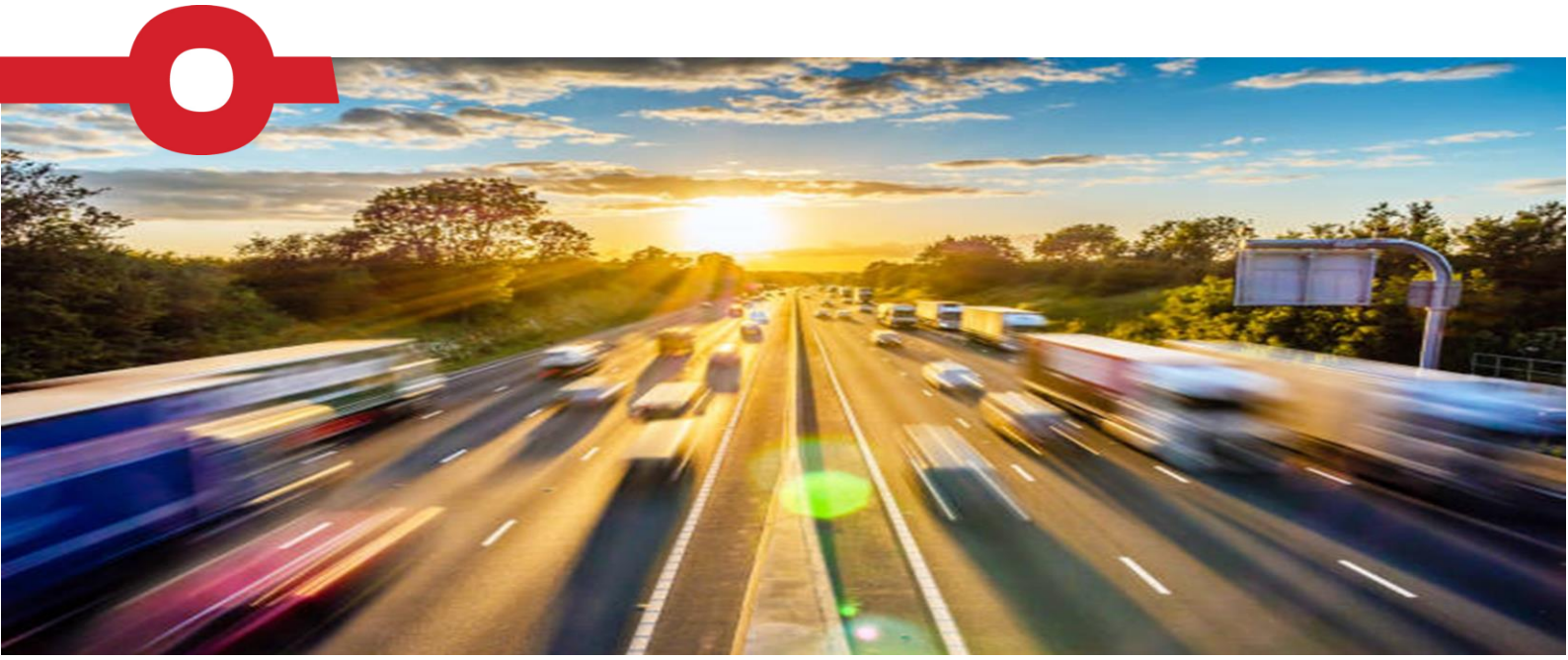
Appendix B – Mid Sussex Junction Mitigation Cost Estimate Report

Mid Sussex District Council Local Plan Transport Study
Reference number GB01T24C55/RPT/05

27/09/2024

JUNCTION MITIGATION COST ESTIMATES REPORT



MID SUSSEX DISTRICT COUNCIL

SYSTRA

MID SUSSEX DISTRICT COUNCIL LOCAL PLAN TRANSPORT STUDY

JUNCTION MITIGATION COST ESTIMATES REPORT

IDENTIFICATION TABLE	
Client/Project owner	Mid Sussex District Council
Project	Mid Sussex District Council Local Plan Transport Study
Study	Junction Mitigation Cost Estimates Report
Type of document	Technical Note
Date	27/09/2024
Reference number	GB01T24C55/RPT/05

APPROVAL

Version	Name		Position	Date	Modifications
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	Approved by	Darren Miller	Director	09/09/2024	
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	Approved by	Darren Miller	Director	19/09/2024	
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	Approved by	David Hudson	Engineer	27/09/2024	

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1.1 Overview

1.1.1 As part of the Mid Sussex Local Plan Transport Study undertaken by Systra, there is a costing exercise has been carried out on the latest junction mitigation design drawings for the 12 junctions associated with the Safety Mitigation and A23 Merge Diverge Assessment schemes.

1.1.2 To provide an indication to Mid Sussex of construction costs, a cost estimate has been completed for each junction high level discussion and comparison.

1.1.3 Given the level of design that has been carried out at this stage, the costings are based on a high level bill of quantity assessments. Taking the main quantities for parts of construction such as new pavement; footways; kerbs.

1.2 Standards

1.2.1 The cost estimate has been prepared in accordance with the Manual of Contract Documents for Highway Works using the Method of Measurement for Highway works laid out in Volume 4, Section 1. To provide a robust cost estimate, the rates assumed are based on experience and a review of SPON's Civil Engineering and Highway Works Price Books 2024. It is noted that these rates may differ from the rates generally used by MSDC.

1.3 Cost Estimation Method

1.3.1 The cost estimates have been split into 3 parts, firstly a works estimate based on identified costs for construction works. Further to this, additional uplifts have been added to make allowance with costs associated with the project outside of the physical works. Finally, Optimism Bias has been identified to cover any further unknown costs.

Works Estimate

1.3.2 The following design series or discipline items have been assessed, these series relate to the Design Manual for Roads and Bridges (DMRB) series and are limited to those series that was felt there was sufficient information in the designs at this stage to be able to provide a quantity for based on the benchmarking process.

- 100 Series - Preliminaries
- 200 Series - Site Clearance
- 400 Series - Safety Barriers (Vehicles and Pedestrian)
- 500 Series – Drainage
- 600 Series - Earthworks
- 700 Series - Pavements
- 1100 Series - Kerbs, Footways and Paved Areas
- 1200 Series - Traffic Signs and Road Markings
- 1250 Series - Traffic Signals
- 1300 Series - Street Lighting
- 1400 Series - Electrical Work for Road Lighting and Traffic Signs
- Utilities

- Other

Uplifts outside of physical works

- Risk - risk has been identified at 40%, this is standard practice for designs at this level of detail.
- Inflation - inflation has been included in the calculations as it is assumed that this will be accounted for in indexation rates to be agreed.
- VAT - VAT has not been included in the calculations.
- Utilities and contingencies - utilities and contingencies has been identified at 20%
- Traffic management -traffic management has been identified at 20%
- Design Fees – design fees have been identified at 15%

Optimism Bias

1.3.3 We have provided costs including allowances for Optimism Bias. This is to redress the tendency of being optimistic about the project, therefore we have to make explicit, empirically based adjustments to the estimates of a project's costs, benefits, and duration. The 3% is the Lower band figure for Capital Expenditure Optimism Bias as stated in Table 1 of the Supplementary Green Book Guidance. 44% is the Upper band figure which is what we have suggested should be used to provide a better estimate of the likely capital costs and to provide an element of contingency due to the number of unknowns.

1.4 Assumptions and Exclusions

1.4.1 To provide of these estimates, the following assumptions/exclusions were also made:

- Earthworks – only excavation of road box and limited 1 in 3 embankments assumed
- New vehicle restraint systems have only been allowed for where the widening works are being undertaken but no allowance for upgrading any existing systems that it would be tying into
- Resurfacing works have been allowed for where widening work is being undertaken
- All excavation material has been assumed unacceptable for reuse
- Drainage – only amendment of existing system – no upgrades
- A nominal allowance has been made for utility protection/diversion measures
- Traffic Management would require 1 full lane closure
- Street lighting is limited to relocation of lighting columns
- The Hickstead scheme overbridge does not require any structural improvements and the widening can be facilitated

Please also note that the estimates exclude the following:

- Supervision fees
- Land purchase costs
- Legal fees
- Highway Authority Fees
- Any decontamination and groundworks geotechnical fees.
- Any structures required

1.4.2 If further detail/information is required, we can carry out take-offs based on our design however, we feel given the high level design at this stage, there would be no further surety on the costings and therefore there would still be significant assumptions, caveats and risks at this stage of the project. To provide a further robust cost estimate, further design would have to be undertaken to the detailed stage with suitable topographical survey, Site Investigation undertaken, 3D design, C3 utility quotations and to finalise signal and signage requirements. This will provide further detail on earthworks and utility costs/implications and highlight any further issues that maybe raised from receipt of the additional information and in turn provide further surety of the total costs.

1.5 Cost Estimate Breakdown - Quantity / BOQ Methods

1.5.1 The figures identified in the works estimates are based on SPONs 2024.Cost estimate has been split into series as identified in Manc MCHW and detailed below.

Preliminaries

1.5.2 The preliminaries cover items including, but not limited to, temporary accommodation and welfare facilities, offices and stores as well as traffic management. 12% of the total construction cost has been included to factor in the preliminary items.

Site Clearance

1.5.3 Site clearance costs are based on calculations of the area of the site with allowance for some movement in rate based on engineering judgement of furniture and materials present.

Safety Barriers (Vehicles and Pedestrian)

1.5.4 The safety barriers and permanent bollards have generally been calculated based on extents and numbers of items proposed as a direct take-off from the drawings.

