Thakeham Homes

REDHILL GARDEN COMMUNITY

TN15 Review of TDC M25 J6 Feasibility Note
# QUALITY CONTROL

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1 INTRODUCTION

1.1.1. The DHA Transport Technical Note (Examination Document INFE29) first appeared in the Tandridge District Council (TDC) Examination Library around 15th October 2019. It was not part of the previous Regulation 19 consultation, nor was it part of the suite of evidence submitted to support the Local Plan at Regulation 22 stage. The document appears to have been written to support the TDC/Surrey County Council (SCC) Housing Infrastructure Fund (HIF) bid which was submitted in March 2019.

1.1.2. The DHA Note is intended to assess the identified mitigation scheme in terms of highway capacity benefits and cost implications.

1.1.3. The Statement of Common Ground (SoCG) between TDC and Highways England (HE) is based upon the improvements in the DHA Note, as clarified in Examination Document STDCE23. Within the SoCG, at paragraph 3.7, it is agreed that the proposed improvement will mitigate the traffic impact of Local Plan growth on M25 Junction 6:

“HE are content that the design work for a proposed M25 Junction 6 (A22) junction improvement (prepared by DHA), as set out in the documents referenced above, demonstrates an improvement scheme that will mitigate the traffic impact of the Local Plan on the junction.”

1.1.4. This Technical Note (TN) highlights the main issues/concerns that TDC/Highways England have failed to properly consider in relation to the proposed mitigation required at M25 J6 to support a Local Plan allocation for a new Garden Village at South Godstone. It covers the inadequacies with the proposed improvements to M25 J6 under the following headings:

- Design Feasibility
- Capacity Analysis
- Process
- Cost
- Programme
2 DESIGN – OPTION 2

2.1 CONTEXT

2.1.1. The Junction was originally constructed and opened in 1976 when the southern section of the M25 was formed. There have been no significant changes to the layout of the junction in terms of lane arrangements since that time. The junction was improved initially with partial signalisation and subsequently to full signalisation in 2005\(^1\). The existing junction dimensions conform almost perfectly to the design standards that would have been prevalent at the time of construction, before the rigour required by the current Design Manual for Roads and Bridges (DMRB)\(^2\).

2.1.2. DMRB standards are required to be applied to any design work associated with this important intersection between M25 which is part of the Strategic Road Network (SRN) and A22 which is a primary route within Surrey and is now incorporated within Major Road Network (MRN)\(^3\).

2.1.3. Any deviation from the DMRB standards would need to be agreed as a relaxation or departure by Surrey County Council (SCC) and Highways England. Deviations beyond recognised relaxations and departures should not be agreed as these would compromise highway safety.

2.1.4. Whilst not within the jurisdiction of HE as the junction itself falls within the control of SCC, HE should be concerned that insufficient width, forward visibility and bridge protection could result in reduced safety margins and increase the risk of bridge strikes which will ultimately adversely affect the mainline M25 carriageway running overhead.

2.2 WIDTH OF OVERBRIDGE PORTALS

2.2.1. WSP attended the site to make laser measurements on Monday 18 Nov 2019. The clear width between abutments for both portals is 12.777m (east) and 12.791m (west). The lanes have a width of 3.7m. From our observations on site, the lane widths are currently barely adequate to accommodate large vehicles to ensure they stay in lane and overturning frequently occurs where vehicles encroach on adjacent lanes.

2.2.2. The M25 mainline overbridge portals are narrow in width and are not sufficiently wide to accommodate three lanes of traffic at reasonable lane widths and the required safety margins in order to protect the bridge structure and allow the highway to pass underneath safely.

2.2.3. The minimum required ‘set back’ distance (i.e. the distance from kerb face to the abutment) is 1200mm from the face of the abutment to the edge of carriageway (in accordance with Table 4.1 of DMRB TD 27/05), with a relaxation to 1000mm when adjacent to a structure.

