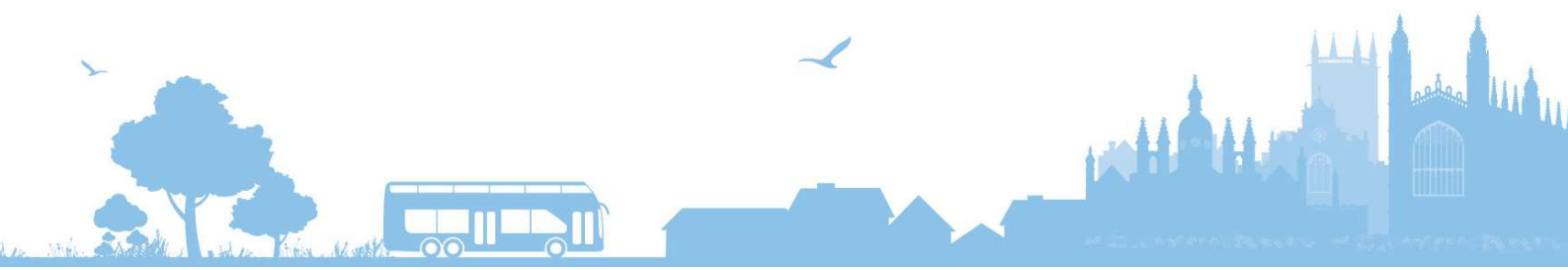


Cambourne to Cambridge Better Bus Journeys

Grange Road Access Report

Greater Cambridge Partnership

August 2017



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This document and its contents have been prepared and are intended solely for Greater Cambridge Partnership's information and use in relation to the Cambourne to Cambridge Better Bus Journeys project.

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Table of contents

EXECUTIVE SUMMARY	7
1 PURPOSE	8
2 INTRODUCTION	9
3 APPROACH	10
4 GRANGE ROAD	11
3.1 Existing Arrangement.....	11
4 ADAMS ROAD PROPOSALS	13
4.1 Existing Arrangement.....	13
4.2 Existing Constraints	14
4.3 Proposal 1 – Reduced width carriageway with parking restrictions, designated parking south of the carriageway, footway/cycleway to the north side of the road.	16
4.4 Proposal 2– Reduced width carriageway with parking restrictions, footway/cycleway to the north side of the road.	17
4.5 Proposal 3– Reduced width carriageway with parking restrictions, designated parking north of the road.	18
4.6 Proposal 4 - Reduced width carriageway with parking restrictions, road restricted to one-way east of Sylvester Road to provide a bus lane and a parking area.	19
4.7 Buildability and Traffic Management.	20
4.8 Safety Considerations	20
4.9 Adams Road Summary.....	20
5 HERSCHEL ROAD PROPOSALS	21
5.1 Existing Arrangement.....	21
5.2 Existing Constraints	22
5.3 Proposal 1 - Reduced width carriageway with parking restriction, designated parking areas south of the carriageway, footway/cycleway to the north side of the road.	24
5.4 Proposal 2 - Reduced width carriageway with parking restrictions, footway/cycleway to the north side of the road.	25
5.5 Proposal 3 - Reduced width carriageway with parking restrictions, designated parking south of the carriageway.	26
5.6 Buildability and Traffic Management.	27
5.7 Safety Considerations	27
5.8 Herschel Road Summary	27
6 RIFLE RANGE (OR ‘RUGBY CLUB’) ACCESS PROPOSALS	28
6.1 Existing Arrangement.....	28
6.2 Existing Constraints	29

6.3	Proposal 1 – Unguided and guided busway provided to the south with a footway/cycleway to the north side.	30
6.4	Proposal 2 - Unguided busway provided to the south with a footway/cycleway to the north side.	31
6.5	Proposal 3 - Guided busway provided to the north with a footway/cycleway to the south side.....	32
6.6	Buildability and Traffic Management.	33
6.7	Safety Considerations	33
6.8	Rifle Range Access Summary	33
7	CRANMER ROAD PROPOSALS	34
7.2	Existing Arrangement.....	34
7.3	Existing Constraints	35
7.4	Proposal 1 – Reduced width carriageway with parking restrictions, designated parking south of the carriageway, footway/cycleway to the north side of the road.	36
7.5	Proposal 2 - Parking restrictions, footway/cycleway to the north side of the road.	37
7.6	Proposal 3 - Parking restrictions, designated parking bays south of the carriageway.....	38
7.7	Proposal 4 - Parking restrictions, designated parking bays south of the carriageway.....	39
7.8	Buildability and Traffic Management.	40
7.9	Safety Considerations	40
7.10	Cranmer Road Summary.....	40
8	CONCLUSIONS AND NEXT STEPS	41
	APPENDIX A – DRAWINGS	42

Executive Summary

Four routes have been assessed on an engineering basis for connecting a busway from the Cambourne to Cambridge Option 3/3A catchment area with Grange Road (from which point bus services would serve a range of City Centre locations depending on demand and route planning). Each route has been assessed and considered the following:

- Arrangement within existing available land;
- Additional land to be purchased;
- Provision of cycle and pedestrian facilities;
- Buildability
- Impact on local properties;
- Increased safety risks;

The four routes for connecting the Cambourne to Cambridge busway to Grange Road were presented to the Greater Cambridge Partnership (GCP) in October 2016. The sites identified were Adams Road, Herschel Road, the Rifle Range (or 'Rugby Club') access track and Cranmer Road.

This report considers these routes on a limited engineering basis and the key conclusions should be taken within the wider context of the assessment of the Strategic Route Alignments as set out within the Full Outline Business Case process. This includes other transport and non-transport criteria, and will ultimately determine the most appropriate route.

Along Adams Road some bus priority is achievable, but this would require significant loss of on street parking and dedicated cycle facilities would not be feasible. This could lead to potential conflict between cyclists on this busy cycle route and the new bus route, as well as impact on existing car users with the introduction of a one way system. Other proposals are possible which would retain a greater amount of parking and would enhance facilities for pedestrians and cyclists, but bus priority would not be feasible for such proposals (impacting on the speed and reliability of bus journeys), although suspending the on street parking would allow two vehicles to pass one another in opposing directions.

For Herschel Road it is not feasible to provide bus priority, impacting on the speed and reliability of bus journeys, although suspending the on street parking would allow two vehicles to pass one another in opposing directions. All the proposals require the bus route to pass through the land of Clare Hall West Court and the site allocated for further student accommodation to the west, as well as signalisation of the junction with Grange Road. The proposals balance the need for dedicated pedestrian and cycle facilities with the need for parking bays, with the potential to accommodate up to 59% of the existing parking or a 4m shared use facility.

The Rifle Range (or 'Rugby Club') access is segregated from the public highway; this provides greater journey time reliability than Adams Road, Herschel Road and Cranmer Road, and permits segregated bus rapid transit using a guided busway for the entire length, a bus only road, or a combination of the two. All proposals would include an off-road footway/cycleway, improving pedestrian/cyclist safety. The route is too narrow to accommodate the full width of a busway and footway/cycleway arrangements, requiring some land take in all proposals.

It is possible to provide bus priority along Cranmer Road, improving journey time reliability for bus users, although there may be some safety concerns with doing so. Cranmer Road has a wider corridor than other on-road proposals (Adams Road and Herschel Road), therefore less compromise is required between bus priority, parking, pedestrian and cyclist provision. Other proposals that don't provide bus priority are possible, with the potential to accommodate up to 45% of the existing parking along with a 3m shared use facility. Suspending the on street parking would allow two vehicles to pass one another in opposing directions.

1 Purpose

Skanska have been commissioned by the Greater Cambridge Partnership (GCP) to investigate the provision of a high quality east/west bus rapid transit between Cambourne and Cambridge.

Catchment areas and high level route options for the Cambourne to Cambridge busway have been identified and presented previously through public consultation.

This report seeks to assess proposals for connecting the Option 3/3a catchment area with Grange Road, west Cambridge, from where bus routes will continue on the public highway. Options for the busway were identified through early stage feasibility studies.

The term proposal is used in the report to describe a potential engineering solution in specific locations. It is used to differentiate these potential interventions from the wider 'Options' being considered in the Full Outline Business Case.

This report forms part of the ongoing business case development process. It considers a specific and limited range of issues and does not consider the other local and strategic issues associated with the specific route alignments in terms of the Option as a whole. As such, these engineering based considerations will only form part of the overall assessment and are to be balanced with other transport and non-transport criteria, including environmental impacts. Whilst some of the wider considerations have been used to inform this report, none of the comments in this report regarding the wider considerations form part of the business case assessment.

The proposals aim to provide facilities for buses with bus rapid transit where possible, cyclist and pedestrian facilities. Taking into account existing constraints and requirements along the routes, identifying and comparing additional land requirements outside of the existing highway boundary and considering the need for further environmental assessment.

This report is not equivalent to a detailed design, which would only be developed once a single option has been selected for submission for statutory approval. At that point, a final design will be developed for approval which will be subject to further tests, such as road safety audit.

The connecting sections of busway within the Option 3/3a catchment area to the west of the Grange Road and links into the City Centre are discussed in separate technical reports.

2 Introduction

A public consultation for the Cambourne to Cambridge Better Bus Journeys project was undertaken in the October/November of 2015. This was centred on six high-level options for bus infrastructure improvements between Cambourne and Cambridge. A general arrangement of the three different options taken to consultation for Area 1 and the three options for Area 2 are illustrated in Figure 1.

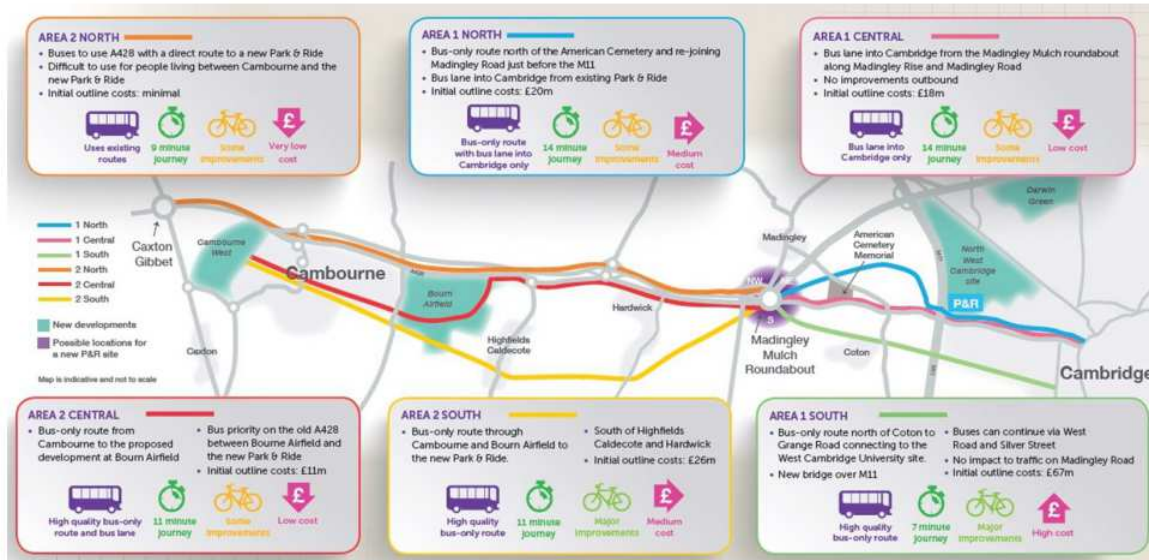


Figure 1. Options Published for Consultation

In October 2016 five catchment area corridor options were presented to the GCP based on the six high-level options, with Option 3/3a identified as the preferred option to be taken forward for further development. At the eastern end of the Option 3/3a catchment area four options were identified for connecting the busway with Grange Road, Cambridge. Refer to Figure 2

