Shuttleworth Mead Junction Capacity Improvements

Stage 0 Summary Report

August 2025

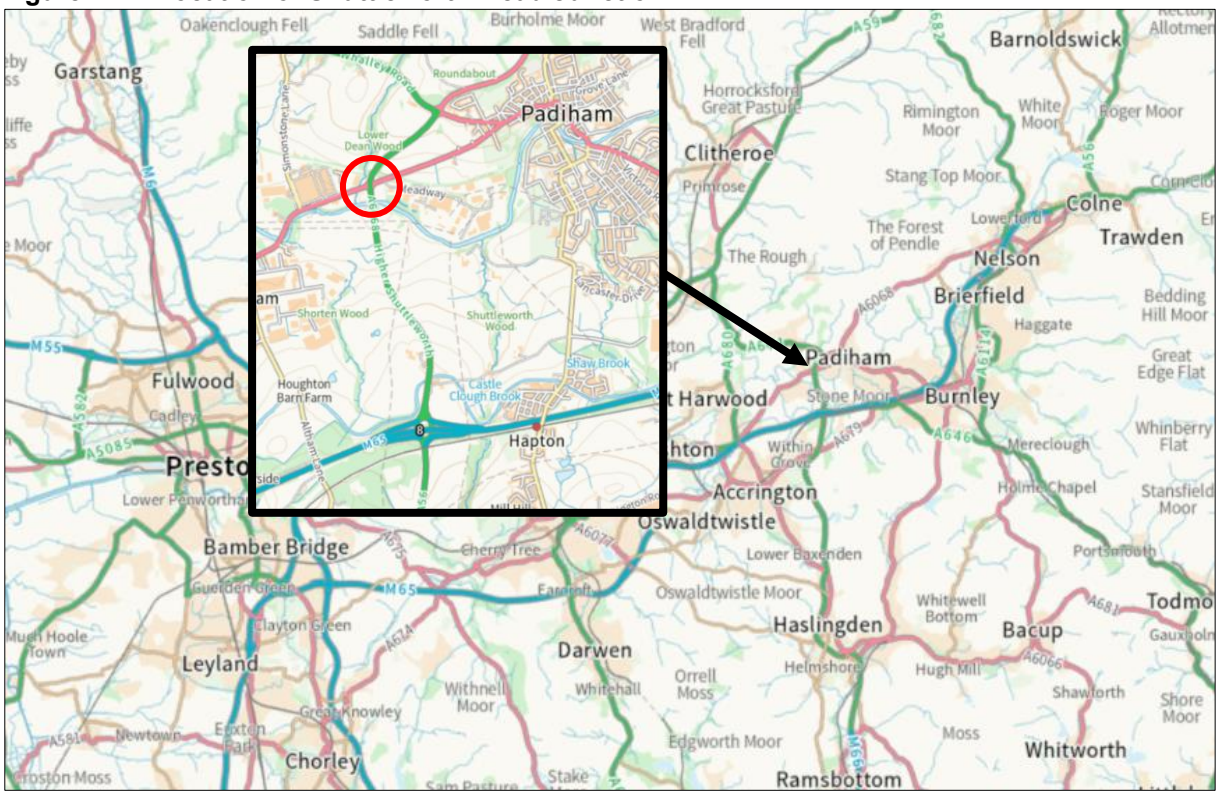
1. Introduction

1.1 Purpose and Location Setting

This Stage 0 report summarises an initial feasibility study and identifies high-level options for addressing network impacts at the 'Shuttleworth Mead' junction, to support planned growth identified through the Hyndburn Local Plan 2040.

The Shuttleworth Mead junction is situated approximately 1.8km north of M65 Junction 8, at the intersection of the A6068 and A678 Blackburn Road (see Figure 1.1). This is around 1.4km west of the town of Padiham in East Lancashire.

Figure 1.1 – Location of Shuttleworth Mead Junction



1.2 Summary of Key Problems

Congestion: The junction currently operates over capacity in peak periods, with congestion on all approaches. This is observed in Figure 1.2, which compares the speed of traffic in the peak with free-flow speed, demonstrating low speed (and thus congestion) on all approaches. The queues on the northbound approach reach back to M65 Junction 8 in peak periods.