2.2.4. Assuming the lane width is retained to safely accommodate large vehicles, and three lanes are provided around the circulatory area of the roundabout, three 3.7m lanes (11.1m) and two 1m ‘setbacks’, an overall portal width of 13.1m would be required as an absolute minimum. The portals are currently both 12.8m wide and are therefore not wide enough to accommodate three lanes of traffic as proposed. It appears that DHA have relied solely upon measurements from inaccurate Ordnance Survey (OS) mapping which suggests that the clear opening width of the portals is circa

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\(^1\) Historic images from Google Earth.

\(^2\) DMRB; Department of Transport

\(^3\) MRN – Major Road Network, Department of Transport
14m$^2$. On this basis the achievability of the design has not been verified. From WSP’s recent review it is clearly evident that to accommodate three running lanes, the lane width would have to be reduced to an unacceptable level with the inherent risks of compromising highway safety.

**ABUTMENT PROTECTION**

2.2.5. With a reduced safety margin to the bridge abutments which reflects a relaxation of standards, WSP consider that there will be a requirement to provide additional protection to the bridge structure. Armco or any Vehicle Restraint System (VRS) placed in front of the abutment will need to be set away from the face of the abutment so that the abutment does not lie within the working width of the barrier. A working width of 600mm is usual for normal containment of vehicles$^5$. The overall minimum setback including allowance for VRS is therefore 1.1m. As previously, with three lanes of 3.7m width and the VRS with setback, an overall portal width of 13.3m would be required as an absolute minimum. The portals are both 12.8m wide and are therefore not wide enough to accommodate the improvement proposed, as illustrated on the drawings within Appendix A.

**2.3 LANE WIDTHS**

2.3.1. The lane widths on the DHA Option 2 drawing vary around the circulatory carriageway from 3.5m to 4.2m, to account for the curvature of the roundabout. Lane widths below the existing 3.7m minimum should not be acceptable to Highways England or SCC as it presents a safety risk of large vehicle side-swope collisions.

2.3.2. A swept path analysis of the proposed improvement shows that the lane arrangement and widths are too tight for three large vehicles to be in adjacent lanes around the circulatory carriageway, as shown in Appendix A. As advised previously by HE$^6$, to accommodate this, where the alignment passes through a radius of between 90-150m, an additional 300mm should be added to the minimum lane widths i.e. this would suggest a lane width of 4mm minimum would be required although this would be subject to a more detailed swept path analysis.

2.3.3. Furthermore, there is no assessment included to prove that the layout would allow the safe manoeuvre of large HGVs side by side around the gyratory. A swept path analysis should have been completed to prove that vehicles are able to safely negotiate the junction without straying into neighbouring lanes.

**2.4 VISIBILITY AND STOPPING DISTANCES**

2.4.1. The junction is subject to the national speed limit, 60mph, with associated onerous sight stopping distance requirements. Insufficient portal width around the gyratory bends will reduce the available Sight Stopping Distances (SSD) and visibility splays to below the required standard, rendering the junction unsafe.

**CIRCULATORY VISIBILITY**

2.4.2. The portals need to be sufficiently wide to allow not only appropriate lane widths and safety margins, but also to allow forward visibility for vehicles to ensure the minimum sight stopping distances can be accommodated. For a roundabout with an inscribed circle diameter (ICD) of greater than 100m,

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$^4$ subject to scaling
$^5$ a system like Flexbeam Plus can have a working width as small as 600mm
$^6$ Discussions between Atkins/HE and WSP in relation to improvements at M25 J10
as is the case for M25 J6, a minimum circulatory visibility splay to a point 70m away is required at any point around the gyratory.

2.4.3. There are a number of points on the proposed junction layout where the minimum 70m visibility splay cannot be provided, including on the approach to the east overbridge portal and the exit from the west overbridge portal, as shown on the drawing in Appendix A. The risk of rear-shunt collisions increases as a consequence of the substandard visibility provision, and the proposed improvement will not be safe. Neither Highways England nor SCC should agree to an arrangement that compromises highway safety.