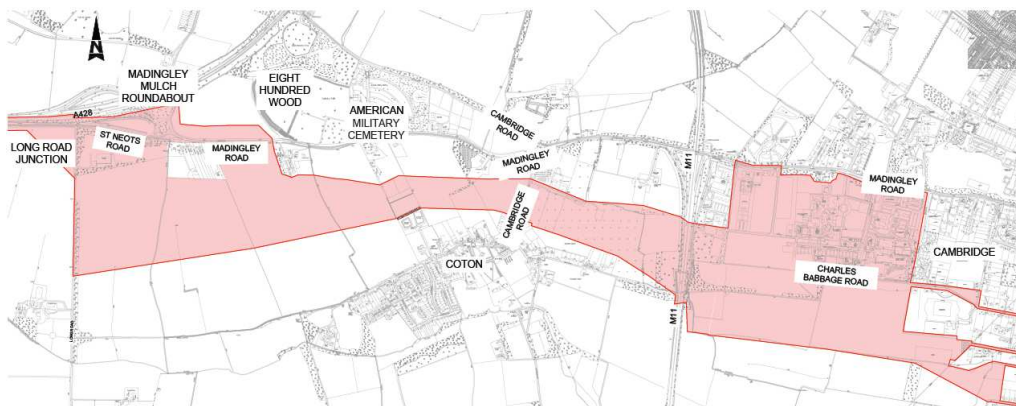


Figure 2. Busway Catchment Area Option 3a – Phase 1 Extends Long Road to West Cambridge

In October 2016 the GCP instructed further development be undertaken of the Option 3/3a catchment area to review potential busway alignments within the corridor. The GCP commissioned topographical surveys of the four potential routes to connect the Option 3/3a busway with Grange Road to enable each option to be assessed.

This Report will provide a technical review of the proposals for connecting the busway to Grange Road via Adams Road, Herschel Road, the Rifle Range access track and Cranmer Road. It will evaluate each proposal and give consideration to existing constraints, land requirements, environmental constraints, engineering constraints and safety considerations.

3 Approach

Each proposal will be assessed for risk and impact against a number of criteria as follows:-

Pedestrian safety	Impact of the standard of footpath provision on pedestrians.
Cyclist safety	Impact of provision/non-provision cycle facilities on cyclists.
Bus Priority	Impact on bus journey times of the arrangement once completed, risk of users delays from unsegregated arrangements.
Buildability/Construction Requirements	Impact of site constraints, requirements for traffic management, utility diversions and working area requirements for delivering the scheme.
Traffic Impact	Assessment of the effect on traffic flow once works have been completed and any carriageway restrictions resulting from the works.
Property Impact	Land take requirements, impact on residents of reduced on street parking, disruption to residents during the construction phase.
Retained Parking	Quantity of on road parking provision retained by proposals in relation to existing provision for residential and other users.
Highway Safety	Consideration of the impact of the proposals on junctions, carriageway alignment and the safety of all users.

Design Assumptions

The design approach adopted for each proposal alignment considers the following criteria:

- The proposed alignment shall remain within the existing highway corridor where practicable to minimise any unnecessary land take.
- The proposed alignment shall consider new connections and improvements to existing connectivity for access, public footpaths, rights of way, wildlife corridors, etc.;
- The design of the segregated busway arrangement has been based on design guidance provided in the 'Guided Busway Design Handbook' published by Britpave;
- The proposed alignment shall consider potential access and egress requirements along the route corridor;
- The Design Manual for Roads and Bridges (DMRB) shall be adhered to when constructing new sections of carriageway and;
- The proposed alignment shall consider the existing constraints and any mitigating measures required to accommodate the works.

4 Grange Road

3.1 Existing Arrangement

Grange Road is a two-way single carriageway 1.6km in length connecting to the A1303 Madingley Road to the north and the A603 Barton Road to the south. Properties fronting the road are predominantly Cambridge University and college sites, schools, and a number of residential properties.

Along the length of Grange Road are a number of connecting junctions. West Road and Sidgwick Avenue to the east side of Grange Road connect to the A1134 Queen's Road towards the Cambridge City Centre. To the west, junctions include Clarkson Road, Adams Road, Herschel Road, Cranmer Road and Selwyn Gardens. Whilst a number of these roads have interlinking side roads they do not provide through road access for vehicles. The Adams Road junction with Grange Road is signalised with a four way signal arrangement, the fourth signalised arm being Burrell's Walk which provides a cycle only route east of Grange Road linking towards the City centre. Also to the west side of Grange Road is the Cambridge University Rugby Union Football Club grounds alongside which is the Rifle Range access track which links to practice grounds and agricultural land west of Cambridge.

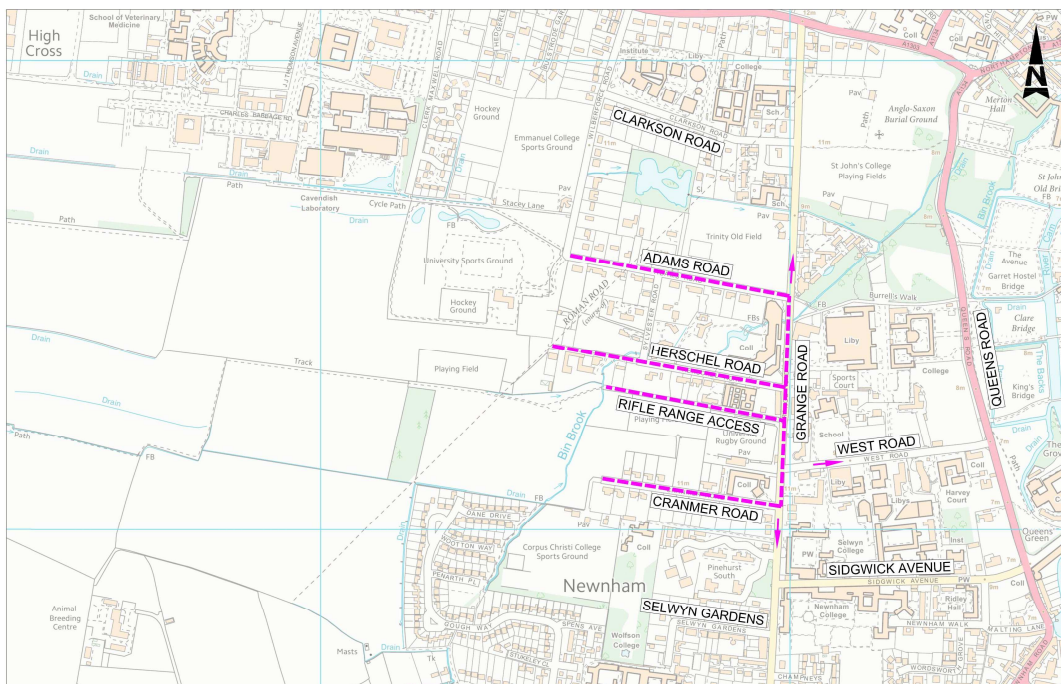


Figure 3 Grange Road and connecting roads

Grange Road has a 20mph speed limit with traffic calming measures along its length. Cycle lanes are marked with a solid line at the nearside of the carriageway edge in both directions between the junction with Herschel Road and the A1303 Madingley Road. Cycle lanes are marked with broken white lines in both directions at the nearside of the carriageway between the junction with Sidgwick Avenue and A603 Barton Road. There is no cycle lane provision between Herschel Road and Sidgwick Avenue. There are a high number of cyclist's using the road with a number of cycle routes passing through the area.

Along the length of Grange Road are a number of traffic island build outs with priority give way arrangements for vehicles; cycle lanes pass through these uninterrupted. Block paved raised 'speed table' features are present at the junctions of Adams Road, West Road and Sidgwick Avenue to encourage speed reduction. Parking restrictions apply throughout the length of Grange Road and pedestrian footways are provided on both sides.



Figure 4 Grange Road at University Rugby Club Grounds (viewed north)

The Grange Road highway corridor is constrained in width by property boundaries. The carriageway width is generally 7.5m to 8.0m. Between Herschel Road and the Rifle Range access, Grange Road narrows to 6.0m width with the carriageway slightly re-aligned to the east due to the property boundary of Clare Hall College Elmside building on the west side which reduces the width of the highway corridor.

4 Adams Road Proposals

4.1 Existing Arrangement

Adams Road is a two-way single carriageway 490m in length and 8.0m in width with pedestrian footways on both sides. The road connects to either Grange Road to the east or Wilberforce Road to the west and has a 20mph speed limit. Properties along the road are mainly residential, with the Trinity Old Field sports ground to the north eastern side of the road. Unrestricted on road parking is provided on both sides of the road through much of its length (total at 560m provided). Residential properties along Adams Road have provisions for off street parking.

At the western end where Adams Road connects to Wilberforce Road there is a link to a segregated cycle route to High Cross and onward towards Coton village. Directly west of Adams Road is the university athletics ground with a private access road to the south. On the south side of Adams Road is a junction with Sylvester Road linking to Herschel Road. At this point the Adams Road corridor narrows in width to the west reducing from 12.0m minimum east of Sylvester Road to 10.4m minimum to the west. The carriageway width remains a consistent 8.0m along the length of the road, with the footway widths reducing west of Sylvester Road to suit property boundaries.

The Adams Road junction with Grange Road is a signalised junction with a block paved raised table. It includes a phase for the Burrell's Walk cycle/foot path opposite to form a cross roads arrangement. Adams Road has high cyclist usage, providing a link between the Coton cycle path and Burrell's Walk to form an east-west link with Cambridge City centre.

