

REPORT N<sup>o</sup> 70012012-007

# MILTON ROAD & HISTON ROAD CORRIDORS

INTERIM DRAFT OPTIONS REPORT



PUBLIC

MAY 2016

**MILTON ROAD & HISTON ROAD**  
**INTERIM OPTIONS REPORT**  
**Greater Cambridge City Deal**

**DRAFT**  
**Public**

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## **A P P E N D I X   B   HISTON ROAD DESIGN OPTIONS**

APPENDIX B-1 'DO MAXIMUM' OPTION

APPENDIX B-2 'DO MAXIMUM' (VARIATION) OPTION

APPENDIX B-3 'TIDAL FLOW OPTION A' (CENTRAL RUNNING)

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# 1 EXECUTIVE SUMMARY

## 1.1 OVERVIEW

- 1.1.1 This Interim Options Report reviews the feedback obtained from the first round of consultation and then further develops that feedback to produce the preferred options for both the Milton Road & Histon Road corridors.
- 1.1.2 The first round of consultation undertaken for both the Milton Road and Histon Road Corridors has required further design development and additional options to be considered. Given the concerns raised over carriageway widening, the option of using tidal bus lane arrangements on both Milton Road and Histon Road was also considered.
- 1.1.3 By creating more capacity for sustainable trips, particularly for buses, along both corridors, the projects will provide the potential to mitigate the impact of further transport demand arising from developments within the Greater Cambridge area, thereby supporting the transport viability of development proposals.

## 1.2 CONCLUSIONS AND RECOMMENDATIONS

- 1.2.1 An assessment of the potential journey time benefits has therefore been undertaken to allow comparison with the other options proposed. The safety, operational, streetscape and maintenance challenges arising from tidal flow options have also been considered through engagement with Cambridgeshire County Council. A separate technical note produced by Cambridgeshire County Council on tidal bus lanes shall be referred to in this instance.
- 1.2.2 The key conclusion of this report is that the preferred options presented within this report should be taken forward for further development and design.
- 1.2.3 It is therefore recommended that the following preferred options proposed within this report are taken forward for further development:
- Milton Road 'Do Something' (Modified) Option; and
  - Histon Road 'Do Maximum' (Modified) Option.

## 1.3 ESTIMATED CAPITAL COSTS

- 1.3.1 At this very early stage of project development, it is difficult to provide an estimated capital cost for the preferred options, however an initial assessment based on typical engineering only costs for this type of work suggests that the costs for the proposed options could be met from the initial project budget estimate.
- 1.3.2 The approximate capital costs for the preferred options identified within this report are as follows:
- Milton Road 'Do Something' (Modified) Option - £6m
  - Histon Road 'Do Maximum' (Variation) Option - £2.5m
- 1.3.3 However, the capital cost estimate should be treated with extreme caution as it is not possible at this stage to assess the costs associated with a number of items (listed in this report) including the diversion / relocation of utilities which is expected to be substantial.

# 2 INTRODUCTION

## 2.1 BACKGROUND

- 2.1.1 WSP|PB were commissioned in April 2015 by Cambridgeshire County Council (CCC) on behalf of the Greater Cambridge City Deal, to undertake a study establishing options to deliver the most effective corridor-based public transport scheme (complemented by comprehensive cycling and walking routes) for the Milton Road and Histon Road corridors, located in the north of Cambridge.
- 2.1.2 By creating more capacity for sustainable trips along both the Milton Road and Histon Road corridors, the projects will provide the potential to mitigate the impact of further transport demand arising from developments within the Greater Cambridge area, thereby supporting the transport viability of development proposals.
- 2.1.3 The Greater Cambridge City Deal has successfully secured a first tranche of the Government's City Deal funding to unlock major growth and economic potential in the greater Cambridge area. This work is part of a wider package of major public transport improvements across the city and into South Cambridgeshire, based on a corridor approach, as set out in the Authority's adopted Transport Strategy for Cambridge and South Cambridgeshire (TSCSC). Both Milton Road and Histon Road corridors are high priority schemes for delivery within the City Deal.

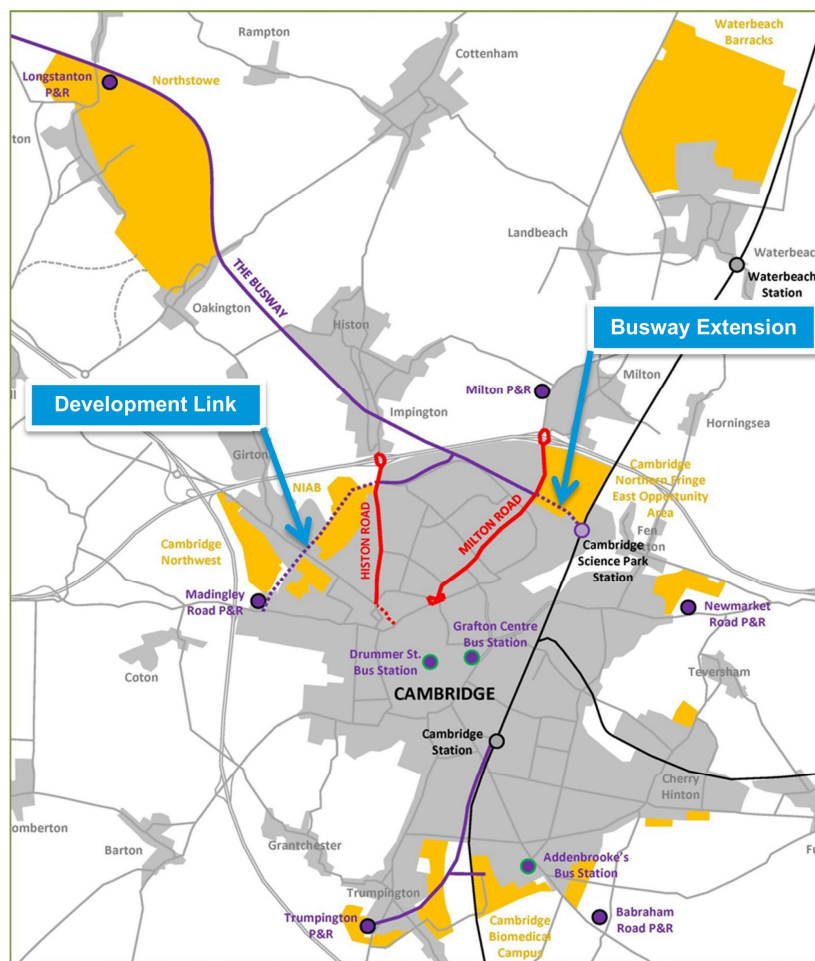
## 2.2 PROJECT OBJECTIVES

- 2.2.1 This project supports the Great Cambridge City Deal priority of achieving efficient and reliable movement between key existing and future housing and employment sites with the overall objectives of this study being (in no particular order):
1. To provide comprehensive priority for buses in both directions along Milton Road and where possible, on Histon Road;
  2. To make provision for cyclists along Milton Road and Histon Road which is segregated from buses and general traffic wherever possible;
  3. To improve provision of cyclists and pedestrians in line with the public realm proposals at Mitcham's Corner whilst maintaining traffic flow through the junction;
  4. To generate options capable of maintaining traffic levels at today's levels in Cambridge;
  5. To consider the potential for enhancing the environment, streetscape and air quality in these corridors; and
  6. To assess the impacts on existing residents and highway capacity for each option.

## 2.3 STUDY AREA

- 2.3.1 Milton Road is one of the key radials into Cambridge and is identified as an increasingly important public transport corridor as part of the Transport Strategy for Cambridge and South Cambridgeshire (TSCSC) and Long Term Transport Strategy (LTTS).
- 2.3.2 Histon Road is also a key radial route into Cambridge which is constrained in its width, which contributes to congestion and makes the consideration of small scale improvements difficult. Figure 2-1 shows both corridors within the context of Cambridge.
- 2.3.3 Both Milton Road & Histon Road experience significant congestion at peak times which impacts on bus journey times making journeys unreliable, unattractive and longer than necessary, as well as affecting the convenience and comfort of cycling trips along the corridor.

Figure 2-1 Milton Road & Histon Road within Cambridge



## 2.4 PURPOSE OF THE REPORT

- 2.4.1 This 'Interim Options Report' sets out recommendations for potential preferred options to be taken forward for further consultation, following the first round of consultation undertaken on the Milton Road & Histon Road corridors in January to February 2016.
- 2.4.2 Reference should be made to the following previous supporting reports and notes produced by WSP|PB:
- Draft Stage 1 Report (September 2015);
  - Draft Options Report (September 2015);
  - Milton Road Consultation Report (May 2016); and
  - Histon Road Consultation Report (May 2016).



# 3 MILTON ROAD OPTIONS

## 3.1 OVERVIEW

3.1.1 For the consultation undertaken between 15<sup>th</sup> November and 15<sup>th</sup> February 2016, the following two options were developed to outline design level:

- a **'Do Maximum'** option: comprising measures to provide the maximum benefit in terms of the project objectives but with a significant impact on the urban street scene and local access; and
- a **'Do Something'** option: offering less overall benefit for bus movements (although journey time and reliability would still improve over that experienced now), a similar level of improvement for cycling and walking but with less impact on the public realm.

3.1.2 This chapter describes a summary of the response to the public consultation and how the options and designs have subsequently been modified in light of the suggestions and concerns provided through that process.

## 3.2 KEY CONSULTATION COMMENTS & RESPONSES

3.2.1 Table 3-1 provides an overview of the key comments made on the design proposals along with a design response to those comments.

**Table 3-1 Key Consultation Comments with Responses**

CONSULTATION PROPOSALS & COMMENTS	DESIGN RESPONSE TO CONSULTATION COMMENTS
<p><b>Banned Turning Movements</b></p> <p>(No right turns into Gilbert Road and Arbury Road, No left turn into King's Hedges Road).</p> <p>Issue/Comments: Impact of displaced traffic on side roads / inconvenience to local trips / lack of accessibility to schools and businesses.</p>	<p>The concerns need to be weighed against the benefits of reduced delays if the banned turns were implemented. However, due to the degree of concern, the junction delays will be addressed through re-design rather than by movement restrictions. Therefore, the banned turns will be removed from the designs and only reconsidered if future modelling work over the summer period shows a clear need for reconsideration.</p> <p>It is felt that the access restrictions at the Union Lane junction are important in achieving reliable and reduced bus journey times and improving conditions for cycling. Therefore these measures should be retained in the design.</p>
<p><b>Loss of Trees</b></p> <p>Issue/Comments: 26% of comments mentioned trees / 70% of these opposed to current proposals / use mature trees if trees replaced / impact on air quality</p>	<p>The impact on the street scene, in particular highway trees and verges, of carriageway widening to create space for further bus and cycle lanes is a significant issue of local concern.</p> <p>On Milton Road the 'Do Maximum' option would achieve more benefit for buses and cycling than the 'Do Something' option but the difference in street scene impact between each option is considered significant. Therefore it is felt that that the 'Do Maximum' option should be set aside and the 'Do something' option taken forward for further development and future detailed consultation.</p>
<p><b>Bus Lanes and Bus Services</b></p>	<p>As identified in earlier reports, the number of buses using Milton Road is expected to double as planned</p>

CONSULTATION PROPOSALS & COMMENTS	DESIGN RESPONSE TO CONSULTATION COMMENTS
<p>Issue/Comments: Bus lanes not justified by low number of buses / consider tidal bus lanes / review location of some stops / poor service for local residents</p>	<p>growth takes place.</p> <p>The local concerns over the lack of access to bus services that use Milton Road is not an issue directly linked to the design of the project but the future provision of bus services along Milton Road and other key access corridors is a matter that is being considered through ongoing liaison and discussion between the Great Cambridge City Deal and bus operators.</p> <p>Options for tidal bus lanes will be considered to minimise the need to reduce the footway width and remove trees. The location of some bus stops will be reconsidered.</p>
<p><b>Cycleway design</b></p> <p>Issue/Comments: 25% of responses discussed some element of the cycleways proposed in either option / Of these 85% were in favour of improvements / mixed views on cycle priority at side roads / concerns over loss of off-road facilities for school trips</p>	<p>The initial ideas put forward provide the potential for significant improvements for cyclists using Milton Road. As part of further work consideration will be given how an off-road cycleway facility might be retained on the west side of the corridor between Arbury Road and Gilbert Road.</p>
<p><b>Closure of Union Lane</b></p> <p>Issue/Comments: 16% of further comments made reference to the proposals at Union Lane / access to medical centre / impact on local accessibility</p>	<p>As identified above, the proposal to close Union Lane will be retained in the designs. Closing off motor vehicle access at the Milton Road end has the potential to reduce traffic levels in Union Lane and to improve conditions for cycling and walking but may also increase traffic on the alternative routes used by displaced traffic. This aspect would be assessed in detail for consideration at the next consultation.</p>
<p><b>Removal of Elizabeth Way Roundabout</b></p> <p>Issue/Comments: Concerns over / potential for improved cycle safety / impact on access to Highworth Avenue.</p>	<p>Replacing the roundabout with traffic signals will improve cycle and pedestrian safety and allow more priority for bus movements, therefore the signalised junction arrangement will be retained in the designs. The amount of traffic displaced by closing off direct access/egress for Highworth Avenue will be small but would create inconvenience for car based trips by local residents by the longer routes that would need to be used. This aspect would be assessed in detail for consideration at the next consultation.</p>
<p><b>Walking Trips</b></p> <p>Issue/Comments: Lack of maintenance of footways / Need for additional crossing points.</p>	<p>Highway maintenance is not a matter directly relevant to the project but it is intended that the improvements developed through the project will provide higher quality and better constructed footways. These improvements will also lessen future maintenance needs.</p> <p>Consideration will be given to whether there is a need for additional crossings.</p>

3.2.2 Throughout the consultation period, the public were encouraged to submit alternative proposals and identify elements of the proposed options that could be improved. Table 3-2 identifies the alternative proposals, how frequently they were suggested and also provides a design response to these ideas.

**Table 3-2 Alternative Consultation Ideas with Design Responses**

<b>ALTERNATIVE CONSULTATION IDEAS</b>	<b>% OF CONSULTATION RESPONSES</b>	<b>DESIGN RESPONSE TO ALTERNATIVE IDEAS</b>
Alternative cross section layouts to reduce or eliminate the need to remove trees	33%	Various options based on a three lane cross section are assessed in this report to identify the optimum layout for bus improvements. It is not possible to provide a bus lane(s) and segregated cycle facilities without road widening along the corridor which will inevitably impact on some highway trees. Other areas for tree planting will be considered as part of the next stage of design
Increase the number of services that stop at bus stops	11%	Bus operators are responsible for deciding which services use which stops although the concerns over local access to bus services are being discussed as part of an on-going dialogue between the City Deal and bus operators
Retain Elizabeth Way roundabout to enable vehicles to turn around, so that they can approach junctions from the opposite side	10%	The need for vehicles to turn round will be significantly diminished by the setting aside of the initial ideas for banning turns at Arbury Road and Gilbert Road
Create clear cycle lanes at signalised junctions	9%	Detailed junction design work will aim to provide clear and user friendly cycle lanes, wherever possible
Propose more crossings on Milton Road	8%	At this stage no new crossings are proposed although some existing crossings will be improved and/or relocated
Introduce a congestion charge	7%	This idea is being considered as part of the Cambridge Access Study
Consider tidal (timed two-way) bus lanes	6%	This next stage of design will consider the potential use of tidal bus lane options.
Relocate bus stops away from signalised junctions to reduce congestion	4%	Where the proximity of a bus stop is likely to impact on the efficient operation of the junction consideration will be given to relocating the stop
Improve current and maintain future surfaces on footways and cycleways	4%	The initial project ideas would significantly improve the quality of footways and cycleways. These improvements will also lessen future maintenance needs
Introduce residents-only parking on roads off Milton Road to enable easier parking for residents and disincentivise driving	4%	Additional parking management measures will be considered for side roads along Milton Road which could include residents-only parking bays to ensure adequate space is available for local residents
Remove the charge for parking at Park & Ride sites	3%	On its own, this is unlikely to achieve a significant reduction in traffic delays or improve the performance of bus services
Improve lighting along Milton Road	2%	Improvements to lighting along Milton Road are to be undertaken by the County Council as part of its Private Finance Initiative (PFI) programme
Design cycleways in the same way as Hills Road	2%	The initial ideas for improving cycling facilities are based on the design concepts used on Hills Road
Explore alternatives to buses such	2%	These are unlikely to be cost effective in a city

ALTERNATIVE CONSULTATION IDEAS	% OF CONSULTATION RESPONSES	DESIGN RESPONSE TO ALTERNATIVE IDEAS
as trams/light rail		the size of Cambridge. The need to provide priority for public transport would remain
Consider Milton Road and Histon Road as one way roads to and from the A14.	2%	Under any such arrangement there would still be a need to develop contraflow facilities for cycling and buses to maintain road network connectivity. The impact on local trip convenience would be significant
Increase cycle awareness of the Highway Code and enforce consequences to those that do not obey it.	1%	This is not a matter relevant to the development of the project
Consider underpasses for cyclists and pedestrians at major junctions	1%	Adequate highway space does not exist at junctions along Milton Road to allow the provision of underpasses. Underpasses are often unpopular options for pedestrians and cyclists and are not considered cost effective or desirable solutions in the context of this project
Design cycleways in the same way as Hills Road	2%	The initial ideas for improving cycling facilities are based on the design concepts used on Hills Road

### 3.3 OPTION DESIGN & IMPACTS

#### OVERVIEW

- 3.3.1 Based on the response to the public consultation it was decided that further work to identify a preferred option should set aside the ideas for banned turns. The options considered include:
- 'Do Nothing' Option – consideration of doing nothing along the Milton Road corridor;
  - 'Do Maximum' Option – use of the previous 'Do Maximum' option used for the first round of consultation whilst removing the previous banned turns (the closure of Union Lane remains in place). This option has almost continuous inbound and outbound bus lanes;
  - 'Do Something' Option – modification of the previous 'Do Something' Option to take into consideration the comments arising from consultation where possible;
  - Tidal Flow Option A (reversible peak period central bus lane); and
  - Tidal Flow Option B (alternating peak period kerb side bus lane).
- 3.3.2 Given the concerns over carriageway widening, the additional option of using a tidal/alternating bus lane arrangement has been explored to see if this provides a more efficient use of carriageway space.
- 3.3.3 In modifying the existing 'Do Something' option, the following aspects have been considered and included where they are considered a benefit:
- Banned turns deleted at King's Hedges Road, Arbury Road and Gilbert Road. Union Lane closure retained;
  - Included option for 'no right turn' from Milton Road into Elizabeth Way;
  - Introduced shared-use area on west side footway between Arbury Road and Asham Way;



- Consider whether it is beneficial to have different split of north and southbound bus lanes, currently designed as directional but cut-off points should be informed by current/future queuing;
- Floating bus stops (where highway space permits);
- Option for segregated cycle facilities through the Elizabeth Way junction: an idea put forward by the Cambridge Cycling Campaign; and
- Opportunities for enhancing public realm and retaining/introducing new planting/trees within the amended layout.

3.3.4 The design approach and principles used for the design modifications referred to in this report are as per those used to produce the previous designs used for consultation. These principles relate to aspects which include minimum widths, typical cross sections and the design approach for junctions, crossings, cycle lanes and bus stops. The principles are described in the Draft Options Report (September 2015).

### 'DO SOMETHING' OPTION

3.3.5 The outline designs for the 'Do Something' option are shown in Appendix A. The key design features are described in Table 3-3.

**Table 3-3 Key Modified 'Do Something' Design Features**

KEY MODE	DESIGN ELEMENTS	RATIONALE FOR INCLUSION
<b>Bus</b>	Inbound bus lane on approach to Green End Road	To optimise bus progression along the route
	Almost continuous inbound bus lane between Woodhead Drive and Mitcham's Corner	
	Outbound bus lane on approach to Elizabeth Way and approach to Arbury Road	
	Almost continuous outbound bus lane between Woodhead Drive and the bus way junction	
	Bus gates on approaches to Gilbert Road junction	
	Early bus detection on all approaches to signal controlled junctions	
	Southbound bus stop south of Arbury Road junction moved further south	
Additional section of northbound bus lane between Elizabeth Way and Arbury Road	Previous design showing area of 'parking and/or planting' not feasible as access to shop forecourts required. Queueing indicates demand for bus lane.	
<b>Cycling</b>	Continuous segregated inbound cycle lane from approach to Green End Road junction through to Mitcham's Corner	To provide a higher standard of cycle facility with greater segregation from motor vehicles and pedestrians, where possible
	Continuous segregated outbound cycle lane from Mitcham's Corner to Lovell Road junction	
	Tiger Crossings near to Mitcham's Corner. Areas of shared-use footway next to Toucans	
	On-demand dedicated signal stage for cyclists on Union Lane arm of Arbury Road junction	
	Bi-directional segregated cycle lane between Lovell Road and busway junction	

KEY MODE	DESIGN ELEMENTS	RATIONALE FOR INCLUSION
	Shared-use facility on west side between Ascham Road and Highworth Avenue	Consultation response indicated that two-way demand on west side in this area – retention/modification of this measure subject to further surveys/analysis
	Off road cycle facilities at Elizabeth Way junction – all red crossing stage	Segregate cyclists from vehicles in time and space – improves road safety
Walking	Raised crossing points across side roads	To give greater priority to cycle and pedestrian movements across side roads and to create opportunities for localised street scape enhancement
	Upgraded signal crossings near Lovell Road and Kendall Way to provide better links for cross routes	To replace aging signal equipment and to enhance the convenience of transverse cycling and walking trips
	Single-stage crossings close to desire lines	
	Pedestrian crossings on all arms as part of Elizabeth Way junction	
	Upgraded footway surfaces	It is expected that most footway surfaces will be disrupted by construction work and utility service diversions which creates the opportunity to strengthen and resurface footways to achieve a higher standard of finish to improvement conditions for pedestrians, particularly those with less/limited mobility
Junctions	Removal of Elizabeth Way roundabout and installation of traffic signals	To signalise the junction to give greater priority to bus and cycling movements, to improve pedestrian and cycle safety at a collision black spot and to create opportunities for localised streetscape enhancement
	Closure of Union Lane for motor vehicle access and egress	To simplify the operation of the junction to increase overall main road green time for buses to reduce delays, to improve safety for cyclists and pedestrians as well as creating opportunities for localised streetscape enhancement
Other	Retain areas of footway and adjacent kerbside (wide) verge with planting/trees and footway parking	Provides vertical greening which improves the look of the street, reduces the corridor linearity & provides emissions reduction measure. Layout and treatment of these areas to be determined as part of wider public realm design for the corridor. Some parking demand on footway – however extent of areas retained for parking subject to further surveys/analysis.

3.3.6 Table 3-4 (in conjunction with Figure 3-1) provides a summary of the main design components that make up the sections and junctions for the Milton Road 'Do Something' scenario.

Figure 3-1 Milton Road Corridor Overview

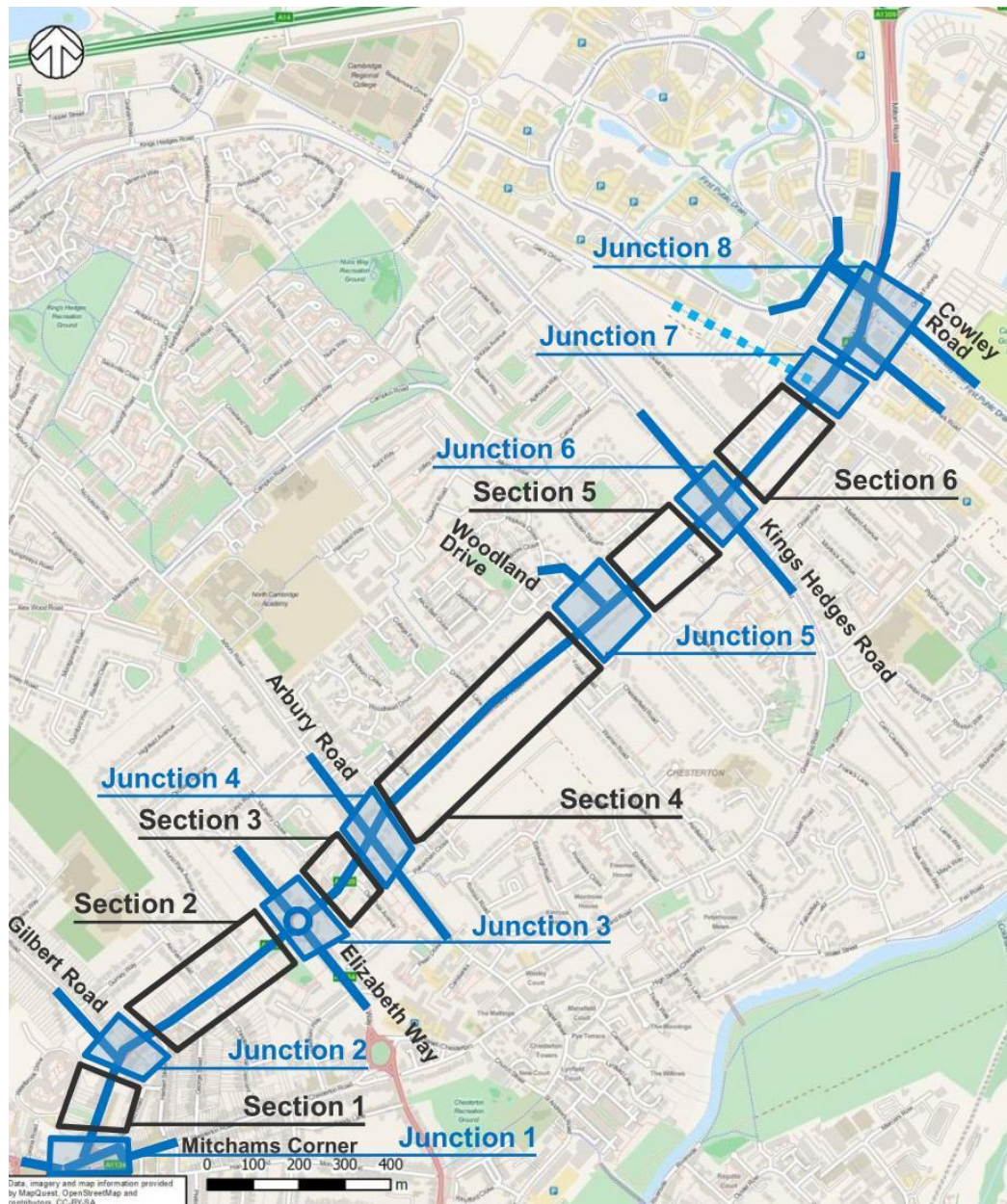


Table 3-4 Summary of Main Design Components for 'Do Something' Option

Milton Road – 'Do Something' Option											
	Northbound bus lane	Southbound bus lane	Northbound raised cycleway	Southbound raised cycle way	Northbound cycle lane	Southbound cycle lane	Shared-use areas	Land-take required	New space for public realm	New/upgraded crossings	New/upgraded signals
Junction 1											
Section 1											
Junction 2											
Section 2											
Junction 3											
Section 3											
Junction 4											
Section 4											
Junction 5											
Section 5											
Junction 6											
Section 6											
Junction 7											
Junction 8											

Not applicable   
 Present along part length   
 Present along entire length

### 'TIDAL FLOW OPTION A' (REVERSIBLE PEAK PERIOD CENTRAL BUS LANE)

- 3.3.7 The central tidal bus lane option has been included in order to identify the potential additional space that can be retained (or better used) for trees/planting in areas of the previous Do Something option (used for consultation) where there were bus lanes in either direction (four lanes in total versus three lanes needed for the tidal option). In addition, this option is being considered to identify the potential journey time savings for buses.
- 3.3.8 An initial review of the design requirements and operational issues has been undertaken in conjunction with County Council officers. This has identified several factors which have a bearing on the feasibility of introducing a tidal bus lane on Milton Road. These factors include:
- Potential need to introduce overhead gantries at regular spacing to provide sufficient awareness of which direction buses will be approaching from. More general road safety issues regarding suitability and requirements of signage, signals and road markings to provide sufficient awareness to all road users regarding operation of the tidal lane;
  - Sequencing and significant safety issues associated with change of direction of bus lane;
  - Phasing/staging at signalised junctions to satisfy required road safety considerations as well as not overly impacting on journey time for other vehicles and cyclists;



- Potential safety and operational issues with buses merging into the nearside lane to access bus stops;
- Potential safety and operational issues with vehicles overtaking buses at stops using tidal lane; and
- Potential blocking back issues at side roads if vehicles not permitted to wait in tidal lane to turn right.

3.3.9 The operation of the Tidal Flow Option A could be as shown in Figure 3-2.

**Figure 3-2 Potential Operation of Tidal Flow Option A**



3.3.10 The outline designs for the central tidal bus lane option are shown in Appendix A. The key design features are described in Table 3-5.