FORWARD VISIBILITY

2.4.4. Forward visibility on the junction approach arms and the approach to pedestrian crossing stop lines and are dependent on the 85%ile speed of the traffic to calculate the desirable minimum SSD. No speed surveys have been completed to establish the 85%ile speed, therefore it is obvious that the forward visibility has not been considered. In the absence of speed surveys, the only option is to assess the SSDs based on the posted speed limit. The roundabout is subject to the National Speed Limit of 60mph, which would result in a SSD of 215m as a desirable minimum. It is clear that on the approaches to the pedestrian crossings on the southern and western sides of the junction cannot accommodate a SSD of 215m, therefore the proposed improvement cannot be considered to be safe.

2.5 VERTICAL PROFILE

2.5.1. There is no consideration of the vertical three-dimensional profile of the proposed junction arrangement. The improvements have been designed as a two-dimensional concept only, which is unacceptable given the significant level differences at points within the junction, as noted on WSP’s site visit on 18th November 2019.

2.5.2. Significant retention of the embankments will be required at points on the approaches to the roundabout, especially on the southbound approach arm of A22 which is to be widened from two lanes to four lanes in advance of the stop line. In this location there are considerable level differences over a sustained distance. It is likely that sheet piling will be required along the entire approach to stabilise and retain the base of the existing embankment.

2.5.3. The toe of the embankment on the M25 eastbound off-slip will need to be cut into to create the extra lane, especially at the point the approach arm meets the circulatory carriageway. Retention of the bank will be needed in this location.

2.5.4. Retention of the central island around the proposed pedestrian route will also be required on the southern side of the mainline M25 carriageway, along with considerable earth removal and regrading is also likely to be required to create the underpass and tie in with the levels on the northern side of the junction.

2.5.5. Third party land may be required to allow retaining structures to be provided or for embankments to be graded-out. This is a considerable constraint which has been overlooked entirely.

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7 Measured 2m from the central island. DMRB CD 116 Geometric Design of Roundabout, July 2019
8 DMRB CD 116 para 3.52
2.6 PEDESTRIANS AND CYCLISTS

2.6.1. Pedestrian crossing widths are long. Pedestrians are required to cross four lanes of traffic in one movement on the A22 southbound approach arm with no refuge island half-way. Assuming lane widths of 3.7m, the crossing length in that location would be 14.8m. At all other pedestrian crossing points three lanes will need to be crossed at a distance of 11.1m. This long crossing distance leads to an 'intimidation impact' which would need to be considered within the context of an Environmental Statement (ES). It would also increase the crossing time required within the traffic signal staging and increase the delays to traffic on both the local and strategic highway network.

2.6.2. There is no consideration of the movement of cyclists around the junction. It is assumed that the pedestrian underpass would need to be able to also accommodate cyclists. The widths of the pedestrian route(s) would need to be sufficient to allow a shared space of at least 3.5m for it to be safe for both pedestrians and cyclists.

2.6.3. The pedestrian route and underpass would be fitted with low level lighting. This is not sufficient to ensure that the route would be safe and would not attract anti-social behaviour.

2.6.4. Protection will be required for pedestrians/cyclists due to the proximity of the route to the wet pond which will be at the toe of the slope on the central island.

2.7 MERGE/DIVERGE ARRANGEMENTS

2.7.1. There is no assessment included within the DHA Note of the adequacy of the merge and diverges on the M25 slip roads. The current and future traffic flows on both the mainline carriageway and the slip roads need to be assessed to determine whether the arrangement at the merges and diverges is correct and to the standard as set out in DMRB CD 122, and whether they remain adequate to accommodate the increase in traffic from the anticipated Local Plan growth.

2.7.2. The impact of failing to assess the merges and diverges is that should improvement be required, it is likely that third party land would need to be acquired to enable the upgraded layouts to be constructed to accommodate the widened carriageways.