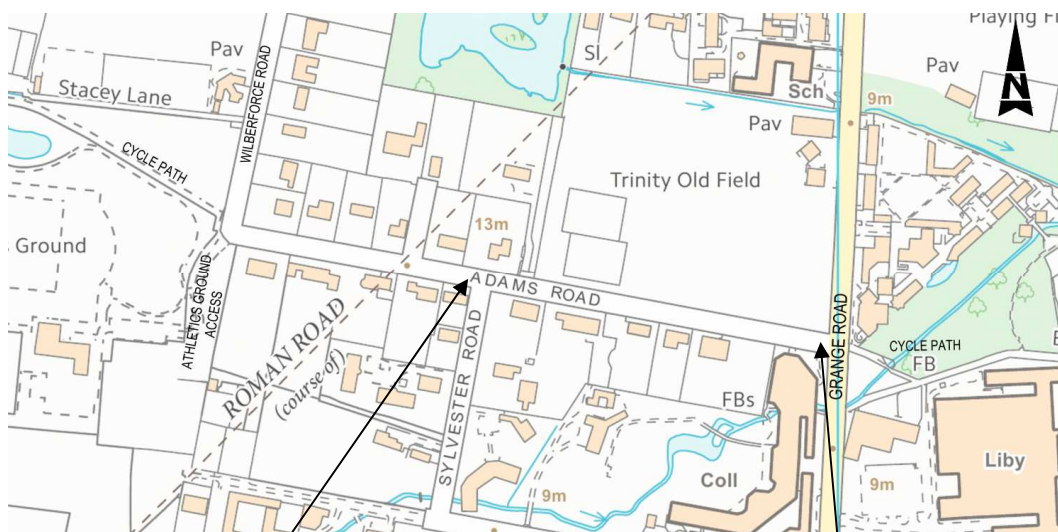


Figure 5 - Adams Road

4.2 Existing Constraints

Provision of a bus route along Adams Road connecting an off line bus route to the west with Grange Road would require alteration to the existing Adams Road configuration to accommodate the busway and ensure journey times would not be disrupted along the route. The following constraints have been identified along Adams Road that would require consideration;

4.2.1 Parking

On road parking of public vehicles is currently permitted for much of the length of Adams Road along both sides. The impact of this is the effective carriageway width is reduced to a single lane width without adequate space for two opposing vehicles to pass one another. Residential properties along the length of the road generally have off road parking provision, however a number of the properties have been sub-divided into apartments and available off road parking may not be sufficient for the multiple residents. It is expected that the parking along the Adams Road is a combination of local resident and commuters using the area to park to access the City Centre. It is therefore expected that some on street parking provision should be maintained on Adams Road.

4.2.2 Carriageway alignment and land constraints

The Adams Road corridor has numerous well established private and college properties along its highway boundaries. The quantity of residential property owners along the road could make it difficult for any required widening of the highway corridor through land purchase, therefore it has been assumed that additional land could not be purchased.

A tight corner radius is present from Adams Road left into Grange Road. The southern corner radii is less tight but both would be restrictive for a bus turning. Land is available on both sides to widen the junction, with a grassed area at the corner of the Trinity Old Fields to the north and an area of grass verge to the southern corner. Improvement of the junction would require land purchase. Alternatively elongating the junction area along Grange Road by repositioning the traffic signals and stop lines to provide space for buses to swing across the opposing carriageway lane could be carried out.

The existing ramps of the raised table are positioned very close to the junction of Adams Road which is likely to cause uncomfortable ride quality for passengers on buses passing through the junction. Existing underground utility services are expected to be present throughout Adams Road. The extent of impact on these would be determined during detailed design stage.

4.2.3 Non motorised users

Adams Road provides an east-west link for cyclists between Grange Road to the east and the High Cross/Coton cycle path to the west. At present cyclists are required to cycle along Adams Road, with only narrow footways provided either side of the road which are unsuitable to be used by cyclists. Adams Road does not currently provide a through route for motorised vehicles and as such traffic flows are low. Use of Adams Road as a busway would increase the risk of conflict for cyclists using the carriageway.

Pedestrian users are currently catered for with footways along Adams Road, these shall be retained by any alteration to the existing highway arrangement.

4.2.4 Environmental

A number of mature and semi mature trees line Adams Road, which are predominantly within private properties beyond the highway boundary. Any requirement to remove or carry out works

to, or near to the trees as part of the alterations to Adams Road would require assessment by environmental specialists.

4.3 Proposal 1 – Reduced width carriageway with parking restrictions, designated parking south of the carriageway, footway/cycleway to the north side of the road.

Proposal 1 would implement parking restrictions along both sides of Adams Road to provide two way traffic flow and allow buses to travel the route unimpeded. The proposal has two different cross sections due to the changing width of Adams Road along its length to retain the arrangement within the existing highway boundary.



Figure 6 – Adams Road - Proposal 1

The eastern end from Sylvester Road to Grange Road would have a 6m wide carriageway, with 2.5m wide parking area and a minimum 1.0m wide footway to the south side and a minimum 2.5m shared use footway/cycleway to the north side.

The western end from Sylvester Road to Wilberforce Road would have a 6m carriageway, with the existing footway on the south side and a minimum 3m shared use footway/cycleway on the north side.

A 2.5m-3.0m wide footway/cycleway would be provided on the northern side of the road to connect the High Cross/Coton cycle path with Burrell's Walk without the need for cyclists to use the narrowed Adams Road carriageway. Parking provision is retained for local residents at the eastern end of the road where space permits parking to be provided, preventing parked vehicles impeding the carriageway.

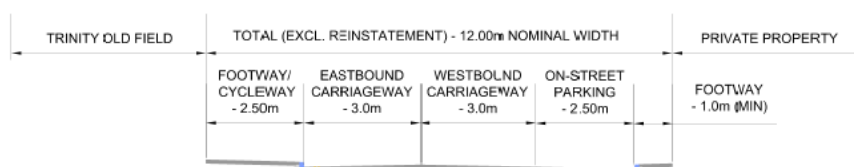


Figure 7 – Adams Road Proposal 1 – East of Sylvester Road

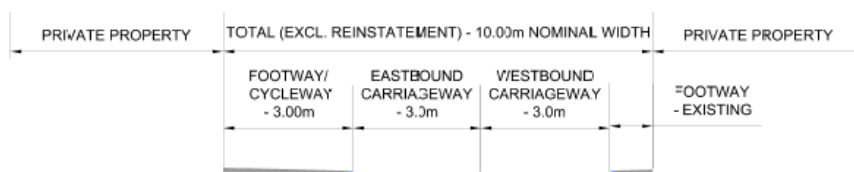


Figure 8 – Adams Road Proposal 1 – West of Sylvester Road

ADVANTAGES	DISADVANTAGES
Retains an amount of on street parking (84m, 15% of existing)	Substandard footway width to southern side of carriageway (1.0m) below Disability Discrimination Act (DDA) guidance minimum width.
Provides cycling provision with a cycle path link from High Cross and Coton to Burrell's Walk	Buses utilising the public highway could lead to bus delays and unreliable journey times
Maintains two-way traffic flow on Adams Road	

4.4 Proposal 2– Reduced width carriageway with parking restrictions, footway/cycleway to the north side of the road.

Proposal 2 would provide a 6m carriageway with parking restrictions along both sides of Adams Road to provide two way traffic flow and allow buses to travel the route unimpeded.



Figure 9 – Adams Road - Proposal 2

A shared use footway/cycleway would be provided on the northern side of the road to connect the High Cross/Coton cycle path with Burrell’s Walk without the need for cyclists to use the narrowed Adams Road carriageway. The footway/cycleway would be 2.5m in width west of Sylvester Road where the highway corridor is narrower, widening to 4.0m east of Sylvester Road. The proposal retains the existing footway width to the south side of the road, providing a minimum of 1.5m width.



Figure 10 – Adams Road Proposal 2 – East of Sylvester Road

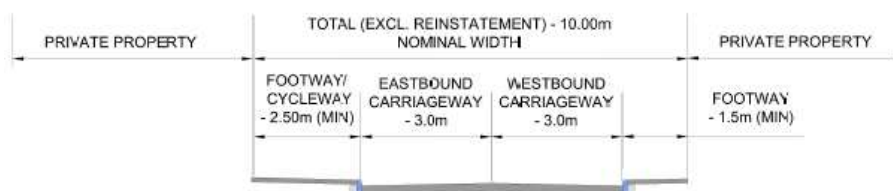


Figure 11 – Adams Road Proposal 2 – West of Sylvester Road

ADVANTAGES	DISADVANTAGES
Provides a 2.5m-4.0m width shared use footway/cycleway link from High Cross and Coton to Burrell’s Walk.	Removes all provision of on street parking.
Maintains two-way traffic flow on Adams Road	Buses utilising the public highway could lead to delays and unreliable journey times
	Retaining existing footways on southern side doesn’t fully utilise the corridor width

4.5 Proposal 3– Reduced width carriageway with parking restrictions, designated parking north of the road.

Proposal 3 would implement parking restrictions along both sides of Adams Road to provide two way traffic flow and allow buses to travel the route unimpeded. This proposal has two different cross sections due to the changing width of Adams Road along its length to retain the corridor within the existing highway boundary.



Figure 12 – Adams Road - Proposal 3

The eastern end from Sylvester Road to Grange Road would have a 6m wide carriageway, with 2.5m parking area and a minimum 1.5m wide footway to the north side and a minimum 2.0m wide footway to the south side.

The western end from Sylvester Road to Wilberforce Road would have a 6m wide carriageway, with a minimum 2m footway on the north and south sides of the carriageway. Cyclists would be required to use the Adams Road carriageway as they do currently.

Parking provision could be retained for local residents at the eastern end of the road where space permits, to prevent parked vehicles impeding the carriageway.

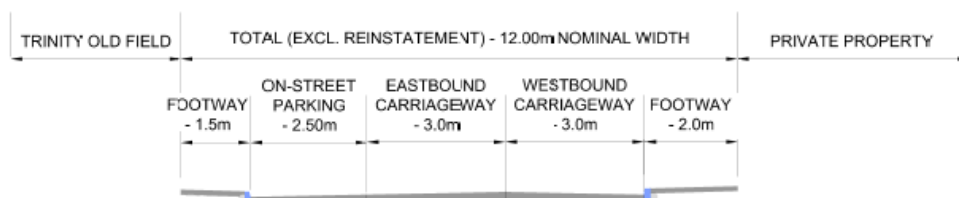


Figure 13 – Adams Road Proposal 3 – East of Sylvester Road

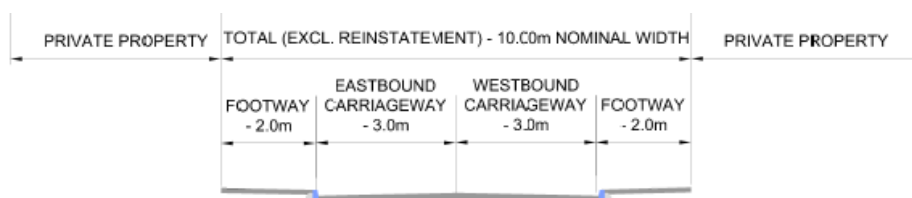


Figure 14 – Adams Road Proposal 3 – West of Sylvester Road

ADVANTAGES	DISADVANTAGES
Retains an amount of on street parking (195m, 35% of existing)	No segregated provision for cyclists.
Maintains two-way traffic flow on Adams Road	Buses and cyclists utilising the public highway could lead to delays and unreliable journey times.

4.6 Proposal 4 - Reduced width carriageway with parking restrictions, road restricted to one-way east of Sylvester Road to provide a bus lane and a parking area.

Proposal 4 would separate traffic flow along the eastern extent of Adams Road by diverting eastbound traffic via Sylvester Road to Herschel Road. Adams Road east of Sylvester Road would provide a one-way public highway operating westbound only. Eastbound buses would be given priority via an eastbound bus lane along Adams Road east of the Sylvester Road junction. The proposal would implement parking restrictions along both sides of Adams Road, with parking provision retained for local residents at the eastern end of the road where space permits parking areas to be provided along the south side of Adams Road between the Grange Road junction and Sylvester Road. West of Sylvester Road the carriageway would remain two-way open to traffic with eastbound buses utilising the public highway. This proposal has two different cross sections due to the changing arrangement of Adams Road along its length.