Drainage

1.5.5 The drainage costs have been calculated based on engineering judgement focused on the extent of major works to realign kerb lines as well as the change between soft and hard landscaped areas which might suggest requirement for new connections into the mains sewer, new carrier pipes and attenuation.

Earthworks

1.5.6 Earthworks includes the excavation for full depth carriageway, this would include existing footway and pedestrian islands which will become carriageway.

Pavements

1.5.7 The pavement costs have been calculated based on estimated areas of new full depth carriageway and areas of proposed re-surfacing.

Full Depth Carriageway Construction:

The full depth carriageway areas have generally been assumed to be those areas of the proposed schemes where areas of carriageway footprint are required. These areas have been identified through measurement with some optional rounding to make allowance for some additional areas based on engineering judgement following visual assessment of topography and to allow for construction joints at tie-ins.

Carriageway Resurfacing:

Carriageway resurfacing areas have been assumed as those areas where proposed carriageway matches the footprint of the existing. These areas have been identified through measurement based on assumed extents of new surfacing related to kerb line tie-ins and road marking extents.

Kerbs, Footways and Paved Areas

1.5.8 These areas have been identified through measurement with some deviation based around existing footway materials in area and assumed extents of footways and kerbing based on engineering judgement.

Traffic Signs and Road Markings

1.5.9 These areas and signs have been identified based on carriageway resurfacing / construction, kerb alignment and proposed footway build out.

Traffic Signals

1.5.10 The traffic signals have generally been calculated based on numbers of signal poles proposed as a direct take-off from the drawings. Some allowance in the costings have been made to allow for additional complexities that may be present including ducting requirements and any thoughts about high level signals or more complex and expensive signalling equipment.

Street Lighting

1.5.11 The street lighting has generally been calculated based on the assumption that any lighting columns removed due to adjacent kerb realignment were to be replaced. The cost range for the calculation was dependent upon height of columns and with allowance for lit signs and ducting and cabling as appropriate.

Utilities

1.5.12 The figures have been derived from a high level review of what utilities boxes and pits are obviously present and the amount of works required (in particular the amount of existing footway proposed to be converted to carriageway).

1.5.13 For reference in the upcoming chapter, the **Table 1** below explains series break down

Table 1. Series Type Description

SERIES TYPE	
Series	**Description**
100	Preliminaries
200	Site Clearance
400	Safety Barriers (Vehicles and Pedestrian)
500	Drainage and Service Ducts
600	Earthworks
700	Pavements
1100	Kerbs, Footways and Paved Areas
1200	Traffic Signs, Signals and Road Markings
1300	Road Lighting Columns and Brackets and Cantilever Masts
1400	Electrical Work for Road Lighting and Traffic Signs

2. JUNCTION COST ESTIMATES – SAFETY SCHEME

2.1 Cuckfield Road/Gatehouse Lane/Bishopstone Lane

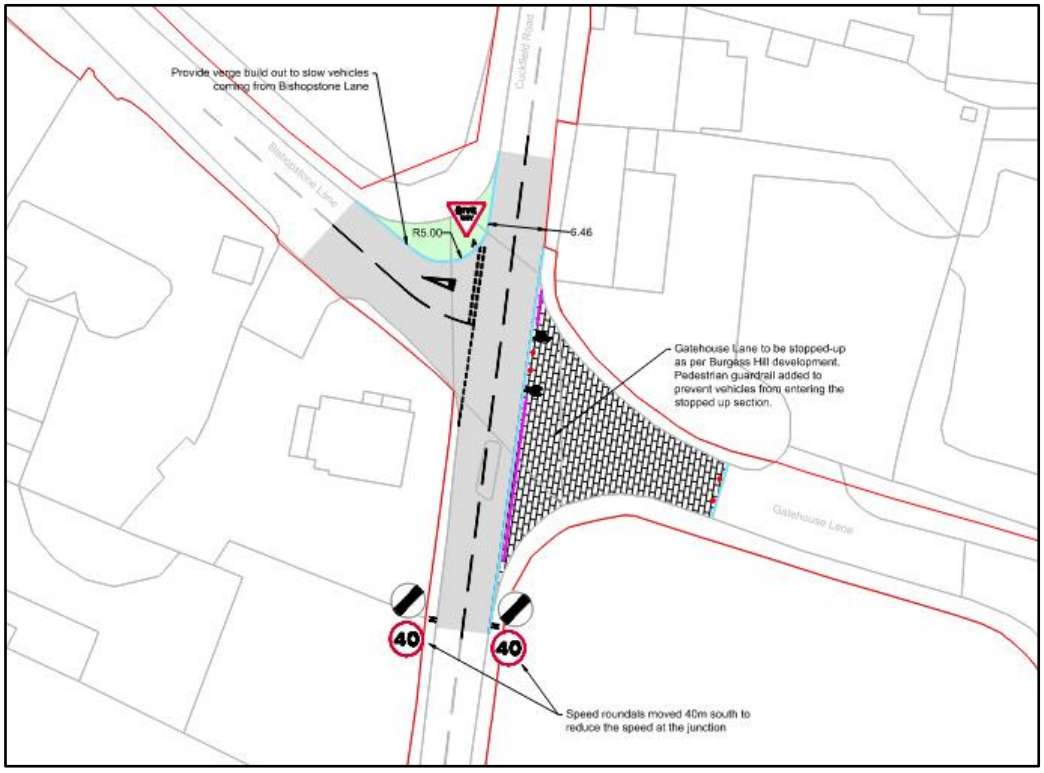
2.1.1 The existing layout consists of the north and southbound single carriage of Cuckfield road with T-junctions of Gatehouse Lane to the East and Bishopstone Lane to the West. These are located directly opposite one another.

2.1.2 The location of Cuckfield Road is shown in **Figure 1.**

Figure 1. Aerial view of existing Bishopstone Lane junction

2.1.3 The proposed design, pictured in **Figure 2** involves the stopping up of Gatehouse Lane with pedestrian guardrails and bollards. This design also proposes an altered radius of the northern kerb line where Bishopstone Lane joins Cuckfield Road, in order to provide improved visibility for those joining the carriageway.

Figure 2. Proposed design of Bishopstone Lane improvements



2.1.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 2** for an estimate summary.

2.1.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 2. Costing summary of Bishopstone Lane junction proposed design

Cuckfield Road/Gatehouse Lane/Bishopstone Lane		
Costing Summary		
Element	**Description**	**Amount**
Construction Cost	**Total of all series**	**114,836.92**
Utilities & Contingency	20%	22,967.38
Traffic Management	20%	28,709.23
Total Construction Cost	**Total TM and Contingency**	**166,513.54**
Design Fees	15%	17,225.54
Optimism Bias	44%	80,845.19
Total Project Cost		**£264,584.27**

*Refer to specific appendix for further breakdown of cost calculations.

2.2 A281/B2117/Shaves Wood Lane

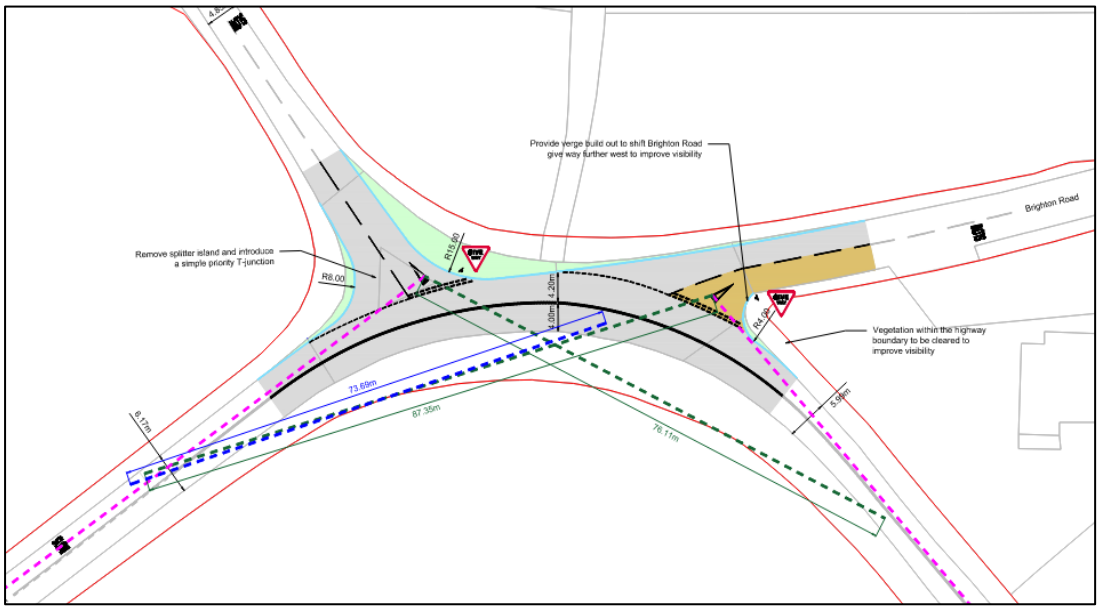
2.2.1 Currently the A281 is a single carriageway comprising of sharp southeastern bend with adjoining roads of the B2117 and Shaves Wood Lane. There are large amounts of vegetation hindering visibility for vehicles joining the A281 from the B2117, particularly in the southern direction. Shaves Wood Lane comprises of a junction with central island, restricting larger, articulated vehicles from entering and exiting the junction safely.

2.2.2 This road network is demonstrated by the aerial image in **Figure 3**.

Figure 3. Aerial view of A281/B2117/Shaves Wood Lane existing road layout

2.2.3 The proposed design, pictured in **Figure 4** suggests the removal of the Shaves Wood Lane Island and changes in kerb lines of both junctions. This is a cost-effective solution allowing an increased turning area for larger vehicles as well as improved visibility.