2.7.3. The current existing and calculated merge and diverge arrangements are as shown in Table 2-1.

Table 2-1 – Existing Merge/Diverge Types for 2018

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<tr>
<th>Slip</th>
<th>Merge/Diverge Type</th>
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<tr>
<td></td>
<td>Existing</td>
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<tr>
<td>M25 Eastbound Off-slip diverge</td>
<td>Layout C - lane drop</td>
</tr>
<tr>
<td>M25 Westbound Off-slip diverge</td>
<td>Layout C - lane drop</td>
</tr>
<tr>
<td>M25 Eastbound On-slip merge</td>
<td>Layout D - lane gain</td>
</tr>
<tr>
<td>M25 Westbound On-slip merge</td>
<td>Layout E Option 1 - lane gain with ghost island offside merge</td>
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9 DMRB CD 122, Geometric Design of Grade Separated Junctions, September 2019
2.7.4. All of the existing merge and diverge arrangements at M25 J6 meet or exceed the current traffic flow requirements from the WSP high level review in accordance with DMRB CD 122.

2.7.5. An assessment of the future merge and diverge arrangements has been completed and is presented in detail in Appendix B. The required future merge/diverge arrangements are shown in Table 2-2.

Table 2-2 - Required Merge/Diverge Types for 2040

<table>
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<th>Slip</th>
<th>2040 Base</th>
<th>2040 Base + Local Plan Growth</th>
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<td>M25 Eastbound Off-slip diverge</td>
<td>Layout D Option 1 – ghost island lane drop OR Layout D Option 2 – auxiliary lane drop</td>
<td>Layout D Option 1 – ghost island lane drop OR Layout D Option 2 – auxiliary lane drop</td>
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<tr>
<td>M25 Westbound Off-slip diverge</td>
<td>Layout C - single lane drop</td>
<td>Layout C - single lane drop</td>
</tr>
<tr>
<td>M25 Eastbound On-slip merge</td>
<td>Layout D - lane gain</td>
<td>Layout D - lane gain</td>
</tr>
<tr>
<td>M25 Westbound On-slip merge</td>
<td>Layout E Option 1 - lane gain with ghost island offside merge</td>
<td>Layout F – two lane gain with ghost island</td>
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2.7.6. The eastbound diverge and the westbound merge arrangements will both need to be significantly upgraded to accommodate the additional flows in 2040 as calculated by DHA at M25 J6. The westbound merge arrangement will need to be upgraded as a direct result of the Local Plan Growth to provide a two-lane gain at the junction. This will require widening of the mainline carriageway to five lanes downstream of the junction. This has not been considered within the DHA Note and should have been fully assessed in the context of developing a scheme to improve M25 J6.

2.8 SAFETY

2.8.1. WSP consider that there are a number of issues of safety which mean that the design is unlikely to satisfy a Road Safety Audit (RSA). There is no Stage 1 RSA included within the DHA report and safety for both vehicle users and pedestrians/cyclists has not been properly considered. Initial observations are provided in the following paragraphs.

2.9 SUMMARY

2.9.1. All constraints point towards a much bigger improvement at the junction than is proposed. It will not be possible to widen the portals to allow acceptable lane widths and safety margins without replacing the whole structure that currently supports the M25 mainline.

2.9.2. The merge and diverge slip road layouts will need to be upgraded with the likely need for additional land outside the current public highway.
2.9.3. The aim of Highways England is to maintain the resilience and safety of the SRN. As set out within this Technical Note, the junction arrangement proposed by TDC and their consultant DHA cannot be implemented as suggested and fails to comply with current DMRB standards.
3 CAPACITY ANALYSIS

3.1 CONTEXT

3.1.1. The traffic capacity assessment that supports the benefits of the improvement is fundamentally flawed and the assessments are not robust. Considerable additional data collection and modelling work is required to establish a feasible solution, as set out in the following paragraphs.

3.2 DATA AND BASE MODEL

3.2.1. Survey data which forms the basis for the assessments is based on a manual count on one day in October 2018. It is highly inappropriate to base an assessment of such an important SRN/MRN junction on just a single day of data. Calibration and validation screen line counts have not been completed and there are no reports on weather conditions or incidents on the highway network. There is no evidence to prove that the day of the survey was in any way typical of the traffic flows at the junction.