Table 3-5 Key Design Features of Tidal Flow Option A

KEY MODE	DESIGN ELEMENT	RATIONALE FOR INCLUSION	
Bus	Central tidal bus lane between Mitcham's Corner and busway	To optimise bus progression along the route and, as part of wider Do Something option' on which this option is based, enable retention of more verges (with trees, planting and footway parking)	
	Separate stage/phase for buses in tidal lane at signalised junctions		
Bus	Buses using tidal lane will use kerbside bus stops	Relocated to minimise risk of traffic blocking back to junction.	
	Southbound bus stop south of Arbury Road junction moved further south		
Cycling	Continuous segregated inbound cycle lane from approach to Green End Road junction through to Mitcham's Corner	To provide a higher standard of cycle facility with greater segregation from motor vehicles and pedestrians, where possible	
	Continuous segregated outbound cycle lane from Mitcham's Corner to Lovell Road junction		
	Tiger Crossings near to Mitcham's Corner. Areas of shared use footway next to Toucans		
	On-demand dedicated signal stage for cyclists on Union Lane arm of Arbury Road junction		
	Bi-directional segregated cycle lane between Lovell Road and Busway junction		Two-way demand from busway cycle route to Cowley Road bridge and Cambridge Business Park
	Shared-use facility on west side between Ascham Road and Highworth Avenue		Consultation feedback that two-way demand on west side in this area – subject to further surveys/analysis
	Off road cycle facilities at Elizabeth Way junction – all red crossing stage		Segregate cyclist from vehicles in time and space – improves road safety
Walking	Raised crossing points across side roads	To give greater priority to cycle and pedestrian movements across side roads and to create opportunities for localised street scape enhancement	
	Upgraded signal crossings near Lovell Road and Kendall Way to provide better links for cross routes	To replace aging signal equipment and to enhance the convenience of transverse cycling and walking trips	
	Single-stage crossings close to desire lines		
	Pedestrian crossings on all arms as part of Elizabeth Way junction		
	Upgraded footway surfaces	It is expected that most footway surfaces will be disrupted by construction work and utility service diversions which creates the opportunity to strengthen and resurface footways to achieve a higher standard of finish to improvement conditions for pedestrians, particularly those with less/limited mobility	
Junctions	Removal of Elizabeth Way roundabout and installation of traffic signals	To signalise the junction to give greater priority to bus and cycling movements, to improve pedestrian and cycle safety at a collision black spot and to create opportunities for localised streetscape enhancement	

KEY MODE	DESIGN ELEMENT	RATIONALE FOR INCLUSION
	Closure of Union Lane for motor vehicle access and egress	To simplify the operation of the junction to increase overall main road green time for buses to reduce delays, to improve safety for cyclists and pedestrians as well as creating opportunities for localised streetscape enhancement
<b>Other</b>	Retain areas of footway and adjacent kerbside wide verge with planting/trees and footway parking	Provides vertical greening which improves the look of the street, reduces the corridor linearity & provides emissions reduction measure. Layout and treatment of these areas to be determined as part of wider public realm design for the corridor. Some parking demand on footway – however extent of areas retained for parking subject to further surveys/analysis.

3.3.11 Table 3-6 (which should be read in conjunction with Figure 3-1) provides a summary of the main design components that make up the sections and junctions for the Milton Road 'Tidal Flow Option A' scenario.

**Table 3-6 Summary of Main Design Components for 'Tidal Flow Option A'**

Milton Road – 'Tidal Flow Option A'										
	Central tidal bus lane	Northbound raised cycleway	Southbound raised cycle way	Northbound cycle lane	Southbound cycle lane	Shared-use areas	Land-take required	New space for public realm	New/upgraded crossings	New/upgraded signals
Junction 1										
Section 1	Present along entire length	Present along entire length	Present along entire length			Present along part length			Present along entire length	
Junction 2										
Section 2	Present along entire length	Present along entire length	Present along entire length			Present along part length		Present along part length	Present along entire length	
Junction 3										
Section 3	Present along entire length	Present along entire length	Present along entire length			Present along part length		Present along part length	Present along entire length	
Junction 4										
Section 4	Present along entire length	Present along entire length	Present along entire length			Present along part length			Present along entire length	
Junction 5							Present along part length	Present along part length		
Section 5	Present along entire length	Present along entire length	Present along entire length			Present along part length		Present along part length	Present along entire length	
Junction 6										
Section 6	Present along entire length	Present along entire length	Present along entire length			Present along part length	Present along part length		Present along entire length	
Junction 7										
Junction 8	Present along entire length	Present along entire length	Present along part length			Present along part length				

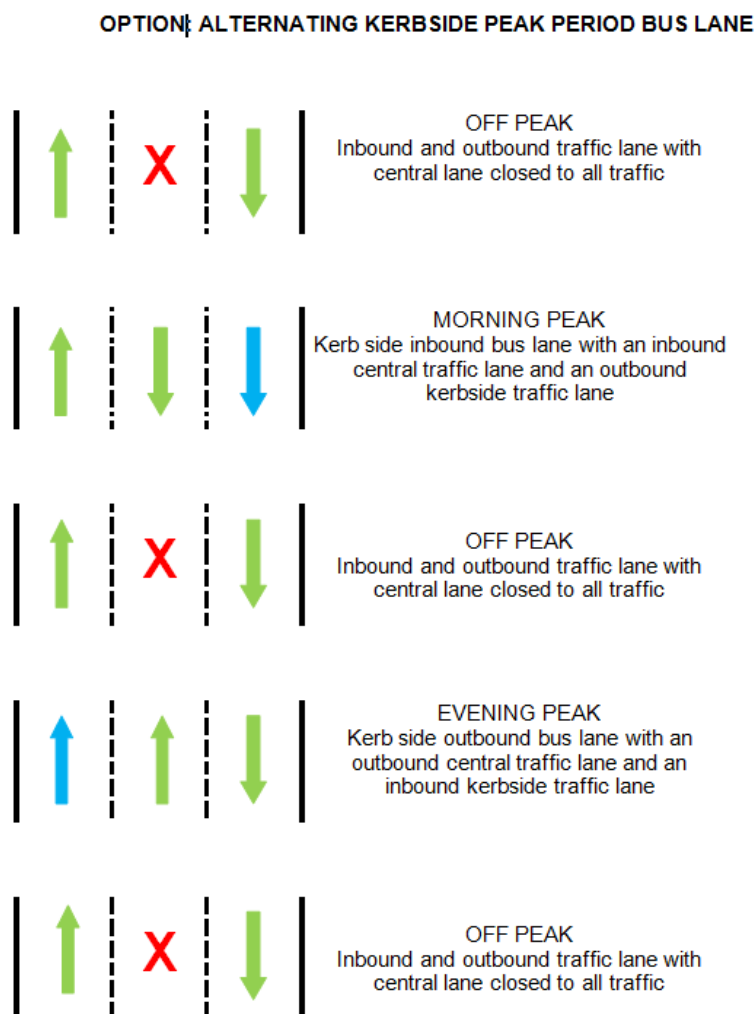
Not applicable    
  Present along part length    
  Present along entire length

**'TIDAL FLOW OPTION B' (ALTERNATING PEAK PERIOD KERB SIDE BUS LANE)**

- 3.3.12 The alternating kerbside bus lane option has been considered as an alternative to the tidal bus lane to potentially mitigate issues with this option such as the need to merge into the kerbside traffic lane to access the bus stops.
- 3.3.13 As shown in Figure 3-3, this option uses a kerb side inbound bus lane, an inbound central traffic lane and an outbound kerbside traffic lane during the morning peak period. During the evening peak period the morning peak period operation would be reversed with a kerb side outbound bus lane, an outbound central traffic lane and an inbound kerb side traffic lane. Outside of the peak periods the central traffic lane would be closed to all traffic with the kerb side lanes being used by all traffic
- 3.3.14 An initial review of the design requirements and operational issues has been undertaken. This has identified several factors which have a bearing on the feasibility of introducing a tidal bus lane on Milton Road. These factors include:
  - ➔ Potential need to introduce overhead gantries at regular spacing to provide sufficient awareness of which direction buses will be approaching from. More general road safety issues regarding suitability and requirements of signage, signals and road markings to provide sufficient awareness to all road users regarding operation of the traffic lanes;

- Sequencing and significant safety issues associated with change of direction of central traffic lane;
- Phasing/staging at signalised junctions to satisfy required road safety considerations as well as not overly impacting on journey time for other vehicles and cyclists; and
- Potential issues with vehicles merging into nearside lane (when operating as a bus lane) to turn left.

**Figure 3-3 Potential Operation of 'Tidal Flow Option B'**



- 3.3.15 In order to make definitive recommendations regarding the preferred design option to take forward, more detailed consideration needs to be given regarding the above points.
- 3.3.16 The outline designs for the central tidal bus lane option are shown in Appendix A. The key design features are described in Table 3-7.

**Table 3-7 Key Design Features of Tidal Flow Option B**

KEY MODE	DESIGN ELEMENT	RATIONALE FOR INCLUSION
Bus	Kerbside bus lane southbound in AM peak and northbound in PM peak	To optimise bus progression along the route and, as part of wider 'Do Something' option' on which this option is based, enable retention of more verges (with trees, planting and footway parking)
	Separate stage/phase for buses at signalised junctions (when operating as bus only lane)	
	Southbound bus stop south of Arbury Road junction moved further south	Relocated to minimise risk of traffic blocking back to junction.
Cycling	Continuous segregated inbound cycle lane from approach to Green End Road junction through to Mitcham's Corner	To provide a higher standard of cycle facility with greater segregation from motor vehicles and pedestrians, where possible
	Continuous segregated outbound cycle lane from Mitcham's Corner to Lovell Road junction	
	Tiger Crossings near to Mitcham's Corner. Areas of shared use footway next to Toucans	
	On-demand dedicated signal stage for cyclists on Union Lane arm of Arbury Road junction	
	Bi-directional segregated cycle lane between Lovell Road and Busway junction	Two-way demand from busway cycle route to Cowley Road bridge and Cambridge Business Park
	Shared-use facility on west side between Ascham Road and Highworth Avenue	Consultation feedback that two-way demand on west side in this area – subject to further surveys/analysis
	Off road cycle facilities at Elizabeth Way junction – all red crossing stage	Segregate cyclist from vehicles in time and space – improves road safety
Walking	Raised crossing points across side roads	To give greater priority to cycle and pedestrian movements across side roads and to create opportunities for localised street scape enhancement
	Upgraded signal crossings near Lovell Road and Kendall Way to provide better links for cross routes	To replace aging signal equipment and to enhance the convenience of transverse cycling and walking trips
	Single-stage crossings close to desire lines	
	Pedestrian crossings on all arms as part of Elizabeth Way junction	It is expected that most footway surfaces will be disrupted by construction work and utility service diversions which creates the opportunity to strengthen and resurface footways to achieve a higher standard of finish to improvement conditions for pedestrians, particularly those with less/limited mobility
Upgraded footway surfaces		

KEY MODE	DESIGN ELEMENT	RATIONALE FOR INCLUSION
<b>Junctions</b>	Removal of Elizabeth Way roundabout and installation of traffic signals	To signalise the junction to give greater priority to bus and cycling movements, to improve pedestrian and cycle safety at a collision black spot and to create opportunities for localised streetscape enhancement
	Closure of Union Lane for motor vehicle access and egress	To simplify the operation of the junction to increase overall main road green time for buses to reduce delays, to improve safety for cyclists and pedestrians as well as creating opportunities for localised streetscape enhancement
<b>Other</b>	Retain areas of footway and adjacent kerbside wide verge with planting/trees and footway parking	Provides vertical greening which improves the look of the street, reduces the corridor linearity & provides emissions reduction measure. Layout and treatment of these areas to be determined as part of wider public realm design for the corridor. Some parking demand on footway – however extent of areas retained for parking subject to further surveys/analysis.

3.3.17 Table 3-8 (which should be read in conjunction with Figure 3-1) provides a summary of the main design components that make up the sections and junctions for the Milton Road 'Tidal Flow Option B'.

Table 3-8 Summary of Main Design Components for Tidal Flow Option B

Milton Road – Tidal Flow Option B											
	Northbound bus lane (AM peak)	Southbound bus lane (PM peak)	Northbound raised cycleway	Southbound raised cycleway	Northbound cycle lane	Southbound cycle lane	Shared-use areas	Land-take required	New space for public realm	New/upgraded crossings	New/upgraded signals
Junction 1											
Section 1											
Junction 2											
Section 2											
Junction 3											
Section 3											
Junction 4											
Section 4											
Junction 5											
Section 5											
Junction 6											
Section 6											
Junction 7											
Junction 8											

Not applicable
  Present along part length
  Present along entire length

### MITCHAM'S CORNER

- 3.3.18 An officer/consultant workshop was held in February to consider further the best options for changing the highway configuration of the Mitcham's Corner gyratory junction. From this process, two favoured options emerged which are the subject of further traffic modelling work to assess the likely impacts.
- 3.3.19 The key to creating space for streetscape improvements is the adoption of a low speed highway design to manage the impact on traffic delays and queues. This was followed up with a site visit to see a recently completed junction improvement at a key junction in Oxford, Frideswide Square, which has adopted a low speed environment. Early feedback on the scheme suggests that traffic delays have reduced despite a reduction in overall carriageway space which has facilitated significant public realm improvements in the Square.
- 3.3.20 Based on the site visit and experience of similar schemes with low speed environments, concept designs are currently being prepared by WSP|PB for Mitcham's Corner for further consideration.



# 4 HISTON ROAD OPTIONS

## 4.1 OVERVIEW

4.1.1 For the consultation undertaken between 15<sup>th</sup> November and 15<sup>th</sup> February 2016, the following two options were developed to outline design level:

- a **'Do Something'** option: offering less overall benefit for bus movements (although journey time and reliability would still improve over that experienced now), a similar level of improvement for cycling and walking but with less impact on the public realm; and
- a **'Do Maximum'** option: comprising measures to provide the maximum benefit in terms of the project objectives but with a significant impact on the urban street scene and local access.

4.1.2 The above options were taken to public consultation, which was undertaken between 15<sup>th</sup> November and 15<sup>th</sup> February 2016. This chapter describes the response to the public consultation and how the options and designs have subsequently been modified in light of the concerns and suggestions given.

## 4.2 KEY CONSULTATION COMMENTS & RESPONSES

4.2.1 Table 4-1 provides an overview of the key comments made on the design proposals along with a design response to those comments.

**Table 4-1 Key issues from Consultation Response & Design Response to Feedback**

CONSULTATION PROPOSALS & COMMENTS	DESIGN RESPONSE TO CONSULTATION COMMENTS
<p><b>Banned Turning Movements</b></p> <p>[No motor vehicle access to Victoria Road, No right turn to Histon Road (except buses), No right turn into Warwick Road]</p> <p>Issue/Comments: impact of displaced traffic on side roads/ inconvenience to local trips/ lack of accessibility to schools and businesses</p>	<p>The concerns need to be weighed against the benefits of reduced delays if the banned turns were implemented. However, due to the degree of concern, the junction delays will be addressed through re-design rather than by movement restrictions. Therefore, the banned turn at Warwick Road will be removed from the designs and only reconsidered if future modelling work over the summer period shows a clear need for reconsideration</p> <p>Despite a generally negative response, it is felt that the access restrictions at the Histon Road/Victoria Road junction are pivotal to achieving reliable and reduced bus journey times and improving conditions for cycling. Therefore these measures should be retained in the designs</p>
<p><b>Loss of Trees</b></p> <p>Issue/Comments: Impact on street scene/ Vandalism of any replacement saplings</p>	<p>The impact on the street scene, in particular highway trees and verges, of carriageway widening to create space for further bus and cycle lanes is a significant issue of local concern although the number of highway trees along Histon Road is relatively small</p> <p>On Histon Road the 'Do Maximum' option would achieve more benefit for buses and cycling than the 'Do Something' option but the difference in street scene impact between each option is not expected to be significant. Therefore it is felt that that the 'Do Maximum' option should be taken forward for further development and future detailed consultation</p>
<p><b>Bus Lanes and Bus Services</b></p>	<p>As identified in earlier reports, the number of buses</p>

CONSULTATION PROPOSALS & COMMENTS	DESIGN RESPONSE TO CONSULTATION COMMENTS
<p>Issue/Comments: 41% of responses mentioned buses, with majority focussing on frequency, reliability and quality of services rather than proposed bus lane</p> <p>Changes to Citi 8 service / Lack of local access to Busway services / Bus lanes not justified by low number of buses</p>	<p>using Histon Road is expected to double as planned growth takes place</p> <p>The local concerns over the lack of access to bus services that use Histon Road is not an issue directly linked to the design of the project but the future provision of bus services along Histon Road and other key access corridors is a matter that is being considered through ongoing liaison and discussion between the Great Cambridge City Deal and bus operators</p>
<p><b>Cycleways</b></p> <p>Issue/Comments: Avoid half way house/ Need consistent high standard design</p>	<p>The initial ideas put forward provide the potential for significant improvements for cyclists using Histon Road although it is recognised that the degree of improvement is likely to be less at the southern end of the corridor where the highway width is much constrained and compromises in the standard of cycling facility may need to be made</p>
<p><b>Removal of parking</b></p> <p>Issue/Comments: 27% of comments made reference to removal of parking (57% in support, 31% opposed)</p>	<p>The idea of removing carriageway parking on the southern section of Histon Road has received a reasonable level of support although it would impact on some local residents and businesses</p> <p>Therefore, it is considered that this idea should be developed further for future consultation, including parking management proposals to mitigate the impact on current users</p>
<p><b>Walking trips</b></p> <p>Issue/Comments: Lack of maintenance of footways /Need for additional crossing points</p>	<p>Highway maintenance is not a matter directly relevant to the project but it is intended that the improvements developed through the project will provide higher quality and better constructed footways. These improvements will also lessen future maintenance needs</p> <p>Consideration will be given to whether there is a need for additional crossings</p>

4.2.2 Throughout the consultation period, the public were encouraged to submit alternative proposals and identify elements of the proposed options that could be improved. Table 4-2 identifies the alternative proposals, how frequently they were suggested and also provides a design response to these ideas.

**Table 4-2 Alternative Ideas and Design Response**

ALTERNATIVE CONSULTATION IDEAS	% OF CONSULTATION RESPONSES	DESIGN RESPONSE TO ALTERNATIVE IDEAS
Alternative cross section layouts to reduce or eliminate the need to remove trees	39%	Various options based on a three lane cross section are assessed in this report to identify the optimum layout for bus improvements. It is not possible to provide a bus lane(s) and segregated cycle facilities without road widening along the corridor which will inevitably impact on some highway trees. Other areas for tree planting will be considered as part of the next stage of design
Make public transport more affordable	9%	The City Deal does not have powers to set bus fares but if bus services are able to operation

ALTERNATIVE CONSULTATION IDEAS	% OF CONSULTATION RESPONSES	DESIGN RESPONSE TO ALTERNATIVE IDEAS
		more reliably and frequency this will increase patronage and in the longer term may lead to cheaper bus travel
Include pedestrian crossing near to Aldi and Iceland	8%	This idea will be explored as part of the next design stage
Remove charge for parking at Park & Ride sites	8%	On its own, this is unlikely to achieve a significant reduction in traffic delays or improve the performance of bus services, but could increase bus patronage
Make Busway services stop at the bus stops along Histon Road	7%	Busway services are intended to provide an express service for passengers to/from the city. If services stop at local stops this may make the service less attractive to current and future users. New bus infrastructure to make local services quicker and more reliable may lead to increased patronage and a more frequency service in the future
Increase the number of bus stops and distribute them more evenly	7%	Histon Road is current well served with bus stops. Providing more stops will increase bus dwell times making trips longer
Introduce a congestion charge	6%	This idea is being considered as part of the Cambridge Access Study
Introduce residents only parking on roads off Histon Road to enable easier parking for residents and disincentivise driving	5%	Additional parking management measures will be considered for side roads along Histon Road which could include residents only parking bays to ensure adequate space is available for local residents
Revert the Citi 8 bus service back to its previous route which served the railway station and Addenbrooke's Hospital	4%	Whilst the routing of bus services is something for bus operators to determine, these matters are being discussed as part of an on-going dialogue between the City Deal and bus operators
Consider a bi-directional cycle lane on one side rather than one on each side	4%	This option may require more crossing movements across the main road to reach a bi-directional facility. The idea of providing a segregated cycle lane each side has received generally good support at consultation and is the favoured option
Consider only vehicular banned turns, thus allowing cyclists to make these turn movements	4%	The idea of banning the right turn into Warwick Road is to be set aside. The ideas for restricting vehicle movements at the Victoria Road junction only impact on motor vehicle movements
Introduce a Park & Ride at Histon	4%	The need to expand Park & Ride capacity is being considered as part of the Cambridge Access Study
Consider where alternative parking is going to be located, if removed	3%	Adequate capacity exists in neighbouring side roads to accommodate any parking removed from the main road. New parking controls will be developed as part of the next design stage for future consultation
Increase the reliability of buses by using stricter regulations	3%	The reliability of bus services is a matter for the Traffic Commissioners. Stricter regulations will not create the conditions required on the highway to allow buses to keep to timetable – this will only be achieved through new bus infrastructure

ALTERNATIVE CONSULTATION IDEAS	% OF CONSULTATION RESPONSES	DESIGN RESPONSE TO ALTERNATIVE IDEAS
Continue cycleways and other infrastructure beyond the scope of this study to create a continuous route	2%	Other City Deal projects will provide similar infrastructure improvements across the City Deal area road network

## 4.3 PREFERRED OPTION DESIGN & IMPACTS

### OVERVIEW

- 4.3.1 Based on the response to the public consultation it was decided that the the idea of banning the right turn into Warwick Road and the idea of 'floating' bus stops would be set aside. The following designs were further considered:
- 'Do Nothing' Option – consideration of doing nothing along the Histon Road corridor;
  - 'Do Maximum' Option – continuous inbound bus lane through to Gilbert Road from King's Hedges Road;
  - 'Do Maximum' (Variation) Option – split inbound bus lane to Gilbert Road and outbound bus lane to King's Hedges Road;
  - Tidal Flow Option A (reversible peak period central bus lane between the proposed NIAB junction and Gilbert Road only); and
  - Tidal Flow Option B (alternating peak period kerb side bus lane between the proposed NIAB junction and Gilbert Road only).
- 4.3.2 As identified in Table 4-2, due to the degree of concern from the public consultation, the junction delays at Warwick Road will be addressed through re-design rather than by movement restrictions.
- 4.3.3 Whilst the idea of providing 'floating' bus stops, which would allow cyclists to avoid overtaking buses dwelling at bus stops, gained some degree of support, the limited highway space available at most existing bus stops means that additional land would be required. This is considered to be impractical at many locations and therefore the idea of floating bus stops has not been considered further.
- 4.3.4 In modifying the existing 'Do Maximum' option, the following aspects have been considered/ included:
- On the southern section, where highway space is very constrained, consider other ideas for cycling improvements, including the provision of advisory cycle lanes;
  - Histon Road / Warwick Road – remove banned right turn;
  - Need to consider potential for rationalisation of the bus stops south of Gilbert Road;
  - Consideration should be given to additional pedestrian crossing/s on Histon Road to the north of Gilbert Road;
  - Consider future junction design near Kings Hedges Road associated with the NIAB development;
  - At the Histon Road/Victoria Road junction, there are concerns over queuing on Victoria Road as a result of providing a priority junction which need to be considered. Potential solutions include signalling to manage the impact on Victoria Road queue;

- Bus lanes, currently designed as directional but need to look at this and determine length required based on cut-off point from current/future traffic queues;
- Consider the impact on Chesterton Road / Northampton Street / Castle Street / Magdalene Street through the LINSIG modelling work; and
- Consideration should be given in any designs for additional crossing provision at appropriate locations.

4.3.5 The design approach and principles used for the design modifications referred to in this report are as per those used to produce the previous designs used for consultation. These principles relate to aspects which include minimum widths, typical cross sections and the design approach for junctions, crossings, cycle lanes and bus stops. The principles are described in the Draft Options Report (September 2015).

#### **‘DO MAXIMUM’ OPTION**

4.3.6 The ‘Do Maximum’ option is the same option as that shown in the Draft Options Report (September 2015). However, the proposed banned movement from Gilbert Road into Warwick Road has been removed.

4.3.7 The outline designs for the modified ‘Do Maximum’ option are shown in Appendix B. The key design features are described in Table 4-3.

**Table 4-3 Key Design Features of ‘Do Maximum’ Option**

<b>KEY MODE</b>	<b>DESIGN ELEMENT</b>	<b>RATIONALE FOR INCLUSION</b>
<b>Bus</b>	Continuous Inbound bus lane between proposed NIAB junction and Gilbert Road	To optimise bus progression along the route
	Early bus detection on all approaches to signal controlled junctions	
	Some bus stops relocated	To avoid bus stops being located opposed each other to reduce overall traffic delays
<b>Cycling</b>	Continuous segregated inbound cycle lane from King’s Hedges Road junction through to Victoria Road	To provide a higher standard of cycle facility with greater segregation from motor vehicles and pedestrians, where possible
	Continuous segregated outbound cycle lane from Rackham Close to King’s Hedges Road junction	
	Bi-directional cycle lane alongside NIAB junction on eastside. Shared use areas connecting NIAB cycle link to bi-directional cycle lane	
	3.9m northbound traffic lane from Victoria Road to Rackham Close. Cycle logos alongside kerblines, approx. 25m spacing	Consideration given to using 1.5m advisory cycle lane in either direction – however, this would leave only 5.4m for both traffic lanes. One of the design principles for this scheme is that the minimum traffic lane width should be 3.0m. Further investigation is required to determine whether a 5.4m carriageway for traffic would be acceptable. Further investigation to be given to requirement for/type of speed reduction measures needed to compliment current proposals as to use in combination with 1.5m advisory cycle lanes & 5.4m carriageway.
<b>Walking</b>	Remodel side road junctions to provide raised crossing points and a more pedestrian friendly environment	To give greater priority to cycle and pedestrian movements across side roads and to create opportunities for localised street scape enhancement.
	Upgraded footway surfaces throughout	It is expected that most footway surfaces will be disrupted by construction work and utility service

KEY MODE	DESIGN ELEMENT	RATIONALE FOR INCLUSION
		diversions which creates the opportunity to strengthen and resurface footways to achieve a higher standard of finish to improvement conditions for pedestrians, particularly those with less/limited mobility.
	Additional crossing provide north of Gilbert Road	To improve pedestrian safety and accessibility. Consideration was also given to whether a crossing can be provided close to the Aldi and Iceland stores. The proximity of the bus stops and accesses means this location is not suitable for a crossing.
<b>Junctions</b>	Prohibition of entry to Victoria Road except for buses and cycling. Prohibition of right turn from Victoria Road into Histon Road except buses and cycling	To simplify the operation of a complex junction to increase overall green time for Histon Road to reduce delays for buses and improve safety for cyclists and pedestrians as well as creating opportunities for localised streetscape enhancement
	Signalisation of Victoria Road junction	To facilitate right turn into Victoria Road by cyclists and better enable exiting traffic from Victoria Road to turn right into Huntingdon Road.
	Inclusion of proposals for NIAB junction	To take into account impact of NIAB trips and tie in previous Histon Road proposals.



4.3.8 Table 4-4 (in conjunction with Figure 4-1 which locates the corridor sections and junctions) provides a summary of the main design components that make up the sections and junctions for the Milton Road 'Do Maximum' Option.

**Figure 4-1 Histon Road Corridor Overview**

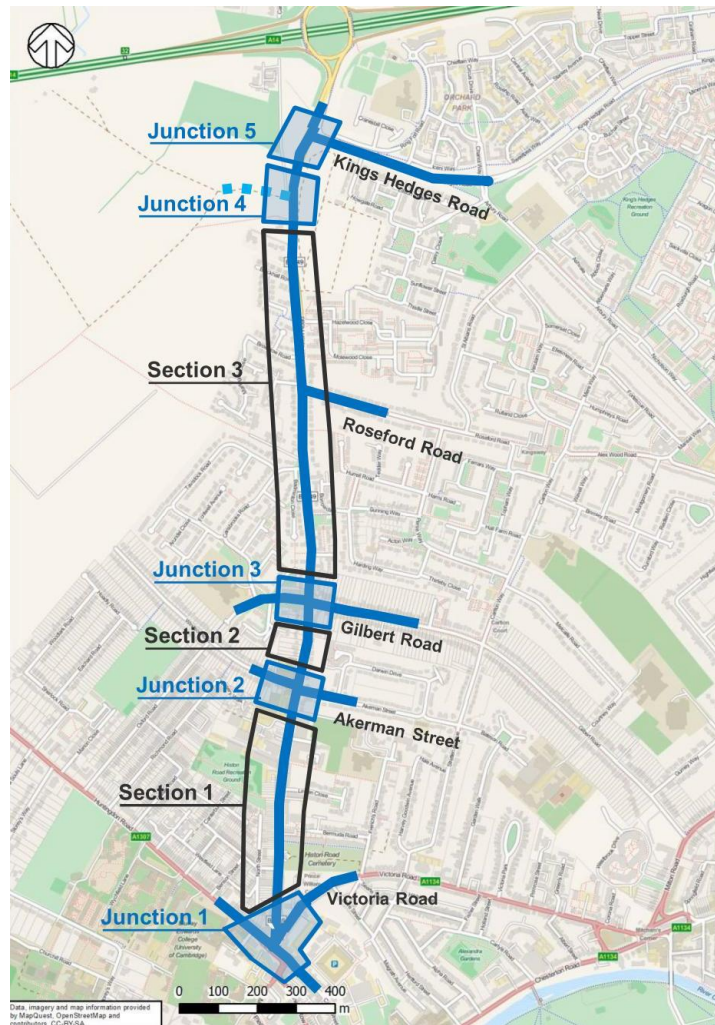




Table 4-4 Summary of Main Design Components for 'Do Maximum' Option

Histon Road – 'Do Maximum'											
	Northbound bus lane	Southbound bus lane	Northbound raised cycleway	Southbound raised cycle way	Northbound cycle lane	Southbound cycle lane	Shared-use areas	Land-take required	New space for public realm	New/upgraded crossing	New/upgraded signals
Junction 1											
Section 1											
Junction 2											
Section 2											
Junction 3											
Section 3											
Junction 4											
Junction 5											

## 'DO MAXIMUM' (VARIATION) OPTION

4.3.9 The outline designs for the 'Do Maximum' (Variation) option are shown in Appendix B. The key design features are described in Table 4-4.