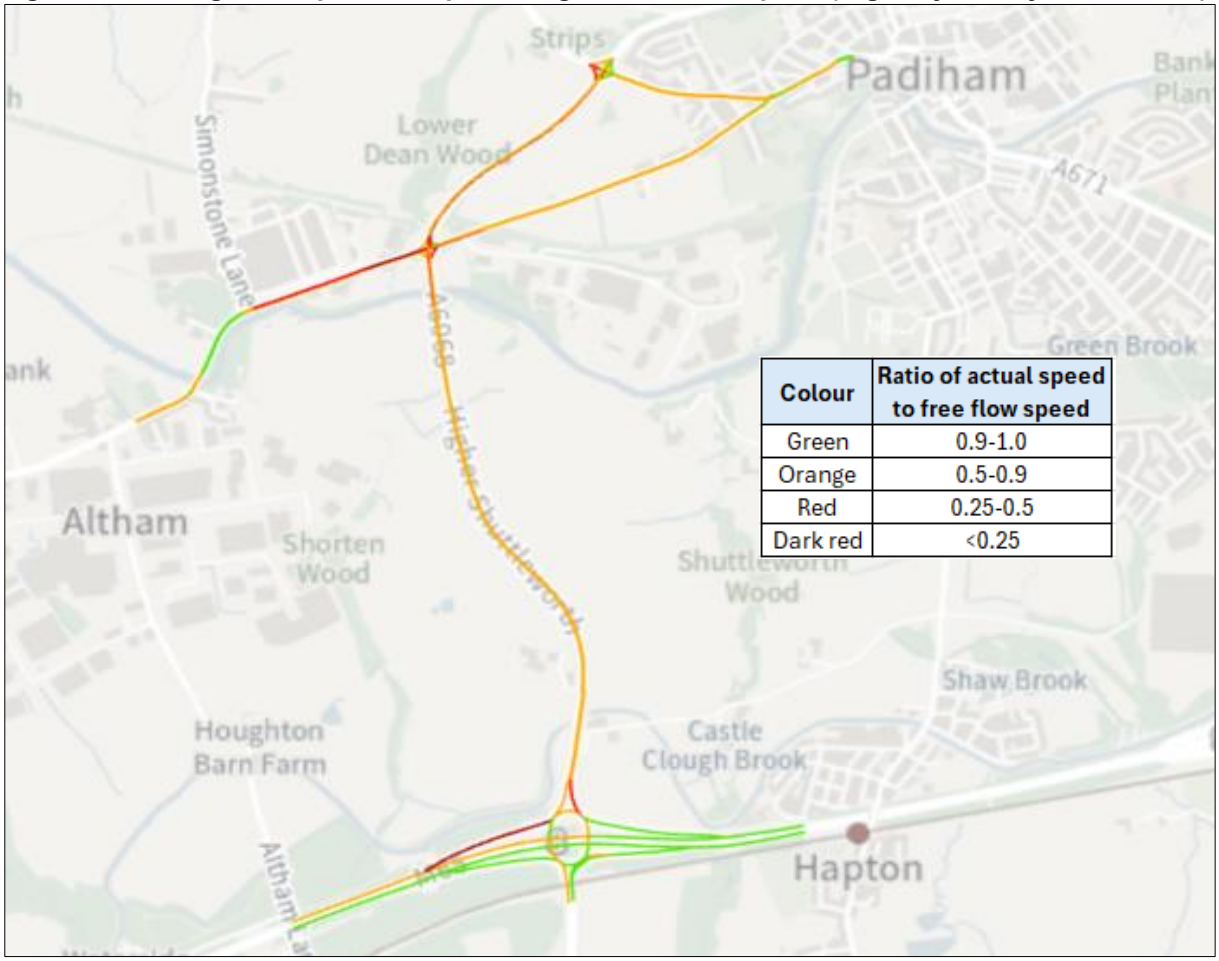
Outdated: The road markings at the junction are faded and the traffic signal equipment outdated. This results in lower turning speeds and hesitation from drivers, which contributes to reduced efficiency at the junction.

Safety: There are safety issues at M65 J8, with a large number of collisions at the junction. A scheme at M65 J8 has been proposed, however it is considered that the benefits of this scheme would be limited until improvements can be made to Shuttleworth Mead junction, to enable a greater number of vehicles to travel northbound from J8; facilitating the benefits of the M65 J8 scheme to be realised.

Active travel: There are currently no formal signalised pedestrian crossings at the junction. Whilst there are dropped kerbs and crossing studs, there are no push buttons or dedicated time within the existing signalling sequence for pedestrians to cross. The junction is located only 80m south of the Padiham Greenway, and 50m west of a bus stop, meaning pedestrians do have a need to cross the junction, particularly east-west.

Growth: The Hyndburn Local Plan 2040 site allocations within the vicinity of the junction most notably includes Huncoat Garden Village to the south-west of M65 J8 and land to the south of Altham business park. Planned growth is anticipated to exacerbate the current issues at the junction in the future.

