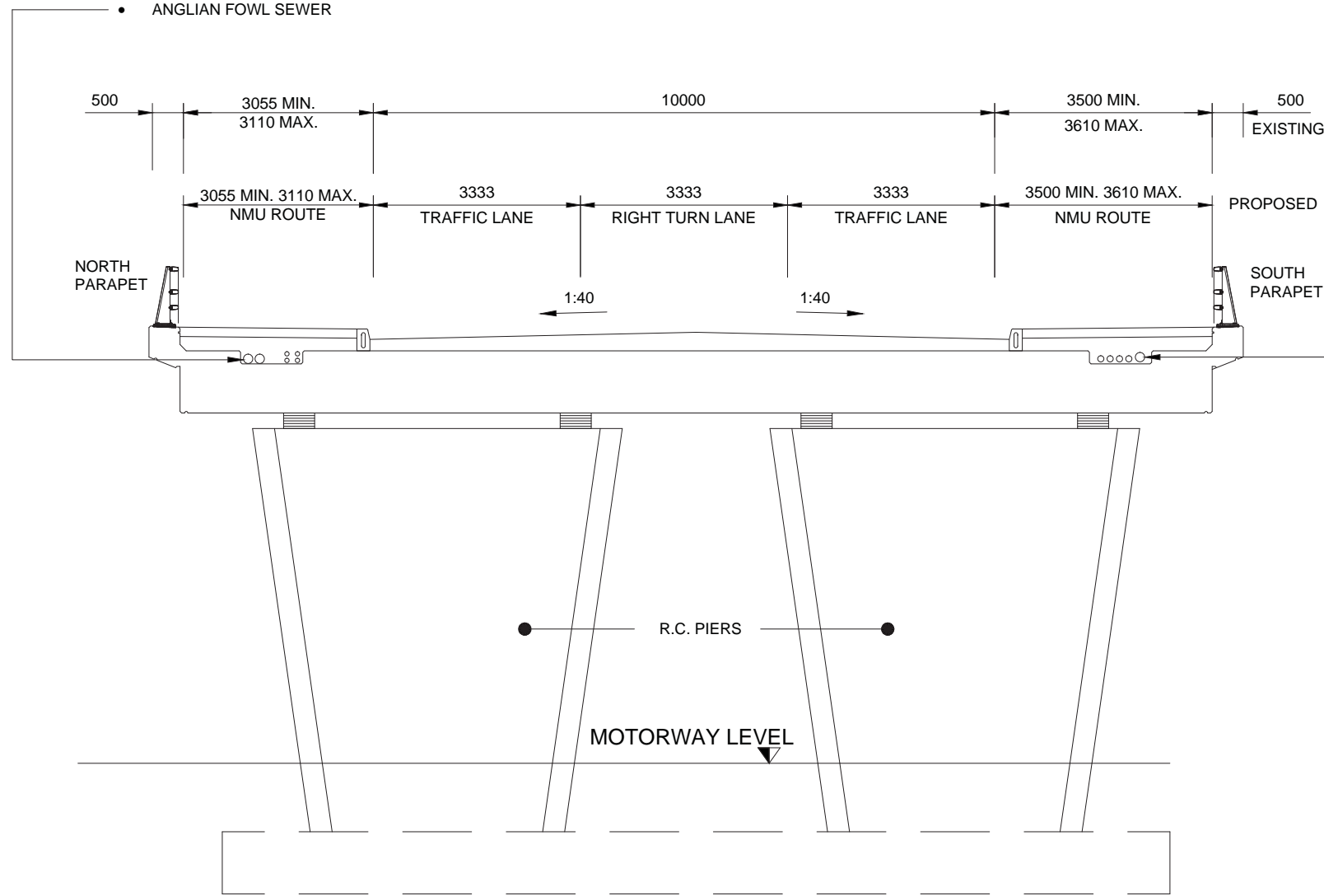
100
Millimetres
0 10
DONOT SCALE



NEW BRIDGE

- STATS BASED ON AS-BUILT DRAWINGS
SERVICE DUCT 1000 x 210
CONTAINING -
- 2 No. 150 mm O / DIA. GAS MAINS
 - 3 No. 100 mm O / DIA. ELECTRICITY DUCTS
 - 1 No. 100 mm O / DIA P.V.C. LIGHTING DUCT
- INFORMATION BASED ON RECENT STATS RESEARCH
- NATIONAL GAS LP x2
 - VIRGIN MEDIA
 - ANGLIAN FOWL SEWER