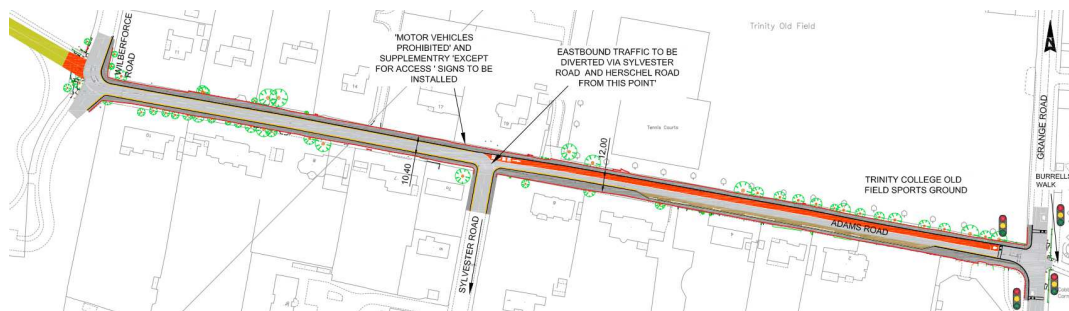


Figure 15 – Adams Road - Proposal 4

The western end from Sylvester Road to Wilberforce Road would have a 6m carriageway with minimum 2.0m wide footways on both sides.

The eastern end from Sylvester Road to Grange Road would have a 3m wide eastbound bus lane, a 3.0m wide westbound carriageway lane and a 2.5m width parking area. Minimum 2m wide footway would be provided on the north side and 1.5m wide on the south side of the carriageway. Cyclists would be required to use the carriageway, and utilise the eastbound bus lane east of Sylvester Road.

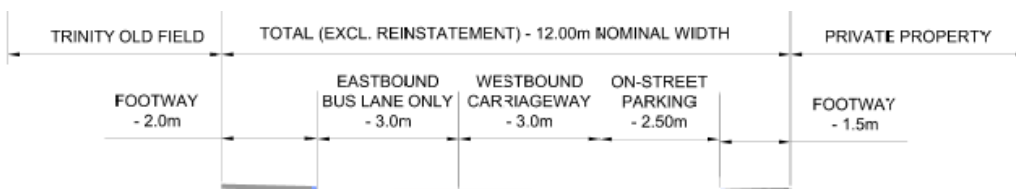


Figure 16 – Adams Road Proposal 4 – East of Sylvester Road

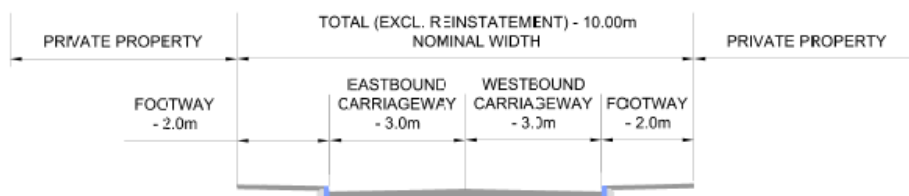


Figure 17 – Adams Road Proposal 4 – West of Sylvester Road

ADVANTAGES	DISADVANTAGES
Provides on street parking (84m, 15% of existing)	No segregated provision for cyclists
Provides bus priority inbound joining Grange Road.	Eastbound traffic required to use Sylvester Road and Herschel Road
Cyclists can use the eastbound bus lane.	Potential delays to buses from cyclists using the eastbound bus lane.

4.7 Buildability and Traffic Management.

All proposals utilise the existing Adams Road area without the need for additional land requirements beyond the highway boundary.

Traffic management restrictions and closures on Adams Road would be required for all proposals to carry out construction activities. A phased approach working east and west of Sylvester Road would assist with maintaining access. Localised traffic restrictions would be required on Grange Road to enable the junction works to be carried out. During school term time the section of Grange Road near the Adams Road junction may become very busy at drop-off and pick up times; consideration should be given to timing works outside of these hours or during school holidays. Access to properties along Adams Road would need to be maintained throughout the construction period. Underground utility services are present along Adams Road, the extent of diversionary and protection works required to utilities would be determined at detailed design stage.

4.8 Safety Considerations

Control of the give way arrangement at the Adams Road/Wilberforce Road junction would need to be managed to ensure junction priority is clearly defined and the risk to cyclists and pedestrians crossing is not increased

Proposal 1 utilises a 1.0m footway width, this is contrary to DDA guidance which recommends footway widths of 1.0m only over short lengths. This would potentially require a disabled user to cross to the northern side of Adams Road to utilise the wider footway/cycleway.

Proposal 3 and 4 require cyclists to use the Adams Road carriageway, which would also be utilised for the busway, increasing the risk of conflict over the existing situation.

4.9 Adams Road Summary

Proposal 1 provides good cycling facilities but compromises on footway width to the south side of Adams Road and bus priority would not be feasible. The 1.0m footway achievable within the existing highway corridor does not comply with the minimum DDA guidance width of 1.5m. The proposal retains 84m of existing on street parking.

Proposal 2 provides much improved cycling and pedestrian facilities, but removes all on street parking, potentially impacting local residents, and bus priority would not be feasible.

Proposal 3 provides good pedestrian facilities and retains the greatest amount of parking (195m) of existing on street parking. No cycle facilities are provided with cyclists required to use the road and bus priority would not be feasible.

Proposal 4 provides bus priority for part of the length of Adams Road via a one way system. Good pedestrian facilities would be provided and the proposal retains 84m of existing on street parking. However, no cycle facilities are possible, leading to safety concerns for cyclists.

In summary, some bus priority is achievable along Adams Road, but this would require significant loss of on street parking and dedicated cycle facilities would not be feasible, leading to potential conflict between cyclists on this busy route and the new bus route, as well as impact on existing car users with the introduction of a one way system. Other proposals are possible which would retain a greater amount of parking and would enhance facilities for pedestrians and cyclists, but bus priority would not be feasible for such proposals, impacting on the speed and reliability of bus journeys, although suspending the on street parking would allow two vehicles to pass one another in opposing directions.

5 Herschel Road Proposals

5.1 Existing Arrangement

Herschel Road is a 300m two-way single carriageway road 8m in width with footways on both sides and a 20mph speed limit. Residential properties are located along the majority of the south side including the Clare Hall Michael Stoker accommodation facility. To the north is university owned land. Unrestricted on road parking is permitted (total 390m), although the majority of residential properties along the length of Herschel Road have off road parking provision. At the western end, Sylvester Road joins from the north and Herschel Road continues for 200m into a private section of the road owned by Clare Hall College as access to the West Court properties; there is no indicated priority at this junction. There is a strong cycling presence along the length of Herschel Road, with Sylvester Road linking to Adams Road and the cycle path towards High Cross and Coton.

The Bin Brook watercourse crosses under Herschel Road within the private Clare Hall access road length, and continues to the north of the road within the grounds of the Needham Research Institute and the Robinson College. Mature trees are located on both sides of Herschel Road along its length, which are predominantly within private properties beyond the highway boundary.



Figure 18 – Herschel Road

5.2 Existing Constraints

Provision of a bus route along Herschel Road connecting an off line bus route to the west with Grange Road would require alteration to the existing configuration to accommodate the bus route and ensure journey times would not be disrupted. The following constraints have been identified along Herschel Road that would require consideration;

5.2.1 Parking

On road parking of public vehicles is currently permitted for much of the length of Herschel Road along both sides. The result of vehicles parking on both sides of the carriageway is that the effective carriageway width is reduced to a single lane width without adequate space for two opposing vehicles to pass one another. Residential properties along the length of the road generally have off road parking provision, however Clare Hall university accommodation facilities do not have available parking off road for the multiple residents. It is expected that the parking along the Herschel Road is a combination of local residents and commuters using the area to park to access the City centre and surrounding workplaces, some on street parking provision should therefore be maintained on Herschel Road.

5.2.2 Carriageway alignment and land constraints

At the western extent of Herschel Road the carriageway becomes a private access road to the Clare Hall West Court properties. The bus route would be required to pass along this private access road to connect to proposed off-road alignments to the west. Provision of the bus route though the site would need to be via agreement with the land owner or through land purchase. On road parking is currently provided along the West Court access road which could impede bus flow. At the western extent of the private section of Herschel Road is an area of trees through which the bus route would be required to pass. This site has been allocated for future Student Housing and access to the site should be retained. The existing structure over Bin Brook within the private access road would need to be assessed for suitability for bus use.

The junction of Herschel Road and Grange Road would need to be signalised to provide bus priority and enable a bus to safely use the junction. The junction has tight corner radii around which buses would be required to turn to enter and exit Herschel Road. To the north there is a footway and large grass area in front of the Robinson College building which provides scope to widen the junction for buses turning left from Herschel Road to Grange Road. To the south is a footway and the boundary of the Clare Hall Elmside Building. Grange Road to the south narrows at this point and there is no scope to carry out sufficient widening to accommodate buses turning left into Herschel Road. It would therefore be necessary to set back the proposed signalised junction stop lines to elongate the junction area and allow buses to swing across the opposing carriageway lane when turning into the junction to prevent them over-running the footways.

The Herschel Road corridor between Grange Road and Sylvester Road is 12m in width comprising of an 8m width carriageway and 2m footways either side. Private property boundaries with mature trees line the road; the trees are positioned at the edge of the highway corridor, preventing major widening of the highway corridor. Due to the inconsistent position of property boundaries along Herschel Road there are a number of locations where the available highway corridor width is less than 12m. In these locations some localised land purchase would be required for some proposals to enable the boundary to be locally altered.

5.2.3 Non Motorised User provision

Herschel Road provides a link for cyclists between Grange Road, via Sylvester Road and Adams Road to the High Cross/Coton cycle path. Existing footways are of insufficient width to accommodate cyclists.

Pedestrian users are currently catered for with footways along Herschel Road; these should be retained by any alteration to the existing highway arrangement.

5.2.4 Environmental

A number of mature and semi mature trees line Herschel Road; these are predominantly within private property beyond the highway corridor. At the western end of the private section of Herschel Road a small wooded area of trees is present through which the bus route would pass requiring removal of trees; this area has been allocated for future Student Housing.

Any requirement to remove or carry out works to, or near to the trees as part of the bus route would require assessment by environmental specialists

5.3 Proposal 1 - Reduced width carriageway with parking restriction, designated parking areas south of the carriageway, footway/cycleway to the north side of the road.

Proposal 1 provides a narrowed carriageway width with parking restrictions to accommodate two way traffic flow and allow buses to travel along the road unimpeded. Parking areas are provided to the south to maintain resident parking. The proposed carriageway arrangement would continue through the Clare Hall West Court access road to connect with a busway to the west.