**Table 4-5 Key Design Features of 'Do Maximum' (Variation) Option**

KEY MODE	DESIGN ELEMENT	RATIONALE FOR INCLUSION
Bus	Inbound bus lane between Roseford Road and Gilbert Road	To optimise bus progression along the route
	Outbound bus lane between Chancellors Walk and Kings Hedges Road	
	Early bus detection on all approaches to signal controlled junctions	
	Some bus stops relocated	
Cycling	Continuous segregated inbound cycle lane from King's Hedges Road junction through to Victoria Road	To provide a higher standard of cycle facility with greater segregation from motor vehicles and pedestrians, where possible
	Continuous segregated outbound cycle lane from Rackham Close to King's Hedges Road junction	
	Bi-directional cycle lane alongside NIAB junction on eastside. Shared use areas connecting NIAB cycle link to bi-directional cycle lane	
	3.9m northbound traffic lane from Victoria Road to Rackham Close. Cycle logos alongside kerblines, approx. 25m spacing	
Walking	Remodel side road junctions to provide raised crossing points and a more pedestrian friendly environment	To give greater priority to cycle and pedestrian movements across side roads and to create opportunities for localised street scape enhancement.
	Upgraded footway surfaces throughout	It is expected that most footway surfaces will be disrupted by construction work and utility service diversions which creates the opportunity to strengthen and resurface footways to achieve a higher standard of finish to improvement conditions for pedestrians, particularly those with less/limited mobility.
	Additional crossing provide north of Gilbert Road	To improve pedestrian safety and accessibility. Consideration was also given to whether a crossing can be provided close to the Aldi and Iceland stores. The proximity of the bus stops and accesses means this location is not suitable for a crossing.
Junctions	Prohibition of entry to Victoria Road except for buses and cycling. Prohibition of right turn from Victoria Road into Histon Road except buses and cycling	To simplify the operation of a complex junction to increase overall green time for Histon Road to reduce delays for buses and improve safety for cyclists and pedestrians as well as creating opportunities for localised streetscape enhancement
	Signalisation of Victoria Road junction	To facilitate right turn into Victoria Road by

KEY MODE	DESIGN ELEMENT	RATIONALE FOR INCLUSION
	Inclusion of proposals for NIAB junction	cyclists and better enable exiting traffic from Victoria Road to turn right into Huntington Road. To take into account impact of NIAB trips and tie in previous Histon Road proposals.

4.3.10 Table 4-6 (in conjunction with Figure 4-1) provides a summary of the main design components that make up the sections and junctions for the Histon Road 'Do Maximum' (Variation) scenario.

**Table 4-6 Summary of Main Design Components for 'Do Maximum' (Variation) Option**

Histon Road – 'Do Maximum' (Variation)											
	Northbound bus lane	Southbound bus lane	Northbound raised cycleway	Southbound raised cycle way	Northbound cycle lane	Southbound cycle lane	Shared-use areas	Land-take required	New space for public realm	New/upgraded crossing	New/upgraded signals
Junction 1											
Section 1											
Junction 2											
Section 2											
Junction 3											
Section 3											
Junction 4											
Junction 5											

Not applicable    
  Present along part length    
  Present along entire length

**‘TIDAL FLOW OPTION A’ (REVERSIBLE PEAK PERIOD CENTRAL BUS LANE)**

- 4.3.11 The central tidal bus lane option between the proposed NIAB junction and Gilbert Road junction has been included in order to identify the potential additional space that can be retained (or better used) for trees/planting. In addition, this option is being considered to identify the potential journey time savings for buses.
- 4.3.12 The operation of this tidal flow option would be as per that indicated in the previous chapter.

**‘TIDAL FLOW OPTION B’ (ALTERNATING PEAK PERIOD KERB SIDE BUS LANE)**

- 4.3.13 The alternating kerbside bus lane option has been considered as an alternative to the tidal bus lane to potentially mitigate issues with this option such as the need to merge into the kerbside traffic lane to access the bus stops.
- 4.3.14 The operation of this tidal flow option would be as per that indicated in the previous chapter.

# 5 OPTIONS MODELLING

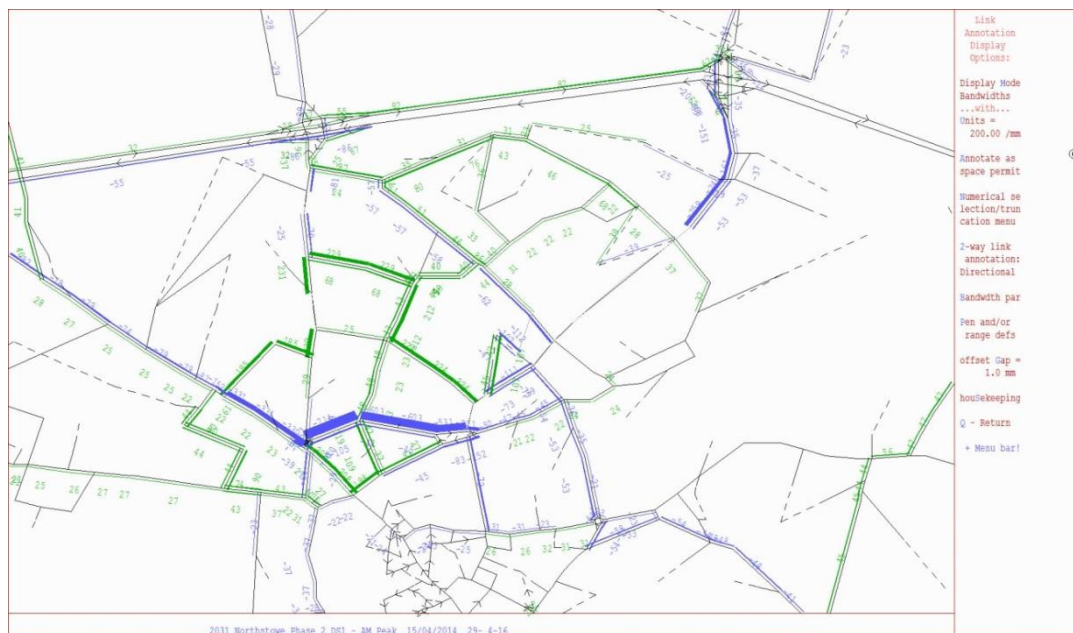
## 5.1 BACKGROUND

- 5.1.1 For both the Milton Road and Histon Road corridors, we have undertaken both 'Strategic' and 'Local' modelling. The strategic SATURN model feeds from the latest available CSRSM (Cambridge Sub Regional Model) update to provide not only an understanding of the wider traffic flows and patterns, but to provide the traffic matrices for the local PARAMICS model used for both corridors.
- 5.1.2 It should be noted that a refresh of the CSRSM model (CSRSM2), is currently being developed by others. When this model becomes available for use, understood to be in Summer 2016, the 'Strategic' modelling will be reviewed.

## 5.2 SATURN MODEL

- 5.2.1 The 2031 'Do Nothing model' was provided by Cambridgeshire County Council and was developed using SATURN V10.8.22. The model covers the whole Cambridge area including the A14, A11 and M11.
- 5.2.2 The schemes for Milton Road, as discussed previously within this report, were coded into the SATURN model to create four models:
- 'Do Something' - inbound and outbound bus lanes on approaches to key junctions;
  - 'Do Maximum' – the scheme originally presented at the first round of consultation, with the banned turns on Milton Road removed (the closure of Union Lane remains in place);
  - 'Tidal Flow Option A' – the scheme with the central bus lane option (inbound AM and outbound PM); and
  - 'Tidal Flow Option B' – the scheme with the kerbside bus lane option (inbound AM and outbound PM).
- 5.2.3 The schemes for Histon Road, as discussed previously were coded into the SATURN model to create five models:
- 'Do Nothing' Option – consideration of doing nothing along the Histon Road corridor;
  - 'Do Maximum' Option – continuous inbound bus lane through to Gilbert Road from King's Hedges Road;
  - 'Do Maximum' (Variation) Option – split inbound bus lane to Gilbert Road and outbound bus lane to King's Hedges Road;
  - Tidal Flow Option A (reversible peak period central bus lane between the proposed NIAB junction and Gilbert Road only); and
  - Tidal Flow Option B (alternating peak period kerb side bus lane between the proposed NIAB junction and Gilbert Road only).
- 5.2.4 Figure 5-1 compares the actual link flow along Milton Road and Histon Road between 2031 Do Something / Do Maximum scenarios respectively and 2031 Do Nothing scenario in the AM Peak. These numbers have been taken from the SATURN model and represent the Do Something / Do Maximum scenarios minus the Do Nothing scenario. Green bars represent increases in traffic flows and blue bars represent decreases.

Figure 5-1 Do-Something (Milton) / Do Something (Histon) Minus Do-Nothing Link Flows (AM)



5.2.5 The following flow changes along Milton Road can be observed:

- There is a reduction in two-way flows along the northern end of Milton Road between Kings Hedges and the A14;
- There is also a smaller reduction in flow between Elizabeth Way and Gilbert Road junctions. There is also a reduction in flows along Arbury Road north-west bound and Elizabeth Way south-east bound away from Milton Road. This reduction is as a result of the changes at the Elizabeth Way, Arbury Road and Victoria Road junctions;
- There is a large reduction from Victoria Road where it intersects with Milton Road but this can largely be attributed to the banning of entry from Histon Road rather than any measure along Milton Road;
- There are roads joining Milton Road where the flows increase. These roads are Gilbert Road south-east bound and to a minor extent Kings Hedges north-west bound and Green End north-west bound. The increase of the flow on these roads is attributed by the changes of the Milton Road/Elizabeth Way and Milton Road/Union Lane; and
- There is a relatively large increase in flows along Carlton Way and Roseford Road. This can largely be attributed to the banned right turn from Victoria Road to Histon Road.

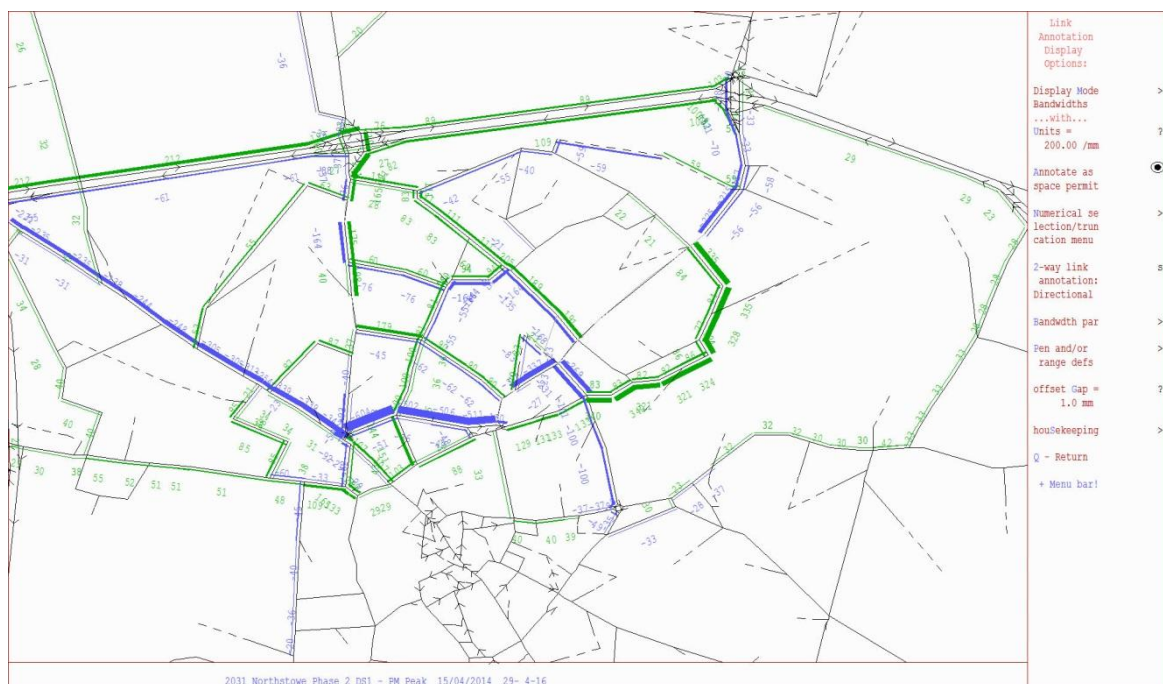
5.2.6 The following flow changes along Histon Road can be observed:

- There is a minor reduction in traffic flows in the AM period southbound from Kings Hedges and a two-way reduction north of Roseford Road.
- There is a significant reduction along Huntingdon Road across Histon Road and along Victoria Road. This is a result of the banning of turns onto Victoria Road from Histon Road. The closure of Victoria Road resulted in a 331 vehicle reduction on the Huntingdon Road Southbound between Oxford Road and Histon Road to Victoria Road and another 340 vehicles reduction from other origins to Victoria Road.
- The reduction of the traffic on Histon Road was mainly relocated on Oxford Road and via Histon Road and Roseford Road to west of Cambridge. Another small part of traffic was relocated on Storey's Way to west of Cambridge. Some of the traffic uses A14, Cambridge Road and King's Hedge Road to Central Cambridge.

- Some vehicles heading to Victoria Road will continue travelling along Huntingdon Road after Histon Road/ Huntingdon Road junction and to central Cambridge. A very small number of vehicles will use A1303 Madingley Road to central Cambridge.
- The closure of Victoria Road resulted in significant flow changes on Histon Road, Victoria Road and Huntingdon Road.

5.2.7 Figure 5-2 below compares the actual link flow along Milton Road and Histon Road between 2031 Do Something / Do Maximum scenarios respectively and 2031 Do Nothing scenario in the PM Peak. These numbers have been taken from the SATURN model and represent the Do Something / Do Maximum scenarios minus the Do Nothing scenario. Green bars represent increases in traffic flows and blue bars represent decreases.

**Figure 5-2 Do-Something (Milton) / Do Maximum (Histon) Minus Do-Nothing Link Flows (PM)**



5.2.8 The following flow changes on Milton Road can be observed:

- As in other peak periods, there is a reduction in two-way flows along the northern end of Milton Road between Kings Hedges and the A14;
- As in inter peak period, the most significant increase in traffic is observed along Green End Road to Chesterton Road, via High Street;
- Similarly there is an increase in flows to Milton Road from both Arbury Road, which is attributed by the rerouting traffic due to the closures at Victoria Road and Highworth Avenue;
- As in the AM peak, there is a large reduction from Victoria Road where it intersects with Milton Road but this can largely be attributed to the banning of entry from Histon Road rather than any measure along Milton Road.

5.2.9 The following flow changes on Histon Road can be observed:

- As in AM peak, here is a significant reduction along Huntingdon Road across Histon Road and along Victoria Road. This is a result of the banning of turns onto Victoria Road from Histon Road. The closure of Victoria Road resulted in 347 vehicles reduction on the



Huntingdon Road southbound between Oxford Road and Histon Road to Victoria Road and another 253 vehicles reduction from other origins to Victoria Road.

- The reduction of the traffic on Histon Road is mainly relocated on A14 through Cambridge Road and Arbury Road to central Cambridge. Some vehicles to Victoria Road will continue travelling along Huntingdon Road after Histon Road/ Huntingdon Road junction and to central Cambridge. Other traffic is relocated to south of Huntingdon Road. A small number of vehicles use Storey Road, Oxford Road and the new NIAB development access road.
- The closure of Victoria Road resulted in significant flow changes on Histon Road, Victoria Road and Huntingdon Road.

### 5.3 PARAMICS MODEL (MILTON ROAD)

- 5.3.1 The Paramics model has been updated by using matrix outputs from the 2031 SATURN model to assess the implications of the alternative traffic routing identified in the previous section at a more local level within the corridor and to understand the specific areas of delay within the corridor.
- 5.3.2 Table 5-1 provides a summary of the bus journey times for the various options on Milton Road between the Science Park and the Mitcham's Corner junction.

**Table 5-1 Milton Road (2031) - Bus Journey Times (between the Science Park and Mitcham's Corner junction) in seconds**

OPTION	BUS JOURNEY TIMES			
	AM PEAK		PM PEAK	
	INBOUND	OUTBOUND	INBOUND	OUTBOUND
'Do Nothing'	487	888	467	1557
'Do Maximum'	378	362	310	275
'Do Something'	388	416	321	348
'Tidal Flow Option A'	487	595	500	368
'Tidal Flow Option B'	342	675	505	357

### 5.4 PARAMICS MODEL (HISTON ROAD)

- 5.4.1 The Paramics model has been updated by using matrix outputs from the 2031 SATURN model to assess the implications of the alternative traffic routing identified in the previous section at a more local level within the corridor and to understand the specific areas of delay within the corridor.
- 5.4.2 Table 5-2 provides a summary of the bus journey times for the various options on Milton Road between the Science Park and the Mitcham's Corner junction.

**Table 5-2 Histon Road (2031) - Bus Journey Times (between the Science Park and Victoria Road junction) in seconds**

OPTION	BUS JOURNEY TIMES			
	AM PEAK		PM PEAK	
	INBOUND	OUTBOUND	INBOUND	OUTBOUND
'Do Nothing'	689	747	386	473
'Do Maximum'	504	543	369	552
'Do Maximum' (Variation)	523	608	387	553
'Tidal Flow Option A'	528	706	418	515
'Tidal Flow Option B'	504	643	420	482

# 6 CAPITAL COSTS

## 6.1 OUTLINE COSTS

6.1.1 At this very early stage of project development, it is difficult to provide an estimated outturn cost of the proposals, however an initial assessment (using Q4 2015 costs) based on typical engineering costs for this type of work suggests that the costs for the proposed options could be met from the initial project budget estimate.

6.1.2 The approximate costs for the preferred options identified within this report are as follows:

- Milton Road 'Do Something' Option - £6m; and
- Histon Road 'Do Maximum' Option - £2.5m.

6.1.3 However, the cost estimate should be treated with extreme caution as it is not possible at this stage to assess the additional costs associated with items including (but not limited to):

- land purchase & any compensation claims;
- the potential relocation of utilities along both corridors which is expected to be substantial;
- risk and contingencies;
- operations and maintenance;
- inflation;
- contractor's overheads, profit and preliminaries; and
- design fees and construction / project management.

# 7 CONCLUSIONS & RECOMMENDATIONS

## 7.1 CONCLUSIONS

- 7.1.1 The initial consultation undertaken for both the Milton Road and Histon Road corridors has required further design development and additional options to be considered. This interim options report contains those options to be considered further with preferred options identified.
- 7.1.2 Given the concerns over carriageway widening, the option of using a tidal bus lane arrangement has been explored on both Milton Road and Histon Road. An assessment of the potential journey time benefits has therefore been undertaken to allow comparison with the other options proposed. The safety, operational, streetscape and maintenance challenges arising from tidal flow options have also been considered through engagement with Cambridgeshire County Council. A separate technical note produced by Cambridgeshire County Council on tidal bus lanes shall be referred to in this instance.
- 7.1.3 The key conclusion of this report is that the options presented within should be taken forward for further development and design.

## 7.2 RECOMMENDATIONS & FURTHER WORK

- 7.2.1 It is recommended that the following preferred options proposed within this report are taken forward for further development:
- Milton Road 'Do Something' Option; and
  - Histon Road 'Do Maximum' Option.
- 7.2.2 Additional work will also be required as follows:
- Further work on the Mitcham's Corner Gyratory is currently being undertaken and will be available shortly. A formal technical note will be provided on this work as soon as possible to support the potential aspirations of the City Deal and Cambridge City Council;
  - Additional corridor design to prepare for and further inform the second round of consultation which is expected to take place later in 2016;
  - On Milton Road, the use of floating bus stop type layouts should be considered, where possible, within the design. Further design work, in conjunction with both the engineering and public realm designs, will need to be undertaken to accommodate this;
  - Making use of the new CSRM2 model (refresh of CSRM) which is expected to become available in Summer 2016 to further inform and update the modelling undertaken both at a strategic and at a local level. The matrices used for the PARAMICS model are drawn directly from the SATURN model which in turn feeds from the CSRM model. The new CSRM2 model will include the latest relevant Local Plan information along with the latest 2011 Census information;
  - Further understanding of the expected walking, cycling and public transport movements arising in the 2031 future year arising from the new CSRM2 strategic model as described previously;
  - Obtaining the C3 utilities information from the relevant statutory undertakers to better understand the potential utilities cost associated with the options put forward within this report;

- Additional parking management measures will be developed to compliment the preferred options being proposed, particularly at the southern end of Histon Road;
- A refresh of the Milton Road PARAMICS model to include the Chesterton Road / Elizabeth Way junction to further understand that junctions impacts on the Milton Road corridor; and
- Further consideration and detailing of the public realm design for the corridors along with supporting visualisations. An understanding of the emerging Greater Cambridge City Deal 'Urban Design Guidance for Transport Infrastructure Projects' will also be of assistance.
- Understanding of the emerging proposals arising from the Greater Cambridge City Deal City Centre Access Study and the impacts they may have on the traffic flows and patterns on both Histon Road & Milton Road
- Development of the initial outline business case for both Milton Road & Histon Road to allow an understanding of the expected Benefit to Cost Ratios for the project.

# Appendix A

**MILTON ROAD DESIGN OPTIONS**

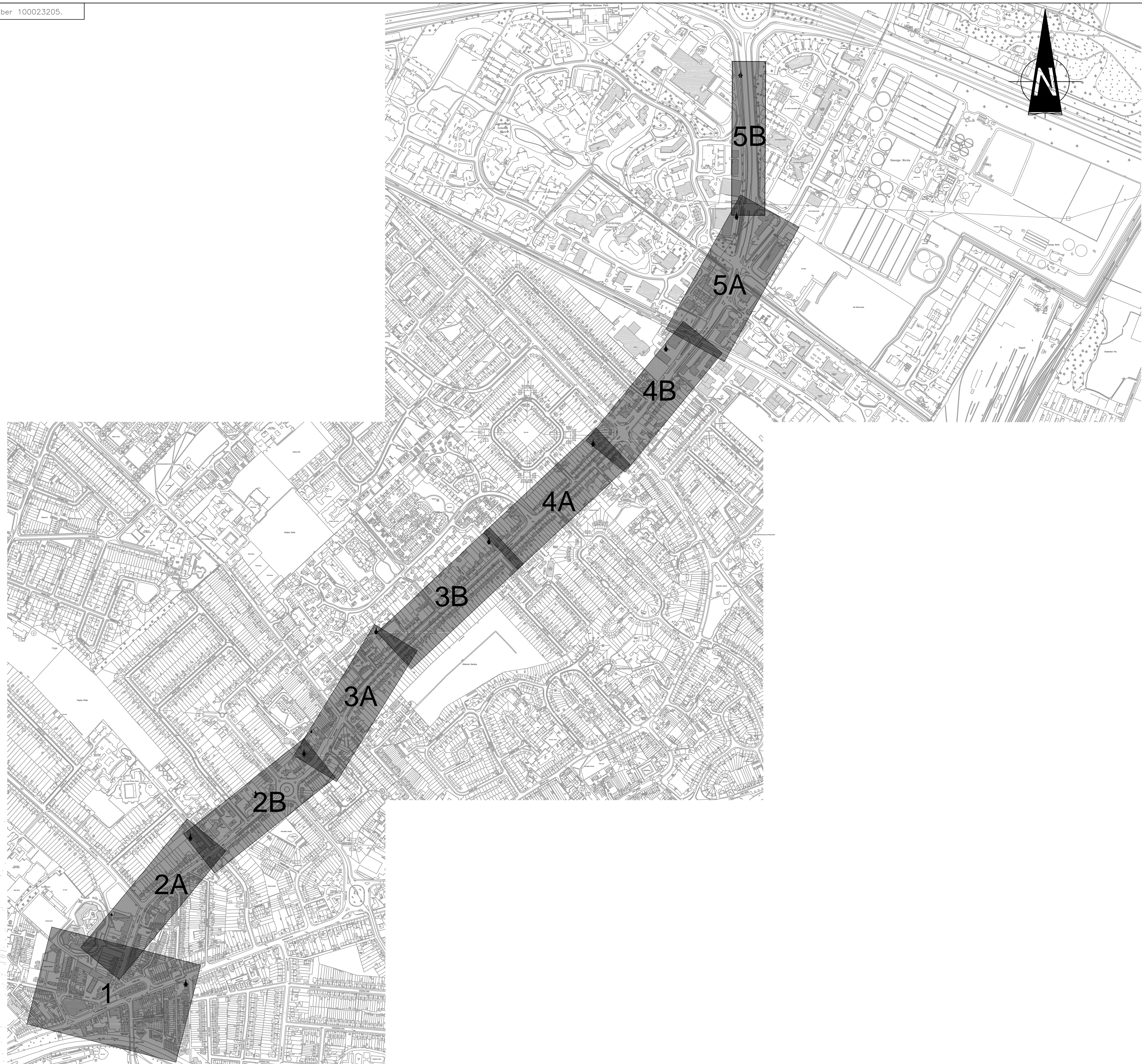


APPENDIX A-1

**'DO SOMETHING' OPTION**

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Site/Project: MILTON ROAD CORRIDOR IMPROVEMENT SCHEME

Title: DO-SOMETHING OPTION-OUTLINE DESIGN

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Designed: AKM	Approved: DP				
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**LEGEND:**

- RAISED CYCLEWAY
- BUS LANE
- FOOTWAY
- TREE TO BE REMOVED
- PUBLIC REALM / PLANTING
- EXISTING VERGE
- PLANTING OR PARKING
- EXISTING FOOTWAY
- ADVISORY CYCLE LANE
- RAISED ACCESS JUNCTION
- SHARED USE AREA AT BUS STOP/CROSSING
- PROPOSED TREE
- BUS STOP CAGE
- BUS SHELTER



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**Notes:**

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated

5. Refer to Stage 2 report for precedent examples:  
 a) Two-stage right-turn  
 b) Shared-use areas  
 c) Bus gate  
 d) Tiger crossing  
 e) On-demand cycle signal stage  
 f) Raised cycleway

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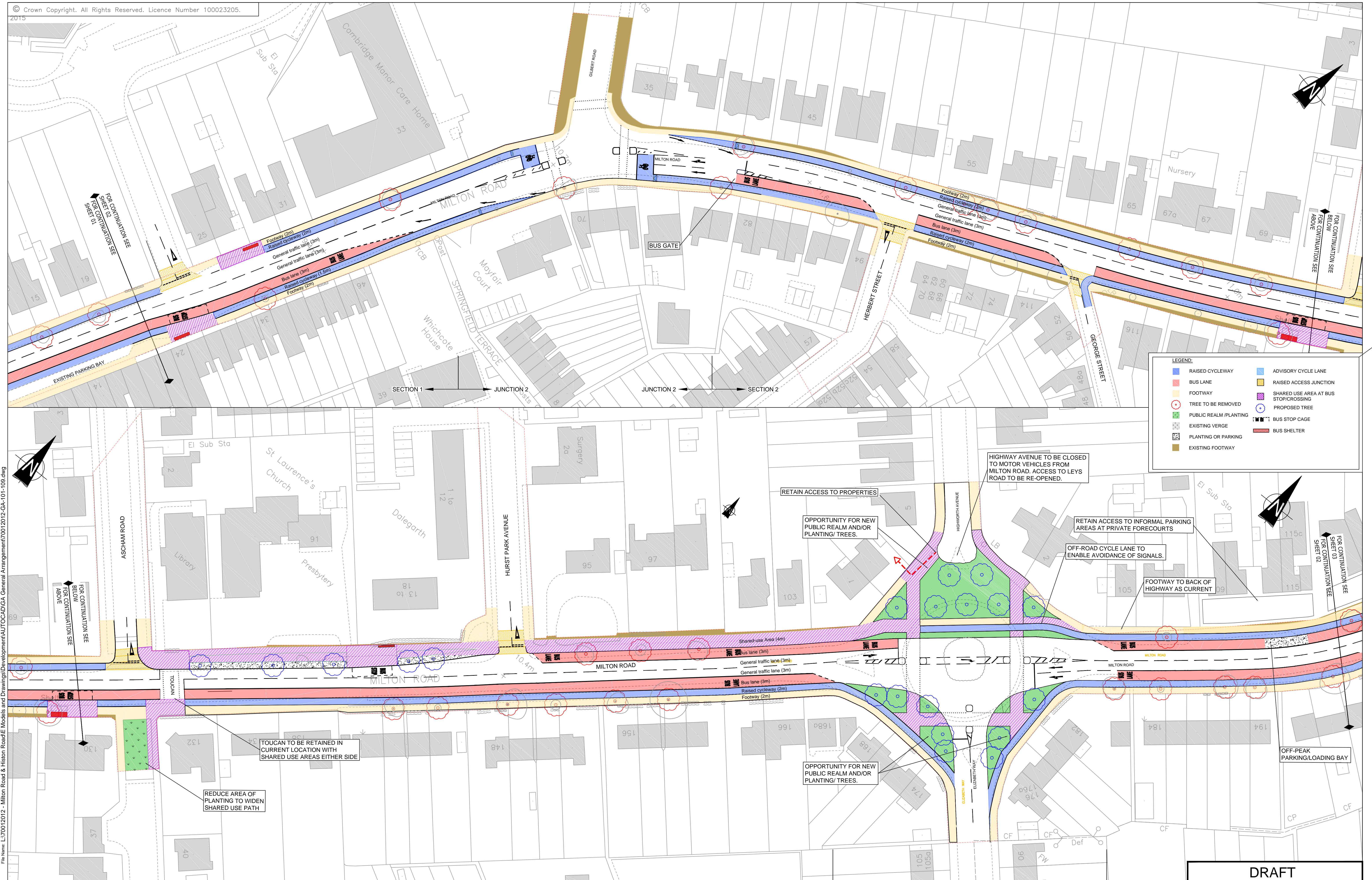
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LEGEND:	
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	BUS LANE
	FOOTWAY
	TREE TO BE REMOVED
	PUBLIC REALM /PLANTING
	EXISTING VERGE
	PLANTING OR PARKING
	EXISTING FOOTWAY
	ADVISORY CYCLE LANE
	RAISED ACCESS JUNCTION
	SHARED USE AREA AT BUS STOP/CROSSING
	PROPOSED TREE
	BUS STOP CAGE
	BUS SHELTER

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Notes:

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated
- Refer to Stage 2 report for precedent examples:
  - Two-stage right-turn
  - Shared-use areas
  - Bus gate
  - Tiger crossing
  - On-demand cycle signal stage
  - Raised cycleway