- STATS BASED ON AS-BUILT DRAWINGS
SERVICE DUCT CONTAINING -
- 1 No. 150 mm O / DIA. WATER MAIN
 - 4 No. 100 mm O / DIA. BT DUCTS
- INFORMATION BASED ON RECENT STATS SEARCH
- VODAFONE
 - BT
 - CAMBRIDGE WATER
 - ANGLIAN SURFACE WATER



EXISTING BRIDGE

OPTION 5A - NEW GUIDED BUSWAY & NMU BRIDGE TO THE NORTH OF EXISTING RECTORY FARM BRIDGE
SCALE 1:100

NOTE:
1). ALL DIMENSIONS SHOWN IN MILLIMETRES UNLESS OTHERWISE STATED

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction	None.
Maintenance / Cleaning	None.
Use	None.
Decommissioning / Demolition	None.

P03	RG	VR	VR	GRS
-----	----	----	----	-----

First Issue

Rev	Drawn / Des	Checked	Approved	Date
-----	-------------	---------	----------	------

Description

FOR REVIEW AND COMMENT	S3
------------------------	----

ATKINS
5 Wellbrook Court
Girton Road
Cambridge
CB3 0NA
Tel: +44 1223 276002
www.atkinsglobal.com

Copyright © Atkins Limited (2016)