Figure 1.2 – Congested speed as a percentage of free flow speed (Highways Analyst, Inrix data)



1.3 Scheme Objectives

Based on the issues identified in the previous section, the main objectives of the Shuttleworth Mead improvement scheme are to:

1) Improve junction performance and alleviate congestion;
2) Support the effectiveness of planned improvements at M65 Junction 8;
3) Enhance pedestrian crossing provision at the junction; and
4) Facilitate traffic growth anticipated within the next local plan period to 2040.

2. Assessment Scope and Methodology

2.1 History

Hyndburn Borough Council submitted its 2040 Local Plan to the Planning Inspectorate in March 2025, proposing up to 1,800 new homes at Huncoat Garden Village.

An assessment by National Highways suggests that pre-existing safety concerns at M65 Junction 8 would worsen with the addition of the Huncoat Garden Village demand. One of the causes of these safety concerns is the queue on the A6068 northbound from Shuttleworth Mead junction blocking back through Junction 8.

Therefore, National Highways identified improvements at Shuttleworth Mead junction as a key component to mitigating the safety concerns at Junction 8, which are pivotal to supporting the development at Huncoat Garden Village.

Previous design work was conducted by LCC in 2017 to identify potential capacity improvement options at Shuttleworth Mead junction. This report builds on the previous work, considering the contemporary situation, including network operation, committed developments including Huncoat Garden Village and the proposed scheme at Junction 8.

2.2 Methodology

This work has been carried out by Lancashire County Council (LCC), in collaboration with Hyndburn Borough Council (HBC) and National Highways (NH).

Firstly, previous work and data at the junction was reviewed. This included:

- Analysis of junction flow data and Highways Analyst journey time data;
- Site visit to further understand the key issues at the junction;
- Review of pre-existing highway improvement designs; and
- Undertaking planning and engineering desktop surveys of the project site.

Based on this, potential options were identified and investigated. This process involved:

1) Identifying high-level options based on previous designs and observations from data and site visit;
2) Iterative design and modelling work to refine a long list of options to two options; and
3) Producing high level cost estimates for the two options, as well as identifying anticipated benefits and potential deliverability risks.

3. Overview of Options

3.1 Options

Two options have been developed for the Shuttleworth Mead junction:

- **Option 1**: A smaller scale highway intervention within the existing junction footprint. Includes replacement of the traffic signal equipment, update to signal staging, a new pedestrian crossing on the northside and resurfacing.
- **Option 2**: A larger scale intervention requiring carriageway widening to maximise the potential junction capacity improvements. Includes increasing the length of traffic lanes on three approaches, most notably on the southside northbound approach where the two lanes will extend back an additional 150 metres. Also includes replacement of the traffic signal equipment, further update to signal staging, new pedestrian crossings on the northside and eastside and resurfacing.

The key elements of each option are summarised in Table 3.1 with indicative designs presented in Figure 3.1 (Option 1) and Figure 3.2 (Option 2).

Table 3.1 – The operation of the two options

Element	Option 1	Option 2
Resurfacing	Yes	Yes
Signal equipment upgrade	Yes	Yes
Addition of crossings	North arm only	North and east arms
Signalisation of left turns	North and west arms	North, west and east arms
North and south arms run straight ahead movement together	Yes	Yes
Addition of separation islands for right turn movements	No	Yes, north and south
East and west arms run separately	No	Yes
Carriageway widening on approach from the south	No	Yes
Carriageway widening on approach from the east	No	Yes
Carriageway widening on approach from the west	No	Yes
Carriageway widening on approach from the north	No	No

Both options include junction resurfacing and upgrades to signal equipment, as well as the addition of pedestrian facilities to varying levels. However, Option 2 provides much more significant changes to the junction layout to increase the junction size, with increased queueing space on the south arm approach.

Option 2 includes crossings of both the north and east arms of the junction, whereas Option 1 includes a pedestrian crossing only on the north arm.

Both options propose the straight-ahead movements of the north and south arms to run concurrently. However, Option 2 goes a step further by proposing separation islands between the right and straight-ahead movements on the north and south arms, which will increase efficiency further.

Option 2 also proposes the east and west arms to be run separately, which will further improve safety given the heavy demand for right turners from the west.