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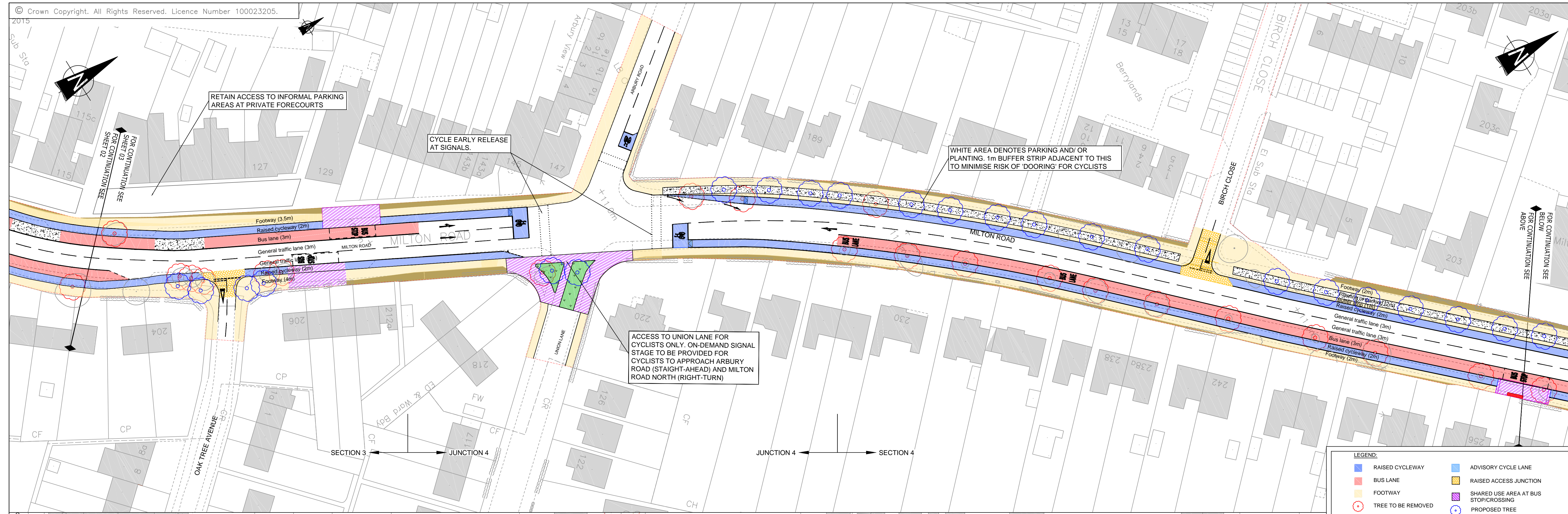
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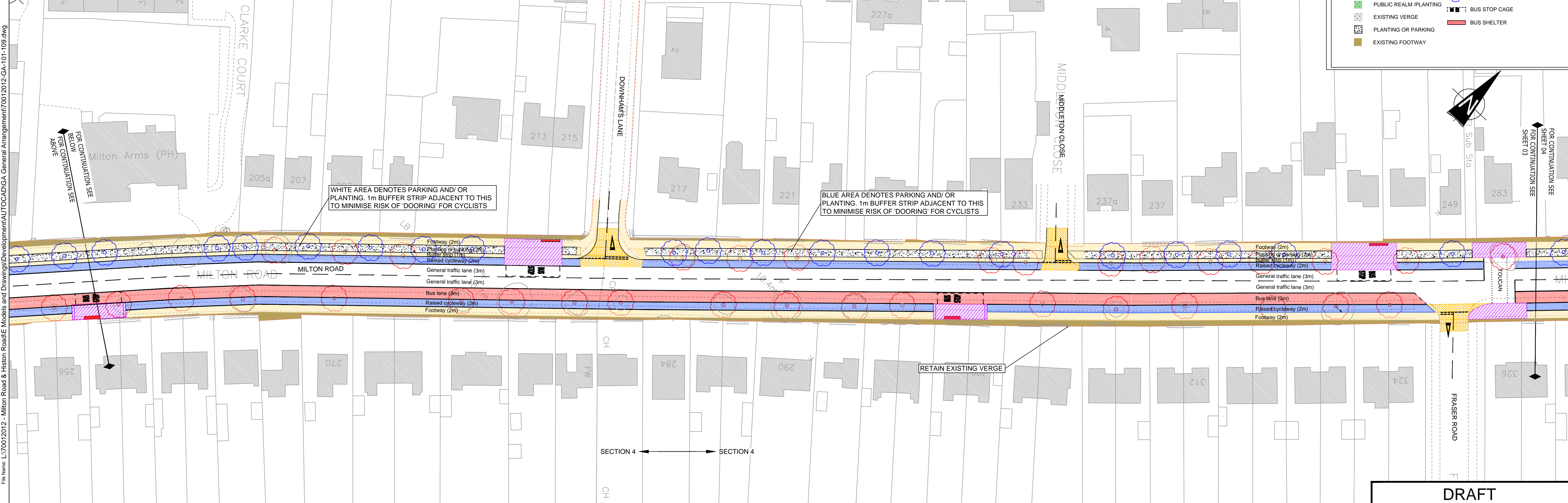
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**LEGEND:**

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	BUS LANE		RAISED ACCESS JUNCTION
	FOOTWAY		SHARED USE AREA AT BUS STOP/CROSSING
	TREE TO BE REMOVED		PROPOSED TREE
	PUBLIC REALM/PLANTING		BUS STOP CAGE
	EXISTING VERGE		BUS SHELTER
	PLANTING OR PARKING		EXISTING FOOTWAY



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- Notes:**
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
  - Widths as per standard section profile unless otherwise stated
5. Refer to Stage 2 report for precedent examples:  
 a) Two-stage right-turn  
 b) Shared-use areas  
 c) Bus gate  
 d) Tiger crossing  
 e) On-demand cycle signal stage  
 f) Raised cycleway

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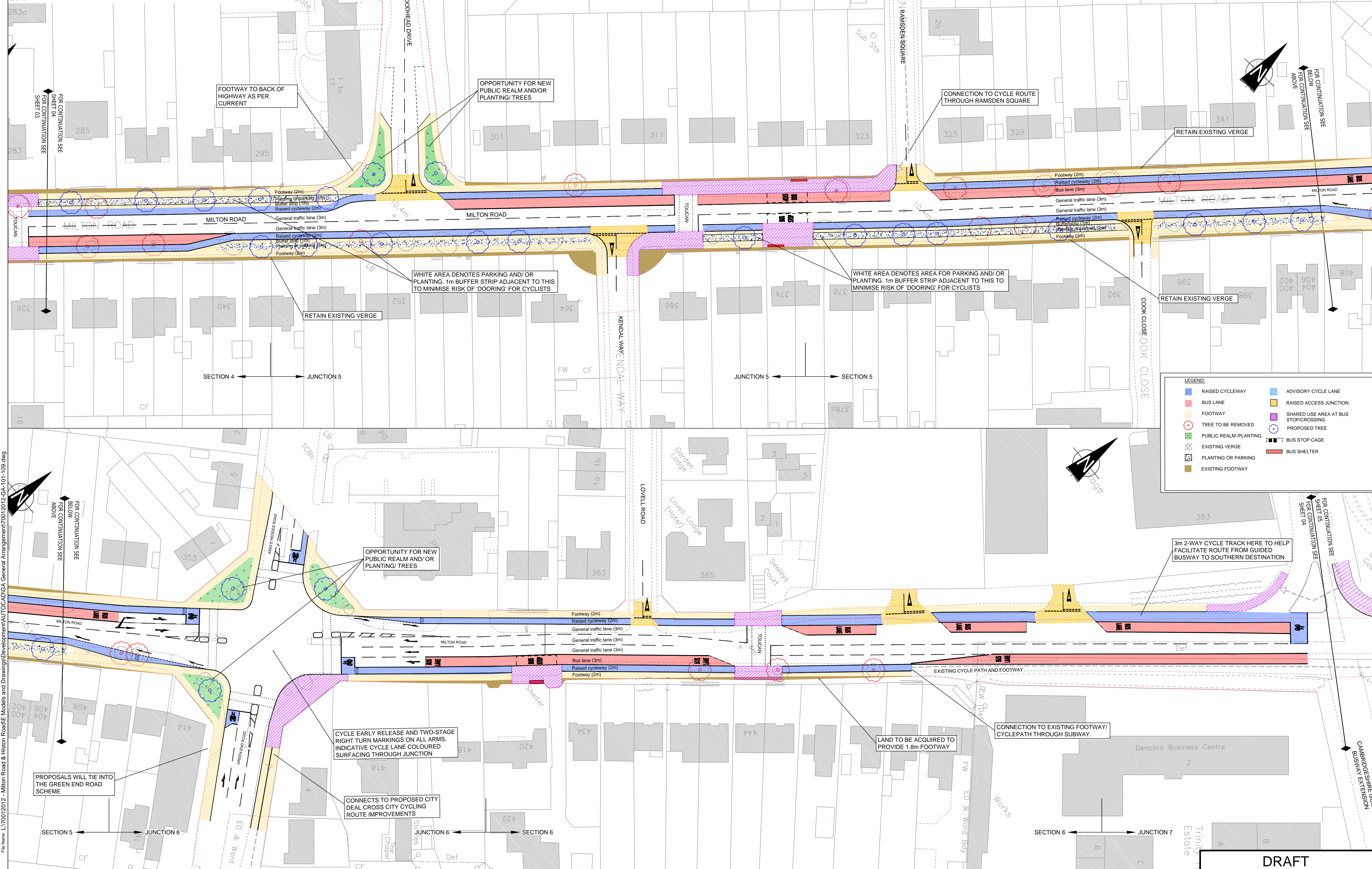
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**LEGEND:**

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	BUS LANE		RAISED ACCESS JUNCTION
	FOOTWAY		SHARED USE AREA AT BUS STOP/CROSSING
	TREE TO BE REMOVED		PROPOSED TREE
	PUBLIC REALM / PLANTING		BUS STOP CAGE
	EXISTING VERGE		BUS SHELTER
	PLANTING OR PARKING		
	EXISTING FOOTWAY		

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- Notes:**
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
  - Widths as per standard section profile unless otherwise stated
  - Refer to Stage 2 report for precedent examples:
    - Two-stage right-turn
    - Shared-use areas
    - Bus gate
    - Tiger crossing
    - On-demand cycle signal stage
    - Raised cycleway

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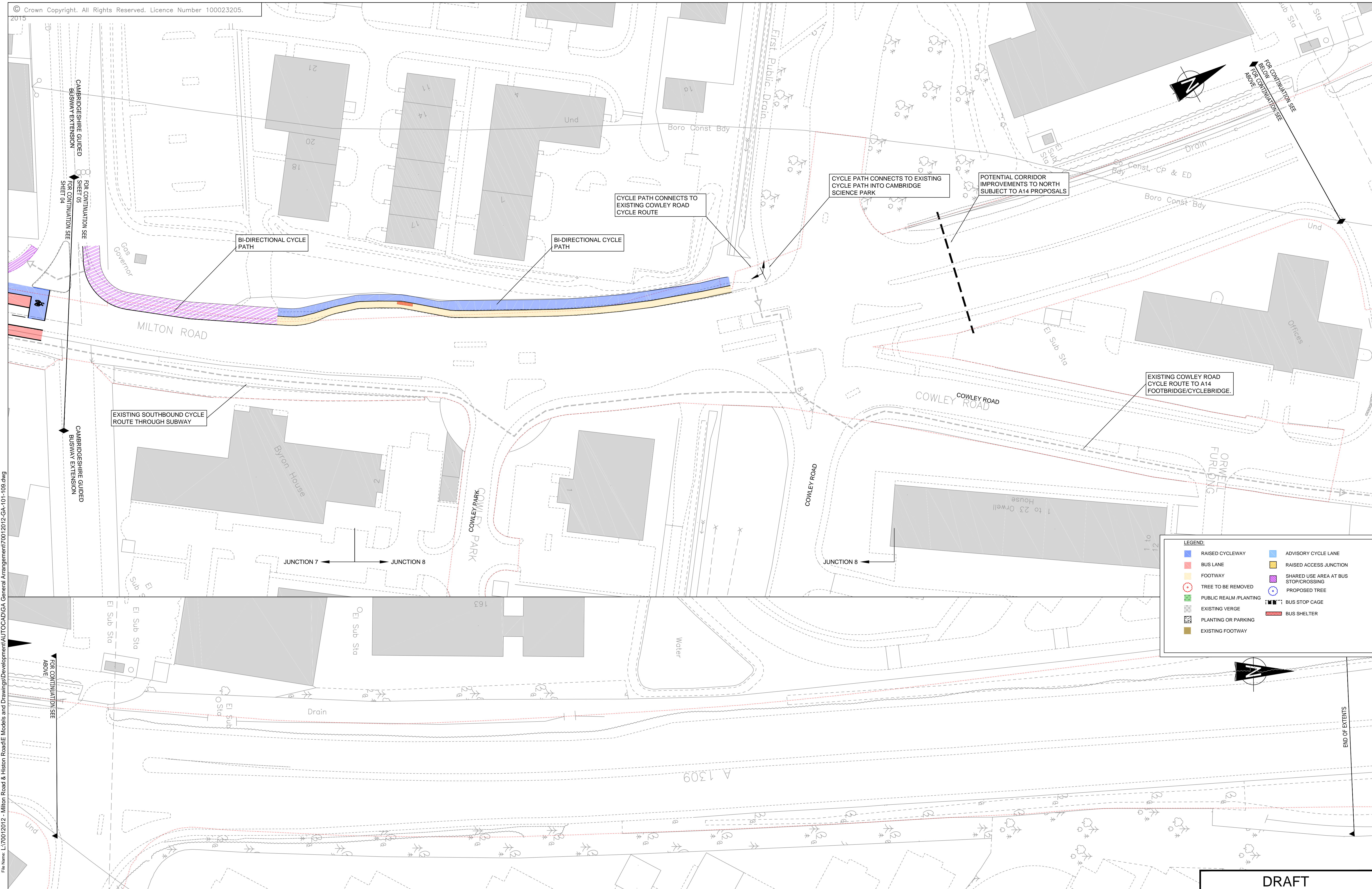
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LEGEND:	
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	BUS LANE
	FOOTWAY
	TREE TO BE REMOVED
	PUBLIC REALM / PLANTING
	EXISTING VERGE
	PLANTING OR PARKING
	EXISTING FOOTWAY
	ADVISORY CYCLE LANE
	RAISED ACCESS JUNCTION
	SHARED USE AREA AT BUS STOP/CROSSING
	PROPOSED TREE
	BUS STOP CAGE
	BUS SHELTER

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Notes:

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated
- Refer to Stage 2 report for precedent examples:
  - Two-stage right-turn
  - Shared-use areas
  - Bus gate
  - Tiger crossing
  - On-demand cycle signal stage
  - Raised cycleway

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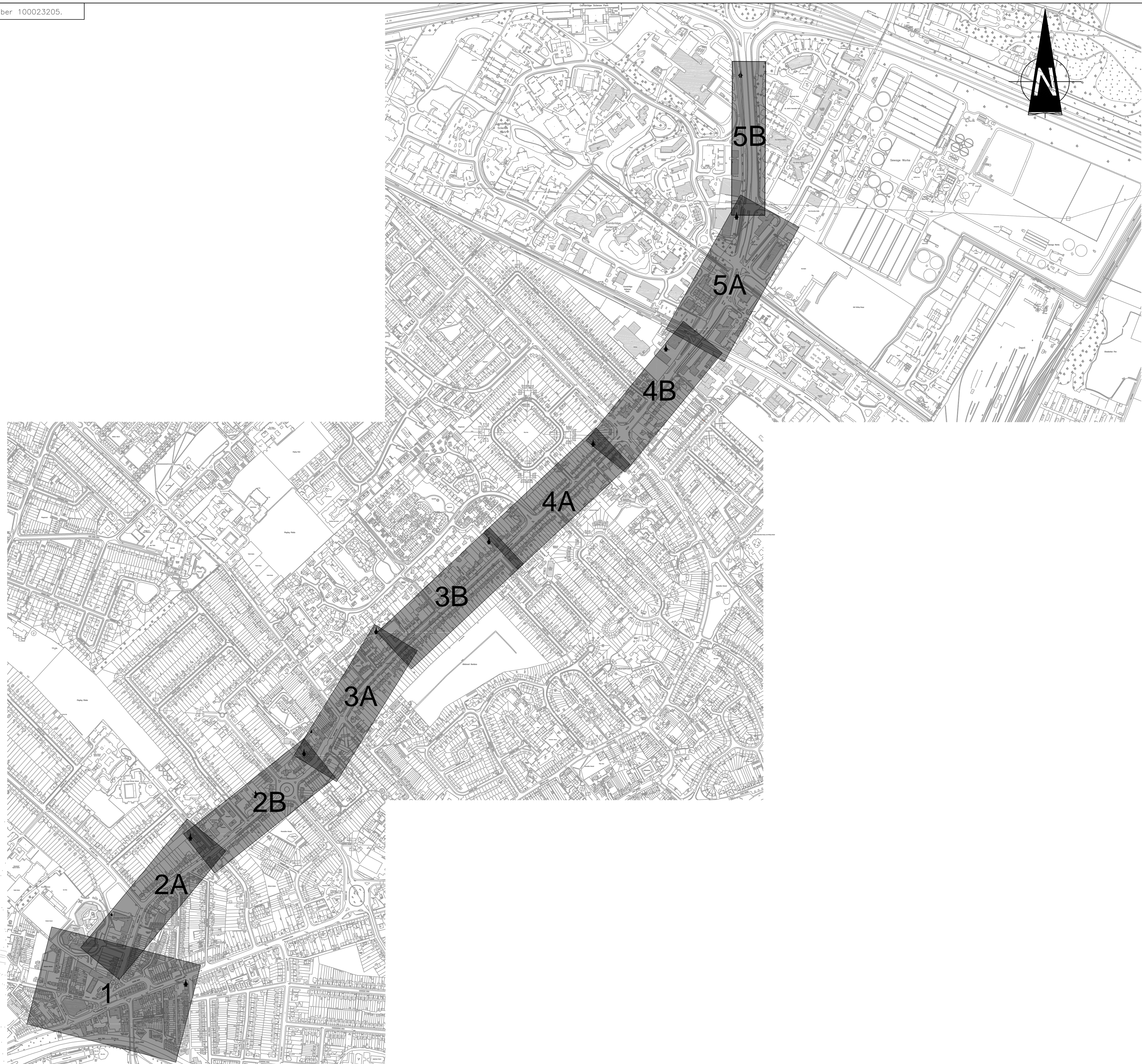
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APPENDIX A-2

**'TIDAL FLOW OPTION A' (CENTRAL RUNNING)**





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Project Number: 70012012-GA-101		Drawing Number: 70012012-GA-201		Revision: A	
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**LEGEND:**

- RAISED CYCLEWAY
- BUS LANE
- FOOTWAY
- TREE TO BE REMOVED
- PUBLIC REALM /PLANTING
- EXISTING VERGE
- PLANTING OR PARKING
- EXISTING FOOTWAY
- ADVISORY CYCLE LANE
- RAISED ACCESS JUNCTION
- SHARED USE AREA AT BUS STOP/CROSSING
- PROPOSED TREE
- BUS STOP CAGE
- BUS SHELTER



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**Notes:**

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated

5. Refer to Stage 2 report for precedent examples:  
 a) Two-stage right-turn  
 b) Shared-use areas  
 c) Bus gate  
 d) Tiger crossing  
 e) On-demand cycle signal stage  
 f) Raised cycleway

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Client: **MILTON ROAD CORRIDOR IMPROVEMENT SCHEME**

Title: **TIDAL BUS LANE OPTION OUTLINE DESIGN**

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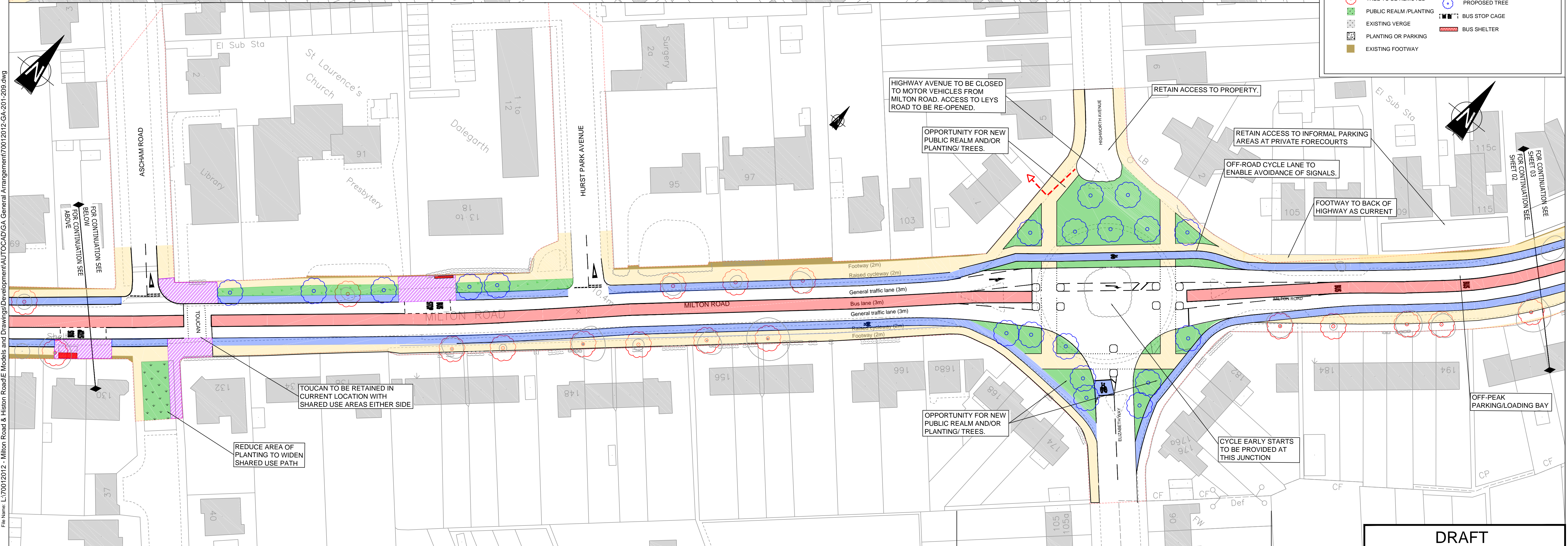
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Project Number: 70012012-GA-102	Sheet: 1 OF 5
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LEGEND:	
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<span style="color: red;">■</span>	BUS LANE
<span style="color: yellow;">■</span>	FOOTWAY
<span style="color: orange;">■</span>	RAISED ACCESS JUNCTION
<span style="color: green;">■</span>	PUBLIC REALM / PLANTING
<span style="color: grey;">■</span>	EXISTING VERGE
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<span style="color: brown;">■</span>	EXISTING FOOTWAY
<span style="color: blue;">■</span>	ADVISORY CYCLE LANE
<span style="color: yellow;">■</span>	SHARED USE AREA AT BUS STOP/CROSSING
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<span style="color: blue;">○</span>	PROPOSED TREE
<span style="color: red;">○</span>	BUS STOP CAGE
<span style="color: red;">■</span>	BUS SHELTER



Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

Notes:

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated
- Refer to Stage 2 report for precedent examples:
  - Two-stage right-turn
  - Shared-use areas
  - Bus gate
  - Tiger crossing
  - On-demand cycle signal stage
  - Raised cycleway

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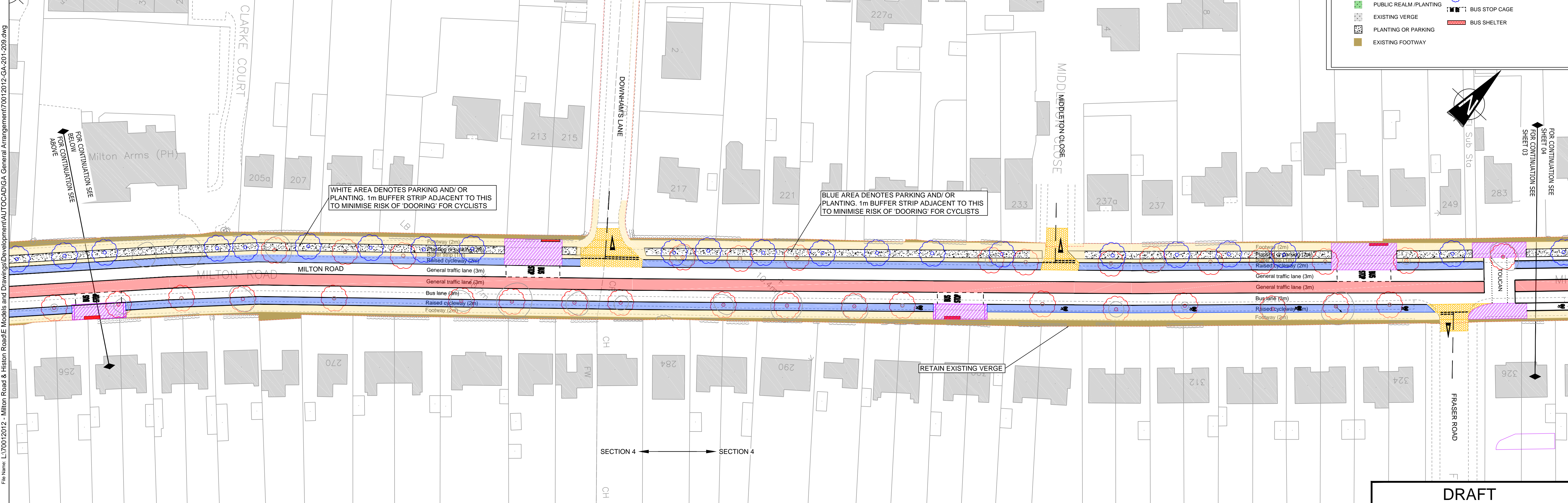
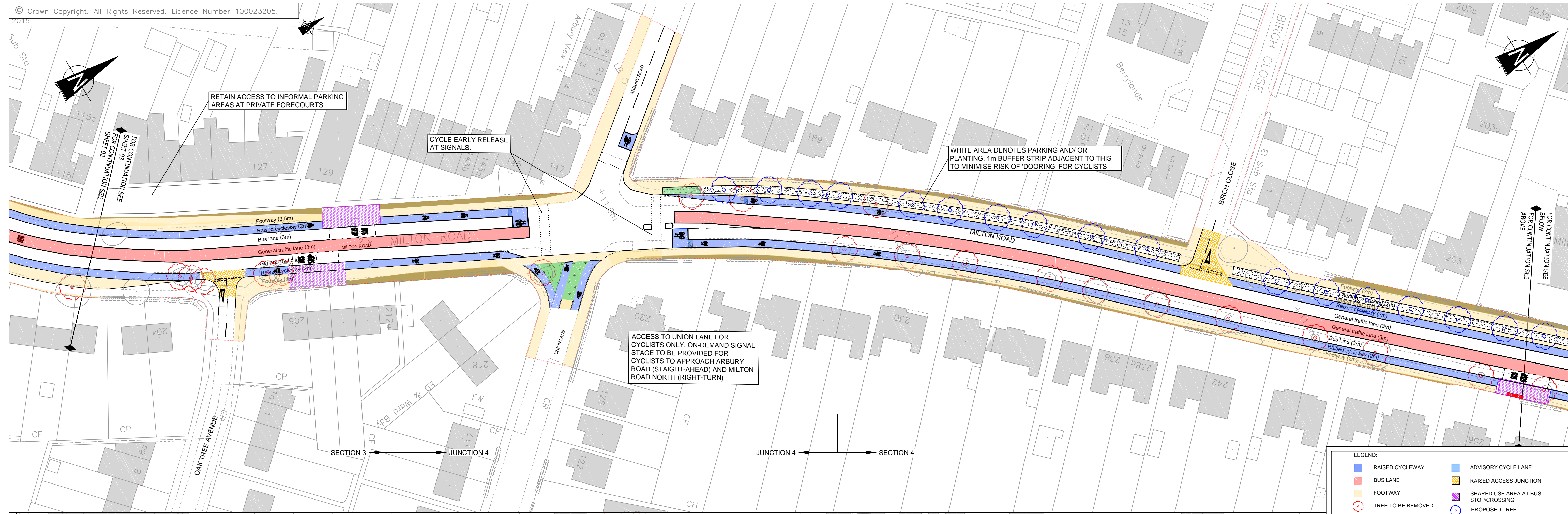
**Cambridgeshire County Council**

**MILTON ROAD CORRIDOR IMPROVEMENT SCHEME**

**TIDAL BUS LANE OPTION OUTLINE DESIGN**

<b>DRAFT</b>	
Drawn: GW	Checked: DP
Designed: AKM	Approved: DP
Date: 20/04/2016	Scale: 1:500 @ A1
Project Number: 70012012-GA-103	Sheet: 2 OF 5
70012012-GA-103	70012012-GA-203
	A
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Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

Notes:

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated

5. Refer to Stage 2 report for precedent examples:

- Two-stage right-turn
- Shared-use areas
- Bus gate
- Tiger crossing
- On-demand cycle signal stage
- Raised cycleway