3.2.2. Traffic signal times at the junction are adaptive i.e. they react to traffic conditions. An average traffic signal time has been taken and this is a usual process. However, the traffic signal timing data is taken from a five-day period in November 2018. The adaptive signal timing data, reacting to traffic flow patterns, does not correspond to the data of the traffic surveys. The use of the traffic signal data for input into the capacity model is therefore inappropriate and unacceptable.

3.2.3. There is no calibration or validation of the LINSIG capacity model, and it appears no survey data available with which to calibrate or validate the model. The resulting model cannot therefore be considered to robustly replicate the existing conditions.

3.3 DEVELOPMENT TRIPS

3.3.1. The SCC SINTRAM72 strategic model has been used to derive development trips for the assessment of the Local Plan Growth scenario. The SINTRAM72 model was created to model the local highway network under the control of SCC, and as such the model (and its predecessors) has never been accepted by Highways England as accurately representing the traffic on the strategic network. The use of the SINTRAM72 model to generate development trips to assess a junction on the strategic road network is therefore highly questionable.

3.3.2. The development trips have been calculated by comparing the ‘base 2033’ and ‘base + development 2033’ scenarios from the SCC SINTRAM72 strategic model. The difference between the two scenarios has been taken as the development trips related to the Local Plan growth. The SINTRAM72 model is a dynamic reassignment model, which routes traffic depending on congestion within the model to prevent junctions becoming over-capacity. As such, traffic is likely to have been routed away from M25 J6 within the ‘base + development 2033’ scenario due to the junction being ‘over-capacity’. By simply calculating the development trips in this way with no consideration of trip rates and origin-destination distribution, the assignment of development traffic at the junction is seriously underestimated.

3.3.3. As a result of the use of the SINTRAM72 2033 scenarios as described above, the trip rate for the development is extremely low. Dividing the total development trips heading northbound in the AM peak by 4,000 residential units presents a trip rate of 0.14 trips per housing unit. Similarly, for southbound trips in the PM peak with a rate of 0.13 trips per housing unit. Even allowing for trips
heading south out of the development or along rural routes (i.e. not to M25 J6), these trip rates are extremely low for a development that will be car-centric as a result of the locational characteristics and lack of realistic sustainable travel opportunities for future residents.

3.3.4. The distribution of development trips within the LINSIG capacity model is therefore highly questionable. The AM and PM peak distributions are not even remotely similar, which is unusual for a predominantly residential development growth scenario where residents leave in one direction in the AM peak and arrive home from the opposite direction in the PM peak. The impact of incorrect turning movements at a junction as important as M25 J6 would be critical to its operation during periods of peak demand.

3.4 LINSIG MODELLING

3.4.1. There are issues with the LINSIG model itself which would negatively affect the impact of the development on the junction when modelled correctly, and therefore affect the level of improvements and mitigation required.

3.4.2. The saturation flows have been manually increased from the standard 1900 vehicles/hour to 2100 vehicles/hour with no explanation; there is no empirical data to show that the proposed junction would accommodate these increased levels of capacity. Furthermore, the saturation flows would be expected to reduce from the standard calculations as a result of slow moving HGVs traversing the junction in large numbers.

3.4.3. The potential for ‘blocking back’ around the circulatory carriageway has not been assessed. This is crucial given that the cycle time is set at 88 seconds when the standard used for a roundabout gyratory is around 60-72 seconds as a maximum to ensure that the circulatory carriageway should remain ‘fluid’ at all times and should not ‘block back’ across other signal nodes within the roundabout gyratory.

3.4.4. The lane lengths on the circulatory carriageway have been input incorrectly, which leads to an overestimation of the stacking length between the junctions on the gyratory. The impact of this could be increased blocking back across junctions, had that actually been assessed.
4 PROCESS

4.1.1. In order for Highways England to ‘sign off’ the junction arrangement as suitable mitigation for the Local Plan growth, there is a formal process that needs to be completed. The Project Control Framework (PCF)\textsuperscript{10} ensures that the correct stages of assessment, engagement, design and approvals are completed satisfactorily to enable Highways England to have confidence that any improvements or major changes to the strategic network have been properly considered.