Figure 4. Proposed design of A281/B2117/Shaves Wood Lane improvements



2.2.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 3** for an estimate summary.

2.2.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 3. Costing summary of A281/B2117/Shaves Wood Lane proposed design

A281/B2117/Shaves Wood Lane		
Costing Summary		
Element	**Description**	**Amount (£)**
Construction Cost	**Total of all series**	**148,905.08**
Utilities & Contingency	20%	29,781.02
Traffic Management	20%	37,226.27
Total Construction Cost	**Total TM and Contingency**	**215,912.36**
Design Fees	15%	22,335.76
Optimism Bias	44%	104,829.17
Total Project Cost		**£343,077.29**

*Refer to specific appendix for further breakdown of cost calculations.

2.3 Sussex Road / Franklynn Road / South Road Roundabout

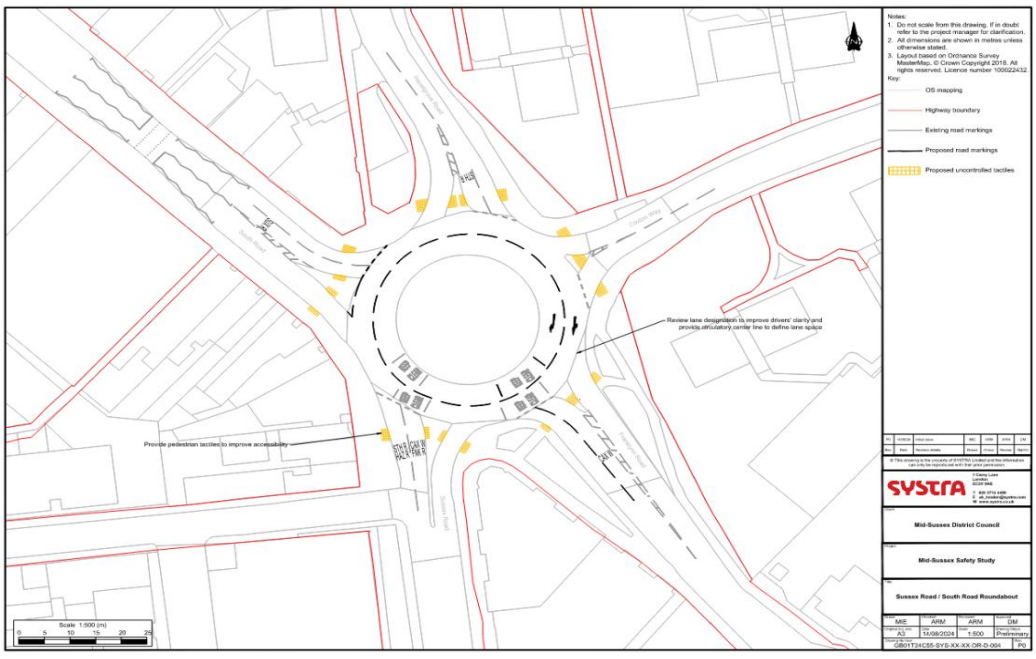
2.3.1 The existing layout compromises of a dual laned roundabout with 5 arms. Each arm has an island separator at the mouth of the entry / exits with little road markings present on the roundabout itself.

2.3.2 This road network is demonstrated by the aerial image in **Figure 5**.

Figure 5. Aerial view of Sussex Road/South Road roundabout existing roundabout layout

2.3.3 The proposed design, pictured in **Figure 6** suggests the implementation of uncontrolled tactiles at various points to allowed increased accessibility. This proposal also includes the addition of road markings to help clarify / define lane spacing.

Figure 6. Proposed of Sussex Road/Franklyn Road/South Road roundabout improvements



2.3.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 4** for an estimate summary.

2.3.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 4. Costing summary of Sussex Road/ South Road roundabout proposed design

Sussex Road / South Road Roundabout		
Costing Summary		
Element	**Description**	**Amount (£)**
Construction Cost	**Total of all series**	**17,026.49**
Utilities & Contingency	20%	3,405.30
Traffic Management	20%	4,256.62
Total Construction Cost	**Total TM and Contingency**	**24,688.41**
Design Fees	15%	2,553.97
Optimism Bias	44%	11,986.65
Total Project Cost		**£39,229.02**

*Refer to specific appendix for further breakdown of cost calculations.

2.4 B2036 London Road/Victoria Way

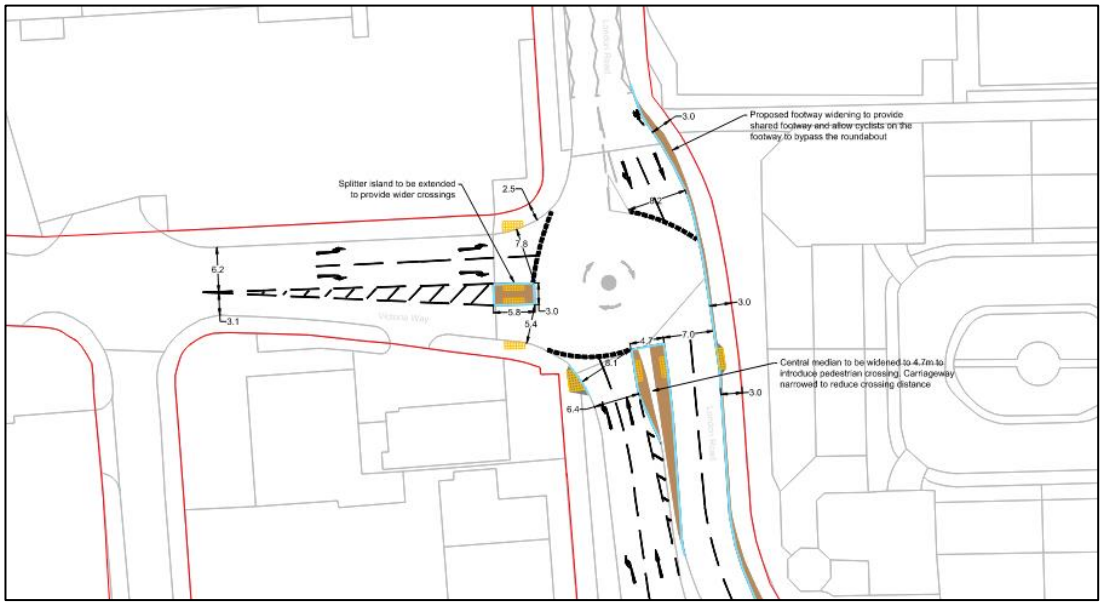
2.4.1 The existing layout comprises of 2 laned single carriageway approaches from London Road, and Victoria Way, with 2 single lane exits to the North and West.

2.4.2 This road network is demonstrated by the aerial image in **Figure 7**

Figure 7. Aerial image of B2036 London Road/Victoria Way existing layout

2.4.3 The proposed design, pictured in **Figure 8** suggests the central median to be widened in order to allow the implementation of a pedestrian crossing, this reduces the carriageway width which is beneficial in reducing pedestrian crossing distance. To the north, a widening of the existing footway to allow for both pedestrians and cyclists to avoid contact with the roundabout.

Figure 8. Proposed design of B2036 London Road/Victoria Way improvement



2.4.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 5** for an estimate summary.

2.4.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 5. Costing summary of B2036 London Road/Victoria Way proposed design

B2036 London Road/Victoria Way		
Costing Summary		
Element	**Description**	**Amount (£)**
Construction Cost	**Total of all series**	**46,469.56**
Utilities & Contingency	20%	9,293.91
Traffic Management	20%	11,617.39
Total Construction Cost	**Total TM and Contingency**	**67,380.86**
Design Fees	15%	6,970.43
Optimism Bias	44%	32,714.57
Total Project Cost		**£107,065.87**

*Refer to specific appendix for further breakdown of cost calculations.

2.5 Hickstead Interchange East Option 1

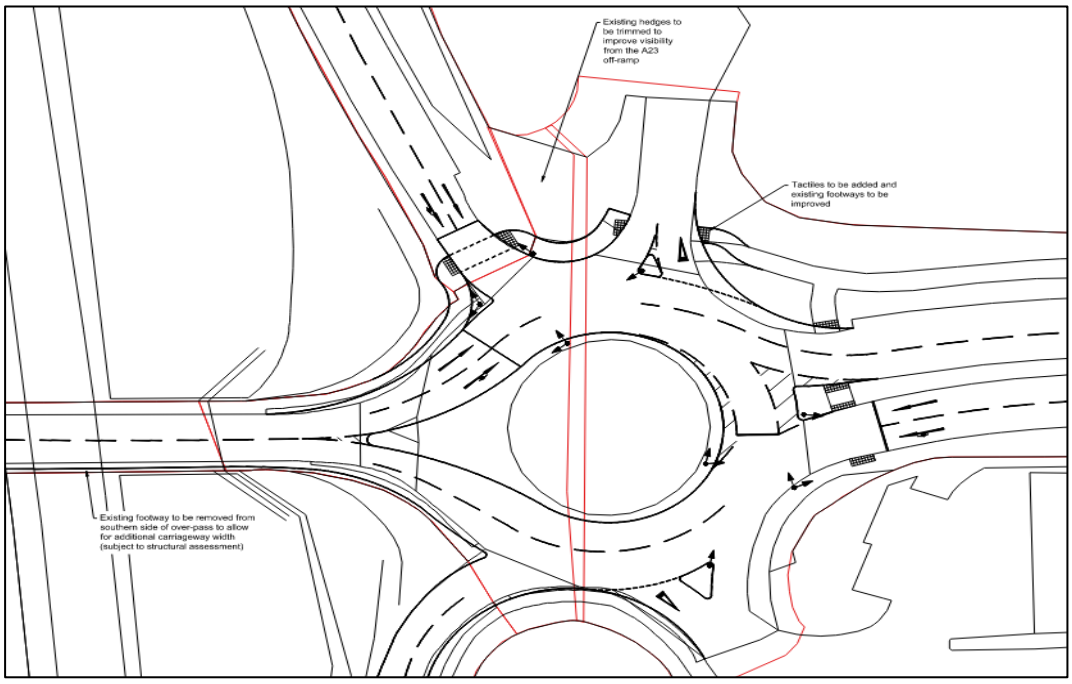
2.5.1 Currently a dumbbell roundabout situated on the east side of the dual carriageway. Providing vehicles merge and diverge access to the A23 northbound and A23 southbound as well as access to the A2300 toward either London (to the West) or Burgess Hill (to the East) with services to the South. All entries are dual laned.