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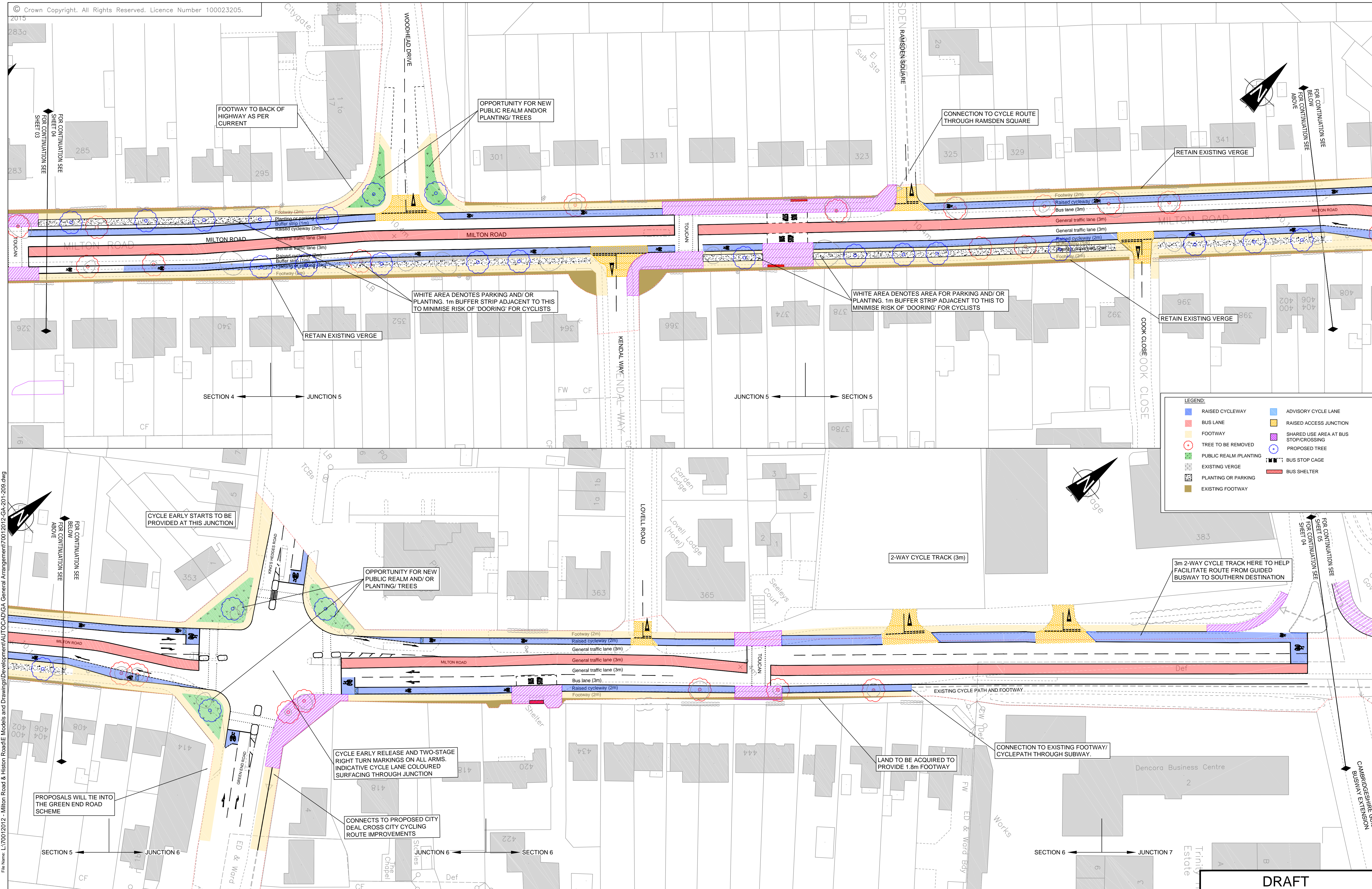
Client:  
Site/Project:  
**MILTON ROAD  
CORRIDOR  
IMPROVEMENT SCHEME**

Title:  
**TIDAL BUS LANE  
OPTION  
OUTLINE DESIGN**

<b>DRAFT</b>			
Drawn: GW	Checked: DP		
Designed: AKM	Approved: DP		
Date: 20/04/2016	Scale: 1:500 @ A1	Sheet: 3 OF 5	Revision:
Project Number: 70012012-GA-104	Drawing Number: 70012012-GA-204	Revision: A	
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Log: Westgarth, George  
Plot Date: 17/05/2016 12:03:00





Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

- Notes:
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
  - Widths as per standard section profile unless otherwise stated
  - Refer to Stage 2 report for precedent examples:
    - Two-stage right-turn
    - Shared-use areas
    - Bus gate
    - Tiger crossing
    - On-demand cycle signal stage
    - Raised cycleway

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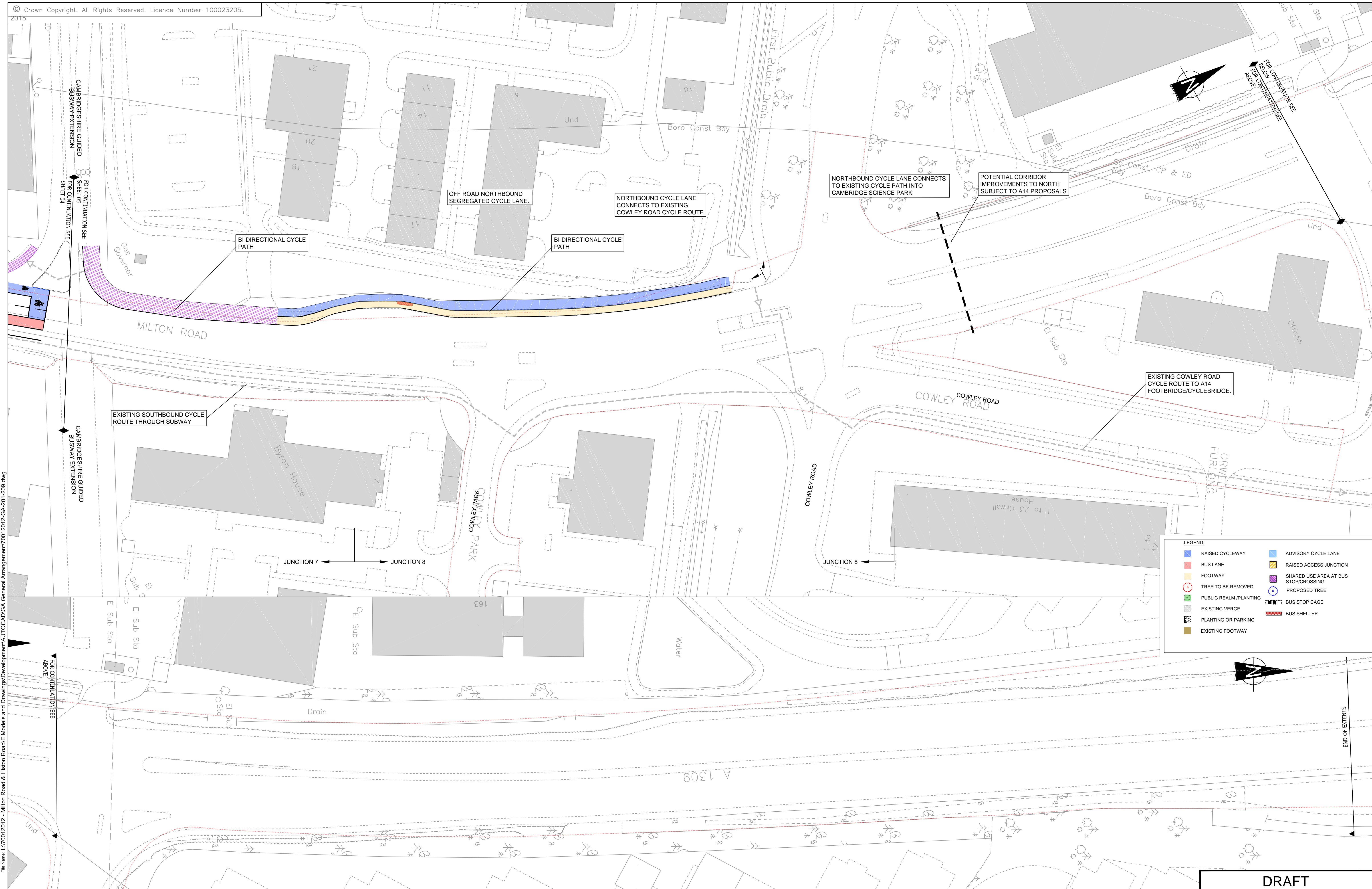
Title: TIDAL BUS LANE OPTION OUTLINE DESIGN

DRAFT

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Designed: AKM	Approved: DP
Date: 20/04/2016	Scale: 1:500 @ A1
Project Number: 70012012-GA-105	Sheet: 4 OF 5
70012012-GA-105	70012012-GA-205
	A

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 Log: Westgarth, George  
 Plot Date: 17/05/2016 12:03:33

Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

**Notes:**

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated
- Refer to Stage 2 report for precedent examples:
  - Two-stage right-turn
  - Shared-use areas
  - Bus gate
  - Tiger crossing
  - On-demand cycle signal stage
  - Raised cycleway

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Client:

Site/Project:  
**MILTON ROAD  
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Title:  
**TIDAL BUS LANE  
 OPTION  
 OUTLINE DESIGN**

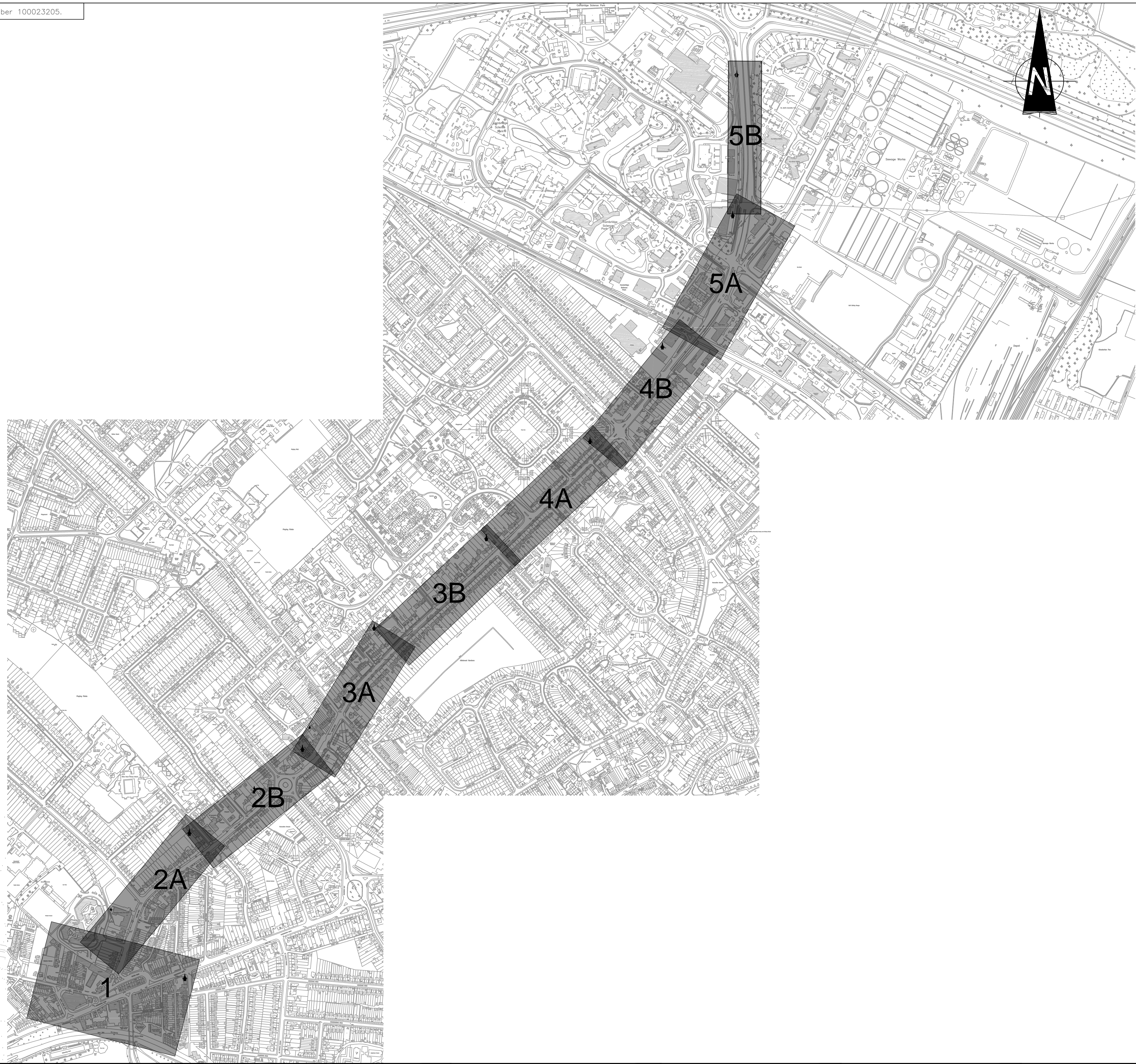
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Date: 20/04/2016	Scale: 1:500 @ A1	Sheet: 5 OF 5
Project Number: 70012012-GA-106	Drawing Number: 70012012-GA-206	Revision: A
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APPENDIX A-3

**'TIDAL FLOW OPTION B' (KERBSIDE RUNNING)**



File Name: L:\70012012 - Milton Road & Histon Road\E Models and Drawings\Development\AUTOCAD\GA.General Arrangement\70012012-GA-301-308.dwg



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A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

Notes:




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Site/Project: MILTON ROAD  
CORRIDOR  
IMPROVEMENT SCHEME

Title: ALTERNATING KERBSIDE  
PEAK PERIOD BUS LANE  
OPTION

DRAFT			
Drawn: GW	Checked: DP		Approved: DP
Designed: AKM	Date: 20/04/2016	Scale: NTS	Sheet: Overview
Project Number: 70012012	Drawing Number: 70012012-GA-301	Revision: A	
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**LEGEND:**

- RAISED CYCLEWAY
- BUS LANE
- FOOTWAY
- TREE TO BE REMOVED
- PUBLIC REALM / PLANTING
- EXISTING VERGE
- PLANTING OR PARKING
- EXISTING FOOTWAY
- ADVISORY CYCLE LANE
- RAISED ACCESS JUNCTION
- SHARED USE AREA AT BUS STOP/CROSSING
- PROPOSED TREE
- BUS STOP CAGE
- BUS SHELTER



File Name: L:\70012012 - Milton Road & Histon Road Models and Drawings\Development\AUTOCAD\GA General Arrangement\70012012-GA-301-308.dwg  
Log: Westgarth, George  
Plot Date: 19/05/2016 15:34:28

Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

**Notes:**

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated

**5. Refer to Stage 2 report for precedent examples:**

- Two-stage right-turn
- Shared-use areas
- Bus gate
- Tiger crossing
- On-demand cycle signal stage
- Raised cycleway

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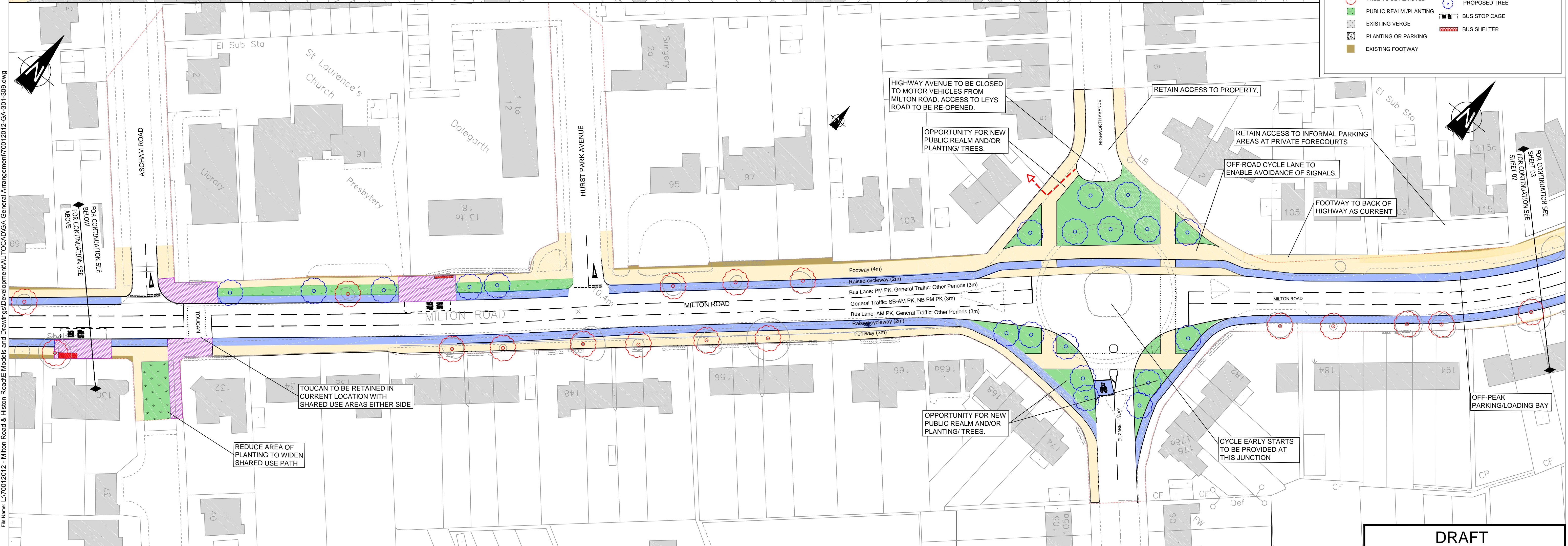
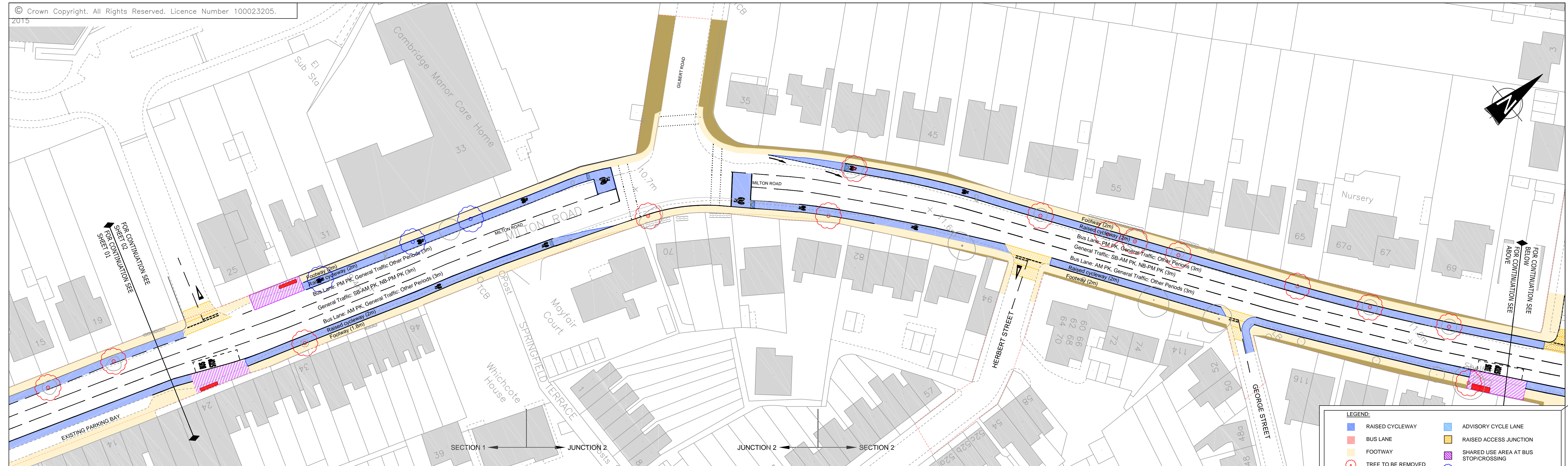
**Cambridgeshire County Council**

Client: **MILTON ROAD CORRIDOR IMPROVEMENT SCHEME**

Title: **ALTERNATING KERBSIDE PEAK PERIOD BUS LANE OPTION**

<b>DRAFT</b>			
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Designed: AKM	Approved: DP		
Date: 20/04/2016	Scale: 1:500 @ A1	Sheet: 1 OF 8	Revision:
Project Number: 70012012	Drawing Number: 70012012-GA-302	A	
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Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

- Notes:
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
  - Widths as per standard section profile unless otherwise stated
  - Refer to Stage 2 report for precedent examples:
    - Two-stage right-turn
    - Shared-use areas
    - Bus gate
    - Tiger crossing
    - On-demand cycle signal stage
    - Raised cycleway

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Fax: 44-(0)20-7337-1701

Client: Cambridgeshire County Council

Site/Project: MILTON ROAD CORRIDOR IMPROVEMENT SCHEME

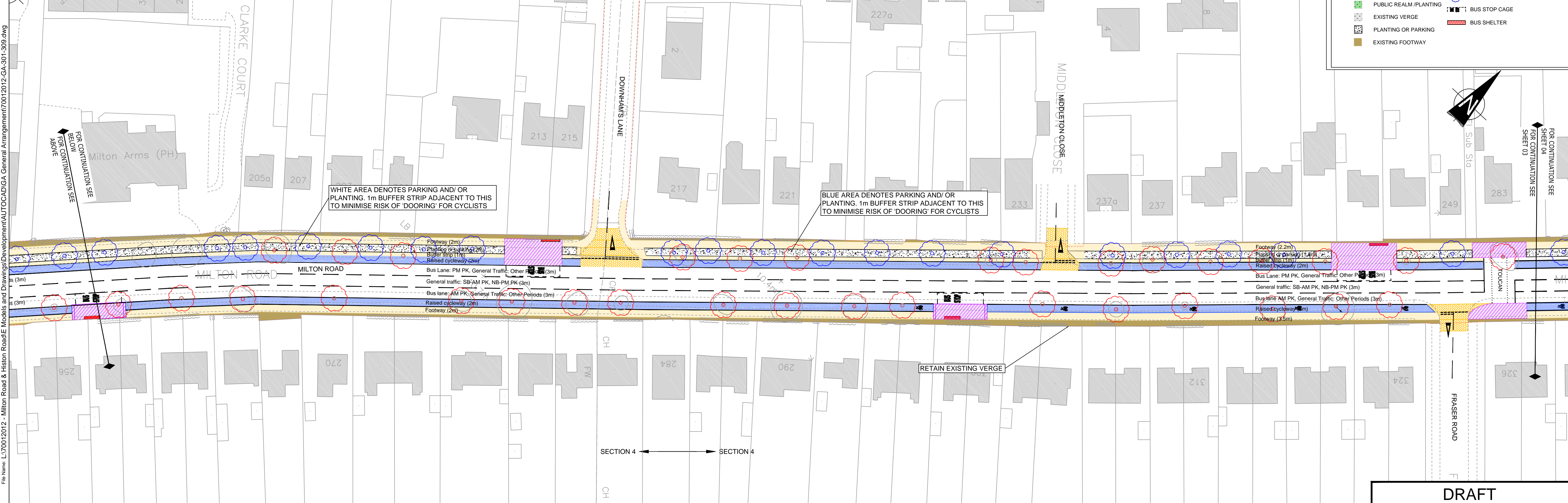
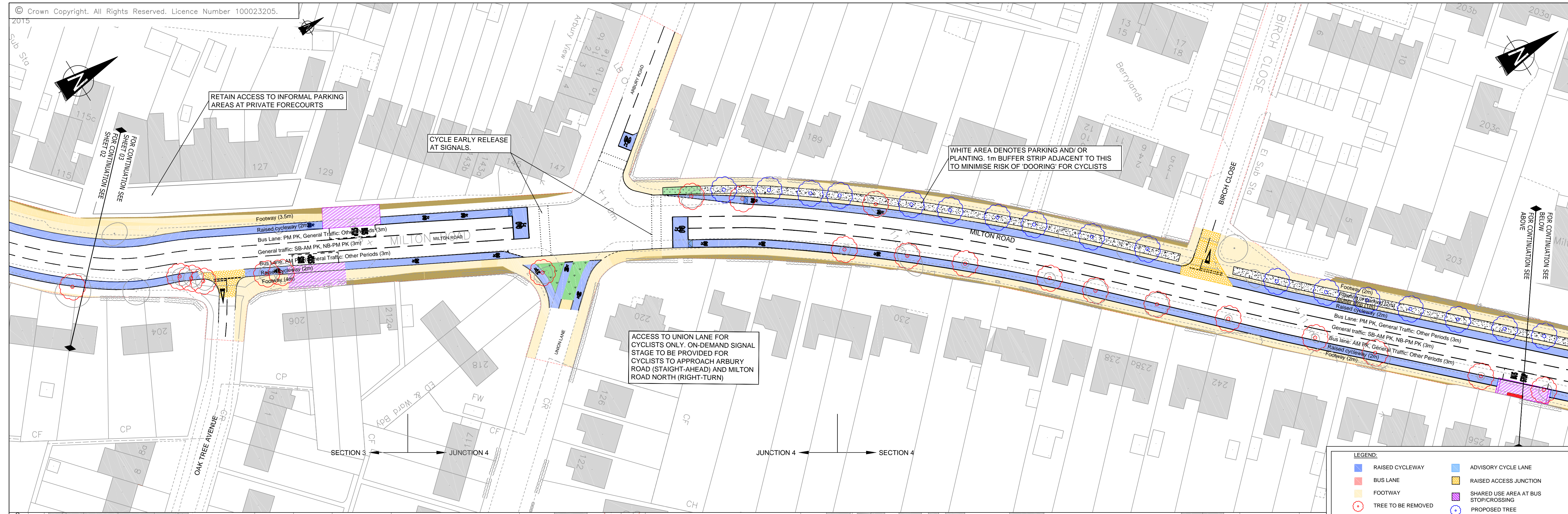
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Designed: AKM	Approved: DP
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Project Number: 70012012	Sheet: 2 OF 8
70012012	70012012-GA-303
	Revision: A

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Log: Westgarth, George  
Plot Date: 19/05/2016 15:34:40





Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

- Notes:
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
  - Widths as per standard section profile unless otherwise stated
5. Refer to Stage 2 report for precedent examples:
- Two-stage right-turn
  - Shared-use areas
  - Bus gate
  - Tiger crossing
  - On-demand cycle signal stage
  - Raised cycleway

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Client: **MILTON ROAD CORRIDOR IMPROVEMENT SCHEME**

Title: **ALTERNATING KERBSIDE PEAK PERIOD BUS LANE OPTION**

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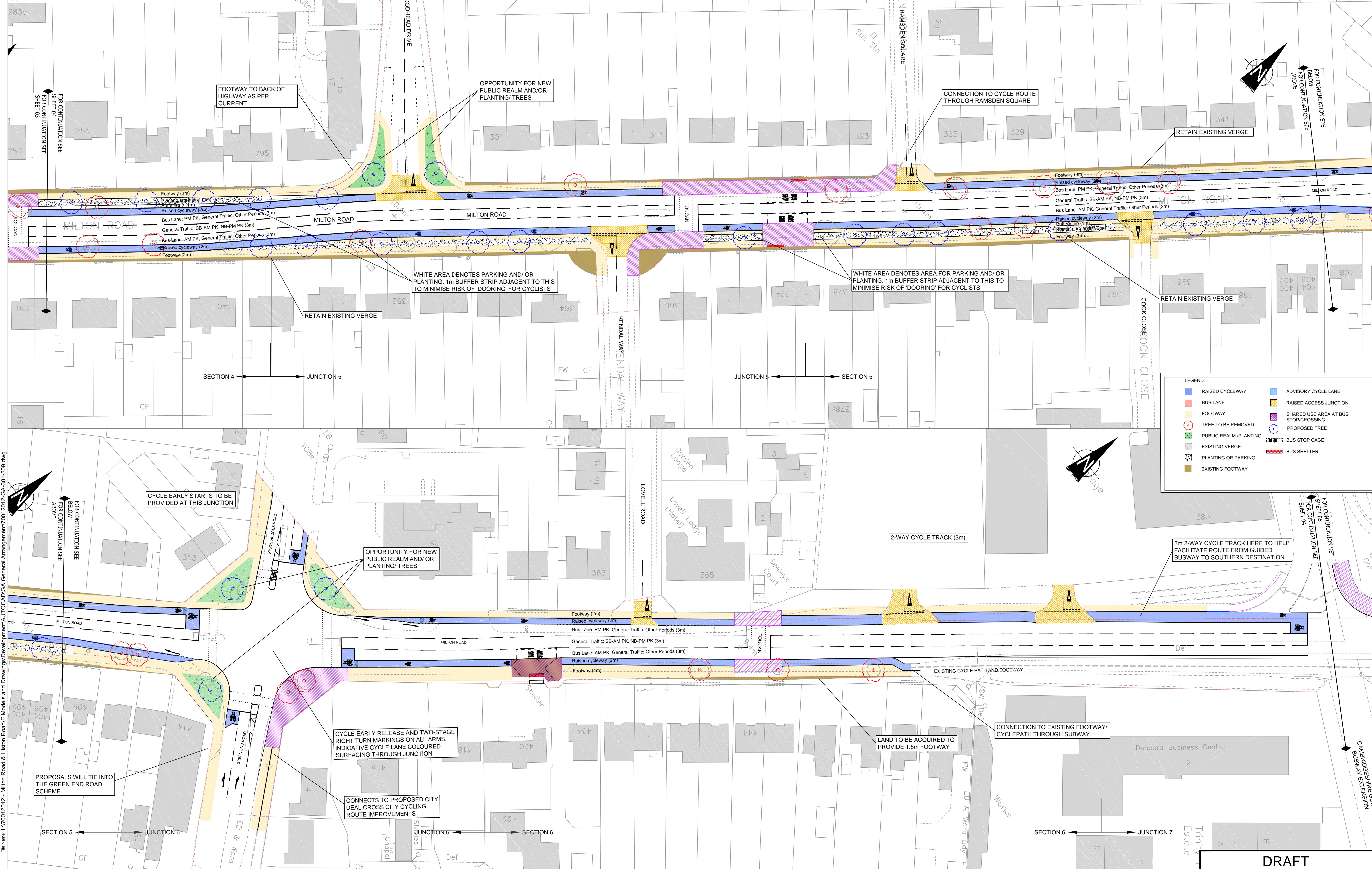
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Project Number: 70012012	Sheet: 3 OF 8
70012012	70012012-GA-304
	A

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Log: Westgarth, George  
Plot Date: 19/05/2016 15:34:52