Figure 3.1 – Indicative design of Option 1 at Shuttleworth Mead junction

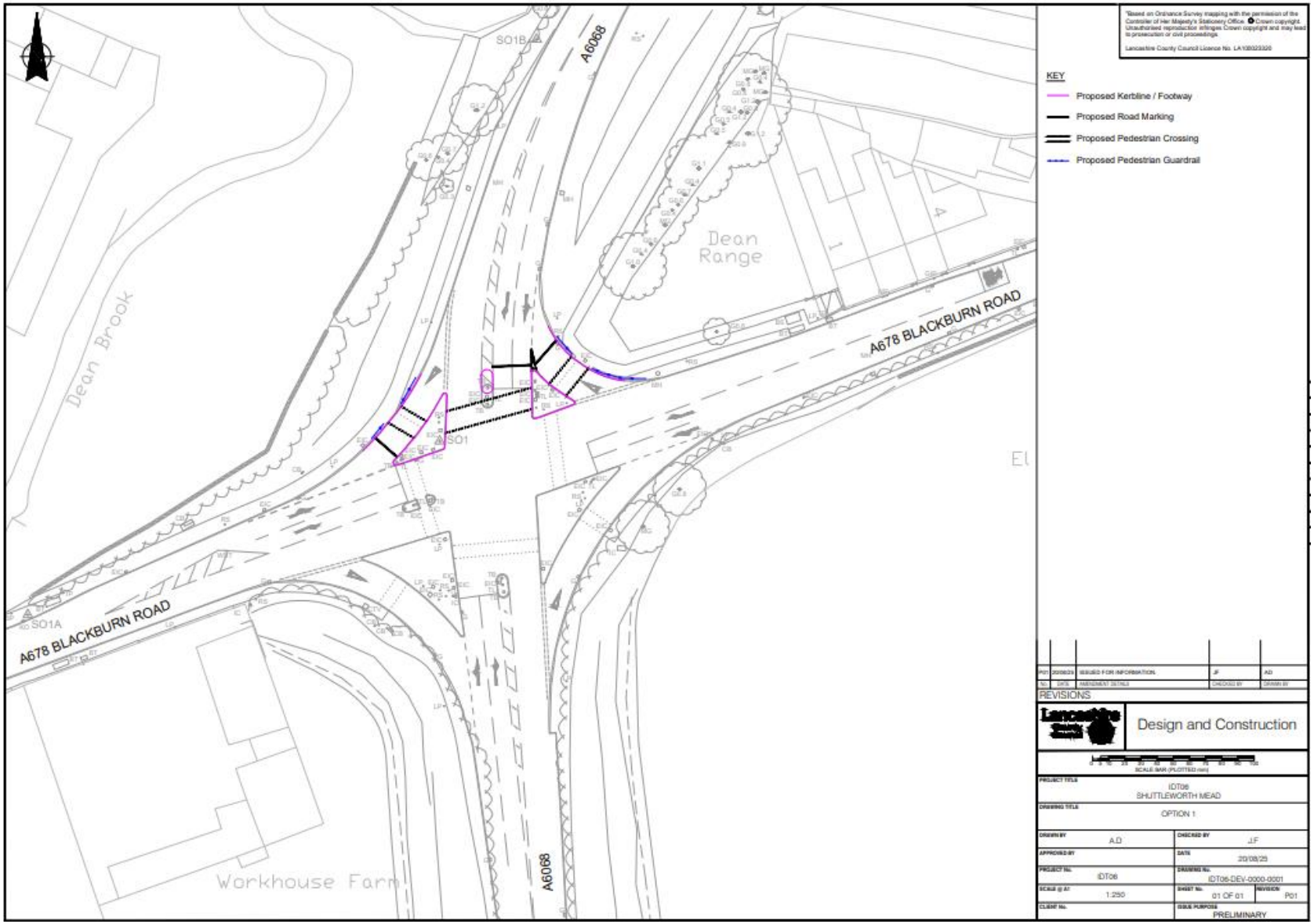
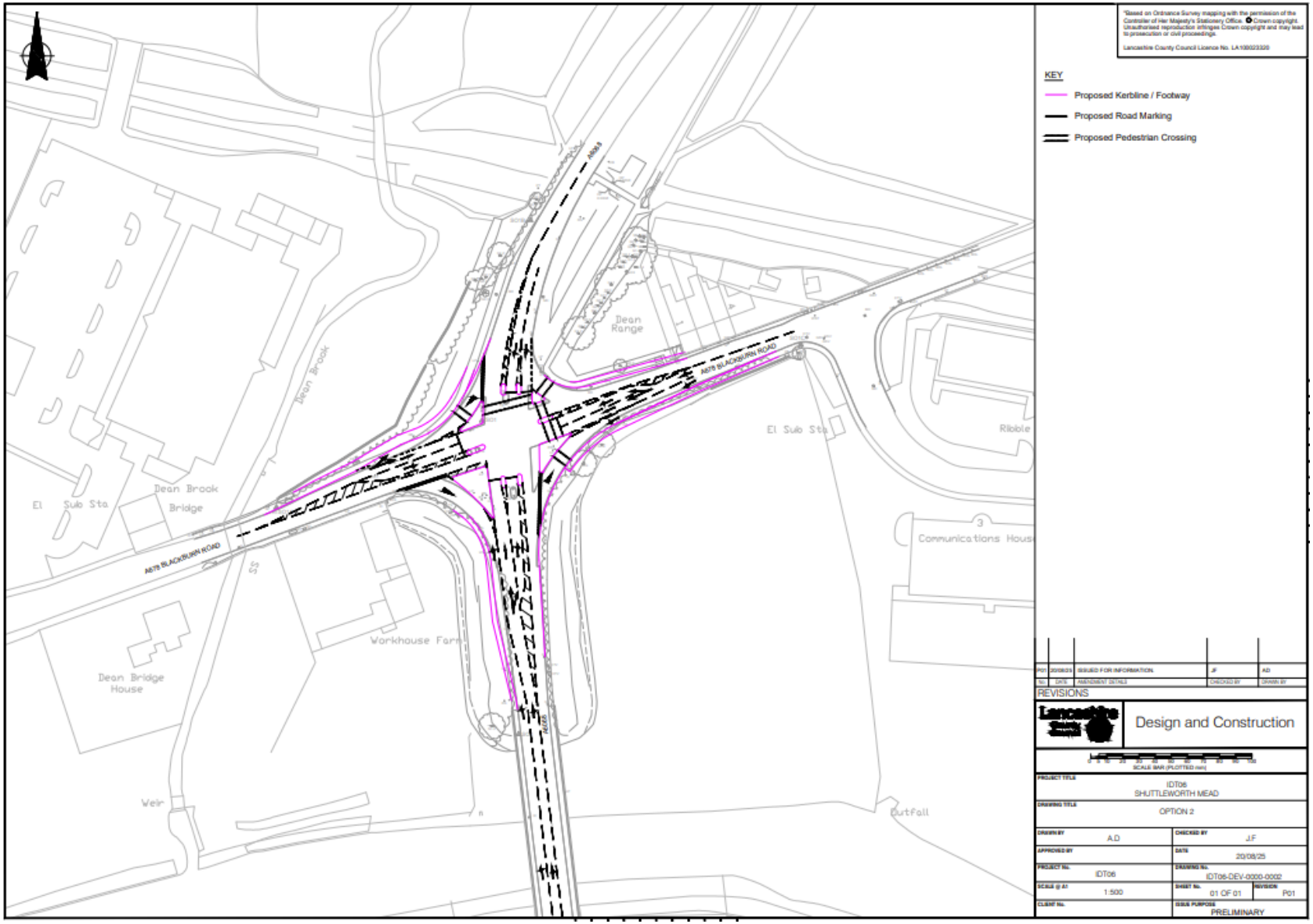