Client

CAMBRIDGE CITY DEAL PARTNERS

Project Title

A428 Corridor Study

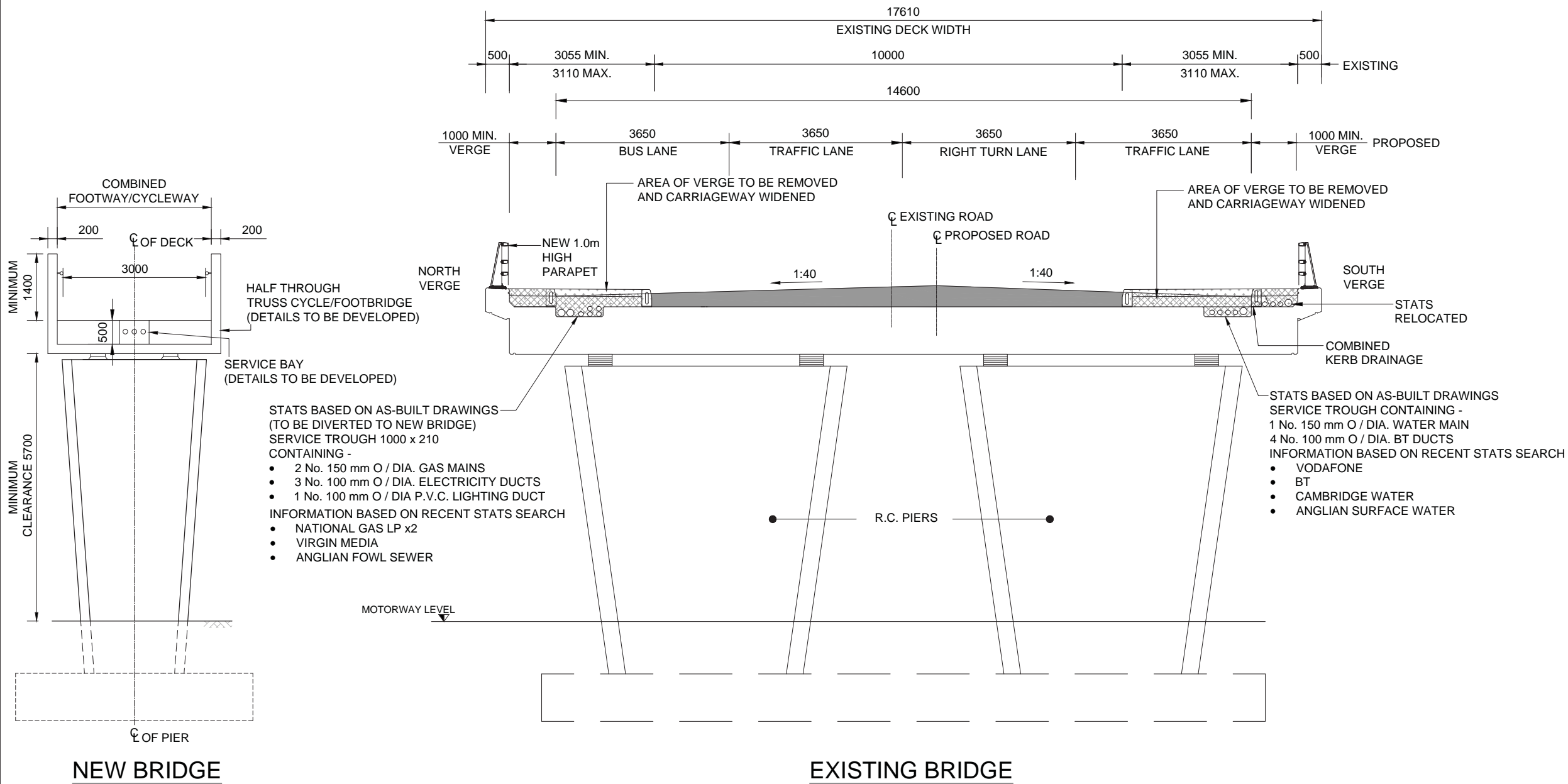
Drawing Title

RECTORY FARM BRIDGE SCHEME OPTION 5A

Scale	Designed / Drawn	Checked	Approved	Authorised
AS SHOWN	RG	VR	VR	GRS
Original Size	Date	Date	Date	Date
A3	25/05/16	26/05/16	03/06/16	09/06/16

Drawing Number	Project	Originator	Volume	Job No.
	A428 - ATK - STR - RF - SK - P - 0007			5134058
Location	Type	Role	Number	Revision
				P03

100
Millimetres
0 10
DONOT SCALE



OPTION 5B - NEW NMU BRIDGE TO THE NORTH OF EXISTING RECTORY FARM BRIDGE
SCALE 1:100

WORKS KEY:

- NEW CONSTRUCTION AREA
- EXISTING CONSTRUCTION TO BE REMOVED
- DETAILS OF PROFILE PLANING AND IN-LAY TO BE DETERMINED AT DETAILED DESIGN STAGE

1). ALL DIMENSIONS SHOWN IN MILLIMETRES UNLESS OTHERWISE STATED

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction	None.
Maintenance / Cleaning	None.
Use	None.
Decommissioning / Demolition	None.

P03	RG	VR	VR	GRS
-----	----	----	----	-----

First Issue

Rev	Drawn / Des	Checked	Approved	Date
-----	-------------	---------	----------	------

Description

FOR REVIEW AND COMMENT	S3
------------------------	----

ATKINS 5 Wellbrook Court
Girton Road
Cambridge
CB3 0NA
Tel: +44 1223 276002
Copyright © Atkins Limited (2016) www.atkinsglobal.com

Client
CAMBRIDGE CITY DEAL PARTNERS

Project Title
A428 Corridor Study

Drawing Title
RECTORY FARM BRIDGE SCHEME OPTION 5B

Scale	Designed / Drawn	Checked	Approved	Authorised
AS SHOWN	RG	VR	VR	GRS

Original Size	Date	Date	Date	Date
A3	25/05/16	26/05/16	03/06/2016	09/03/16

Drawing Number	Project	Originator	Volume	Job No.
A428 - ATK - STR - RF - SK - P - 0008				5134058

Location	Type	Role	Number	Revision
				P03

Appendix E. Level 1 Cost Estimates

Option 1	Reassign Lanes	£276,000
Option 2	Widening of Carriageway by Reducing Verges	£632,000
Option 3	Widening the Bridge to the North	£4,150,000
Option 4	Widening the Bridge to the South	£4,738,000
Option 5A	Constructing a New, Single Lane Bridge Adjacent to the Existing Bridge	£6,401,000
Option 5B	Constructing a New, Pedestrian and Cycle Bridge Adjacent to the Existing Bridge	£2,262,000

All prices are as at 2010 and exclusive of VAT.