2.5.2 This road network is demonstrated by the aerial image in **Figure 9**.

Figure 9. Aerial view of existing Hickstead Interchange East junction layout

2.5.3 The proposed design, pictured in **Figure 10** demonstrates the addition of tactiles to surrounding footways on the north side of the round about as well as trimmed vegetation on the A23 off slip. Suggested removal of footway on overpass to allow carriageway widening.

Figure 10. Proposed design of Hickstead Interchange East Option 1 improvements



2.5.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 6** for an estimate summary.

2.5.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 6. Costing summary of Hickstead Interchange East Option 1 proposed design

Hickstead Interchange East Option 1		
Costing Summary		
Element	**Description**	**Amount (£)**
Construction Cost	**Total of all series**	**741,447.57**
Utilities & Contingency	20%	148,289.51
Traffic Management	20%	148,289.51
Total Construction Cost	**Total TM and Contingency**	**1,038,026.59**
Design Fees	15%	155,703.99
Optimism Bias	44%	525,241.46
Total Project Cost		**£1,718,972.04**

*Refer to specific appendix for further breakdown of cost calculations.

2.6 Hickstead Interchange East Option 2

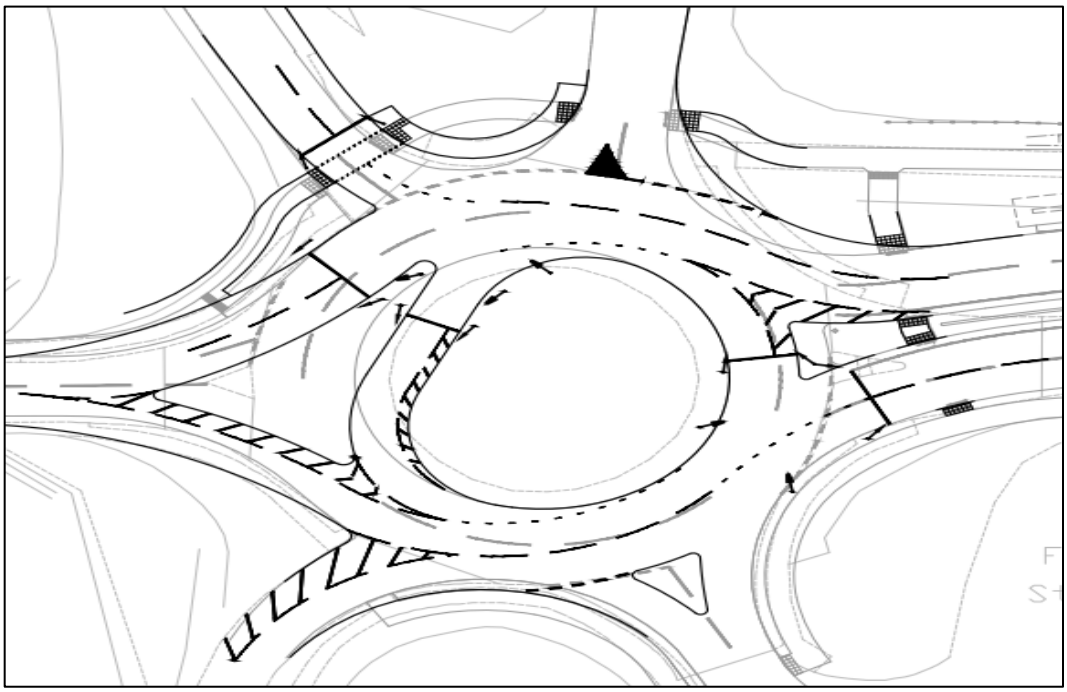
2.6.1 Refer to section 2.5.1 for existing junction description.

2.6.2 This road network is demonstrated by the aerial image in **Figure 11.**

Figure 11. Aerial view of existing Hickstead Interchange East junction layout

2.6.3 The proposed design, pictured in **Figure 12** suggests that a new island is to be added on the west entrance / exit, this will help guide vehicles as well as reducing the centre of the roundabout down to one lane. This design includes the implementation of tactiles at crossing points and increased hatch formations for lane clarity.

Figure 12. Proposed design of Hickstead Interchange East Option 2 improvements



2.6.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 7** for an estimate summary.

2.6.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 7. Costing summary of Hickstead Interchange East Option 2 proposed design

Hickstead Interchange East Option 2		
Costing Summary		
Element	**Description**	**Amount**
Construction Cost	**Total of all series**	**945,775.60**
Utilities & Contingency	20%	189,155.12
Traffic Management	20%	189,155.12
Total Construction Cost	**Total TM and Contingency**	**1,324,085.84**
Design Fees	15%	198,612.88
Optimism Bias	44%	669,987.44
Total Project Cost		**£2,192,686.15**

*Refer to specific appendix for further breakdown of cost calculations.

2.7 Hickstead Interchange West Option 1

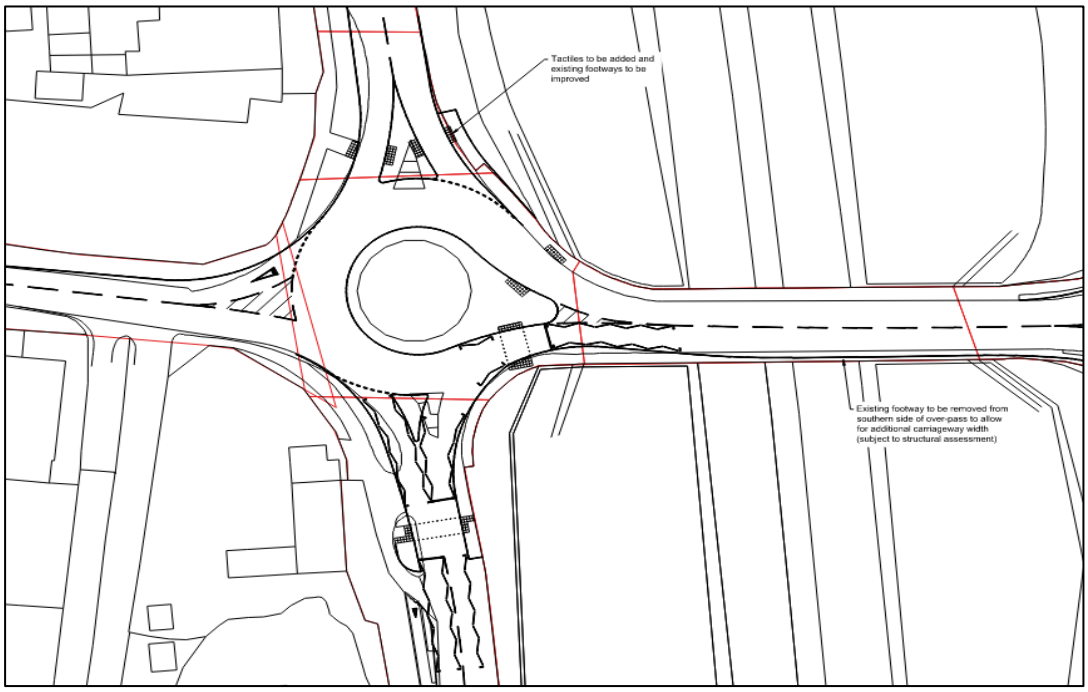
2.7.1 The existing is a 4-arm dumbbell round about which allows merge and diverge access to and from the A23 Northbound via the north and south arms with east and onto the A2300.

2.7.2 This road network is demonstrated by the aerial image in **Figure 13**.

Figure 13. Aerial view of existing Hickstead Interchange West junction layout

2.7.3 The proposed design, pictured in **Figure 14** demonstrates this western roundabout to be converted to a tear drop roundabout with the extension of the central island, tactiles to be added to adjoining footways

Figure 14. Proposed design of Hickstead Interchange West Option 1 improvements



2.7.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 8** for an estimate summary.

2.7.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 8. Costing summary of Hickstead Interchange West Option 1 proposed design

Hickstead Interchange West Option 1		
Costing Summary		
Element	**Description**	**Amount (£)**
Construction Cost	**Total of all series**	**350,132.85**
Utilities & Contingency	20%	70,026.57
Traffic Management	20%	70,026.57
Total Construction Cost	**Total TM and Contingency**	**490,185.99**
Design Fees	15%	73,527.90
Optimism Bias	44%	248,034.11
Total Project Cost		**£811,748.00**

*Refer to specific appendix for further breakdown of cost calculations.