Figure 3.2 – Indicative design of Option 2 at Shuttleworth Mead junction



4. Scheme Impacts

4.1 Environmental Assessment

A preliminary desktop environmental appraisal has been undertaken to identify potential environmental constraints associated with the junction improvements.

The site is within designated Green Belt and would need further consideration should a planning application be required.

It is unlikely that Option 1 would require a planning application.

Initial desk-based assessments and site observations indicate the following key considerations.

Ecology and Biodiversity

The site has nearby woodland, hedgerows and protected species habitats which may require ecological surveys and mitigation.

To the north of the junction is a designated Ancient Woodland and Biological Heritage Site (BHS) within Lower Dean Wood.

The site has potential for protected species such as Great Crested Newts, Barn Owls, Common Toads and Bats to be impacted. There are areas of hedgerows and trees that may be impacted by the development and may require further consideration.

There is possibility of Invasive and Injurious Weeds (such as Himalayan Balsam) to be present on site which may need further consideration.

To the south of the scheme is the River Calder which has the potential for Otters and Water Voles which may need to be considered.

Water Environment

To the south of the site is the River Calder, as well as designated Flood Risk Zone 2 and 3 and therefore a Flood Risk Assessment may be required.

Cultural Heritage

To the west of the junction is a Grade 2 listed building, 'Workhouse Farm' and may require a heritage assessment and / or listed building consent.

Landscape and Visual Impact

The junction improvements may affect the local character and therefore further consideration may be required.

Geological/Soils

Potential for further assessment on soils due to possible coal mining activity, including mine entries and zone of influence. The site is within a mineral safeguarding area.