**LEGEND:**

	RAISED CYCLEWAY		ADVISORY CYCLE LANE
	BUS LANE		RAISED ACCESS JUNCTION
	FOOTWAY		SHARED USE AREA AT BUS STOP/CROSSING
	TREE TO BE REMOVED		PROPOSED TREE
	PUBLIC REALM / PLANTING		BUS STOP CAGE
	EXISTING VERGE		BUS SHELTER
	PLANTING OR PARKING		
	EXISTING FOOTWAY		

File Name: L:\70012012 - Milton Road & Histon Road & Drawing Development\AUTOCAD\GA General Arrangement\70012012-GA-301-308.dwg  
 Log: Westgarth, George  
 Plot Date: 19/05/2016 15:35:05

Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

Notes:

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated
- Refer to Stage 2 report for precedent examples:
  - Two-stage right-turn
  - Shared-use areas
  - Bus gate
  - Tiger crossing
  - On-demand cycle signal stage
  - Raised cycleway

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Client: **MILTON ROAD CORRIDOR IMPROVEMENT SCHEME**

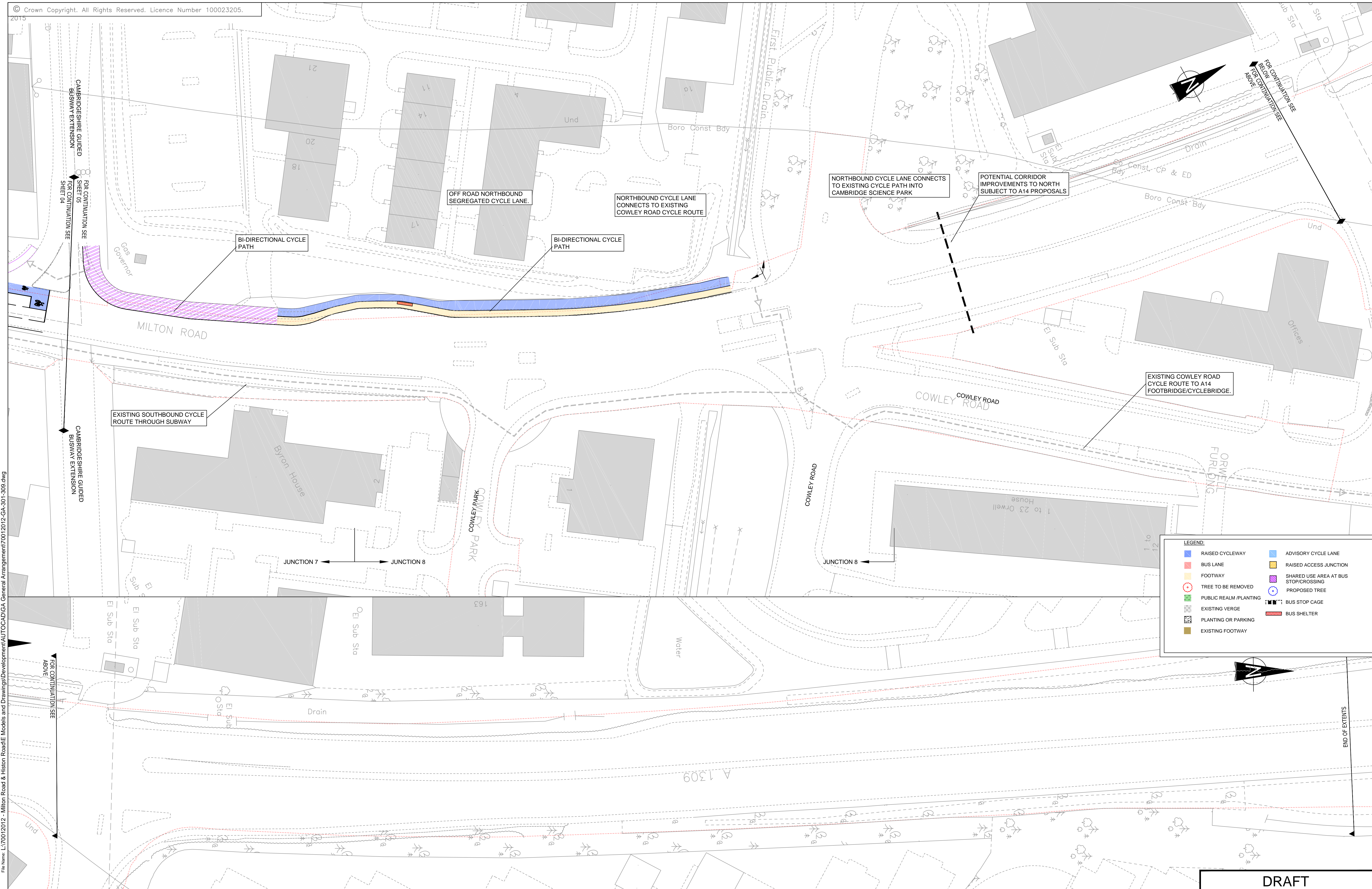
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Designed: AKM	Approved: DP
Date: 20/04/2016	Scale: 1:500 @ A1
Project Number: 70012012	Sheet: 4 OF 8
Drawing Number: 70012012-GA-305	Revision: A

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**LEGEND:**

	RAISED CYCLEWAY		ADVISORY CYCLE LANE
	BUS LANE		RAISED ACCESS JUNCTION
	FOOTWAY		SHARED USE AREA AT BUS STOP/CROSSING
	TREE TO BE REMOVED		PROPOSED TREE
	PUBLIC REALM / PLANTING		BUS STOP CAGE
	EXISTING VERGE		BUS SHELTER
	PLANTING OR PARKING		
	EXISTING FOOTWAY		

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 Plot Date: 19/05/2016 15:35:16

Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

**Notes:**

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated
- Refer to Stage 2 report for precedent examples:
  - Two-stage right-turn
  - Shared-use areas
  - Bus gate
  - Tiger crossing
  - On-demand cycle signal stage
  - Raised cycleway

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Fax: 44-(0)20-7337-1701

Client:

Site/Project:

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CORRIDOR  
IMPROVEMENT SCHEME**

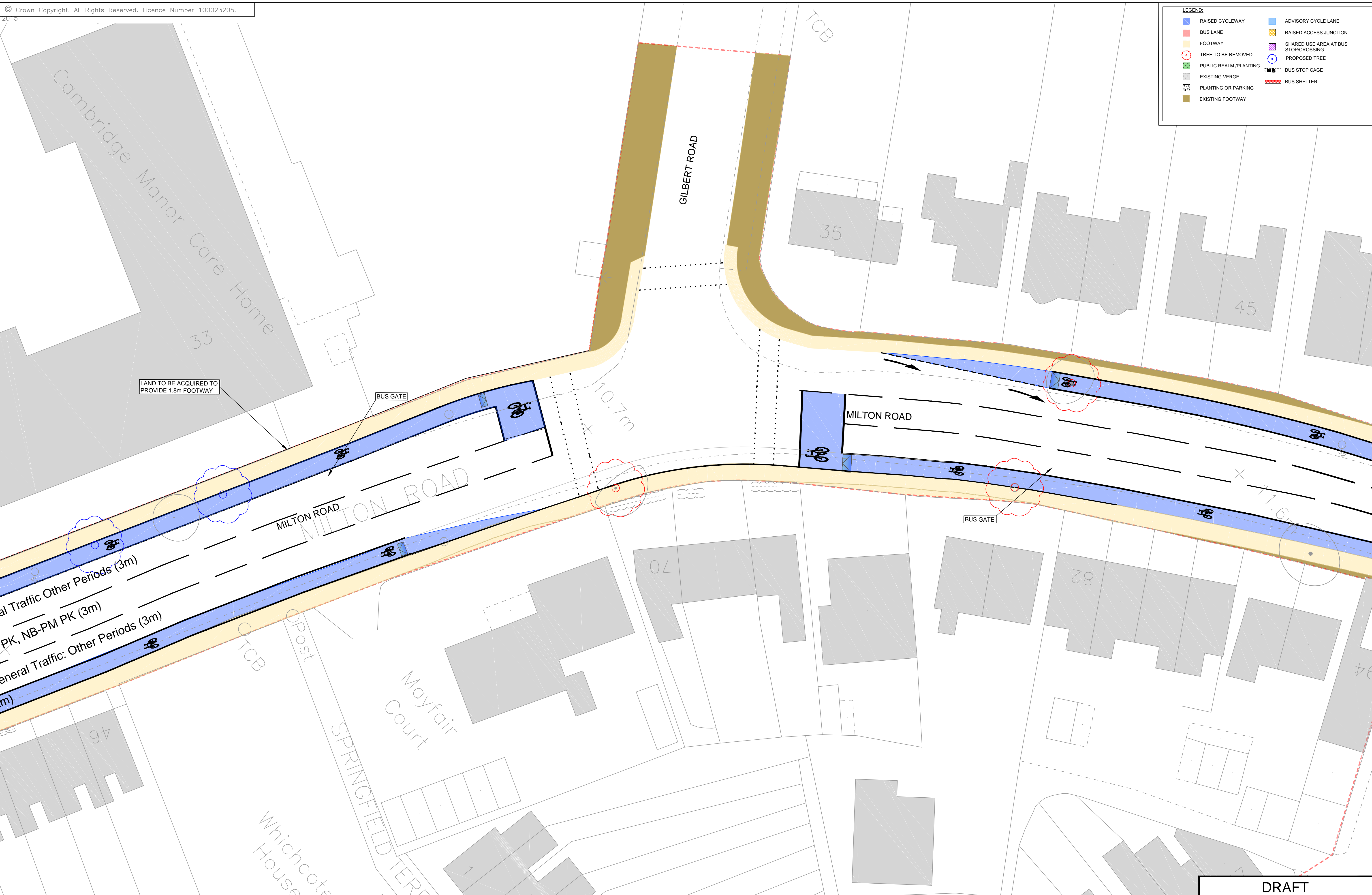
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PEAK PERIOD BUS LANE  
OPTION**

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Designed: AKM	Approved: DP		
Date: 20/04/2016	Scale: 1:500 @ A1	Sheet: 5 OF 8	Revision:
Project Number: 70012012	Drawing Number: 70012012-GA-306	Revision: A	
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LEGEND:			
	RAISED CYCLEWAY		ADVISORY CYCLE LANE
	BUS LANE		RAISED ACCESS JUNCTION
	FOOTWAY		SHARED USE AREA AT BUS STOP/CROSSING
	TREE TO BE REMOVED		PROPOSED TREE
	PUBLIC REALM /PLANTING		BUS STOP CAGE
	EXISTING VERGE		BUS SHELTER
	PLANTING OR PARKING		
	EXISTING FOOTWAY		



LAND TO BE ACQUIRED TO PROVIDE 1.8m FOOTWAY

BUS GATE

MILTON ROAD

BUS GATE

General Traffic Other Periods (3m)  
 PK, NB-PM PK (3m)  
 General Traffic: Other Periods (3m)

Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

- Notes:
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
  - Widths as per standard section profile unless otherwise stated
  - Refer to Stage 2 report for precedent examples:
    - a) Two-stage right-turn
    - b) Shared-use areas
    - c) Bus gate
    - d) Tiger crossing
    - e) On-demand cycle signal stage
    - f) Raised cycleway

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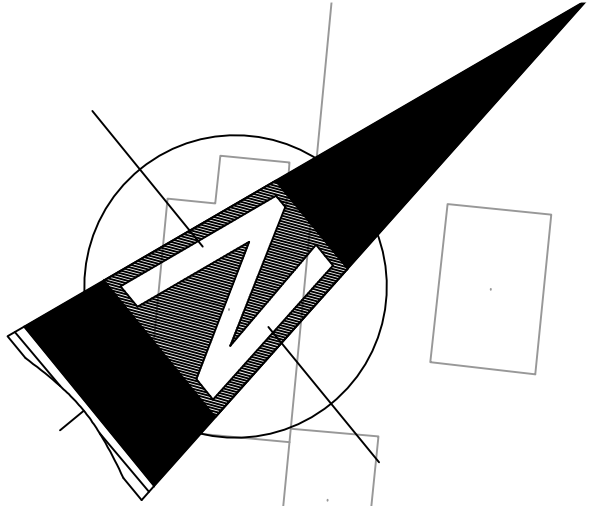
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 CORRIDOR  
 IMPROVEMENT SCHEME**

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 PEAK PERIOD BUS LANE  
 OPTION**

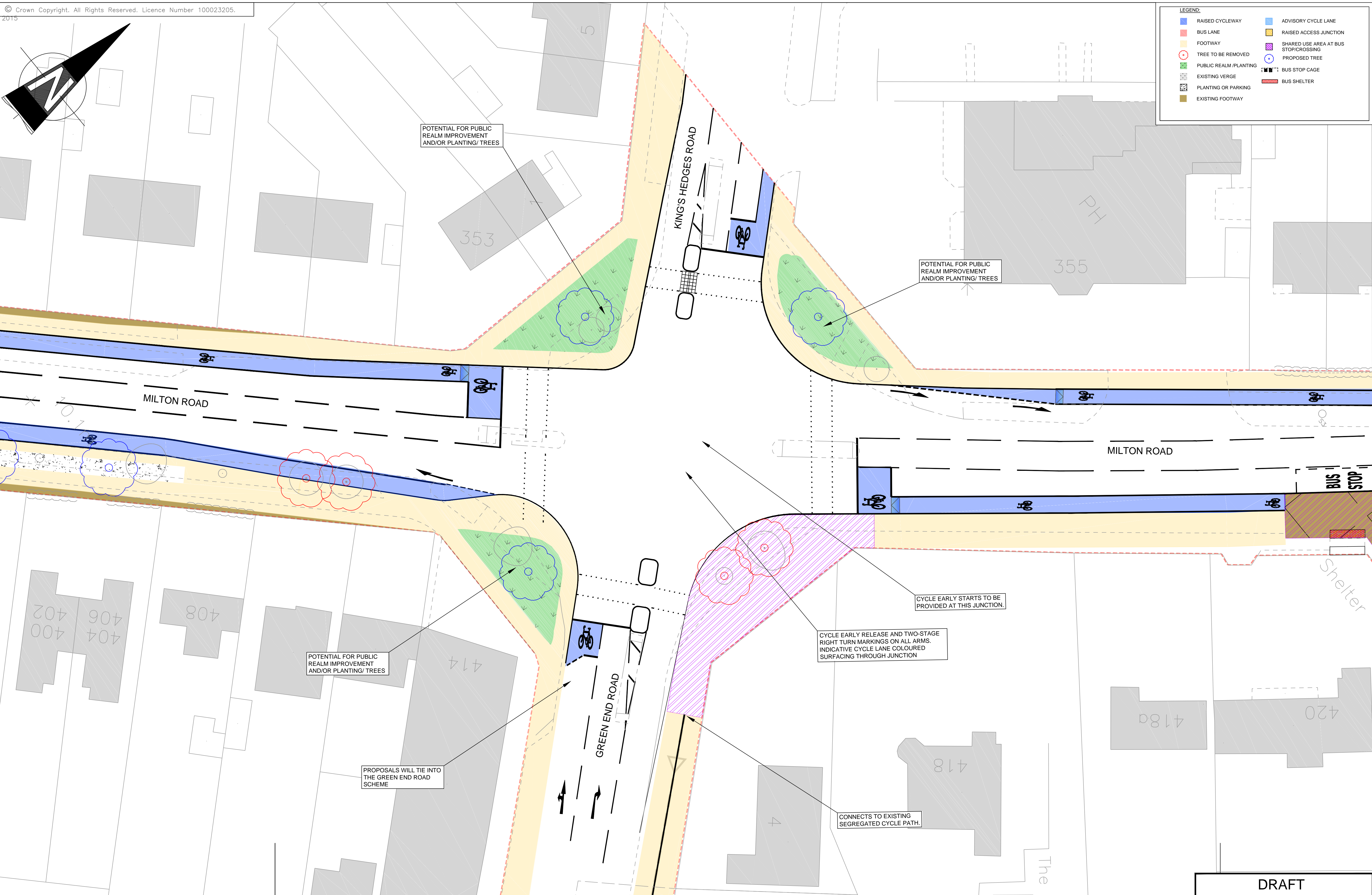
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 Log: Westgarth, George  
 Plot Date: 19/05/2016 15:35:24





LEGEND:	
	RAISED CYCLEWAY
	BUS LANE
	FOOTWAY
	TREE TO BE REMOVED
	PUBLIC REALM /PLANTING
	EXISTING VERGE
	PLANTING OR PARKING
	EXISTING FOOTWAY
	ADVISORY CYCLE LANE
	RAISED ACCESS JUNCTION
	SHARED USE AREA AT BUS STOP/CROSSING
	PROPOSED TREE
	BUS STOP CAGE
	BUS SHELTER



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Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

Notes:

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated
- Refer to Stage 2 report for precedent examples:
  - Two-stage right-turn
  - Shared-use areas
  - Bus gate
  - Tiger crossing
  - On-demand cycle signal stage
  - Raised cycleway

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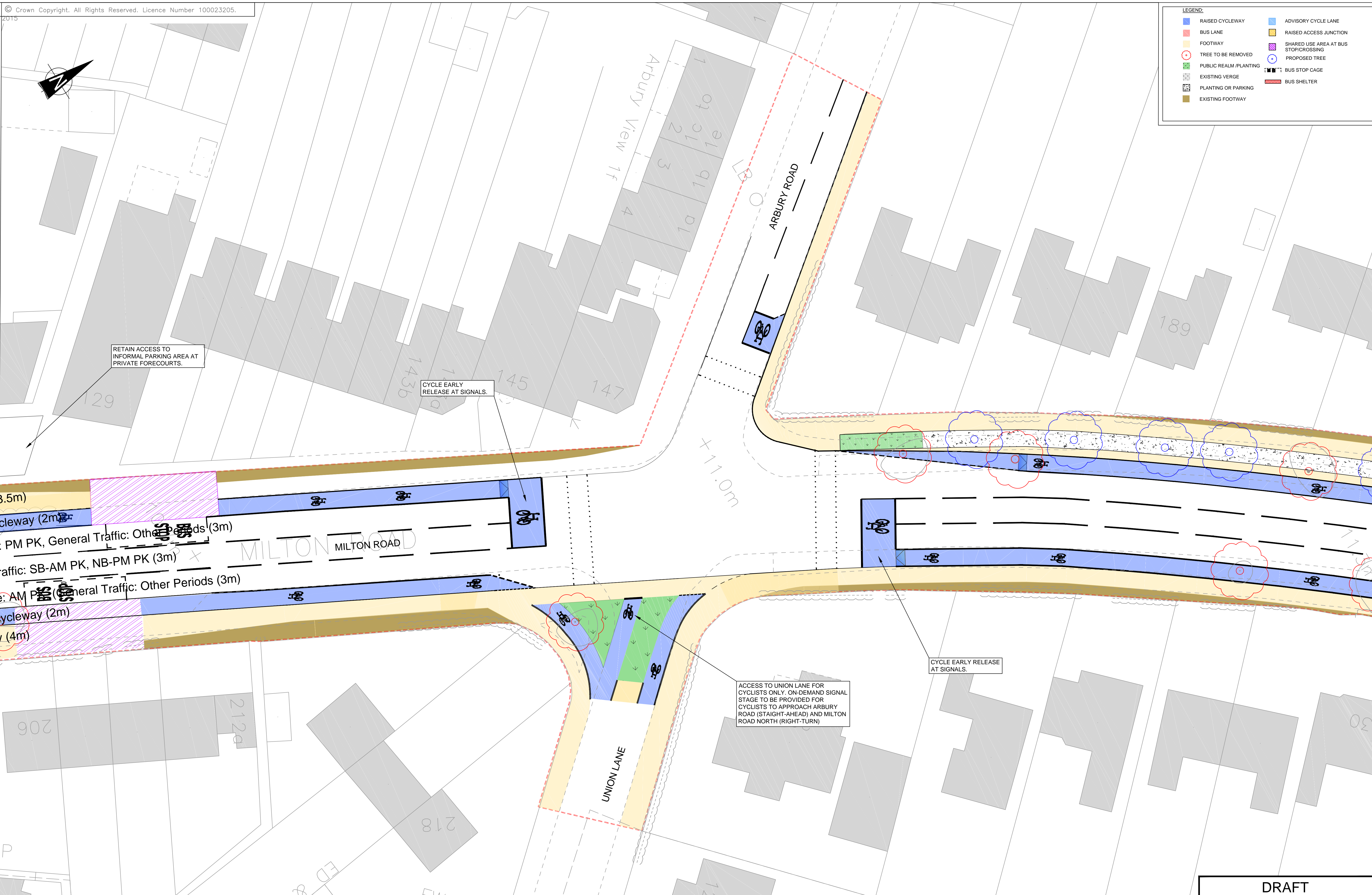
Site/Project:  
**MILTON ROAD CORRIDOR IMPROVEMENT SCHEME**

Title:  
**KING'S HEDGES ROAD ALTERNATING KERBSIDE PEAK PERIOD BUS LANE OPTION**

DRAFT			
Drawn: GW	Checked: DP		
Designed: AKM	Approved: DP		
Date: 20/04/2016	Scale: 1:200 @ A1	Sheet: 7 OF 8	
Project Number: 70012012-GA-108	Drawing Number: 70012012-GA-308	Revision: A	
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LEGEND:			
	RAISED CYCLEWAY		ADVISORY CYCLE LANE
	BUS LANE		RAISED ACCESS JUNCTION
	FOOTWAY		SHARED USE AREA AT BUS STOP/CROSSING
	TREE TO BE REMOVED		PROPOSED TREE
	PUBLIC REALM /PLANTING		BUS STOP CAGE
	EXISTING VERGE		BUS SHELTER
	PLANTING OR PARKING		
	EXISTING FOOTWAY		



File Name: L:\70012012 - Milton Road & Histon Road\E Models and Drawings\Development\AUTOCAD\GA General Arrangement\70012012-GA-301-308.dwg  
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Rev	Date	Description	By	Chk	App
A	20/04/16	ISSUED FOR REVIEW	GW	AKM	DP

Notes:

- ASLs to be 5m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated

5. Refer to Stage 2 report for precedent examples:

- Two-stage right-turn
- Shared-use areas
- Bus gate
- Tiger crossing
- On-demand cycle signal stage
- Raised cycleway

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MILTON ROAD  
CORRIDOR  
IMPROVEMENT SCHEME

Title:  
ARBURY ROAD JUNCTION  
ALTERNATING KERBSIDE  
PEAK PERIOD BUS LANE  
OPTION

DRAFT			
Drawn: GW	Checked: DP		
Designed: AKM	Approved: DP		
Date: 20/04/2016	Scale: 1:200 @ A1	Sheet: 8 of 8	
Project Number: 70012012	Drawing Number: 70012012-GA-309	Revision: A	
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# Appendix B

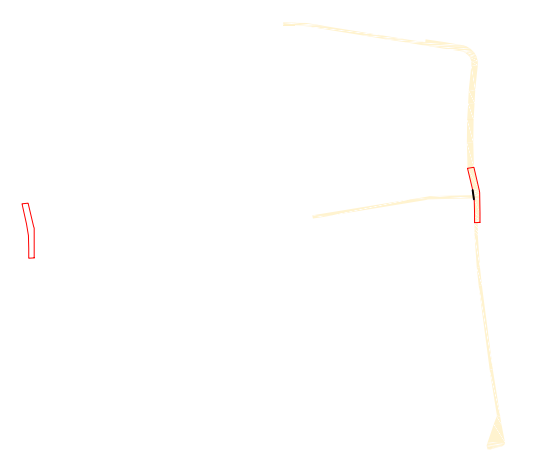
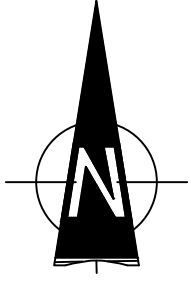
**HISTON ROAD DESIGN OPTIONS**

APPENDIX B-1

**'DO MAXIMUM' OPTION**

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Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

Notes:


  
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Site/Project:  
**HISTON ROAD  
 CORRIDOR  
 IMPROVEMENT  
 SCHEME**

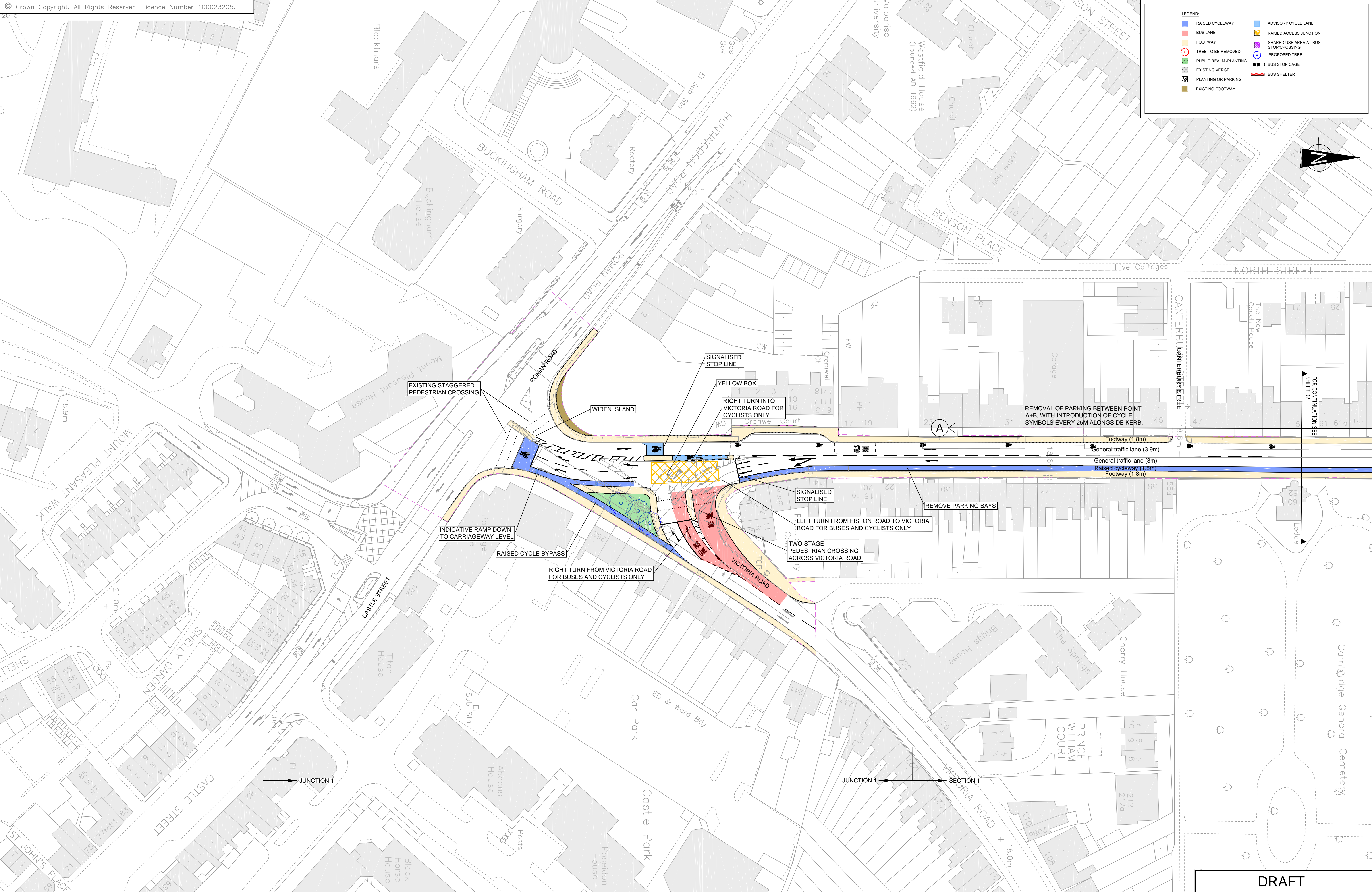
Title:  
**DO-MAXIMUM  
 OPTION-OUTLINE  
 DESIGN**

DRAFT		
Drawn: GW	Checked: DP	
Designed: AKM	Approved: DP	
Date: 06/04/2016	Scale: 1:500 @	A1 Sheet: Overview
Project Number:	Drawing Number:	Revision:
70012012-GA-001	70012012-GA-001	A
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**LEGEND:**

- RAISED CYCLEWAY
- BUS LANE
- FOOTWAY
- TREE TO BE REMOVED
- PUBLIC REALM PLANTING
- EXISTING VERGE
- PLANTING OR PARKING
- EXISTING FOOTWAY
- ADVISORY CYCLE LANE
- RAISED ACCESS JUNCTION
- SHARED USE AREA AT BUS STOP/CROSSING
- PROPOSED TREE
- BUS STOP CAGE
- BUS SHELTER



File Name: L:\70012012 - Milton Road & Histon Road Models and Drawings\Development\JUTOCAD\GA General Arrangement\70012012-GA-601-606.dwg

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

- Notes:**
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - Widths as per standard section profile unless otherwise stated
  - No parking permitted on Histon Road, unless otherwise stated
  - Refer to 'Draft Options' report for precedent examples:
    - a) Shared-use areas
    - b) Raised cycleway

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Client: **HISTON ROAD CORRIDOR IMPROVEMENT SCHEME**