2.8 Hickstead Interchange West Option 2

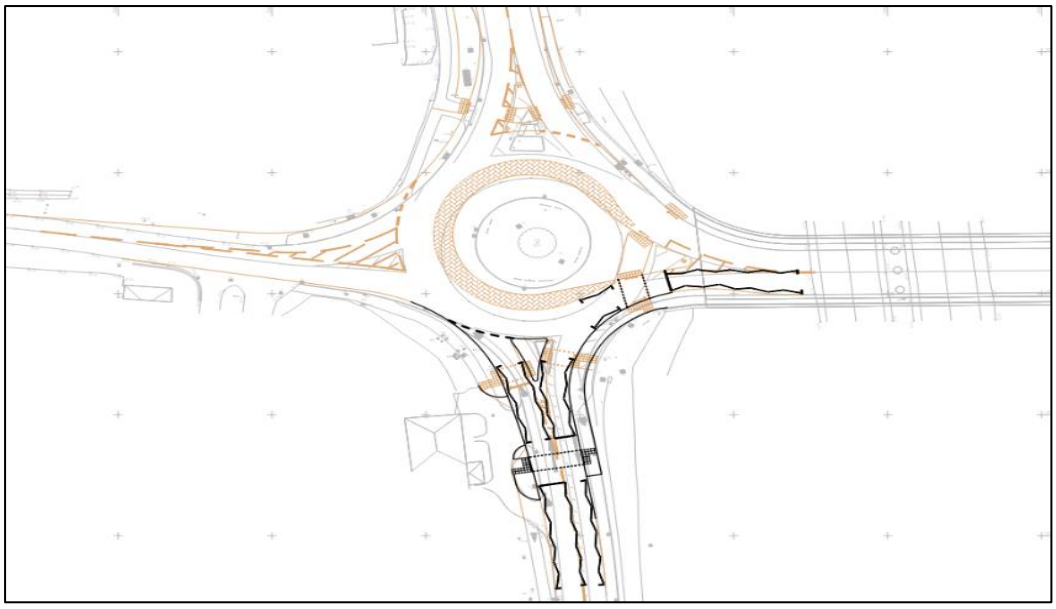
2.8.1 Refer to 2.7.1 for existing layout / junction description.

2.8.2 This road network is demonstrated by the aerial image in **Figure 15**.

Figure 15. Aerial view of existing Hickstead Interchange West junction layout

2.8.3 The proposed design, pictured in **Figure 16** demonstrates altered hatching on the Western arm with an additional lane, this widening of the carriageway is achieved via kerb repositioning and white line alterations. Widening of pedestrian island of the northern arm as well as improvement of tactiles at crossing points. Central island to be extended outward to form a tear drop.

Figure 16. Proposed design of Hickstead Interchange West Option 2 improvements



2.8.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 9** for an estimate summary.

2.8.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 9. Costing summary of Hickstead Interchange West Option 2 proposed design

Hickstead Interchange West Option 2		
Costing Summary		
Element	**Description**	**Amount (£)**
Construction Cost	**Total of all series**	**416,712.22**
Utilities & Contingency	20%	83,342.44
Traffic Management	20%	83,342.44
Total Construction Cost	**Total TM and Contingency**	**583,397.10**
Design Fees	15%	87,509.57
Optimism Bias	44%	295,198.93
Total Project Cost		**£966,105.60**

*Refer to specific appendix for further breakdown of cost calculations.

2.9 Copthorne Roundabout

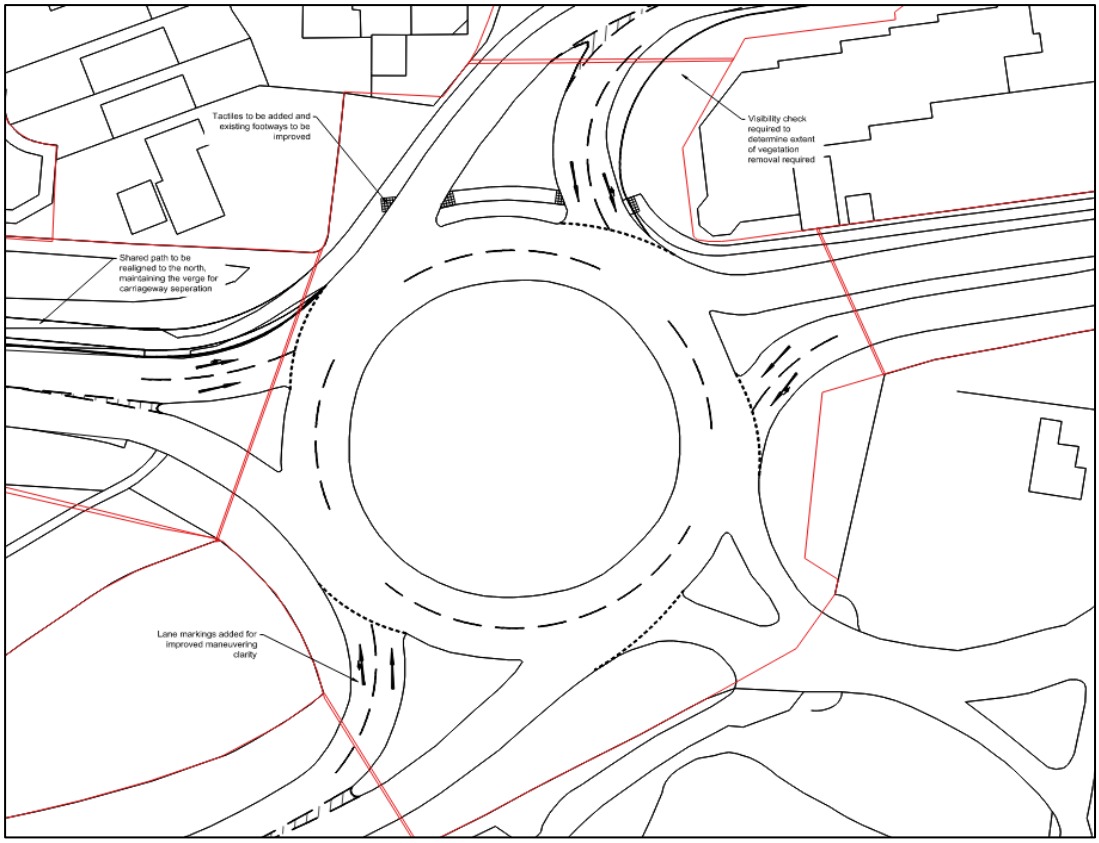
2.9.1 Copthorne roundabout comprises of a of 5 arms which split into a total of 10 entry and exit points. These are separated by verges and vegetation

2.9.2 This road network is demonstrated by the aerial image in **Figure 17**.

Figure 17. Aerial view of existing Copthorne Roundabout layout

2.9.3 The proposed design, pictured in **Figure 18** indicated increased quantities of road markings to aid in vehicle placement clarity. Improved tactiles to be added to aid in safe pedestrian movement. Realignment of the shared path in order to maintain the correct separation between the verge and the carriageway.

Figure 18. Proposed design of Copthorne Roundabout improvements



2.9.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 10** for an estimate summary.

2.9.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 10. Costing summary of Copthorne Roundabout proposed design

Copthorne Roundabout (Junction 2)		
Costing Summary		
Element	**Description**	**Amount (£)**
Construction Cost	**Total of all series**	**200,263.20**
Utilities & Contingency	20%	40,052.64
Traffic Management	20%	40,052.64
Total Construction Cost	**Total TM and Contingency**	**280,368.48**
Design Fees	15%	42,055.27
Optimism Bias	44%	141,290.21
Total Project Cost		**£464,290.21**

*Refer to specific appendix for further breakdown of cost calculations.

3. A23 MERGE / DIVERGE ASSESSMENTS COST ESTIMATES

3.1 A23/A272 Southbound Off-Slip

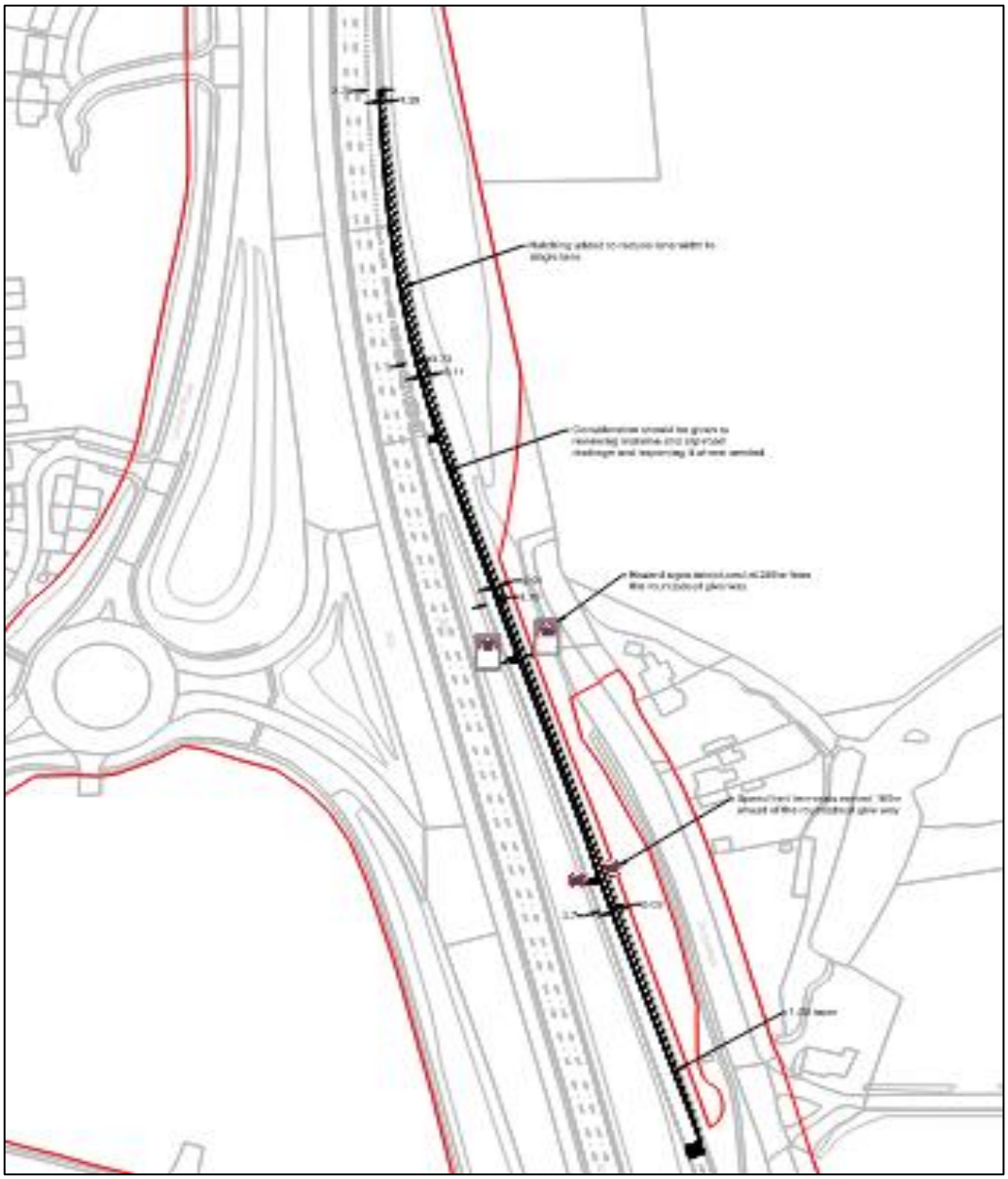
3.1.1 Currently the A23 / A272 is a Type C 3 lane diverge southbound with 3 lanes upstream and 3 lanes downstream with dual lanes on the off slip.