4.2 Cost Estimate – Option 1

Option 1 – £1.5m-£2m (August 2025 high level cost estimate)

Option 1 proposes targeted improvements to the existing junction layout, focusing on capacity enhancements and pedestrian safety. The scheme retains the current road geometry, minimising disruption and capital expenditure while delivering essential infrastructure upgrades.

Anticipated Scope of Works:

- Installation of a controlled pedestrian crossing to the northern arm of the junction, where no facility currently exists
- Minor alterations to existing traffic islands and kerb alignments to accommodate new crossing facilities.
- Full replacement of existing traffic signal equipment, including signal heads, poles, controller and all below-ground ducting and associated infrastructure
- Full carriageway resurfacing
- Refreshment of road markings across the junction area and approaches
- Re-application of high-friction (anti-skid) surfacing
- Minor adjustments to drainage, footways, and verge areas
- Installation of associated street furniture
- Design, procurement and supervision costs
- Planning and survey requirements

4.3 Risks and Uncertainties – Option 1

Whilst Option 1 is designed to minimise complexity, several risks may impact cost and programme:

- Statutory undertaker diversions – Initial assessments suggest a low likelihood of significant utility conflicts; however, there remains a residual risk of encountering uncharted or shallow utilities during construction. Reactive measures or oversight from asset owners may be required.
- Design constraints – Minor changes to kerb lines and traffic islands may introduce unforeseen design or construction challenges, particularly in spatially constrained areas.
- Site conditions – Further site investigations may reveal conditions that require design revisions or additional mitigation measures.

Cost Estimate Exclusions:

- New / replacement road signage
- Street lighting / electrical works
- Drainage works beyond minor adjustments
- Road restraint systems
- New DNO (Distribution Network Operator) connections
- Statutory undertaker diversions

4.4 Cost Estimate – Option 2

Option 2 – £6m-7m (August 2025 high level cost estimate)

Option 2 involves a comprehensive redesign of the junction layout to increase traffic capacity and improve pedestrian safety. Controlled pedestrian crossings are proposed on both the northern and eastern arms. The scheme includes widening of the eastern, southern and western approach arms, with the southern arm extending westward on an embankment approximately three metres higher than adjacent land. This widening requires substantial earthworks and existing embankment modifications.

Anticipated Scope of Works:

- Widening of the approach arms
- Full replacement of the traffic signal equipment, including signal heads, poles, controller and below-ground ducting
- A new scheme of road lighting
- Resurfacing of the entire junction
- Refreshed road markings and reapplication of high-friction surfacing
- Significant drainage modifications
- Reconstruction and realignment of footways and verge areas
- New road signage
- Installation of a Vehicle Restraint System (VRS)
- Statutory Undertaker diversions
- Design, procurement and supervision costs
- Planning and survey requirements

4.5 Risks and Uncertainties – Option 2

Several risks and uncertainties have been identified that could materially affect the cost and delivery and programme:

- Planning Approval / potential Listed building consent – Required due to scale of the scheme and proximity to a Grade II listed building. This introduces additional survey, reporting, and consultation requirements, with associated design, programme and cost implications.
- Statutory undertaker diversions – Present a major risk; while early assessments have informed the current estimate, the full scope of impact remains uncertain and could escalate depending on site conditions and asset owner requirements.
- Ground conditions - Pose potential challenges, particularly at the southern arm where significant earthworks are proposed.
- Drainage – The capacity, location and condition of existing drainage assets are unconfirmed and subject to survey work.

Cost Estimate Exclusions:

- Drainage works beyond what can reasonably be considered in the areas of widening (e.g. upgrading existing main carrier drains if found to be damaged or unusable)
- New DNO (District Network Operator) connections
- A scheme of landscape mitigation
- Statutory undertaker diversions where no response has been received
- A requirement for an Environment Impact Assessment (EIA)

4.6 Delivery Risks

No on-site surveys have been conducted as part of this Stage 0 assessment; only desktop survey information has been used.

Larger-scale improvements carry increased risk due to unknowns such as topography and planning restrictions, which cannot be fully mitigated at this stage.

The widening from the south for Option 2 requires cutting into an embankment. This is a high cost and potentially difficult element of the scheme to deliver.

4.7 Transport Impacts

The impacts on highway users, active travel users and public transport users for both options have been considered.

The traffic impacts have been assessed using a junction model (LinSig) and a microsimulation model (VISSIM), to assess both the local and more strategic impacts of the two proposed options.

The following traffic demand scenarios were used for morning (0715-0815) and evening (1630-1730) peaks:

- 2024 – traffic flows from 2024 count data.
- 2027 forecast – Demand from local committed developed explicitly included (including Huncoat Garden Village) and TEMPro v8.1 growth applied to the 2024 base model flows.
- 2040 forecast – Demand from local committed developed explicitly included (including Huncoat Garden Village) and TEMPro v8.1 growth applied to the 2024 base model flows.