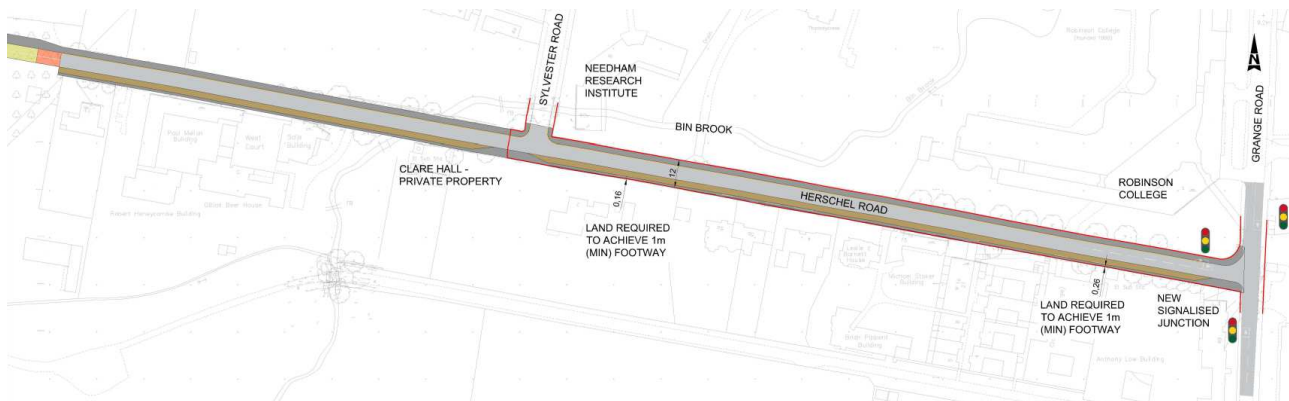


Figure 19 – Herschel Road - Proposal 1

The proposal would provide a 6m wide carriageway, with a 2.5m parking area to the south side of the road and parking restrictions along the north side of the road. A minimum 1.0m wide footway on the south side and a minimum 2.5m shared use footway/cycleway on the north side would be provided. This includes the section within the privately owned West Court access road west of the Sylvester Road junction, maintaining a 12m cross section width along the length of the route. A new signalised junction would be required at the junction with Grange Road to allow buses to turn into and out of Herschel Road.



Figure 20 – Herschel Road Proposal 1 Section

Provision of the 2.5m wide shared use footway/cycleway to the northern side of Herschel Road would provide a link to cycle provision on Grange Road to Sylvester Road which connects north to Adams Road and cycle path links to the west. This would prevent cyclists having to use the narrowed Herschel Road carriageway.

ADVANTAGES	DISADVANTAGES
Provides on street parking (230m, 59% of existing provision).	Substandard footway width to southern side of carriageway (1.0m) is below DDA guidance minimum width.
Provides a shared use footway/cycleway linking to Grange Road.	Buses utilising the public highway could lead to delays and unreliable journey times
	12m construction width would require additional slivers of private land

5.4 Proposal 2 - Reduced width carriageway with parking restrictions, footway/cycleway to the north side of the road.

Proposal 2 would provide a 6m carriageway with parking restrictions along both sides of Herschel Road to accommodate two way traffic flow and allow buses to travel the route unimpeded.

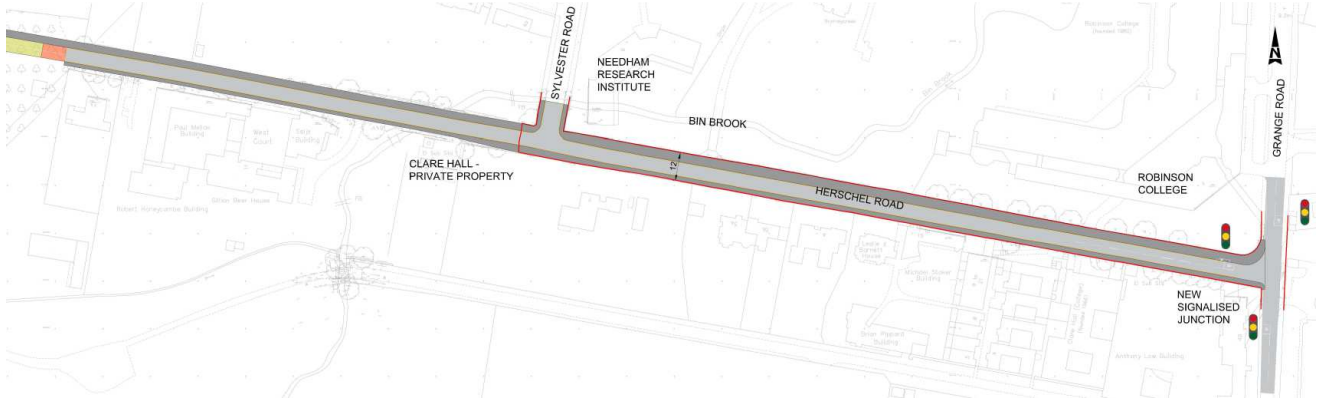


Figure 21 – Herschel Road - Proposal 2

A 4.0m wide footway/cycleway would be provided on the northern side of Herschel Road to provide a link between cycle provision on Grange Road to Sylvester Road which connects north to Adams Road and cycle path links to the west. This would prevent cyclists having to use the narrowed Herschel Road carriageway. The proposal provides a minimum of 2.0m width footway to the south side of the road. This includes the section within the privately owned West Court access road west of the Sylvester Road junction, maintaining a 12m cross section width along the length of the route. A new signalised junction would be required at the junction with Grange Road to allow buses to turn into and out of Herschel Road.



Figure 22 – Herschel Road Proposal 2 Section

ADVANTAGES	DISADVANTAGES
Provides a high quality shared use footway/cycleway link of 4.0m consistent with the proposed footway/cycleway widths alongside the busway to the west.	Removes all provision of on street parking.
Maintains two-way traffic flow on Herschel Road	Buses utilising the public highway could lead to delays and unreliable journey times.

5.5 Proposal 3 - Reduced width carriageway with parking restrictions, designated parking south of the carriageway.

Proposal 3 provides a narrowed carriageway width with parking restrictions to accommodate two way traffic flow and allow buses to travel the road unimpeded. Parking bays are provided to the south to maintain resident parking. The proposed carriageway arrangement would continue through the private Clare Hall West Court access road to connect with an off road bus route to the west.

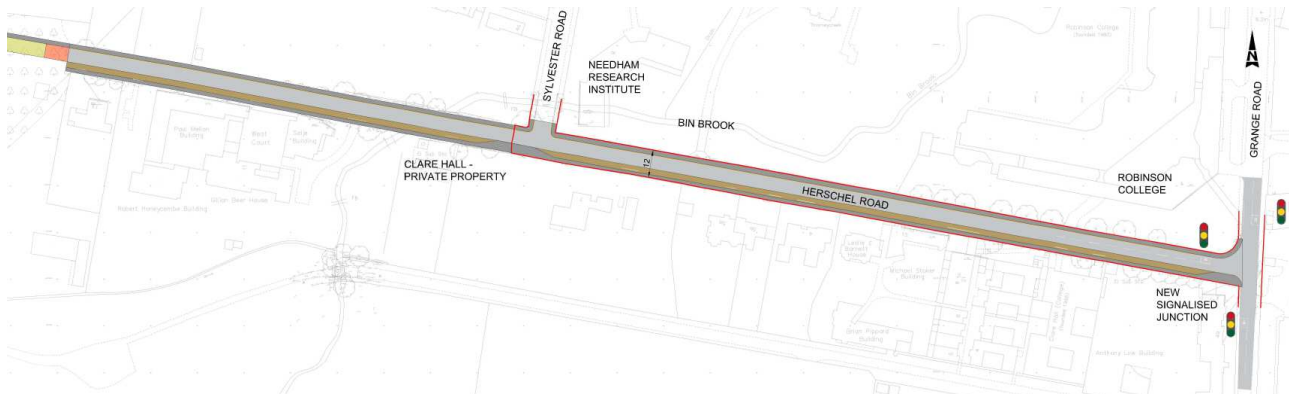


Figure 23 – Herschel Road - Proposal 3

This proposal provides a 6m carriageway, with 2.5m parking bay on the south side with minimum 1.5m wide footways on the south and north sides.

Cyclists would be required to use the carriageway as existing. A new signalised junction would be required at the junction with Grange Road to allow buses to turn into and out of Herschel Road.

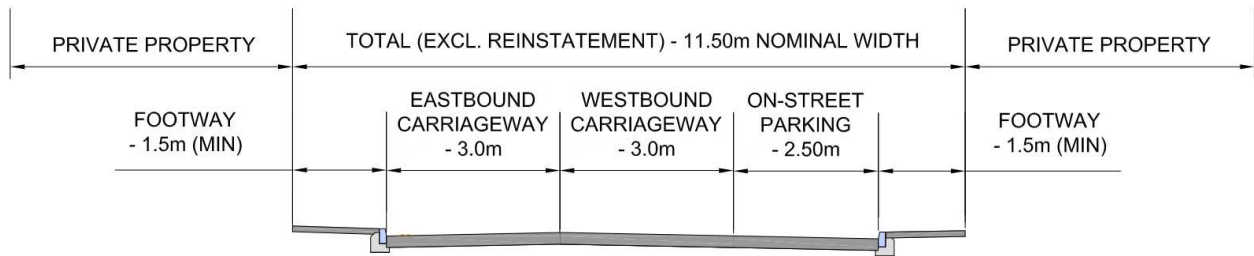


Figure 24 – Herschel Road Proposal 3 Section

ADVANTAGES	DISADVANTAGES
Retains on street parking (230m, 59% of existing)	No segregated provision for cyclists.
Maintains two-way traffic flow on Herschel Road	Buses utilising the public highway could lead to delays and unreliable journey times.

5.6 Buildability and Traffic Management.

Proposal 1 requires purchasing additional slivers of land due to the existing highway corridor not being sufficient to accommodate the required arrangement. Proposals 2 and 3 utilise the existing Herschel Road corridor without the need for additional land requirements beyond the highway boundary.

Traffic management restrictions and closures on Herschel Road would be required for all proposals to carry out construction activities. Works adjacent to the Clare Hall properties along the privately owned section of Herschel Road would need to be carefully managed to ensure access is provided during construction works. Localised traffic restrictions would be required on Grange Road to enable the junction works to be carried out. During school term time the section of Grange Road near the Herschel Road junction could become very busy at drop-off and pick up times; consideration should be given to timing works outside of these hours or during school holidays. Access to properties along Herschel Road would need to be maintained throughout the construction period. Underground utility services are present along Herschel Road, the extent of diversionary and protection works required to utilities would be determined at detailed design stage.

5.7 Safety Considerations

Proposal 1 utilises a 1.0m footway width. This is contrary to DDA guidance which recommends footway widths of 1.0m only over short lengths. This would potentially require a disabled user to cross to the northern side of Herschel Road to utilise the wider footway/cycleway.

Proposal 3 requires cyclists to use the Herschel Road carriageway, which would also be utilised for the bus route, increasing the risk of conflict.

5.8 Herschel Road Summary

Proposal 1 provides an on carriageway bus route and separate cycle provision but compromises on footway width to the south side of Herschel Road. The 1.0m footway is not achievable within the existing highways corridor due to the varying position of the highway boundary and does not comply with the minimum DDA guidance width of 1.5m. The proposal retains 230m of parking for residents.

Proposal 2 provides an on carriageway bus route with good cycling and pedestrian facilities but removes all on street parking. No land would be required beyond the highway boundary.

Proposal 3 provides an on carriageway bus route with standard width footways. No separate off carriageway cycle provision is included, with cyclists required to use Herschel Road. This could lead to safety concerns for cyclists and increased bus delays of them sharing the same space. No land is required beyond the highway boundary and this proposal retains 230m of parking.

In summary, it is not feasible to provide bus priority along Herschel Road; impacting on the speed and reliability of bus journeys, although suspending the on street parking would allow two vehicles to pass one another in opposing directions. All the proposals require the bus route to pass through the land of Clare Hall West Court and the site allocated for further student accommodation to the west, as well as signalisation of the junction with Grange Road. The proposals balance the need for dedicated pedestrian and cycle facilities with the need for parking bays, with the potential to accommodate up to 59% of the existing parking or a 4m shared use facility.