3.1.2 This road network is demonstrated by the aerial image in **Figure 19**

Figure 19. Aerial view of existing A23 / A272 Southbound Diverge

3.1.3 As there is a Junction present 200 metres north of diverge, and a vehicle refuge 300 m. An additional mainline lane would involve significant works and cost. A full lane implementation would conflict junctions and laybys to the north. Limited highway boundary width to be able to achieve any upgrades. The proposed design, pictured in **Figure 20** suggests increased hatching to reduce lane with to a single lane as well as the introduction of additional hazard signs altering road users of the upcoming roundabout.

Figure 20. Proposed design of A23 / A272 improvements



3.1.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 11** for an estimate summary.

3.1.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total

construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 11. Costing summary of A23/A272 southbound off slip proposed design

A23/A272 Southbound Off Slip		
Costing Summary		
Element	**Description**	**Amount (£)**
Construction Cost	**Total of all series**	**14,502.88**
Utilities & Contingency	20%	2,900.58
Traffic Management	20%	3,625.72
Total Construction Cost	**Total TM and Contingency**	**21,029.18**
Design Fees	15%	2,715.43
Optimism Bias	44%	10,210.03
Total Project Cost		**£33,414.64**

*Refer to specific appendix for further breakdown of cost calculations.

3.2 A23/A272 Southbound On-Slip

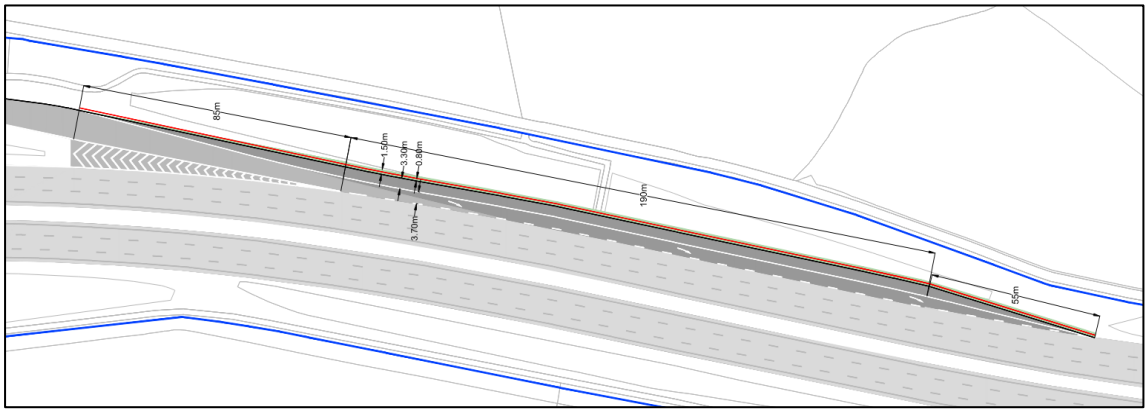
3.2.1 Currently the A23 / A272 is a layout A option 2 - 2 lane taper merge southbound with 3 lanes upstream and 3 lanes downstream with a slip which reduces from 2 lanes to 1 prior to the current auxiliary.

3.2.2 This road network is demonstrated by the aerial image in **Figure 21**.

Figure 21. Ariel view of existing A23 A272 – Southbound on-slip

3.2.3 The proposed design, pictured in **Figure 22** suggests There is sufficient space in order to provide an upgrade to a layout B parallel merge from the existing type A taper merge, the provision of an improvement to a layout B has been taken forward for further feasibility testing and design development for the southbound on slip.

Figure 22. Proposed design of A23 A272 – Southbound on-slip improvements



3.2.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 12** for an estimate summary.

3.2.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 12. Costing summary of A23 A272 – Southbound on-slip proposed design

A23/A272 Southbound On-Slip		
Costing Summary		
Element	**Description**	**Amount (£)**
Construction Cost	**Total of all series**	**510,186.82**
Utilities & Contingency	20%	102,037.36
Traffic Management	20%	127,546.71
Total Construction Cost	**Total TM and Contingency**	**739,770.89**
Design Fees	15%	110,965.63
Optimism Bias	44%	374,324.07
Total Project Cost		**£1,225,060.59**

*Refer to specific appendix for further breakdown of cost calculations.

3.3 A23/B2117 – Southbound On-Slip

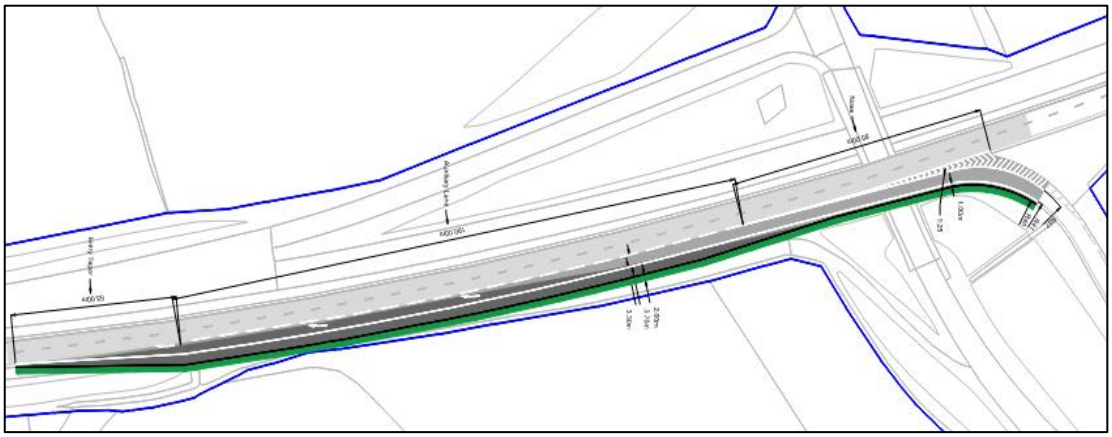
3.3.1 The B2117 junction on the A23 includes two slip roads: the northbound off slip and southbound on slip. The A23 mainline at this junction has two lanes upstream and downstream in both directions.

3.3.2 The location of the A23 B2117 is shown below with an aerial view shown in **Figure 23.**

Figure 23. Aerial view of existing A23 B2117 – Southbound on-slip

3.3.3 The proposed design, pictured in **Figure 24** suggests There is sufficient space in order to provide an upgrade to a layout B parallel merge from the existing type A taper merge, the provision of an improvement to a layout B has been taken forward for further feasibility testing and design development for the southbound on slip for the A23-B2117 junction.

Figure 24. Proposed design of A23 B2117 – Southbound on-slip improvements



3.3.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 13** for an estimate summary.

3.3.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 13. Costing summary of A23 B2117 - Southbound on-slip proposed design

A23 B2117 - Southbound On-Slip		
Costing Summary		
Element	**Description**	**Amount (£)**
Construction Cost	**Total of all series**	**277,022.49**
Utilities & Contingency	20%	55,404.50
Traffic Management	20%	55,404.50
Total Construction Cost	**Total TM and Contingency**	**387,831.49**
Design Fees	15%	58,174.72
Optimism Bias	44%	196,242.73
Total Project Cost		**£642,248.94**

*Refer to specific appendix for further breakdown of cost calculations.