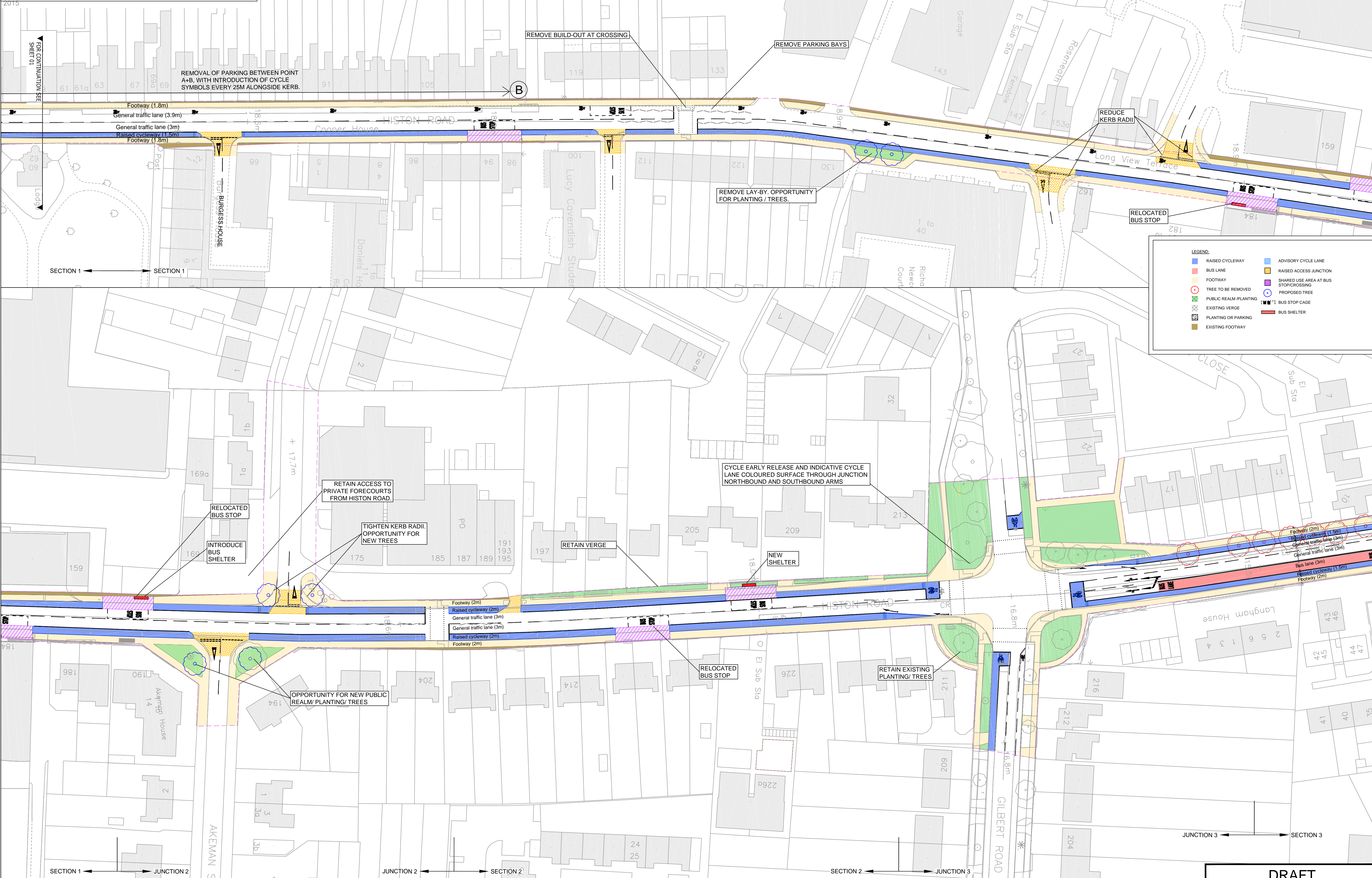
Title: **DO-MAXIMUM OPTION-OUTLINE DESIGN**

**DRAFT**

Drawn: GW	Checked: DP
Designed: AKM	Approved: DP
Date: 06/04/2016	Scale: 1:500 @ A1
Project Number: 70012012-GA-002	Sheet: 1 OF 3
70012012-GA-002	70012012-GA-002
	A

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**LEGEND:**

- RAISED CYCLEWAY
- BUS LANE
- FOOTWAY
- TREE TO BE REMOVED
- PUBLIC REALM PLANTING
- EXISTING VERGE
- PLANTING OR PARKING
- EXISTING FOOTWAY
- ADVISORY CYCLE LANE
- RAISED ACCESS JUNCTION
- SHARED USE AREA AT BUS STOP/CROSSING
- PROPOSED TREE
- BUS STOP CAGE
- BUS SHELTER

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

**Notes:**

1. ASLs to be 5m deep
2. All bus stops to be fully accessible
3. Widths as per standard section profile unless otherwise stated
4. No parking permitted on Histon Road, unless otherwise stated
5. Refer to 'Draft Options' report for precedent examples:

a) Shared-use areas  
b) Raised cycleway

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Site/Project: HISTON ROAD CORRIDOR IMPROVEMENT SCHEME

Title: DO-MAXIMUM OPTION-OUTLINE DESIGN

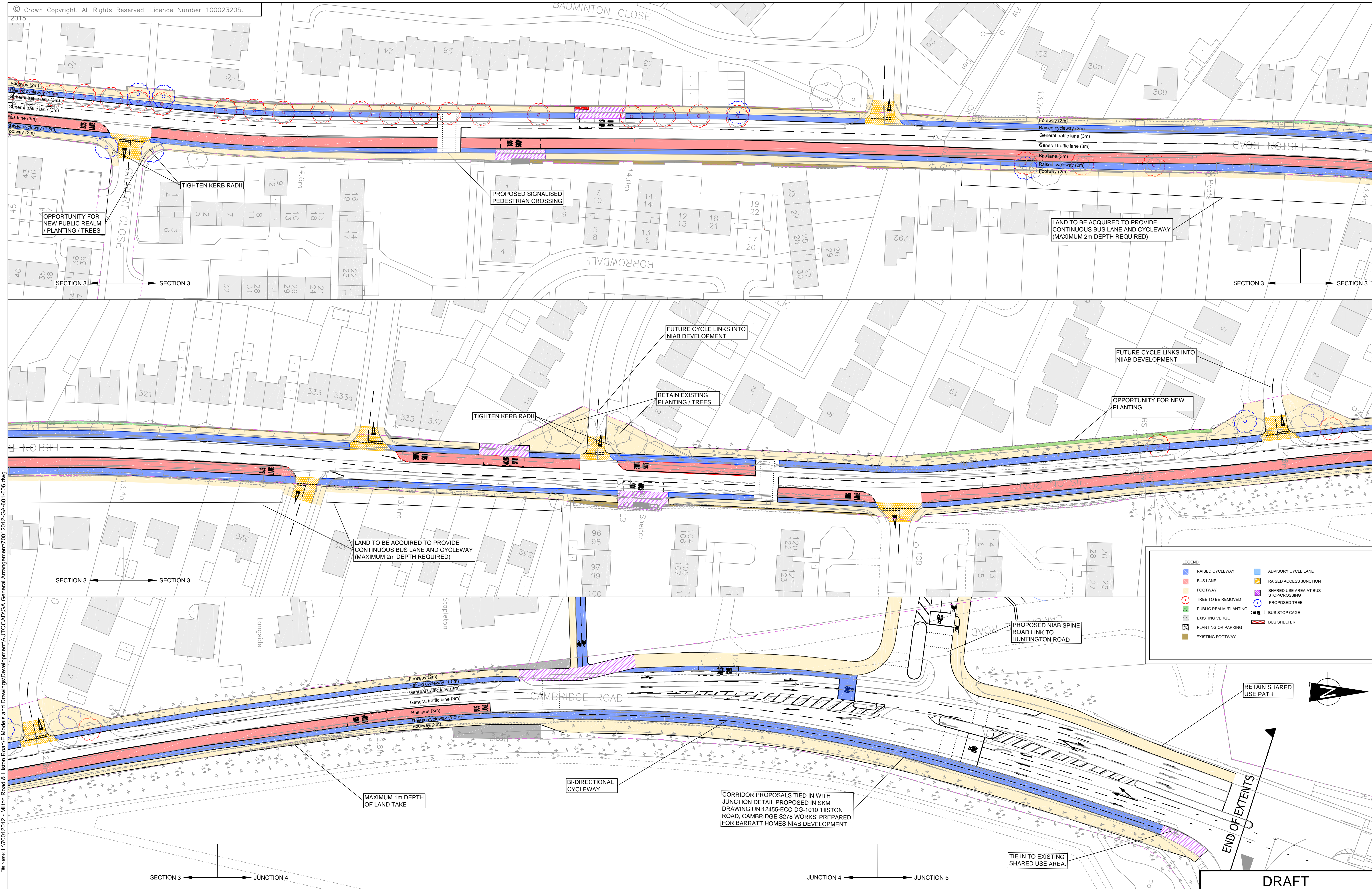
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Drawn: GW	Checked: DP
Designed: AKM	Approved: DP
Date: 06/04/2016	Scale: 1:500 @ A1
Project Number: 70012012-GA-003	Sheet: 2 OF 3
Drawing Number: 70012012-GA-003	Revision: A

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File Name: L:\70012012 - Histon Road & Histon Road E Models and Drawings\Development\JUT\CCAD\GA General Arrangement\70012012-GA-601-606.dwg





File Name: L:\70012012 - Milton Road & Histon Road E Models and Drawings\Development\JUTCAD\GA General Arrangement\70012012-GA-601-606.dwg

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

- Notes:
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - Widths as per standard section profile unless otherwise stated
  - No parking permitted on Histon Road, unless otherwise stated
  - Refer to 'Draft Options' report for precedent examples:
- a) Shared-use areas  
b) Raised cycleway

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Site/Project:  
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Title:  
**DO-MAXIMUM OPTION-OUTLINE DESIGN**

**DRAFT**

Drawn: GW	Checked: DP
Designed: AKM	Approved: DP
Date: 06/04/2016	Scale: 1:500 @ A1
Project Number: 70012012-GA-001	Sheet: 3 OF 3
70012012-GA-001	70012012-GA-004
	A

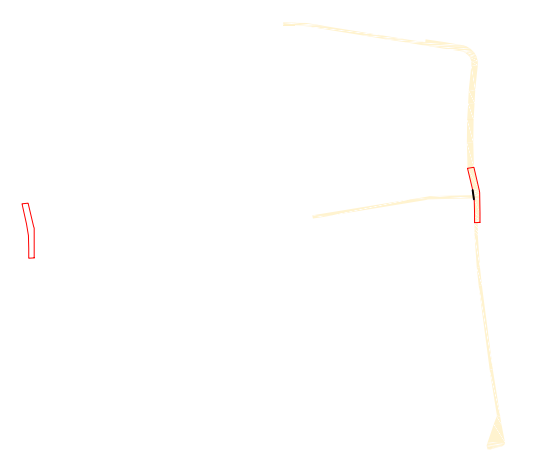
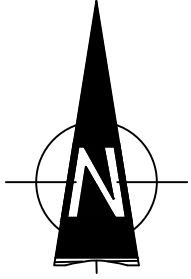
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APPENDIX B-2

**'DO MAXIMUM' (VARIATION) OPTION**





Login: Westgarth, George  
File Name: L:\70012012 - Milton Road & Histon Road\Development\AUTOCAD\GA General Arrangement\70012012-GA-01-006.dwg  
Plot Date: 23/05/2016 13:43:18

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

Notes:


  
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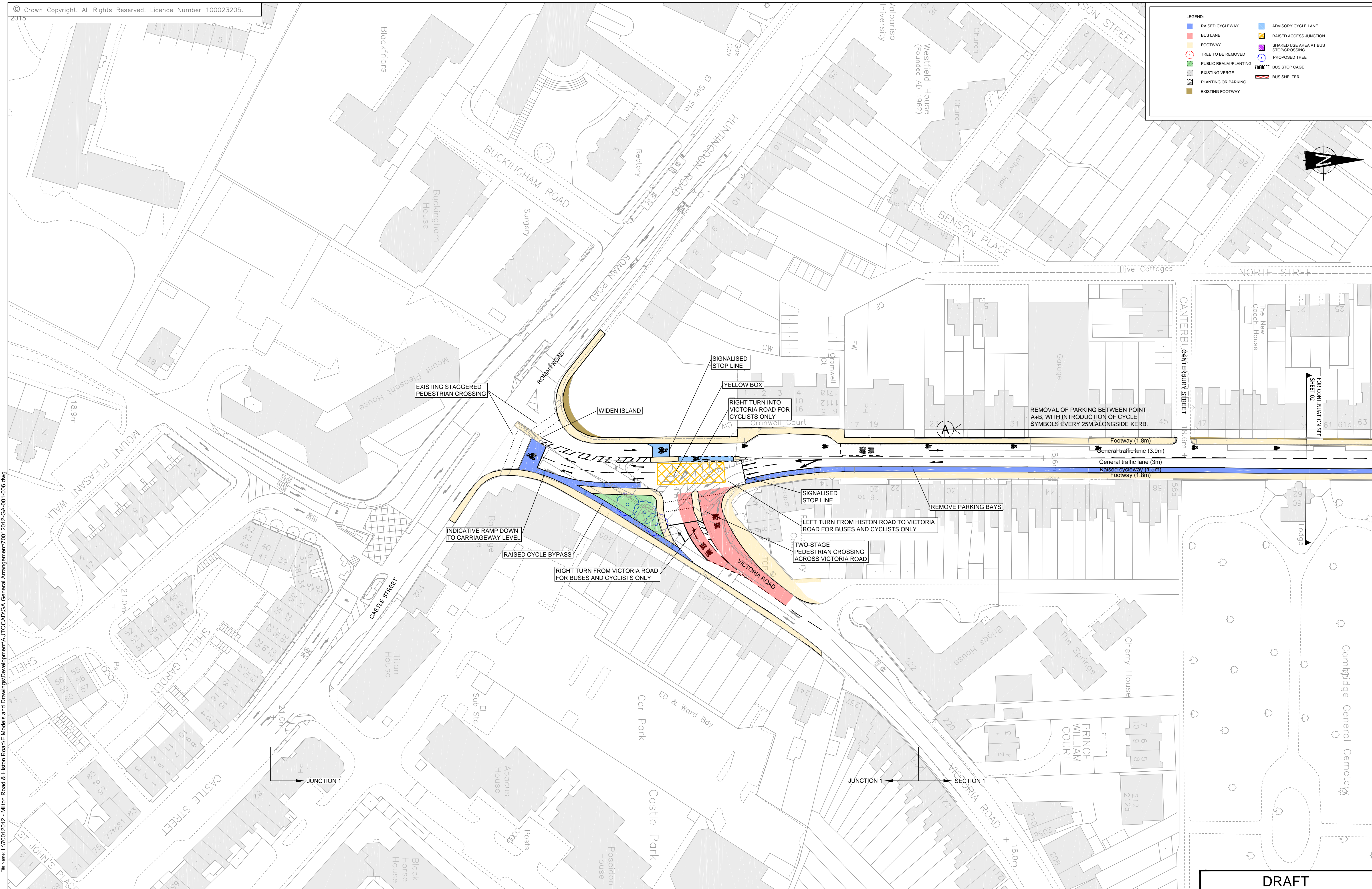
Site/Project:  
**HISTON ROAD  
 CORRIDOR  
 IMPROVEMENT  
 SCHEME**

Title:  
**DO-MAXIMUM  
 OPTION-OUTLINE  
 (VARITATION) DESIGN**

DRAFT		
Drawn: GW	Checked: DP	
Designed: AKM	Approved: DP	
Date: 06/04/2016	Scale: 1:500 @	A1 Sheet: Overview
Project Number:	Drawing Number:	Revision:
70012012-GA-001	70012012-GA-001	A
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LEGEND:	
	RAISED CYCLEWAY
	BUS LANE
	FOOTWAY
	TREE TO BE REMOVED
	PUBLIC REALM PLANTING
	EXISTING VERGE
	PLANTING OR PARKING
	EXISTING FOOTWAY
	ADVISORY CYCLE LANE
	RAISED ACCESS JUNCTION
	SHARED USE AREA AT BUS STOP/CROSSING
	PROPOSED TREE
	BUS STOP CAGE
	BUS SHELTER



File Name: L:\70012012 - Milton Road & Histon Road Models and Drawings\Development\JUTOCAD\GA General Arrangement\70012012-GA-001-006.dwg  
 Log: Westgarth, George  
 Plot Date: 23/05/2016 13:43:23

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

- Notes:
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - Widths as per standard section profile unless otherwise stated
  - No parking permitted on Histon Road, unless otherwise stated
  - Refer to 'Draft Options' report for precedent examples:
    - a) Shared-use areas
    - b) Raised cycleway

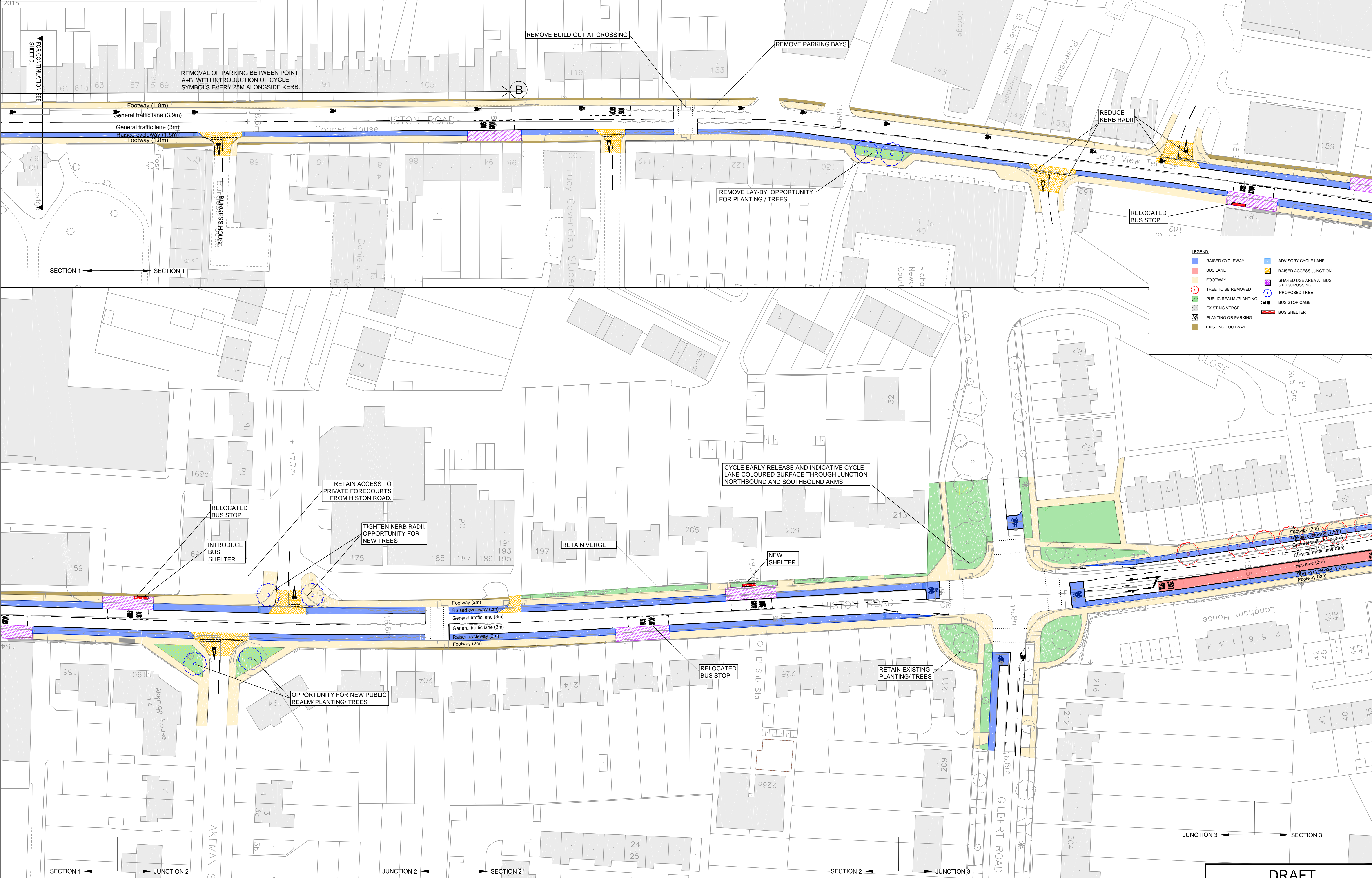
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 Site/Project: **HISTON ROAD CORRIDOR IMPROVEMENT SCHEME**

Title: **DO-MAXIMUM OPTION-OUTLINE (VARIATION) DESIGN**

<b>DRAFT</b>			
Drawn: GW	Checked: DP	Designed: AKM	Approved: DP
Date: 06/04/2016	Scale: 1:500 @ A1	Sheet: 1 OF 3	Revision:
Project Number: 70012012-GA-002	Drawing Number: 70012012-GA-002	Revision: A	
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File Name: L:\70012012 - Milton Road & Histon Road Models and Drawings\Development\JUT\CCAD\GA General Arrangement\70012012-GA-001-006.dwg  
 Log: Westgarth, George  
 Plot Date: 23/05/2016 13:43:32

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

Notes:

- ASLs to be 5m deep
- All bus stops to be fully accessible
- Widths as per standard section profile unless otherwise stated
- No parking permitted on Histon Road, unless otherwise stated
- Refer to 'Draft Options' report for precedent examples:

a) Shared-use areas  
b) Raised cycleway

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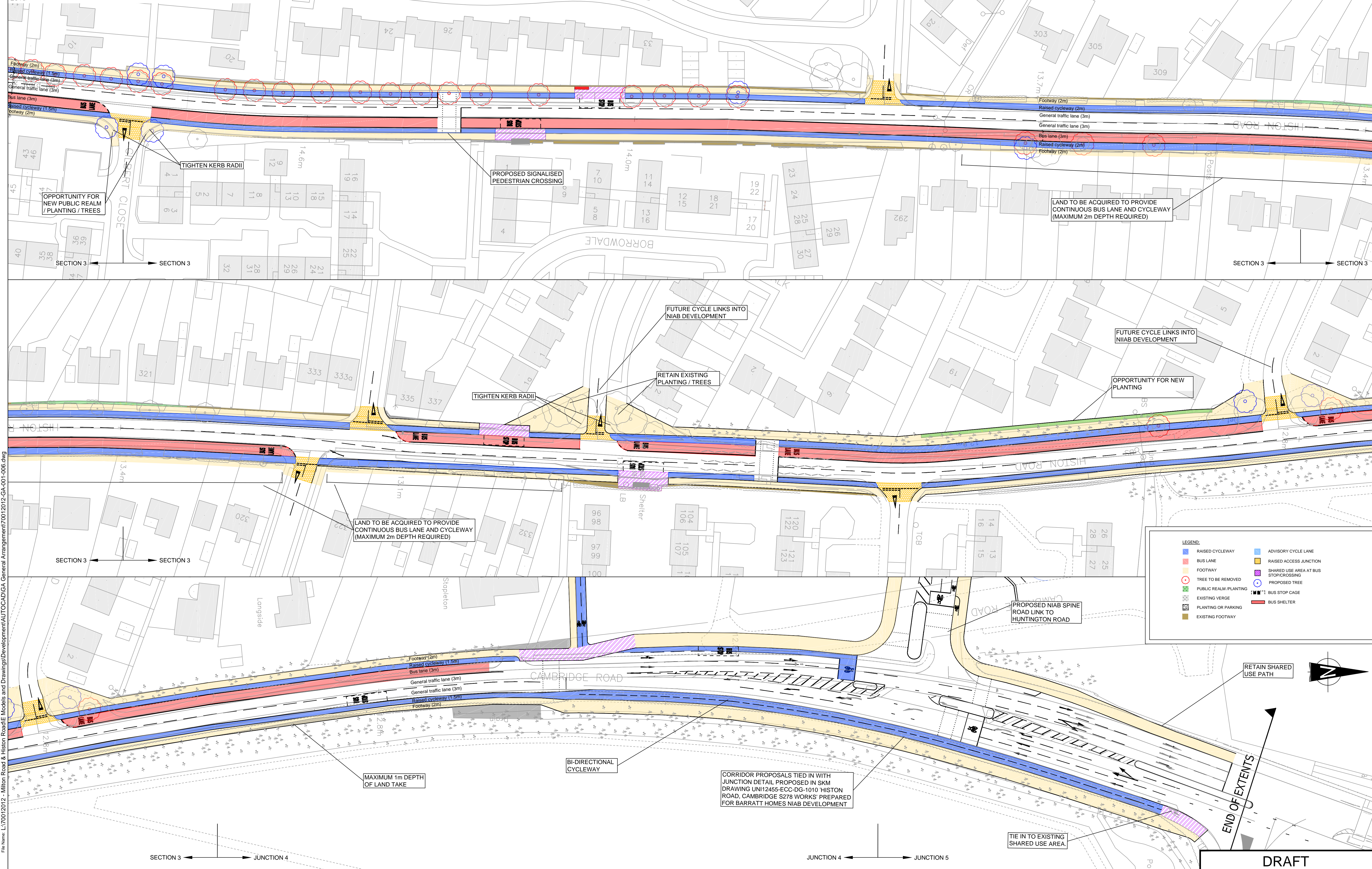
Client: Cambridgeshire County Council

Site/Project: HISTON ROAD CORRIDOR IMPROVEMENT SCHEME

Title: DO-MAXIMUM OPTION-OUTLINE (VARIATION) DESIGN

<b>DRAFT</b>			
Drawn: GW	Checked: DP	Designed: AKM	Approved: DP
Date: 06/04/2016	Scale: 1:500 @ A1	Sheet: 2 OF 3	Revision:
Project Number: 70012012-GA-003	Drawing Number: 70012012-GA-003	Revision: A	
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File Name: L:\70012012 - Milton Road & Histon Road E Models and Drawings\Development\JTCAD\GA General Arrangement\70012012-GA-001-006.dwg

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

Notes:

- ASLs to be 5m deep
- All bus stops to be fully accessible
- Widths as per standard section profile unless otherwise stated
- No parking permitted on Histon Road, unless otherwise stated
- Refer to 'Draft Options' report for precedent examples:

a) Shared-use areas  
b) Raised cycleway

Corridor proposals tied in with junction detail proposed in SKM drawing UN112455-ECC-DG-1010 'HISTON ROAD, CAMBRIDGE S278 WORKS' PREPARED FOR BARRATT HOMES NIAB DEVELOPMENT

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Site/Project:  
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Title:  
**DO-MAXIMUM OPTION-OUTLINE (VARIATION) DESIGN**

**DRAFT**

Drawn: GW	Checked: DP
Designed: AKM	Approved: DP
Date: 06/04/2016	Scale: 1:500 @ A1
Project Number: 70012012-GA-001	Sheet: 3 OF 3
70012012-GA-001	70012012-GA-004
	A

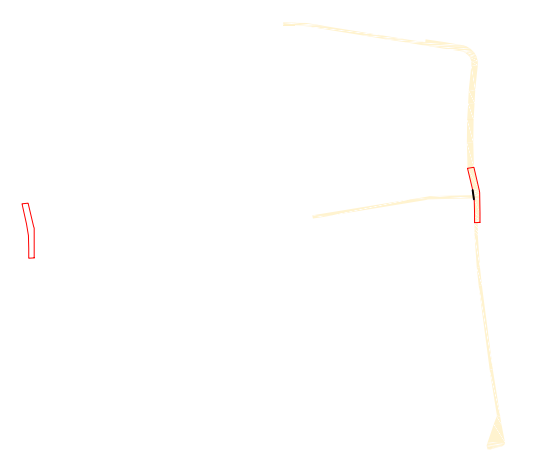
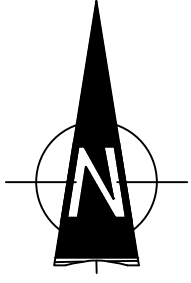
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APPENDIX B-3

**'TIDAL FLOW OPTION A' (CENTRAL RUNNING)**





Login: Westgarth, George  
File Name: L:\70012012 - Milton Road & Histon Road\Development\AUTOCAD\GA General Arrangement\70012012-GA-401-408.dwg  
Plot Date: 19/05/2016 09:30:57

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

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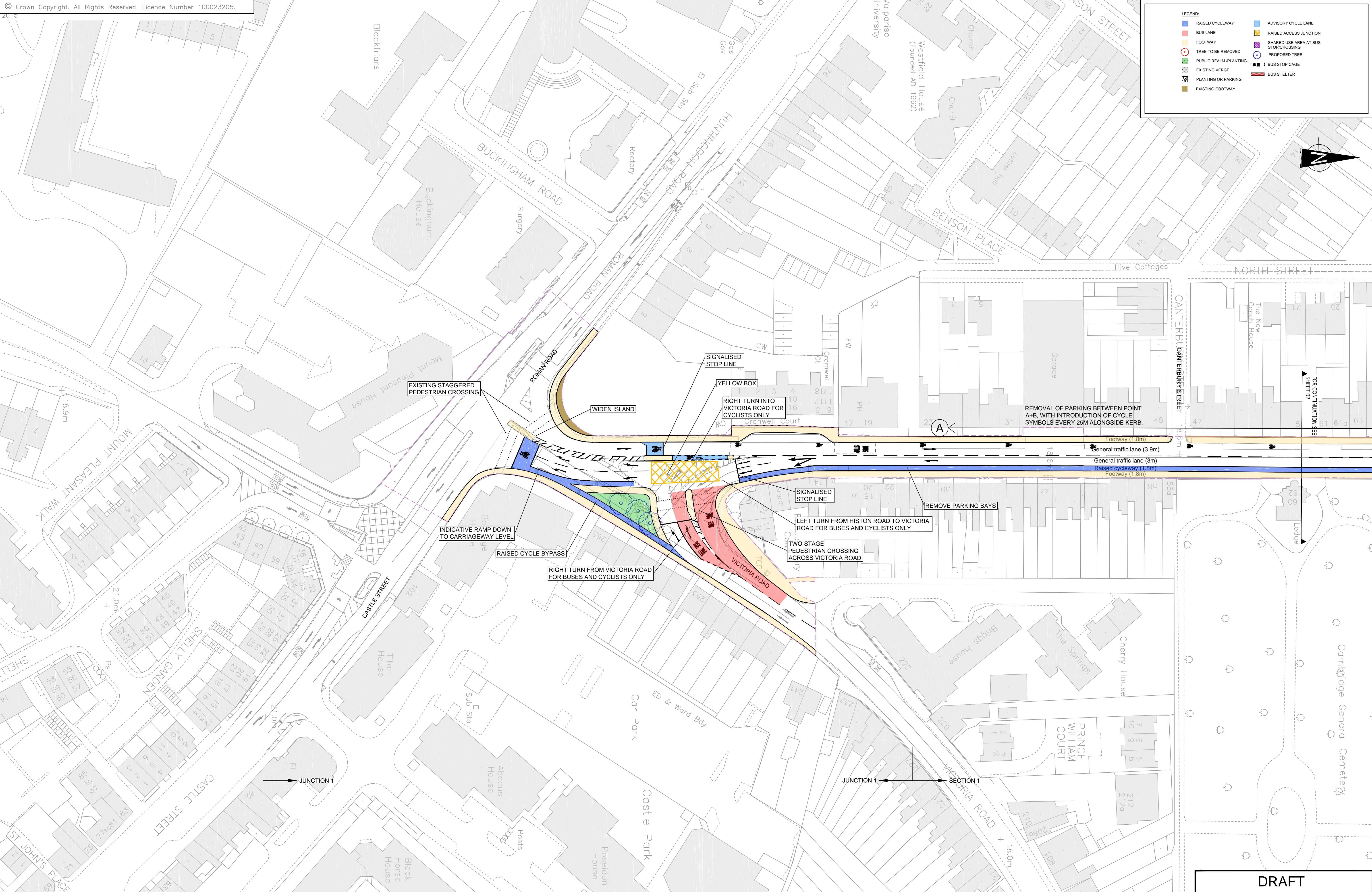
Site/Project:  
**HISTON ROAD  
 CORRIDOR  
 IMPROVEMENT  
 SCHEME**