6 Rifle Range (or 'Rugby Club') Access Proposals

6.1 Existing Arrangement

The Rifle Range access is a narrow 380m long, 4.0m wide paved track positioned to the south of properties within Herschel Road and north of the University Rugby Club grounds. The track provides private access to the Rugby Club grounds and the practice/events fields to the west. The access track is generally unused but vehicular access is required for occasional use to the playing fields west of the rugby grounds which are owned by the University Rugby Club. The paved track ends at Bin Brook where there is a wooden structure and an unmade track continues on into agricultural land to the west.

The University Rugby Club to the south includes the rugby match ground with stands in close proximity to the boundary.

The access track corridor is bounded by a number of mature trees to the north, many of which fall within the boundary of adjacent property grounds and provide screening to the properties and gardens. To the south is timber fencing which delineates the boundary of the University Rugby Club grounds.

At the junction of the Rifle Range access track and Grange Road there is a kink in the alignment of Grange Road where it locally narrows past the Clare Hall Elmside property to the north. On the southern corner of the junction a mature tree is located to the rear of the Grange Road footway. The access track is gated to prevent public access.

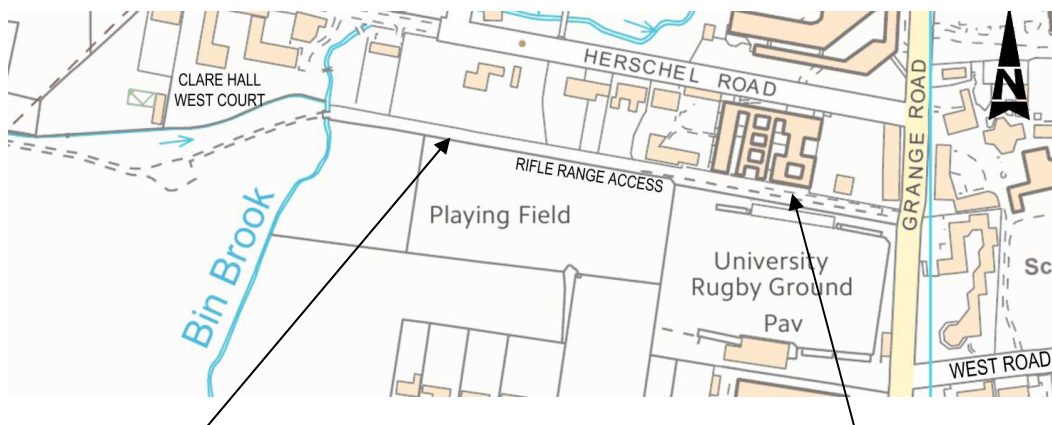


Figure 25 – Rifle Range Access Track

6.2 Existing Constraints

To provide a bus route utilising the corridor of land along the privately owned Rifle Range access track would require acquisition of the track as well as land adjacent to the corridor to accommodate the proposed bus route and adjacent footway/cycleway. The access track is currently gated to prevent public access and it is expected that measures to prevent public vehicles accessing the bus route land would be required. The following constraints have been identified along the Rifle Range access that would require consideration;

6.2.1 Alignment and land constraints

The access road corridor along which the proposed bus route would follow varies in width between 10m adjacent to the Clare Hall college properties at the Grange Road junction, widening to 13m through to the end of the Rugby Club ground, and then narrowing to 7m west of the Rugby Club ground to the crossing of Bin Brook. The position of the land boundaries is currently unknown, but is assumed for the purposes of this assessment to be from existing fences and/or buildings. Further investigation into the exact position of the boundaries should be carried out with development of proposals along the corridor.

At the eastern end land is constrained to the north by the Clare Hall college land and properties which is bounded by a line of trees. To the south the close proximity of the Rugby Club stands restrict any available land for widening the corridor in this area.

At the western end of the rugby playing pitch the access road corridor narrows to 7m in width as the fence line of the playing field area encroaches into the land on the southern side. Towards the western end of the access track assumed boundaries of private and university properties on the north side of the corridor encroach into the available land, with numerous mature trees along the boundary fence. The land use along this section, residential to the north with a number of different land owners, and playing fields to the south owned by the University Rugby Club, guide any land take requirement outside of the Rifle Range access corridor towards the southern side.

Vehicle access to the playing fields is required to be retained by the University Rugby club along the access road. It would be necessary to retain vehicle access within the proposed bus route arrangement along the access track. The junction of Rifle Range access and Grange Road would need to be signalised to provide bus priority and enable a bus to safely use the junction.

The junction of the Rifle Range access track and Grange Road has tight corner radii around which buses would be required to turn to enter and exit a busway along the track. To the north the Grange Road carriageway narrows to 6m from the western side due to the boundary of the Clare Hall Elmside properties. To the south the carriageway is 7m, with the rugby club fence line and a mature tree positioned at the back of the footway. These features restrict any potential widening of the junction to assist buses with turning to and from Grange Road. Land could be purchased at the junction to improve the alignment, but the position of the Clare Hall buildings to the north reduces the amount of land available without impacting on the buildings. The alternative proposal would be to set back the signalised junction stop lines to elongate the junction area and allow buses to swing across the opposing carriageway lane when turning into the junction to prevent them over-running the Grange Road footways.

6.2.2 Environmental

There are a number of mature and semi mature trees along the Rifle Range access, both within the assumed access track boundary and within private property beyond the corridor. The area either side of the access track within the assumed Rifle Range corridor is laid to grass. Proposed bus routes along the corridor would require the full width of the available land and additional land beyond the assumed boundary. An environmental and ecological assessment of the Rifle Range access would be required to determine any mitigation measures as part of the detailed design process.

6.3 Proposal 1 – Unguided and guided busway provided to the south with a footway/cycleway to the north side.

Proposal 1 provides a section of bus only road between the junction with Grange Road and the rugby club playing fields at the western end of the University Rugby Club grounds. This unguided section enables vehicular access to be retained to the playing fields. West of the playing fields access the bus route would be a guided busway, linking to off road alignments to the west. The use of a private access road would enable buses to operate at higher speeds than on-road proposals which would be required to comply with the 20mph speed restrictions on the adjacent roads

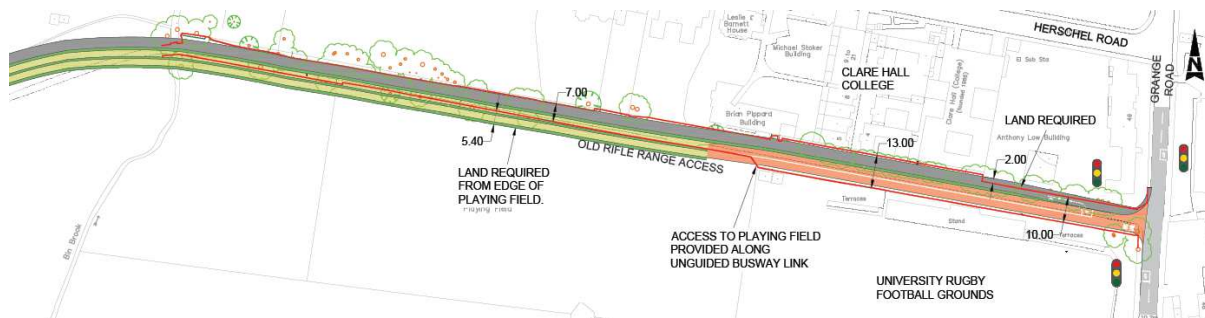


Figure 26 – Rifle Range Access - Proposal 1

The eastern end between the playing field access and the junction with Grange Road would be a 6m bus only road allowing authorised vehicles to access the rugby club playing field. The western end from the playing field access to the west would utilise a guided busway arrangement. A 4m wide busway maintenance track utilised as a shared use footway/cycleway would link cycle routes along Grange Road with the proposed shared use footway/cycleway running alongside the busway to the west. Signalisation of the junction with Grange Road would be required.



Figure 27 – Rifle Range Access Proposal 1 Section

Figure 28 – Rifle Range Access Proposal 1 Section

Proposal 1 cannot be accommodated fully within the existing Rifle Range access road corridor, requiring additional land on both sides, and a number of trees within these land areas to be removed.

An additional 66m long strip to the northern side of the corridor at the eastern end is required with a maximum width of approx. 2.0m. The land is owned by Clare Hall College. This area of land contains a line of semi mature trees which would require removal.

A 237m long strip of land to the southern side from the rugby ground boundary west, within the playing field area is required, maximum width of approx. 5.4m.

ADVANTAGES	DISADVANTAGES
Bus priority with segregated guided busway.	Additional land requirements beyond Rifle Range corridor with removal of trees required.
Access to playing field maintained	Poorly aligned access from Grange Road
Provides a shared use footway/cycleway	Potential unauthorised access to the unguided bus lane section.

6.4 Proposal 2 - Unguided busway provided to the south with a footway/cycleway to the north side.

Proposal 2 provides a 6m bus only road to the south allowing authorised vehicle access to the playing fields and a shared use footway/cycleway to the north.



Figure 29– Rifle Range Access - Proposal 2

The use of an unguided bus only road would remove the need for a maintenance track, allowing the shared use footway/cycleway width to be reduced to 3.5m. The need to provide separation strips between the footway/cycleway and the busway would also be removed, allowing the overall cross section to be reduced and the quantity of additional land required to be minimised. Due to the bus only road being unguided a reduced speed limit would be required compared to guided busway proposals.

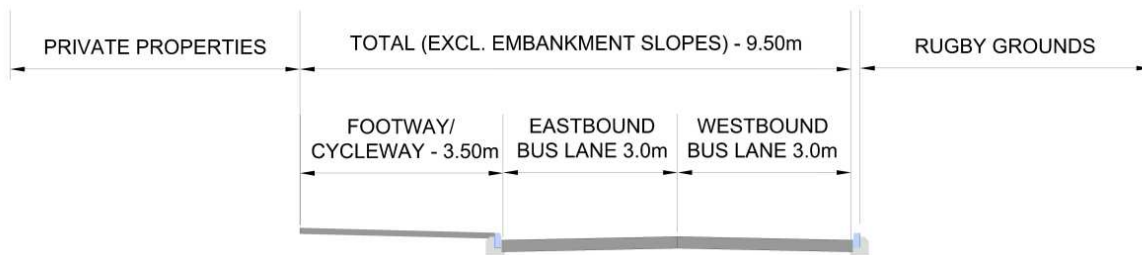


Figure 30 – Rifle Range Access Proposal 2 Section

Proposal 2 cannot be accommodated fully within the existing Rifle Range access road corridor, requiring additional land on the southern side and a number of trees to be removed. A length of 237m to the south from the rugby ground boundary within the playing field with a maximum width of approx. 2.5m would be required. Signalisation of the junction with Grange Road would be required.

ADVANTAGES	DISADVANTAGES
Bus priority segregated unguided bus lane.	Additional land requirements beyond Rifle Range corridor with removal of trees required.
Access to playing field maintained.	Poorly aligned access from Grange Road.
Provides a shared use footway/cycleway.	Bus speeds would need to be restricted.
Reduced construction width and additional land area requirements.	Unauthorised access to the bus lane.