3.4 A23/B2118 - Northbound On-Slip

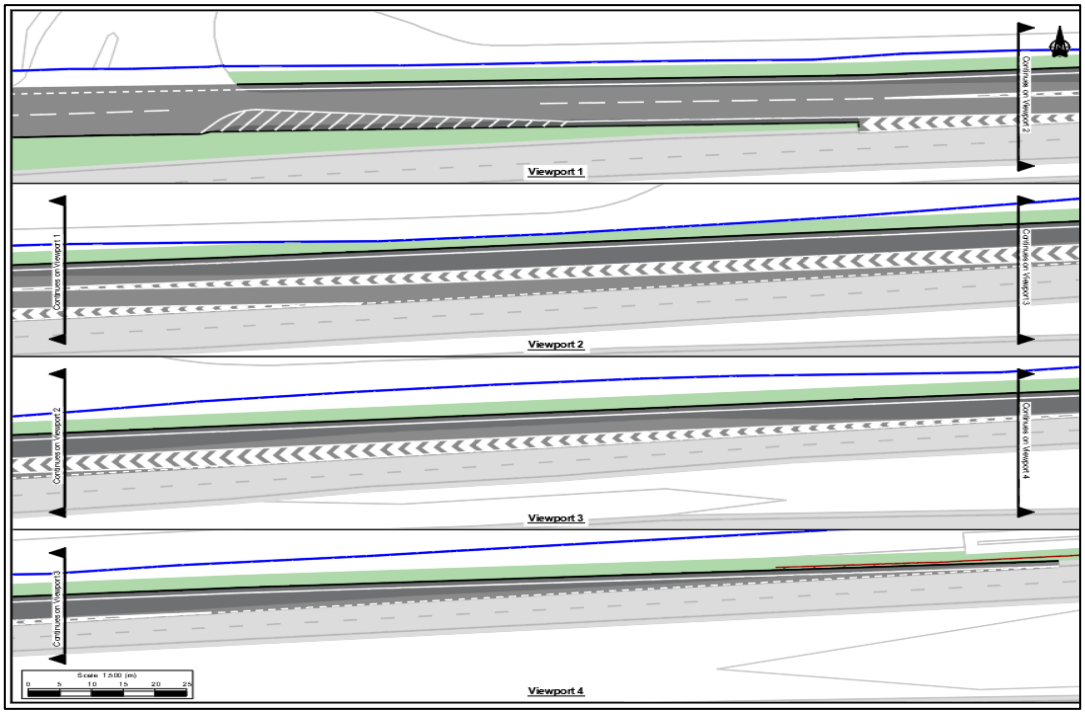
3.4.1 The B2118 junction on the A23 includes two slip roads: the northbound on slip and the southbound off slip. The A23 mainline at this junction has two lanes upstream and downstream in both directions. The northbound on slip is a type B parallel merge / auxiliary lane, and the southbound off slip is a type A option 1 taper diverge.

3.4.2 The location of the A23 B2118 is shown below in aerial view in **Figure 25**.

Figure 25. Aerial view of existing A23 B2118 junction layout

3.4.3 The proposed design, pictured in **Figure 26** suggests that a Type C ghost island merge is feasible due to the existing space provided by the auxiliary lane. The ghost island and first merge lane could be proposed on the inside of the existing slip road avoiding the need for significant highway space from the existing edge of slip road to part maintain the current merge.

Figure 26. Proposed design of A23 B2118 - Northbound on-slip improvements



3.4.4 The design shown in this figure has been costed using SPONs Civil Engineering and Highway Works Price Book 2024, please see **Table 14** for an estimate summary.

3.4.5 Within this table, utilities and contingencies (U&C) and traffic management (TM) are taken as 20% of the construction cost. The sum of construction cost, U&C and TM produces a total construction cost (TCC). Design fees is taken as 15% of the TCC, and optimism bias (OB) is taken as 44% of the TCC. The sum of the TCC, the design fees and the OB produces a total project cost (TPC).

Table 14. Costing summary of A23 B2118 - Northbound On-Slip proposed design

A23 B2118 - Northbound On-Slip		
Costing Summary		
Element	**Description**	**Amount**
Construction Cost	**Total of all series**	**707,531.15**
Utilities & Contingency	20%	141,506.23
Traffic Management	20%	176,882.79
Total Construction Cost	**Total TM and Contingency**	**1,025,920.17**
Design Fees	15%	153,888.03
Optimism Bias	44%	519,115.61
Total Project Cost		£1,698,923.80

*Refer to specific appendix for further breakdown of cost calculations.

4. SUMMARY

4.1 Summary

4.1.1 As part of the Mid Sussex Local Plan Transport Study undertaken by Systra, a cost estimation exercise has been undertaken to provide MSDC an ideal of the costs associated with the proposed junction mitigations.

4.1.2 The below table provides a summary of the junctions and the associated costs estimates.

Table 15. Summary of junctions and associated cost estimates

JUNCTION NAME	PROJECT COST
Cuckfield Road/Gatehouse Lane/Bishopstone Lane	£264,584.27
A281/B2117/Shaves Wood Lane	£343,077.29
Sussex/Franklynn Road/South Road Roundabout	£39,229.02
B2036 London Road/Victoria Way	£107,065.87
Hickstead Interchange East Option 1	£1,718,972.04
Hickstead Interchange East Option 2	£2,192,686.15
Hickstead Interchange West Option 1	£811,748.00
Hickstead Interchange West Option 2	£966,105.60
Copthorne Roundabout	£464,290.21
A23/A272 - Southbound Off Slip	£33,414.64
A23/A272 – Southbound On Slip	£1,225,060.59
A23/B2117 – Southbound On Slip	£642,248.94
A23/B2118 – Northbound On Slip	£1,698,923.80

4.1.3 To provide a further robust cost estimate, further design would have to be undertaken to the detailed stage with suitable topographical survey, Site Investigation undertaken, 3D design, C3 utility quotations and to finalise signal and signage requirements. This will provide further detail on earthworks and utility costs/implications and highlight any further issues that maybe raised from receipt of the additional information and in turn provide further surety of the total costs.

5. APPENDIX

Cuckfield Road/Gatehouse Lane/Bishopstone Lane – Costing Summary

CUCKFIELD ROAD/GATEHOUSE LANE/BISHOP LANE

General Summary

Series	Description	Amount	
100	Preliminaries	£	12,303.96
200	Site Clearance	£	7,502.09
400	Safety Barriers (Vehicles and Pedestrian)	£	10,316.12
500	Drainage and Service Ducts	£	7,362.57
600	Earthworks	£	1,521.06
700	Pavements	£	54,032.67
1100	Kerbs, Footways and Paved Areas	£	19,984.61
1200	Traffic Signs, Signals and Road Markings	£	1,813.85
1300	Road Lighting Columns and Brackets and Cantilever Masts	£	-
1400	Electrical Work for Road Lighting and Traffic Signs	£	-
		£	114,836.92

Utilities & Contingency	20%	£	**22,967.38**
Traffic Management	25%	£	**28,709.23**

Total Construction cost with TM and 20% contingency	£	**166,513.54**

Design Fees (15%)	£	17,225.54
OB (44%)	£	80,845.19
Total Project costs	£	264,584.27

A281/B2117/Shaves Wood Lane – Costing Summary

A281/B2117/SHAVES WOOD LANE

General Summary

Series	Description	Amount	
100	Preliminaries	£	15,954.12
200	Site Clearance	£	13,837.87
400	Safety Barriers (Vehicles and Pedestrian)	£	-
500	Drainage and Service Ducts	£	7,362.57
600	Earthworks	£	5,866.94
700	Pavements	£	90,272.21
1100	Kerbs, Footways and Paved Areas	£	13,099.01
1200	Traffic Signs, Signals and Road Markings	£	2,512.36
1300	Road Lighting Columns and Brackets and Cantilever Masts	£	-
1400	Electrical Work for Road Lighting and Traffic Signs	£	-
		£	148,905.08

Utilities & Contingency	20%	£	**29,781.02**
Traffic Management	25%	£	**37,226.27**

Total Construction cost with TM and 20% contingency	**£**	**215,912.36**

Design Fees (15%)	£	22,335.76
OB (44%)	£	104,829.17
Total Project costs	£	343,077.29

Sussex/Franklynn Road/South Road Roundabout – Costing Summary

SUSSEX ROAD/FRANLYNN ROAD/SOUTH ROAD

General Summary

Series	Description	Amount	
100	Preliminaries	£	1,824.27
200	Site Clearance	£	8,642.74
400	Safety Barriers (Vehicles and Pedestrian)	£	-
500	Drainage and Service Ducts	£	-
600	Earthworks	£	82.17
700	Pavements	£	-
1100	Kerbs, Footways and Paved Areas	£	6,000.00
1200	Traffic Signs, Signals and Road Markings	£	477.31
1300	Road Lighting Columns and Brackets and Cantilever Masts	£	-
1400	Electrical Work for Road Lighting and Traffic Signs	£	-
		£	17,026.49

Utilities & Contingency	20%	£	**3,405.30**
Traffic Management	25%	£	**4,256.62**

Total Construction cost with TM and 20% contingency	£	**24,688.41**

Design Fees (15%)	£	2,553.97
OB (44%)	£	11,986.65
Total Project costs	£	39,229.02

B2036 LONDON ROAD/VICTORUA WAY

General Summary

Series	Description	Amount	
100	Preliminaries	£	4,978.88
200	Site Clearance	£	14,592.76
400	Safety Barriers (Vehicles and Pedestrian)	£	-
500	Drainage and Service Ducts	£	2,454.19
600	Earthworks	£	531.37
700	Pavements	£	2,149.00
1100	Kerbs, Footways and Paved Areas	£	14,443.48
1200	Traffic Signs, Signals and Road Markings	£	5,801.42
1300	Road Lighting Columns and Brackets and Cantilever Masts	£	279.66
1400	Electrical Work for Road Lighting and Traffic Signs	£	1,238.80
		£	46,469.56

Utilities & Contingency	20%	£	**9,293.91**
Traffic Management	25%	£	**11,617.39**

Total Construction cost with TM and 20% contingency	£	**67,380.86**

Design Fees (15%)	£	6,970.43
OB (44%)	£	32,714.57
Total Project costs	£	107,065.87