The LinSig model utilises all forecast years, whilst the VISSIM model only assesses the 2040 flows at this stage.

Note in the LinSig models an average peak hour period is modelled, which means the results are a representation of the average impacts across the hour. Whereas the VISSIM model utilities 15-minute periods and thus can represent a maximum peak within the hour. Furthermore the results will never be identical between the two software packages as different assumptions and parameters are used.

Three model scenarios were created:

- DN – Do Nothing; a model reflecting the existing junction layout and operation.
- Opt1 – a model reflecting the Option 1 design and operation.
- Opt2 – a model reflecting the Option 2 design and operation.

Note that in the evening peak, where the queue from the south is most significant and detrimental to the performance of M65 J8, this arm is run twice a cycle to reduce queue length in both the Option 1 and Option 2 models.

Highway Impacts – Junction Modelling

The localised highway junction impacts have been assessed LinSig. The LinSig model includes both the Shuttleworth Mead junction and Blackburn Road/Meadway junction which is located around 100m east of Shuttleworth Mead.

Results for each scenario are presented in Table 4.1 and

Table 4.2 for Practical Reserve Capacity (PRC) and total junction delay respectively, along with a comparison between each option and the Do Nothing scenario.

Table 4.1 – PRC results

PRC [%]		DN	Opt1	Diff Opt1 vs DN	Opt2	Diff Opt2 vs DN
2024	AM	-12.5	-3.5	9.0	24.9	37.4
	PM	-35.5	-6.3	29.2	9.2	44.7
2027	AM	-20.0	-6.3	13.7	19.8	39.8
	PM	-44.8	-10.3	34.5	4.7	49.5
2040	AM	-35.1	-14.2	20.9	12.4	47.5
	PM	-64.0	-15.9	48.1	-5.0	59.0

Table 4.2 – Total junction delay results

Delay [pcuHr]		DN	Opt1	Diff Opt1 vs DN	Opt2	Diff Opt2 vs DN
2024	AM	44.5	39.7	-4.8	30.6	-13.9
	PM	94.1	38.4	-55.7	33.2	-60.9
2027	AM	72.4	46.8	-25.5	33	-39.4
	PM	120.7	44.4	-76.3	37	-83.8
2040	AM	142.6	87.1	-55.5	37.7	-104.9
	PM	181.1	69.9	-111.2	48.7	-132.4

The results suggest that both design options would significantly improve the PRC and decrease the total delay per vehicle at the junction when compared to the existing situation.

Whilst Option 1 is a notable improvement on the existing operation of the junction with a reduction in overall delay and increased capacity, easing congestion, capacity issues at the junction are not fully resolved.

Option 2 is expected to have a much greater impact, and the junction is predicted to be within capacity for all except the 2040 evening peak scenario, where it is slightly over capacity.

Highway Impacts – Microsimulation Modelling

The strategic highway impacts have been assessed using microsimulation modelling in VISSIM. This model covers the area of Shuttleworth Mead junction, the Blackburn Road/Meadway junction and M65 junction 8. Crucially this means it captures the interaction between Shuttleworth Mead and M65 J8, which the junction model alone is unable to emulate.

Both the Shuttleworth Mead Option 1 and Option 2 VISSIM models include the proposed junction improvement scheme at M65 Junction 8. The Do Nothing VISSIM model includes the existing arrangement at M65 J8.

Results are shown in Table 4.3 and Table 4.4 for the maximum modelled queues and latent demand on each arm, respectively, in the morning peak in 2040. Table 4.5 and Table 4.6 show these for the evening peak in 2040.

The latent demand represents any vehicles that are unable to load onto the modelled network due to the network already being congested and thus can be thought of as a representation of additional queue.

Table 4.3 – Maximum modelled queues (in metres), morning peak

Junction Approach	2040 DN	2040 Opt1	Diff Opt1 vs DN	2040 Opt2	Diff Opt2 vs DN
M65 J8 North Arm	196.9	106.3	-90.6	163.6	-33.3
M65 J8 East Arm	54.1	91.4	37.3	86.5	32.4
M65 J8 South Arm	1896.8	632.7	-1264.1	470.9	-1425.9
M65 J8 West Arm	2072	207	-1865	212.8	-1859.2
Shuttleworth Mead South Arm	1739.2	1729.3	-9.9	246.4	-1492.8
Shuttleworth Mead West Arm	545	548.6	3.6	534.4	-10.6
Shuttleworth Mead North Arm	683.8	684.4	0.6	682.9	-0.9
Shuttleworth Mead East Arm	623.8	638.5	14.7	584.7	-39.1