4.1.2. There is no indication that the PCF process has been used for M25 J6, which suggests that due process for determining the correct improvements for the junction has not been followed. Without this, it is difficult to understand how Highways England have agreed within the Statement of Common Ground with TDC (paragraph 3.7) that the improvements demonstrate suitable mitigation for the impact of the Local Plan growth on the junction.

\textsuperscript{10} Highways England – Project Control Framework (PCF)
5. **COST**

### 5.1 HIF FUNDING

5.1.1. To date, there has been no announcement to confirm whether SCC/TDC have been awarded HIF funding for the junction. The latest announcement of successful schemes from Government was on 1st Nov 2019.

5.1.2. There is no detail available on the SCC HIF submission, therefore it is not clear whether SCC/TDC have applied for full funding to deliver the junction improvement or partial funding. There is also no detail on gap funding for the instance that either partial funding is awarded, or the cost of the scheme is significantly higher than currently anticipated. Given the concerns raised by WSP in this TN, should a grant be forthcoming, then considerable gap funding would be required to ensure delivery of a viable scheme to upgrade M25 J6.

### 5.2 COST PLAN

5.2.1. The Cost Plan for the junction improvement underestimates the costs in a number of areas, both in the technical elements included and in the assumptions.

- The allowance for retention of slopes is minimal and will be insufficient to cover the scale of the retention that will be required at various points on the junction, especially on the A22 southbound approach where sheet piling is likely to be required.
- There is no allowance for retention of slopes associated with the pedestrian underpass.
- There is no allowance for third party land which may be required following creation of a 3D model to fully understand the retention requirements.
- There is no consideration of improvements to the slip road merges and diverges, therefore the costs associated with improvements and additional land requirements are excluded from the Cost Plan. The westbound merge will need to be significantly upgraded as a direct result of the increase in traffic flows in 2040 from the Local Plan Growth. This will increase the costs of the junction improvement considerably.
- The full costs of creating an underpass for the pedestrian route have not been considered. The methodology that will be required includes excavating and pushing precast concrete boxes under the carriageway one by one.
- The allowance for risk & optimism bias is far too low. It is included at 40% however DfT requirements are for closer to 60% for this level of design detail, made up of at least 10-15% risk and 44% optimism bias
- Overheads and profit are not fully accounted for within the costs, which artificially reduces the total costs of the improvements.
- There is no consideration of the compensation that would be imposed as a result of the construction of the improvements and the overhead M25 mainline lane rentals that will be required. These costs will be considerable and have been entirely overlooked.

5.2.2. Assuming a more significant improvement is feasible and deliverable to upgrade M25 J6, then the estimated costs would be in the region of circa £200 million, excluding the required upgrade to the slip roads. This cost will be completely unviable, and the current HIF bid would if successful leave a significant funding gap. TDC has failed to identify how any additional funding would be secured which seriously questions the overall deliverability of the Garden Village at South Godstone.
6 PROGRAMME

6.1.1. There is no detail on the timing of delivery of the junction, nor any phasing assessment to show when the junction would need to be constructed and operational in order to prevent the Local Plan growth causing a severe impact at the junction.

6.1.2. The Cost Plan assumes inflation to 2024, therefore the inference is that the junction improvements would not be built before that date.

6.1.3. Assuming that funding is available, then any improvement works would need to be included in the next Roads Period 2020-25\textsuperscript{11}. There is no assessment to prove that the existing arrangements at the junction would be able to accommodate the increase in traffic until that time; in fact, the opposite is more likely. The LINSIG assessment shows the junction is unable to operate effectively in the 2018 base case; therefore, any additional traffic at the junction would have a severe impact prior to improvements being implemented and completed.