**A428 Western Corridor
Masterplanning Stage Cost Study - Highways
Assumptions and Exclusions**



1.00 Exclusions

- 1.01 Works arising from asbestos surveys or analyses.
- 1.02 Works arising from the identification of hazardous materials.
- 1.03 Abnormal ground conditions over and above risk allowance.
- 1.04 Client direct order works.
- 1.05 Requirements imposed by Planning Authority or Fire Officer.
- 1.06 Landfill tax higher level for active waste.
- 1.07 Agency costs, legal fees and finance charges.
- 1.08 Development taxes, levies or other "planning gain" items.
- 1.09 Section 106 costs/278 agreements.
- 1.10 VAT.
- 1.11 Statutory fees.
- 1.12 Land acquisition and associated costs (CPO), provided separately.
- 1.13 Noise barriers, except at Coton.
- 1.14 Piled foundations other than as covered by the risk allowance.
- 1.15 Professional fees and surveys - 12% to be added to TUBA spreadsheet.
- 1.16 Jacking and bearing replacements.

2.00 Assumptions

- 2.01 Ground conditions are generally good with no soft spots.
- 2.02 "Shallow foundations" for the widening and new bridge(s) options i.e. no piling.
- 2.03 Stabilisation of soils not required over and above risk allowance.
- 2.04 No major ecological impacts i.e. badgers, owls, newts, etc. over and above risk allowance.

**A428 Western Corridor
Masterplanning Stage Cost Study - Highways
Risk**



For the purposes of this Masterplanning Stage Cost Study, Faithful+Gould have considered the risk profile for the construction element of the A428 Western Corridor Study. We have taken into account other comparable schemes such as the extension to the Cambridge Guided Busway at Chesterton and the A13 Diversionary Works at Barking, as well as the Risk Register carried out for the A428 Corridor Study (Reference P01) dated 10/07/2013.

The allowance for risk at Masterplanning Stage is set at 30% and whilst no specific allowance has been included for Government Optimism Bias, we consider this to be a 'standard civil engineering project', that is to say, not requiring any special design considerations.

A428 Western Corridor - Rectory Farm Bridge
Cost Estimate



Option 1

Description	Quantity	Unit	Rate	Total £	Notes
<u>Reassign Lanes</u>					
1 Modifications to traffic lights at M11 slip road (north bound)	1	item	30,000	30,000	
2 Road markings	1	item	5,000	5,000	
3 Replacing the north parapet to a 1.4m high P2 type parapet	81	m	350	28,350	
4 Allowance for new street lighting	1	item	30,000	30,000	
5 Unmeasured works and design development	30.0%			28,005	
Sub-total:				121,355	
6 Preliminaries	25.0%			30,000	
7 Traffic management	30.0%			45,000	
8 Overheads & profit	8.0%			16,000	
9 Contingency	30%			64,000	
To Summary £				276,000	

**A428 Western Corridor - Rectory Farm Bridge
Cost Estimate
Option 2**



Description	Quantity	Unit	Rate	Total £	Notes
<u>Widening of Carriageway by Reducing Verges</u>					
1 Breaking out existing hard pavings	162	m2	70	11,340	
2 Disposal of excavated materials	49	m3	45	2,205	
3 Road construction	162	m2	120	19,440	
4 Kerbing	324	m	30	9,720	
5 Road markings	1	item	10,000	10,000	
6 STATS diversions	1	item	100,000	100,000	
7 Replacing expansion joints	1	item	20,000	20,000	
8 Replacing the north parapet to a 1.4m high P2 type parapet	81	m	350	28,350	
9 Allowance for new street lighting	1	item	30,000	30,000	
10 Unmeasured works and design development	30.0%			69,317	
Sub-total:				300,372	
11 Preliminaries	25.0%			75,000	
12 Traffic management	20.0%			75,000	
13 Overheads & profit	8.0%			36,000	
14 Contingency	30%			146,000	
To Summary £				632,000	