Hickstead Interchange East Option 1 – Costing Summary

HICKSTEAD INTERCHANGE EAST OPTION 1 MITIGATIONS

General Summary

Series	Description	Amount	
100	Preliminaries	£	79,440.81
200	Site Clearance	£	2,425.70
400	Safety Barriers (Vehicles and Pedestrian)	£	17,669.30
500	Drainage and Service Ducts	£	10,566.43
600	Earthworks	£	82,425.28
700	Pavements	£	24,519.44
1100	Kerbs, Footways and Paved Areas	£	73,448.80
1200	Traffic Signs, Signals and Road Markings	£	450,951.82
1300	Road Lighting Columns and Brackets and Cantilever Masts	£	-
1400	Electrical Work for Road Lighting and Traffic Signs	£	-
		£	741,447.57

Utilities & Contingency	20%	£	**148,289.51**
Traffic Management	20%	£	**148,289.51**

Total Construction cost with TM and 20% contingency	£	**1,038,026.59**
		490185.99

Design Fees (15%)	£	155,703.99
OB (44%)	£	525,241.46
Total Project costs	£	1,718,972.04

HICKSTEAD INTERCHANGE EAST OPTION 2 MITIGATIONS

General Summary

Series	Description	Amount
100	Preliminaries	£ 101,333.10
200	Site Clearance	£ 6,353.31
400	Safety Barriers (Vehicles and Pedestrian)	£ -
500	Drainage and Service Ducts	£ 10,566.43
600	Earthworks	£ 104,198.40
700	Pavements	£ 72,406.40
1100	Kerbs, Footways and Paved Areas	£ 87,445.89
1200	Traffic Signs, Signals and Road Markings	£ 563,472.07
1300	Road Lighting Columns and Brackets and Cantilever Masts	£ -
1400	Electrical Work for Road Lighting and Traffic Signs	£ -
		£ 945,775.60

Utilities & Contingency	20%	£	**189,155.12**
Traffic Management	20%	£	**189,155.12**

Total Construction cost with TM and 20% contingency	**£**	**1,324,085.84**
		583397.10
Design Fees (15%)	£	198,612.88
OB (44%)	£	669,987.44
Total Project costs	£	2,192,686.15

HICKSTEAD INTERCHANGE WEST OPTION 1 MITIGATIONS

General Summary

Series	Description	Amount	
100	Preliminaries	£	37,514.23
200	Site Clearance	£	5,944.13
400	Safety Barriers (Vehicles and Pedestrian)	£	-
500	Drainage and Service Ducts	£	22,642.35
600	Earthworks	£	28,220.40
700	Pavements	£	42,785.60
1100	Kerbs, Footways and Paved Areas	£	62,501.13
1200	Traffic Signs, Signals and Road Markings	£	150,525.01
1300	Road Lighting Columns and Brackets and Cantilever Masts	£	-
1400	Electrical Work for Road Lighting and Traffic Signs	£	-
		£	350,132.85

Utilities & Contingency	20%	£	**70,026.57**
Traffic Management	20%	£	**70,026.57**
Total Construction cost with TM and 20% contingency		**£**	**490,185.99**

Design Fees (15%)	£	73,527.90
OB (44%)	£	248,034.11
Total Project costs	£	811,748.00

HICKSTEAD INTERCHANGE WEST OPTION 2 MITIGATIONS

General Summary

Series	Description	Amount
100	Preliminaries	£ 44,647.74
200	Site Clearance	£ 5,944.13
400	Safety Barriers (Vehicles and Pedestrian)	£ -
500	Drainage and Service Ducts	£ 22,642.35
600	Earthworks	£ 28,220.40
700	Pavements	£ 106,964.00
1100	Kerbs, Footways and Paved Areas	£ 57,768.59
1200	Traffic Signs, Signals and Road Markings	£ 150,525.01
1300	Road Lighting Columns and Brackets and Cantilever Masts	£ -
1400	Electrical Work for Road Lighting and Traffic Signs	£ -
		£ 416,712.22

Utilities & Contingency	20%	£	**83,342.44**
Traffic Management	20%	£	**83,342.44**
Total Construction cost with TM and 20% contingency		**£**	**583,397.10**

Design Fees (15%)	£	87,509.57
OB (44%)	£	295,198.93
Total Project costs	£	966,105.60

Copthorne Roundabout – Costing Summary

COPTHORNE ROUNDABOUT MITIGATIONS

General Summary

Series	Description	Amount	
100	Preliminaries	£	21,456.77
200	Site Clearance	£	1,760.49
400	Safety Barriers (Vehicles and Pedestrian)	£	-
500	Drainage and Service Ducts	£	3,018.98
600	Earthworks	£	85,095.36
700	Pavements	£	43,937.52
1100	Kerbs, Footways and Paved Areas	£	43,974.00
1200	Traffic Signs, Signals and Road Markings	£	1,020.08
1300	Road Lighting Columns and Brackets and Cantilever Masts	£	-
1400	Electrical Work for Road Lighting and Traffic Signs	£	-
		£	200,263.20

Utilities & Contingency	20%	£	**40,052.64**
Traffic Management	20%	£	**40,052.64**

Total Construction cost with TM and 20% contingency	£	**280,368.48**

Design Fees (15%)	£	42,055.27
OB (44%)	£	141,866.45
Total Project costs	£	464,290.21

A23/A272 - Southbound Off Slip – Costing Summary

A23/A272 SOUTHBOUND OFF SLIP

General Summary

Series	Description	Amount
100	Preliminaries	£ 1,553.88
200	Site Clearance	£ 8,808.60
400	Safety Barriers (Vehicles and Pedestrian)	£ -
500	Drainage and Service Ducts	£ -
600	Earthworks	£ -
700	Pavements	£ -
1100	Kerbs, Footways and Paved Areas	£ -
1200	Traffic Signs, Signals and Road Markings	£ 4,140.40
1300	Road Lighting Columns and Brackets and Cantilever Masts	£ -
1400	Electrical Work for Road Lighting and Traffic Signs	£ -
		£ 14,502.88

Utilities & Contingency	20%	£	**2,900.58**
Traffic Management	25%	£	**3,625.72**

Total Construction cost with TM and 20% contingency	£	**21,029.18**

Design Fees (15%)	£	2,175.43
OB (44%)	£	10,210.03
Total Project costs	£	33,414.64

A23/A272 – Southbound On Slip – Costing Summary

Mid Sussex - A23 A272 SB Merge

General Summary

Series	Description	Amount	
100	Preliminaries	£	54,662.87
200	Site Clearance	£	17,043.17
400	Safety Barriers (Vehicles and Pedestrian)	£	31,382.60
500	Drainage and Service Ducts	£	57,781.13
600	Earthworks	£	53,237.03
700	Pavements	£	243,815.50
1100	Kerbs, Footways and Paved Areas	£	15,398.36
1200	Traffic Signs, Signals and Road Markings	£	954.00
1300	Road Lighting Columns and Brackets and Cantilever Masts	£	14,852.56
1400	Electrical Work for Road Lighting and Traffic Signs	£	21,059.60
		£	510,186.82

Utilities & Contingency	20%	£	**102,037.36**
Traffic Management	25%	£	**127,546.71**
Total Construction cost with TM and 20% contingency		**£**	**739,770.89**

Design Fees (15%)	£	110,965.63
OB (44%)	£	374,324.07
Total Project costs	£	1,225,060.59

A23/B2117 – Southbound On Slip – Costing Summary

Mid Sussex - A23 - B2117

General Summary

Series	Description	Amount
100	Preliminaries	£ 29,680.98
200	Site Clearance	£ 8,460.66
400	Safety Barriers (Vehicles and Pedestrian)	£ -
500	Drainage and Service Ducts	£ 21,132.86
600	Earthworks	£ 26,385.70
700	Pavements	£ 177,033.50
1100	Kerbs, Footways and Paved Areas	£ 13,586.79
1200	Traffic Signs, Signals and Road Markings	£ 742.00
1300	Road Lighting Columns and Brackets and Cantilever Masts	£ -
1400	Electrical Work for Road Lighting and Traffic Signs	£ -
		£ 277,022.49

Utilities & Contingency	20%	£	**55,404.50**
Traffic Management	20%	£	**55,404.50**
Total Construction cost with TM and 20% contingency		**£**	**387,831.49**

Design Fees (15%)	£	58,174.72
OB (44%)	£	196,242.73
Total Project costs	£	642,248.94

A23/B2118 – Northbound On Slip – Costing Summary

Mid Sussex - A23 B2118

General Summary

Series	Description	Amount	
100	Preliminaries	£	75,806.91
200	Site Clearance	£	19,264.86
400	Safety Barriers (Vehicles and Pedestrian)	£	18,177.20
500	Drainage and Service Ducts	£	49,083.80
600	Earthworks	£	54,323.50
700	Pavements	£	422,322.75
1100	Kerbs, Footways and Paved Areas	£	33,514.08
1200	Traffic Signs, Signals and Road Markings	£	2,544.00
1300	Road Lighting Columns and Brackets and Cantilever Masts	£	27,848.55
1400	Electrical Work for Road Lighting and Traffic Signs	£	4,645.50
		£	707,531.15

Utilities & Contingency	20%	£	**141,506.23**
Traffic Management	25%	£	**176,882.79**

Total Construction cost with TM and 20% contingency	£	**1,025,920.17**

Design Fees (15%)	£	153,888.03
OB (44%)	£	519,115.61
Total Project costs	£	1,698,923.80

SYSTRA provides advice on transport, to central, regional and local government, agencies, developers, operators and financiers.

A diverse group of results-oriented people, we are part of a strong team of professionals worldwide. Through client business planning, customer research and strategy development we create solutions that work for real people in the real world.

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