Table 4.4 – Latent demand (in vehicles), morning peak

Model Zone (loading point)	2040 DN	2040 Opt1	Diff Opt1 vs DN	2040 Opt2	Diff Opt2 vs DN
A6068 North	160	134	-26	0	-160
M65 West	1325	0	-1325	0	-1325
Blackburn Road West	206	378	172	1	-205
A56 South	923	0	-923	0	-923
Blackburn Road East	0	145	145	0	0

Table 4.5 – Maximum modelled queues (in metres), evening peak

Junction Approach	2040 DN	2040 Opt1	Diff Opt1 vs DN	2040 Opt2	Diff Opt2 vs DN
M65 J8 North Arm	410.0	118.6	-291.4	105.4	-304.6
M65 J8 East Arm	31.6	89.3	57.7	89.5	57.8
M65 J8 South Arm	1673.4	144.7	-1528.7	145.4	-1528.1
M65 J8 West Arm	2071.5	162.9	-1908.6	163.0	-1908.5
Shuttleworth Mead South Arm	1706.2	1670.4	-35.8	1411.9	-294.3
Shuttleworth Mead West Arm	546.7	549.2	2.5	549.2	2.5
Shuttleworth Mead North Arm	684.1	683.9	-0.2	686.0	1.9
Shuttleworth Mead East Arm	189.2	427.7	238.5	294.6	105.4

Table 4.6 – Latent demand (in vehicles), evening peak

Model Zone (loading point)	2040 DN	2040 Opt1	Diff Opt1 vs DN	2040 Opt2	Diff Opt2 vs DN
A6068 North	3	0	-3	0	-3
M65 West	4229	0	-4229	0	-4229
Blackburn Road West	231	321	90	39	-192
A56 South	0	0	0	0	0
Blackburn Road East	0	0	0	0	0

These results show that overall both Option 1 and Option 2, in conjunction with the changes at M65 J8, reduce queueing and latent demand across the network in both peak periods.

The largest change is the reduction in latent demand from M65 West, particularly in the PM, where all vehicles are now able to join the model network in both Options, suggesting there has been a significant increase in capacity.

With Option 1, whilst the queue at Shuttleworth Mead junction itself are similar to the Do Nothing, the queues on the south and west arms of M65 J8 are greatly reduced. This suggests that Option 1 would provide enough capacity at Shuttleworth Mead junction to enable the improvements at M65 J8 to be effective.

Option 1 does however predict a slight worsening of queue on the east arm of Shuttleworth Mead junction, as well as an increase in latent demand on the west arm, suggesting some redistribution of delay to these arms. This queue however is not as present with Option 2, where most of the latent demand is now able to enter the model network.

Option 2 delivers more pronounced improvements than Option 1, by almost fully removing the queue on the south approach to Shuttleworth Mead junction. Option 2

delivers consistent and substantial reductions in latent demand, especially on the key strategic routes.

Active Travel and Public Transport Impacts

Both options propose new signalised crossings of the north arm of the junction, which will give pedestrians dedicated time to cross the road on the key desire line at the junction. This is a huge improvement on the existing arrangement for pedestrians. Option 2 also provides new signalised crossings on the east arm of the junction to cater for north-south movements of pedestrians.

Bus routes 121, 122, 152 and M2 use the junction, as well as several school bus services. These buses would benefit from the reduced congestion at the junction, helping to improve journey times and bus reliability.

5. Recommendations and Next Steps

5.1 Recommendations

This Stage 0 report presents two options that both meet the key objectives detailed in Section 1.3. The identification of feasible 'options' to improve capacity at the Shuttleworth Mead junction (intersection of A6068 and A678 Blackburn Road) demonstrates the means to provide necessary complementary network improvements to enable planned National Highways improvements at M65 J8 to come forward.

This initial assessment provides evidence to inform the Hyndburn Local Plan examination by demonstrating the feasibility of an improvement scheme at the junction subject to available funding.

Additional assessment beyond Stage 0 is required to determine the full scope of works and consider the potential for phased delivery that aligns with growth projections.

Subject to the outcomes of the Local Plan examination is it recommended to advance scheme development activity to Stage 1.

5.2 Next Steps

This work is considered a Stage 0 feasibility assessment of the scheme. Following stages are likely to include:

- Stage 1 – Further options development and appraisal.
- Stage 2 – Preliminary design and business case development.
- Stage 3 – Detailed design and planning.
- Stage 4 – Procurement and award.
- Stage 5 – Construction and implementation.
- Stage 6 – Monitoring and evaluation.