**A428 Western Corridor - Rectory Farm Bridge
Cost Estimate
Option 3**



Description	Quantity	Unit	Rate	Total £	Notes
<u>Widening the Bridge to the North</u>					
1 Breaking out existing hard pavings	243	m2	70	17,010	
2 Disposal of excavated materials	73	m3	45	3,285	
3 Widening bridge	202	m2	7,000	1,414,000	
4 Road construction	373	m2	120	44,760	
5 Kerbing	486	m	30	14,580	
6 Road markings	1	item	10,000	10,000	
7 STATS diversions	1	item	100,000	100,000	
8 New bearing					Included in Item 3.
9 Widening foundation					Included in Item 3.
10 Replacing expansion joints	1	item	20,000	20,000	
11 Allowance for new street lighting	1	item	30,000	30,000	
12 Replacing the north parapet to a 1.4m high P2 type parapet					Included in Item 3.
13 Unmeasured works and design development	10.0%			165,364	
Sub-total:				1,818,999	
14 Preliminaries	25.0%			455,000	
15 Traffic management	30.0%			682,000	
16 Overheads & profit	8.0%			236,000	
17 Contingency	30%			958,000	
To Summary £				4,150,000	

A428 Western Corridor - Rectory Farm Bridge
Cost Estimate



Option 4

Description	Quantity	Unit	Rate	Total £	Notes
<u>Widening the Bridge to the South</u>					
1 Breaking out existing hard pavings	284	m2	70	19,880	
2 Disposal of excavated materials	85	m3	45	3,825	
3 Widening bridge	202	m2	7,000	1,414,000	
4 Road construction	373	m2	120	44,760	
5 Kerbing	568	m	30	17,040	
6 Road markings	1	item	10,000	10,000	
7 STATS diversions	1	item	100,000	100,000	
8 New bearing					Included in Item 3.
9 Widening foundation					Included in Item 3.
10 Modifications to M11 slip roads	1	item	200,000	200,000	
11 Replacing expansion joints	1	item	20,000	20,000	
12 Replacing the north parapet to a 1.4m high P2 type parapet	81	m	350	28,350	
13 Allowance for new street lighting	1	item	30,000	30,000	
14 Unmeasured works and design development	10.0%			188,786	
Sub-total:				2,076,641	
15 Preliminaries	25.0%			519,000	
16 Traffic management	30.0%			779,000	
17 Overheads & profit	8.0%			270,000	
18 Contingency	30%			1,093,000	
To Summary £				4,738,000	

A428 Western Corridor - Rectory Farm Bridge
 Cost Estimate
 Option 5A



Description	Quantity	Unit	Rate	Total £	Notes
<u>Constructing a New Bridge Adjacent to the Existing Bridge</u>					
1 New bridge over M11	1	nr	2,492,170	2,492,170	Single lane.
2 STATS diversions	1	item	30,000	30,000	
3 Replacing the north parapet to a 1.4m high P2 type parapet	81	m	350	28,350	
4 Unmeasured works and design development	10.0%			255,052	
Sub-total:				2,805,572	
4 Preliminaries	25.0%			701,000	
5 Traffic management	30.0%			1,052,000	
6 Overheads & profit	8.0%			365,000	
7 Contingency	30%			1,477,000	
To Summary £				6,401,000	

A428 Western Corridor - Rectory Farm Bridge
 Cost Estimate
 Option 5B



Description	Quantity	Unit	Rate	Total £	Notes
<u>Constructing a New Bridge Adjacent to the Existing Bridge</u>					
1 New pedestrian and cycle bridge over M11	1	nr	870,780	870,780	Steel, single span.
2 STATS diversions	1	item	30,000	30,000	
3 Unmeasured works and design development	10.0%			90,078	
Sub-total:				990,858	
4 Preliminaries	25.0%			248,000	
5 Traffic management	30.0%			372,000	
6 Overheads & profit	8.0%			129,000	
7 Contingency	30%			522,000	
To Summary £				2,262,000	

Graham Stevens

Atkins
5 Wellbrook Court
Girton Road
Cambridge
CB3 0NA

graham.stevens@atkinsglobal.com
01223814086

© Atkins Ltd except where stated otherwise.

The Atkins logo, 'Carbon Critical Design' and the strapline
'Plan Design Enable' are trademarks of Atkins Ltd.