6.1.4. To date, there is no correspondence available to suggest that the junction improvements are already included either within RP2 2020-25, or that it would be possible to include the works in RP2, given the other major works programmed in the local area during that period. The coordination of works on the SRN and MRN is critical to ensuring that both networks operate safely and without unnecessary disruption.

\textsuperscript{11} Roads Period 2 (RP2) 2020-25
7 SUMMARY

7.1.1. To summarise, there are some serious failings with the DHA Note and the improvements proposed at M25 J6 to mitigate the impacts of the TDC Local Plan growth as set out below inter alia:

- Design Feasibility – the design does not meet the current DMRB standards and is therefore unfeasible and unsafe;
- It appears the design is based on Ordnance Survey mapping, the dimensions of which have not been validated on site, therefore the clear width between the abutment walls is significantly overestimated;
- The assessment of the impact of the improvements is fundamentally flawed and is based on inappropriate data manipulation, leading to an overestimation of capacity at the junction in the future and an underestimation of the impact of the Local Plan growth;
- There is no assessment of the merge and diverge arrangements which will require upgrading as a result of the increase in traffic in accordance with DMRB. This could have implications for land acquisition along M25 mainline and the cost of the scheme would be significantly more than currently forecast by TDC;
- Process – the required PCF process does not appear to be being followed, which given the complexity of this scheme improvement would be an absolute necessity to comply with HE’s requirements therefore it is premature for Highways England to agree that the mitigation is suitable;
- Cost Analysis – there is no consideration of the impact of retention on land acquisition, which would significantly increase the costs of the improvement
- A realistic cost of improving M25 J6 with reconstruction of the junction could be in the region of circa £200million, which excludes the cost of any land acquisition that may be required to facilitate the improvement of the slip roads and potential compensation required for construction lane rentals.
- The allowance for risk and optimism bias is significantly too low, and the calculations for OH&P is not fully accounted for.

7.1.2. In its current form as assessed and presented to the Examination, the improvements proposed for M25 J6 are unfeasible, unviable and unsafe and the associated costs are significantly underestimated, with no identification of a source of gap funding which will be required to accommodate the reconstruction of M25 J6. On this basis, the SoCG between Highways England and TDC relies on a flawed concept that is unacceptable, inaccurate and misleading and should either be withdrawn or amended by the parties.
Appendix B

MERGE/DIVERGE ASSESSMENT
Merge/Diverge – High Level Assessment

- Mainline M25 traffic flows have been obtained from DfT sources for 2017 for count point 50638.
- Traffic growth values for 2018-2033 and 2033-2040 have been taken from the DHA Note. No growth has been applied from 2017-2018.
- Slip road flows have been taken from the network diagrams also presented in the DHA Note and converted from PCUs to vehicles using vehicle proportions from the DfT count site to create a bespoke AM and PM factor.
- Busiest hour has been assessed, which equates to the PM peak for eastbound traffic and the AM peak for westbound traffic.
- Where the mainline flow in the busiest hour exceeds the maximum lane flow, the maximum flow has been used, in accordance with CD 122 para 3.8.

<table>
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<th>Slip</th>
<th>Mainline Upstream No. Lanes Maximum Vph Flow</th>
<th>Busiest Hour</th>
<th>Corresponding Peak</th>
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<tbody>
<tr>
<td>M25 Eastbound Off-slip diverge</td>
<td>4 lanes 7,200 vph</td>
<td>6,603 (1600-1700)</td>
<td>7100</td>
</tr>
<tr>
<td>M25 Westbound Off-slip diverge</td>
<td>4 lanes 7,200 vph</td>
<td>6,251 (0700-0800)</td>
<td>6424</td>
</tr>
<tr>
<td>M25 Eastbound On-slip merge</td>
<td>3 lanes 5,400 vph</td>
<td>5427 (1600-1700)</td>
<td>5571</td>
</tr>
<tr>
<td>M25 Westbound On-slip merge</td>
<td>3 lanes 5,400 vph</td>
<td>5528 (0700-0800)</td>
<td>5748</td>
</tr>
</tbody>
</table>