6.5 Proposal 3 - Guided busway provided to the north with a footway/cycleway to the south side.

Proposal 3 provides a guided busway the length of the Rifle Range access track. A busway maintenance track would be provided alongside the busway utilised as a 4m wide shared use footway/cycleway. Authorised vehicular access would be provided to the University Rugby Club playing fields by permitting vehicles to utilise the maintenance track alongside the busway.

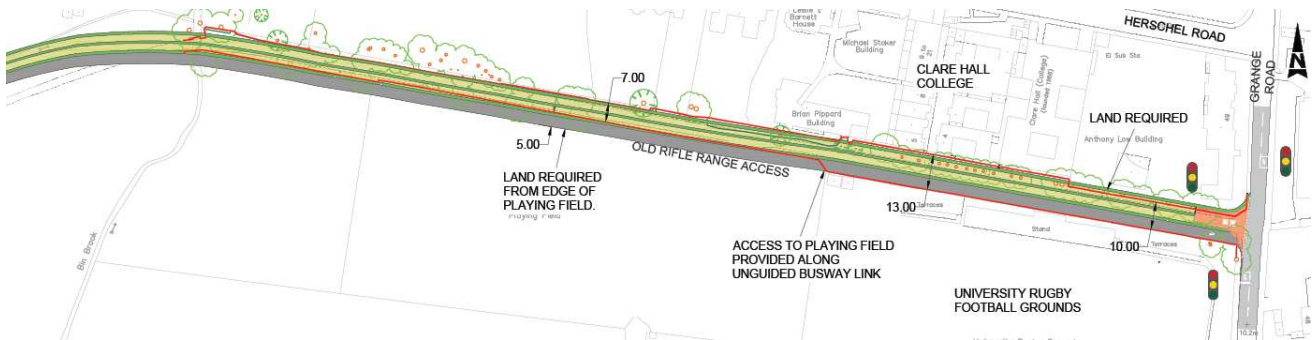


Figure 31– Rifle Range Access - Proposal 3

Provision of a guided busway arrangement along the Rifle Range access would allow higher vehicle speeds to be maintained for the length of the route. The use of the maintenance track to provide access to the playing fields would reduce the potential for disruption to buses using the route, providing greater journey time reliability.

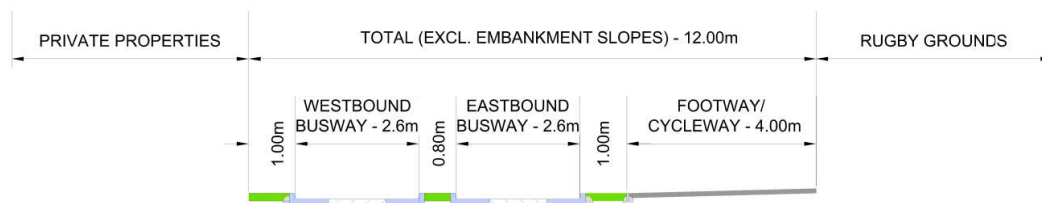


Figure 32 – Rifle Range Access Proposal 3 Section

Proposal 3 cannot be accommodated fully within the existing Rifle Range access road corridor, requiring additional land on both sides, and a number of trees within these land areas to be removed.

An additional 66m long strip to the northern side of the corridor at the eastern end is required with a maximum width of approx. 2.0m. The land is owned by Clare Hall College. This area of land contains a line of semi mature trees which would require removal.

A 237m long strip of land to the southern side from the rugby ground boundary west, within the playing field area is required, maximum width of approx. 5.0m.

A new signalised junction would be required at the junction with Grange Road.

ADVANTAGES	DISADVANTAGES
Bus priority with segregated guided busway.	Additional land requirements beyond Rifle Range corridor with removal of trees required.
Access to playing field maintained.	Poorly aligned access from Grange Road
Provides a shared use footway/cycleway	Conflict between cyclists and vehicles using the maintenance track for access
Higher bus speed permitted	

6.6 Buildability and Traffic Management.

The Rifle Range access track bus route proposals require land purchase to construct segregated busways and shared use footway/cycleway facilities. Proposal 1 and 3 require most land due to wider construction widths. The existing Rifle Range access track is generally free from obstructions with minimal utility services. The route is free from traffic and is not a public right of way making construction within the site less onerous in terms of traffic and pedestrian management. The narrow width of the corridor would be restrictive to construction activities, but less so than other proposals which are required to be constructed in traffic management on the public highway.

6.7 Safety Considerations

The junction of the Rifle Range access and Grange Road has poor visibility due to existing boundaries. It would therefore be necessary to install traffic signals, however buses exiting the busway would not have site of vehicles until they have entered Grange Road.

6.8 Rifle Range Access Summary

Proposal 1 provides a segregated busway arrangement along part of the access road corridor, whilst maintaining access to the playing field area.

Proposal 2 provides a segregated bus only road with reduced Proposal 2 requires additional land take from the playing field (owned by the University Rugby Club) only additional land requirements. Bus speeds would be reduced in line with unsegregated busway proposals

Proposal 3 provides a segregated guided busway with reduced additional land requirements. Bus speed can be maintained with a fully segregated busway.

In summary the Rifle Range access is segregated from the public highway; this provides greater journey time reliability than Adams Road, Herschel Road and Cranmer Road, and permits segregated bus rapid transit using a guided busway for the entire length, a bus only road or a combination of the two. All proposals would include an off-road footway/cycleway, improving pedestrian/cyclist safety. The track and verge are too narrow to accommodate the full width of a busway and footway/cycleway arrangements, requiring some adjacent land take in all proposals.

7 Cranmer Road Proposals

7.2 Existing Arrangement

Cranmer Road is 7.5m wide two-way single carriageway road 405m in length with footways on both sides. The road connects to Grange Road to the eastern end. At the western end of the road is a controlled entrance to the Corpus Christi sports centre and a permissive use footpath that leads to Gough Way to the south. The road has a 20mph speed limit with residential properties along the majority of its length. Cripps Court (Selwyn College) is positioned on the northern side at its junction with Grange Road. Unrestricted on road parking is permitted along the length of the carriageway (total 510m). The existing residential properties along Cranmer Road in general have off street parking, a number of the properties have been subdivided into apartments.

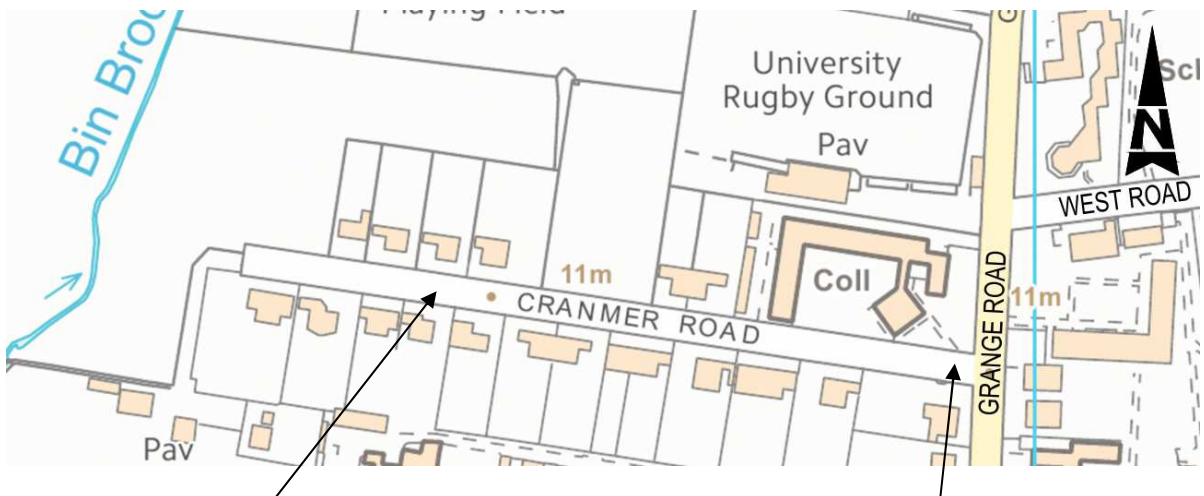


Figure 33 – Cranmer Road

7.3 Existing Constraints

Provision of a bus route along Cranmer Road connecting an off line bus route to the west with Grange Road would require alteration to the existing Cranmer Road configuration to accommodate the bus route and ensure journey times would not be disrupted. The following constraints have been identified along Cramer Road that would require consideration;

7.3.1 Parking

On road parking for public vehicles is currently permitted much of the length of Cranmer Road along both sides, which reduces the effective width to a single lane without adequate space for two opposing vehicles to pass one another. Residential properties along the length of the road generally have off road parking provision, however a number have been subdivided into accommodation facilities which may not have adequate parking off road for the multiple residents. It is expected that the parking along the Cranmer Road is a combination of local residents and commuters using the area to park to access the City centre.

7.3.2 Carriageway alignment and land constraints

The junction of Cranmer Road and Grange Road would need to be signalised to provide bus priority and enable a bus to safely use the junction.

The junction of Cranmer Road and Grange Road has tight corner radii around which buses would be required to turn to enter and exit the road. To the northern corner a short wall is located at the rear of the footway with a lawn area beyond in front of Cripps Court, with appropriate land purchase there is scope to improve the junction in this area. To the southern corner is an established wall to the residential corner property, with the property gardens beyond. Removal of the wall and land purchase to enable junction widening may be more difficult in this area. The alternative would be to set back the proposed signalised junction stop lines to elongate the junction area and allow buses to swing across the opposing carriageway lane when turning into the junction to prevent them over-running the footways.

At the western extent of Cranmer Road the carriageway meets an automatic barrier restricting access to a private road to the Corpus Christi sports ground. To the northern side of the access track a permissive use footpath is provided which follows alongside the sports field access towards the south leading to Gough Way; open farm land is present further west through which Bin Brook passes. Any busway through this area would be required to cross Bin Brook.

The Cranmer Road corridor is 13m in width comprising of a 7.5m width carriageway and 2.8m footways either side. This provides a wider corridor than other Grange Road link proposals discussed in this Report.

7.3.3 Non Motorised User provision

Cranmer Road does not provide a through route for cyclists. The Gough Way footpath at the western end of the road is narrow and poorly aligned being suitable for pedestrian users only.

Pedestrian users are currently catered for with footways along Cranmer Road; these shall be retained by any alteration to the existing highway arrangement.

7.3.4 Environmental

There are a number of mature and semi mature trees along Cranmer Road within private property beyond the highway boundary. Any requirement to remove or carry out works to, or near to the trees as part of the busway would require assessment by environmental specialists.

7.4 Proposal 1 – Reduced width carriageway with parking restrictions, designated parking south of the carriageway, footway/cycleway to the north side of the road.

Proposal 1 provides a narrowed carriageway width with parking restrictions to provide two way traffic flow and allow buses to travel the road unimpeded. A parking area would be provided to the south side to maintain resident parking.



Figure 34– Cranmer Road - Proposal 1

Proposal 1 provides a 6m carriageway, with 2.5m parking area (232m) to the south side of Cranmer Road and parking restrictions along the north side of the road. A minimum 1.5m footway on the south and a minimum 3m shared use footway/cycleway on the north would be provided. A new signalised junction would be required at the junction with Grange Road to allow buses to turn into and out of Cranmer Road.