Title:  
**TIDAL BUS LANE  
 OPTION  
 OUTLINE DESIGN**

DRAFT		
Drawn: GW	Checked: DP	
Designed: AKM	Approved: DP	
Date: 06/04/2016	Scale: 1:500 @	A1 Sheet: Overview
Project Number:	Drawing Number:	Revision:
70012012-GA-401	70012012-GA-401	A
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LEGEND:	
	RAISED CYCLEWAY
	BUS LANE
	FOOTWAY
	TREE TO BE REMOVED
	PUBLIC REALM PLANTING
	EXISTING VERGE
	PLANTING OR PARKING
	EXISTING FOOTWAY
	ADVISORY CYCLE LANE
	RAISED ACCESS JUNCTION
	SHARED USE AREA AT BUS STOP/CROSSING
	PROPOSED TREE
	BUS STOP CAGE
	BUS SHELTER



File Name: L:\70012012 - Milton Road & Histon Road Models and Drawings\Development\JUTOCAD\GA General Arrangement\70012012-GA-401-403.dwg  
 Log: Westgarth, George  
 Plot Date: 13/05/2016 09:31:06

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

- Notes:
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - Widths as per standard section profile unless otherwise stated
  - No parking permitted on Histon Road, unless otherwise stated
  - Refer to 'Draft Options' report for precedent examples:
    - a) Shared-use areas
    - b) Raised cycleway

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Client: **HISTON ROAD CORRIDOR IMPROVEMENT SCHEME**

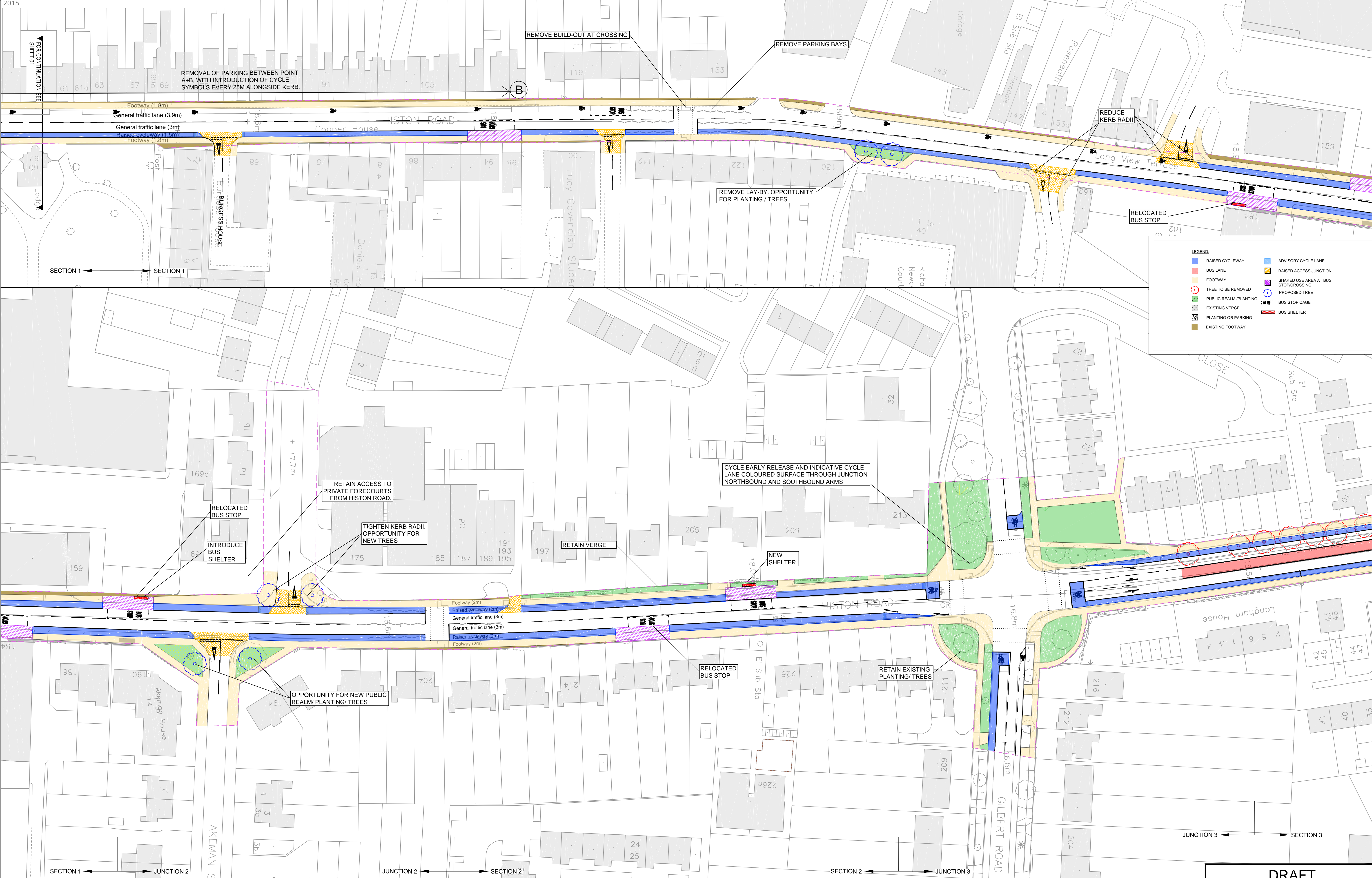
Site/Project: **TIDAL BUS LANE OPTION OUTLINE DESIGN**

Drawn: GW  
 Designed: AKM  
 Date: 06/04/2016  
 Project Number: 70012012-GA-402

DRAFT		
Checked: DP	Approved: DP	Scale: 1:500 @ A1
Sheet: 1 OF 3	Revision:	
70012012-GA-402	70012012-GA-402	A

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**LEGEND:**

- RAISED CYCLEWAY
- BUS LANE
- FOOTWAY
- TREE TO BE REMOVED
- PUBLIC REALM PLANTING
- EXISTING VERGE
- PLANTING OR PARKING
- EXISTING FOOTWAY
- ADVISORY CYCLE LANE
- RAISED ACCESS JUNCTION
- SHARED USE AREA AT BUS STOP/CROSSING
- PROPOSED TREE
- BUS STOP CAGE
- BUS SHELTER

File Name: L:\70012012 - Milton Road & Histon Road Models and Drawings\Development\JUT\CCAD\GA General Arrangement\70012012-GA-401-403.dwg  
 Log: Westgarth, George  
 Plot Date: 13/05/2016 09:31:18

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

**Notes:**

- ASLs to be 5m deep
- All bus stops to be fully accessible
- Widths as per standard section profile unless otherwise stated
- No parking permitted on Histon Road, unless otherwise stated
- Refer to 'Draft Options' report for precedent examples:

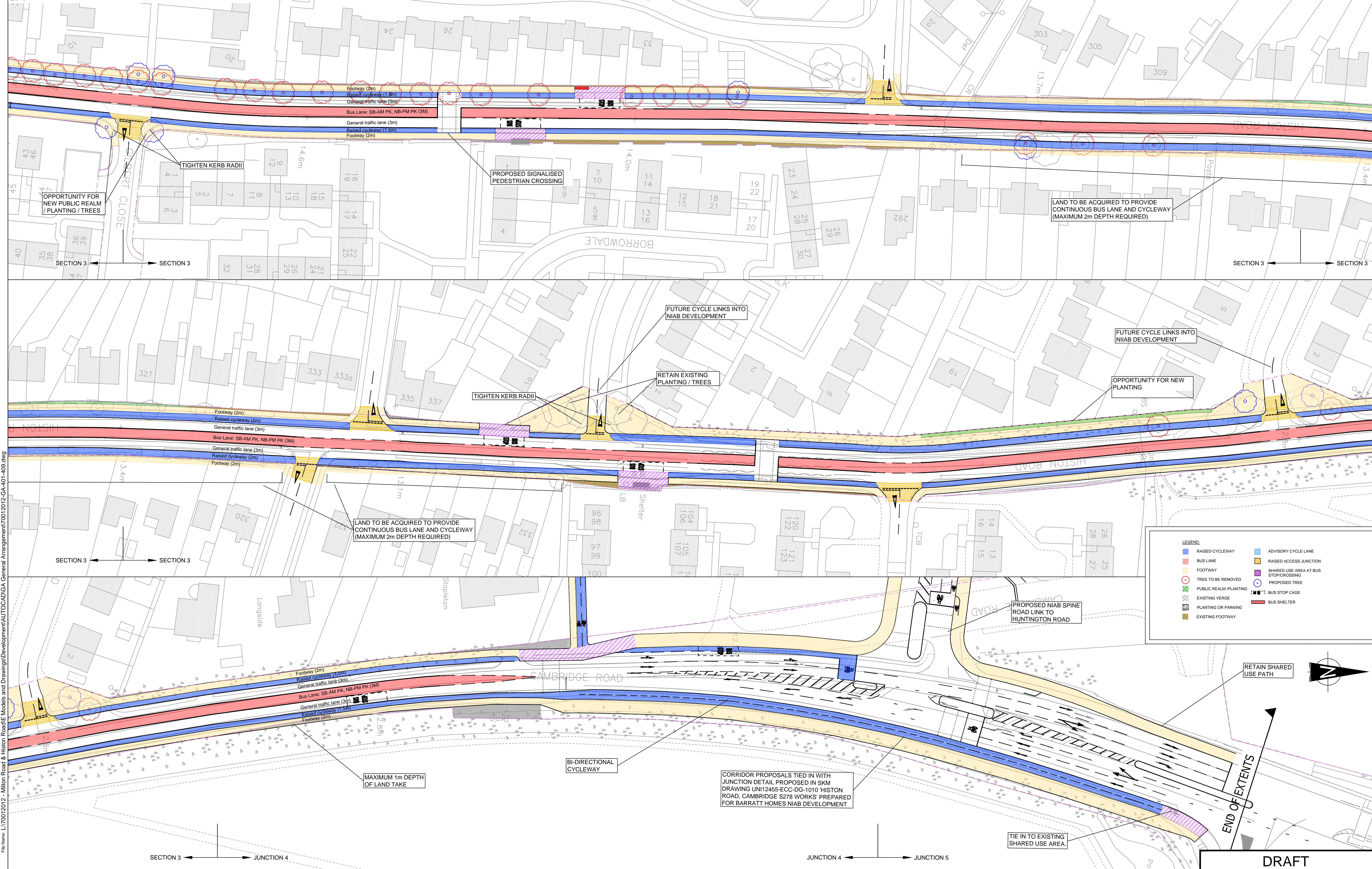
a) Shared-use areas  
b) Raised cycleway

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 Site/Project: HISTON ROAD CORRIDOR IMPROVEMENT SCHEME

**TIDAL BUS LANE OPTION OUTLINE DESIGN**  
 Drawn: GW, Checked: DP, Designed: AKM, Approved: DP  
 Date: 06/04/2016, Scale: 1:500 @ A1, Sheet: 2 OF 3  
 Project Number: 70012012-GA-403, Drawing Number: 70012012-GA-403, Revision: A  
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File Name: L:\70012012 - Milton Road & Histon Road E Models and Drawings\Development\JUTOCAD\GA General Arrangement\70012012-GA-401-403.dwg  
 Log: Westgarth, George  
 Plot Date: 13/05/2016 09:31:13

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

- Notes:
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - Widths as per standard section profile unless otherwise stated
  - No parking permitted on Histon Road, unless otherwise stated
  - Refer to 'Draft Options' report for precedent examples:
- a) Shared-use areas  
b) Raised cycleway

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Site/Project:  
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Title:  
**TIDAL BUS LANE OPTION OUTLINE DESIGN**

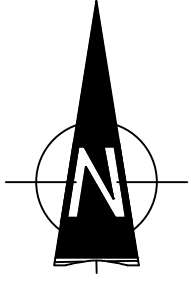
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Designed: AKM	Approved: DP
Date: 06/04/2016	Scale: 1:500 @ A1
Project Number: 70012012-GA-401	Sheet: 3 OF 3
70012012-GA-401	70012012-GA-404
	A
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APPENDIX B-4

**'TIDAL FLOW OPTION B' (KERBSIDE RUNNING)**





Login: Westgarth, George  
 Plot Date: 19/05/2016 16:39:28  
 File Name: L:\70012012 - Milton Road & Histon Road\Development\AUTOCAD\GA General Arrangement\70012012-GA-501-508.dwg

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

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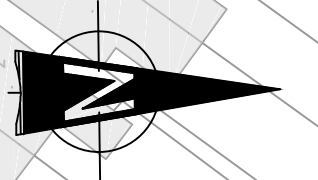
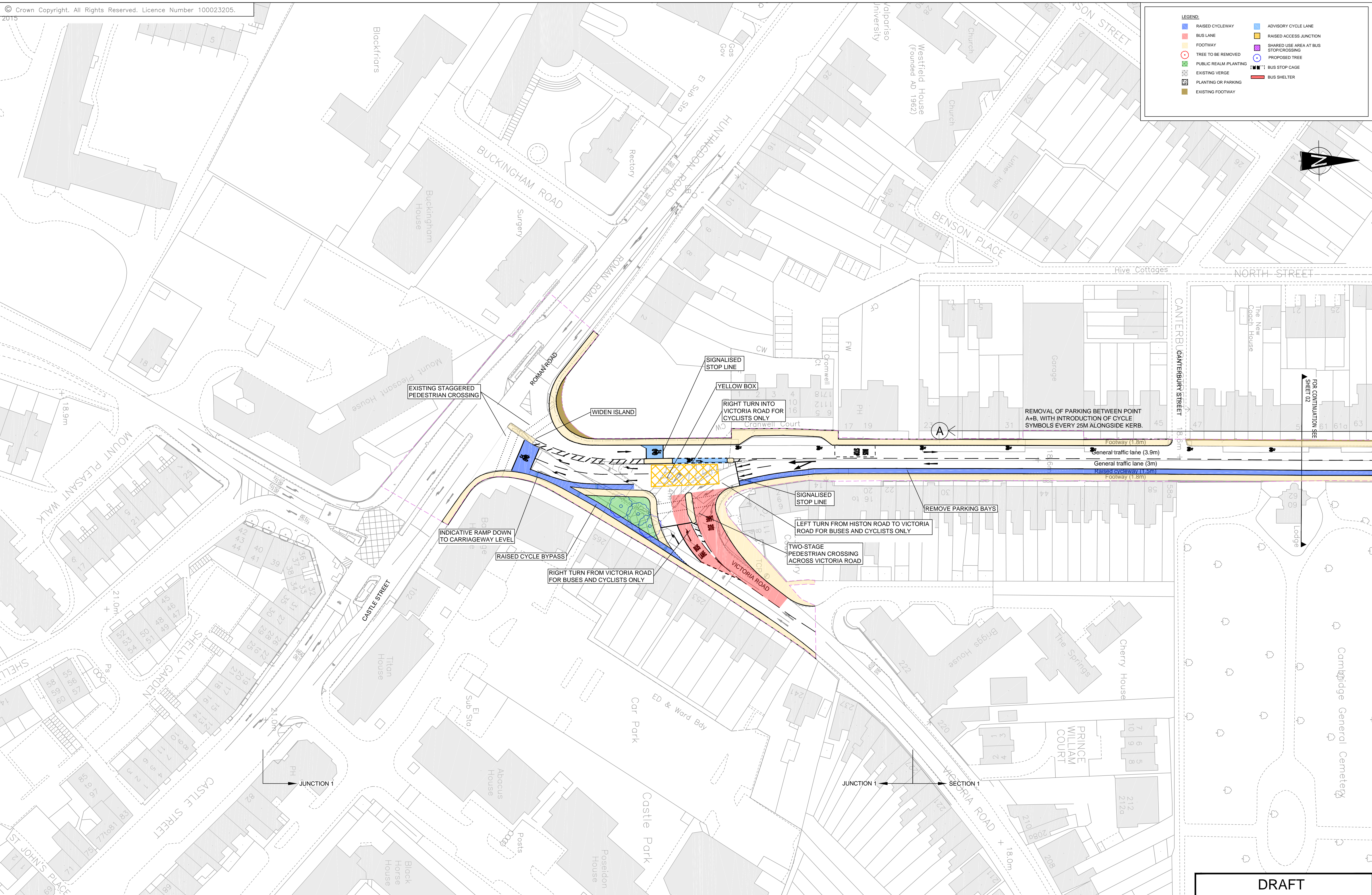
Client:  
Site/Project:  
**HISTON ROAD  
CORRIDOR  
IMPROVEMENT  
SCHEME**

Title:  
**ALTERNATING KERBSIDE  
CORRIDOR  
PEAK PERIOD BUS LANE  
OPTION  
OUTLINE DESIGN**

DRAFT		
Drawn: GW	Checked: DP	
Designed: AKM	Approved: DP	
Date: 06/04/2016	Scale: 1:500 @	A1 Sheet: Overview
Project Number:	Drawing Number:	Revision:
70012012-GA-501	70012012-GA-501	A
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LEGEND:	
	RAISED CYCLEWAY
	BUS LANE
	FOOTWAY
	TREE TO BE REMOVED
	PUBLIC REALM PLANTING
	EXISTING VERGE
	PLANTING OR PARKING
	EXISTING FOOTWAY
	ADVISORY CYCLE LANE
	RAISED ACCESS JUNCTION
	SHARED USE AREA AT BUS STOP/CROSSING
	PROPOSED TREE
	BUS STOP CAGE
	BUS SHELTER



FOR CONTINUATION SEE SHEET 02

File Name: L:\70012012 - Milton Road & Histon Road Models and Drawings\Development\AUTOCAD\GA General Arrangement\70012012-GA-501-503.dwg

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

- Notes:
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - Widths as per standard section profile unless otherwise stated
  - No parking permitted on Histon Road, unless otherwise stated
  - Refer to 'Draft Options' report for precedent examples:
    - a) Shared-use areas
    - b) Raised cycleway

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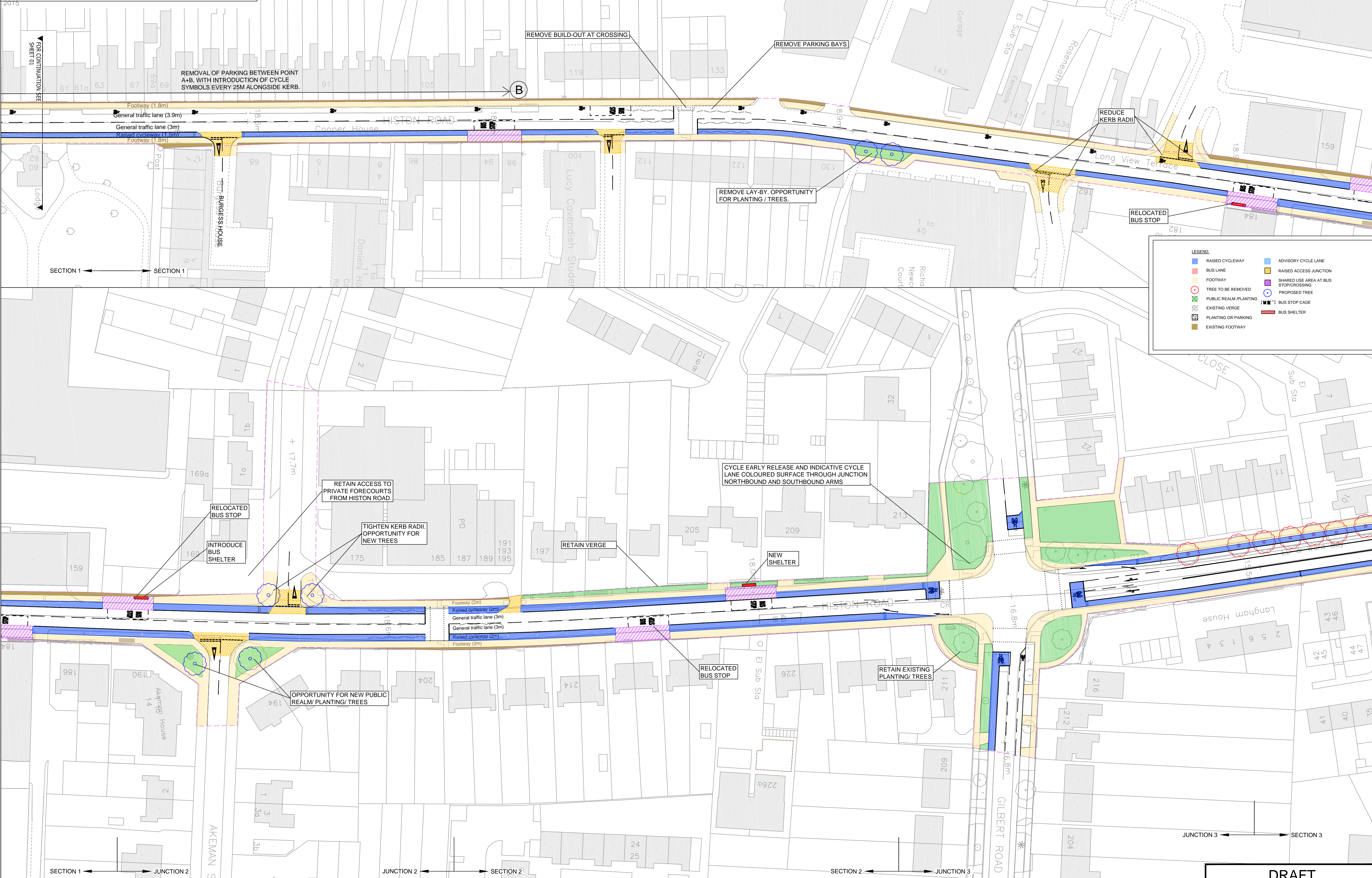
Site/Project: **HISTON ROAD CORRIDOR IMPROVEMENT SCHEME**

Title: **ALTERNATING KERBSIDE PEAK PERIOD BUS LANE OPTION OUTLINE DESIGN**

DRAFT			
Drawn: GW	Checked: DP	Designed: AKM	Approved: DP
Date: 06/04/2016	Scale: 1:500 @ A1	Sheet: 1 OF 3	Revision:
Project Number: 70012012-GA-502	Drawing Number: 70012012-GA-502	A	

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File Name: L:\70012012 - Milton Road & Histon Road Models and Drawings\Development\JUT\CCAD\GA General Arrangement\70012012-GA-501-508.dwg  
 Log: Westgarth, George  
 Plot Date: 13/05/2016 16:39:44

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

- Notes:
- ASLs to be 5m deep
  - All bus stops to be fully accessible
  - Widths as per standard section profile unless otherwise stated
  - No parking permitted on Histon Road, unless otherwise stated
  - Refer to 'Draft Options' report for precedent examples:
- a) Shared-use areas  
b) Raised cycleway

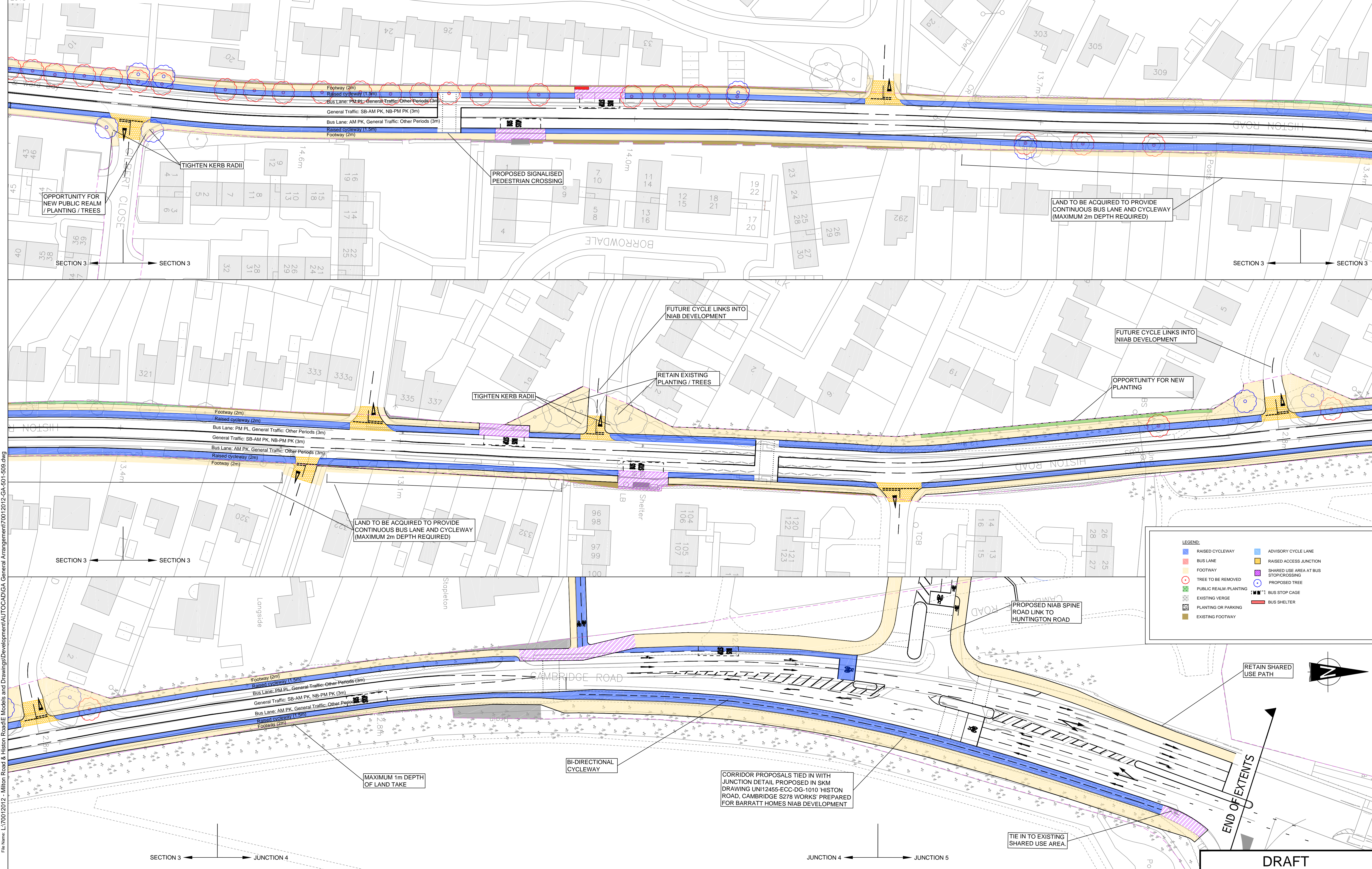
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 Tel: 44-(0)20-7337-1700, Fax: 44-(0)20-7337-1701

Client: **Cambridgeshire County Council**  
 Site/Project: **HISTON ROAD CORRIDOR IMPROVEMENT SCHEME**

Title: **ALTERNATING KERBSIDE PEAK PERIOD BUS LANE OPTION OUTLINE DESIGN**  
 Drawn: GW, Checked: DP, Designed: AKM, Approved: DP  
 Date: 06/04/2016, Scale: 1:500 @ A1, Sheet: 2 OF 3  
 Project Number: 70012012-GA-503, Drawing Number: 70012012-GA-503, Revision: A  
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**DRAFT**





**LEGEND:**

- RAISED CYCLEWAY
- BUS LANE
- FOOTWAY
- TREE TO BE REMOVED
- PUBLIC REALM / PLANTING
- EXISTING VERGE
- PLANTING OR PARKING
- EXISTING FOOTWAY
- ADVISORY CYCLE LANE
- RAISED ACCESS JUNCTION
- SHARED USE AREA AT BUS STOP / CROSSING
- PROPOSED TREE
- BUS STOP CAGE
- BUS SHELTER

File Name: L:\70012012 - Milton Road & Histon Road E Models and Drawings\Development\JUTOCAD\GA General Arrangement\70012012-GA-501-508.dwg  
 Log: Westgarth, George  
 Plot Date: 13/05/2016 16:39:56

Rev	Date	Description	By	Chk	App
A	06/04/15	ISSUED FOR REVIEW	GW	AKM	DP

Notes:

- ASLs to be 5m deep
- All bus stops to be fully accessible
- Widths as per standard section profile unless otherwise stated
- No parking permitted on Histon Road, unless otherwise stated
- Refer to 'Draft Options' report for precedent examples:

a) Shared-use areas  
b) Raised cycleway

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Client:

Site/Project:

**HISTON ROAD CORRIDOR IMPROVEMENT SCHEME**

Title:

**ALTERNATING KERBSIDE PEAK PERIOD BUS LANE OPTION OUTLINE DESIGN**

**DRAFT**

Drawn: GW	Checked: DP
Designed: AKM	Approved: DP
Date: 06/04/2016	Scale: 1:500 @ A1
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