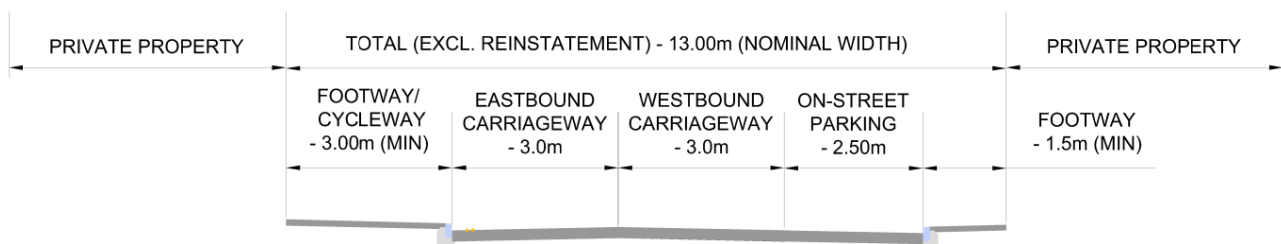


Figure 35 – Cranmer Road Proposal 1 Section

Provision of the 3.0m wide shared use footway/cycleway to the northern side of Cranmer Road would provide a link to cycle provision on Grange Road with footway/cycleway provision along the proposed busway to the west. This would prevent cyclists having to use the narrowed Cranmer Road carriageway.

ADVANTAGES	DISADVANTAGES
Provides on street parking (232m, 45% of existing)	Buses utilising the public highway could lead to delays and unreliable journey times
Provides a Shared use footway/cycleway	Southern footway is narrowed compared with the existing width.

7.5 Proposal 2 - Parking restrictions, footway/cycleway to the north side of the road.

Proposal 2 would provide a 7m carriageway with parking restrictions along both sides of Cranmer Road to provide two way traffic flow and allow buses to travel the route unimpeded.



Figure 36– Cranmer Road - Proposal 2

Provision of the 3.5m wide shared use footway/cycleway to the northern side of Cranmer Road would provide a link to cycle provision on Grange Road with footway/cycleway provision along the proposed busway to the west. A 2.5m footway would be provided to the south side of Cranmer Road. A new signalised junction would be required at the junction with Grange Road to allow buses to turn into and out of Cranmer Road.

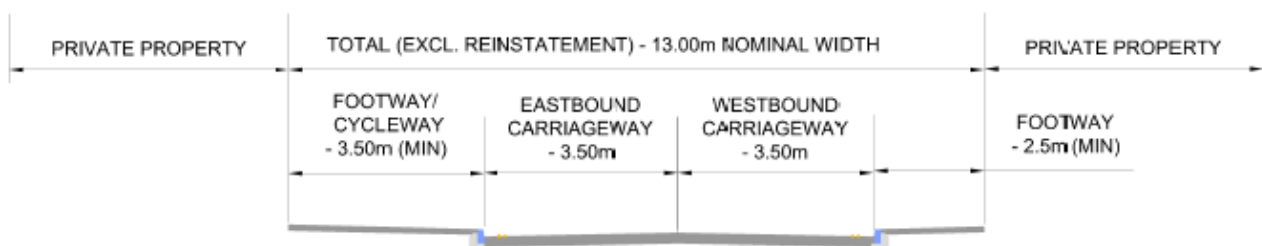


Figure 37 – Cranmer Road Proposal 2 Section

ADVANTAGES	DISADVANTAGES
Provides a shared use footway/cycleway link of 3.5m wide.	Removes all provision of on street parking.
Maintains two-way traffic flow on Cranmer Road	Buses utilising the public highway could lead to delays and unreliable journey times.
Provides 3.5m carriageway lanes.	Small reduction in footway width on the south side.

7.6 Proposal 3 - Parking restrictions, designated parking bays south of the carriageway.

Proposal 3 provides a 7m wide carriageway width with parking restrictions to provide two way traffic flow and allow buses to travel the road unimpeded. A parking area would be provided to the south to maintain resident parking.



Figure 38– Cranmer Road - Proposal 3

This proposal provides a 7m carriageway, with 2.5m parking area (232m) and a minimum 1.5m footway on the south and a minimum 2m footway on the north. A new signalised junction would be required at the junction with Grange Road to allow buses to turn into and out of Cranmer Road.

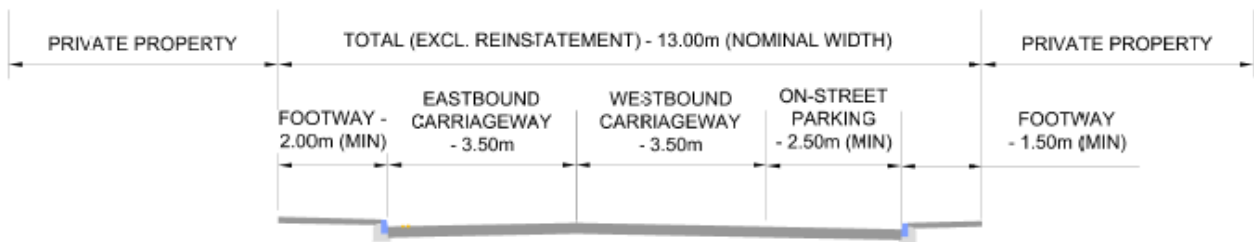


Figure 39 – Cranmer Road Proposal 3 Section

ADVANTAGES	DISADVANTAGES
Provides on street parking (232m, 45% of existing)	No segregated provision for cyclists.
Maintains two-way traffic flow on Cranmer Road	Buses utilising the public highway could lead to delays and unreliable journey times.
Provides 3.5m carriageway lanes.	Southern footway is narrowed compared with the existing width.

7.7 Proposal 4 - Parking restrictions, designated parking bays south of the carriageway.

Proposal 4 provides a 6m wide carriageway width with parking restrictions to provide two way traffic flow and allow buses to travel the road unimpeded.



Figure 40– Cranmer Road - Proposal 4

Provision of the 2.5m wide shared use footway/cycleway to the northern side of Cranmer Road would provide a link to cycle provision on Grange Road with footway/cycleway provision along the proposed busway to the west. A 1.5m footway would be provided to the south side of Cranmer Road. A new signalised junction would be required at the junction with Grange Road to allow buses to turn into and out of Cranmer Road.

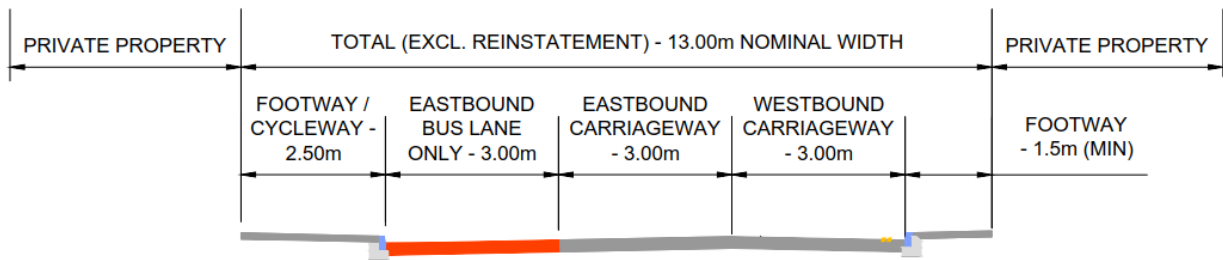


Figure 41 – Cranmer Road Proposal 4 Section

ADVANTAGES	DISADVANTAGES
Provides a shared use footway/cycleway link of 2.5m wide.	Removes all provision of on street parking.
Maintains two-way traffic flow on Cranmer Road	Southern footway is narrowed compared with the existing width.
Provides bus priority inbound joining Grange Road.	Bus Lane is narrow potentially leading to conflict with cyclists

7.8 Buildability and Traffic Management.

All proposals utilise the existing Cranmer Road corridor without the need for additional land requirements beyond the highway boundary.

Traffic management restrictions and closures on Cranmer Road would be required for all proposals to carry out construction activities. Localised traffic restrictions would be required on Cranmer Road to enable the junction works to be carried out. Access to properties and the Corpus Christi sports centre would need to be maintained throughout the construction period. Underground utility services are present along Cranmer Road, the extent of diversionary and protection works required to utilities would be determined at detailed design stage.

7.9 Safety Considerations

Proposal 3 requires cyclists to use the Cranmer Road carriageway, which would also be utilised for the busway, increasing the risk of conflict over the existing situation.

Proposal 4 includes the construction of a 3m wide bus lane. Due to the narrow width of the bus lane there is a potential for conflict with cyclists using the bus lane.

7.10 Cranmer Road Summary

Proposal 1 provides an on carriageway busway and separate shared use footway/cycleway provision.

Proposal 2 provides an on carriageway busway and separate cycle provision. All parking has been removed to provide improved widths for all users, but would impact on local residential properties that have insufficient parking.

Proposal 3 provides an on carriageway busway with standard width footways. No separate off carriageway cycle provision is included, with cyclists required to use Cranmer Road. This could lead to safety concerns for cyclists and increased bus delays of them sharing the same space.

Proposal 4 provides an inbound bus priority along the length of Cranmer Road. Good pedestrian facilities and some cycling facilities would be provided. However, no parking facilities are possible and the bus lane is narrow, leading to safety concerns for cyclists who use it.

In summary, it is possible to provide bus priority along Cranmer Road, improving journey time reliability for bus users, although there may be some safety concerns with doing so. Cranmer Road has a wider corridor than other on-road proposals (Adams Road and Herschel Road), therefore less compromise is required between bus priority, parking, pedestrian and cyclist provision. Other proposals that don't provide bus priority are possible, with the potential to accommodate up to 45% of the existing parking along with a 3m shared use facility. Suspending the on street parking would allow two vehicles to pass one another in opposing directions.

8 Conclusions and Next Steps

Adams Road, Cranmer Road and the Rifle Range access have the ability to provide varying levels of bus priority, with the Rifle Range able to provide segregated bus rapid transit through the use of a guided busway or bus only road. If bus priority was to be provided along Adams Road, there would potentially be a negative impact on cyclist safety due to the conflict with buses on this busy cycle route. Cranmer Road has a wider corridor width, providing a shared use footway/cycleway in all proposals and retaining parking provision in some.

Herschel Road cannot provide bus priority, although improved walking and cycling facilities can be provided, as well as suspending the on street parking to allow two vehicles to pass one another in opposing directions. .

Further consultation with local stakeholders is encouraged to determine the specific impact the proposals would have. The Adams Road, Herschel Road and Cranmer Road proposals can all be provided within the public highway. The Rifle Range access proposals would all require land purchase, therefore early engagement with land owners would be prudent.

Appendix A – Drawings

Rifle Range access track

- DWG 5040372/HW/FS/050
- DWG 5040372/HW/FS/051
- DWG 5040372/HW/FS/052

Adams Road

- DWG 5040372/HW/FS/060
- DWG 5040372/HW/FS/061
- DWG 5040372/HW/FS/062
- DWG 5040372/HW/FS/063

Herschel Road

- DWG 5040372/HW/FS/080
- DWG 5040372/HW/FS/081
- DWG 5040372/HW/FS/082

Cranmer Road

- DWG 5040372/HW/FS/070
- DWG 5040372/HW/FS/071
- DWG 5040372/HW/FS/072
- DWG 5040372/HW/FS/073

