File Note

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Job No/ Name	ST12118
Subject	Review of Maidstone Modelling and Appraisal Work

The purpose of this note is to provide a review of the Maidstone Visum modelling work and subsequent appraisal analysis in order to help interpret the findings and to rationalise them within a real world context.

The Visum model has provided a range of headline results in terms of future year person flows, vehicle movements on key links, journey times on key links, and overall network congestion. In addition, it has provided forecasts of park & rides usage and bus and rail patronage.

The limitations of the model have been acknowledged as follows:

- Only a single AM and PM peak hour has been modelled: this creates difficulties in understanding the application of peak spreading that is incorporated within the model
- Limited detail in the external zones: this creates difficulties in utilising information that originate and terminate in these areas – a key aspect of park & ride, as well as rail demand.
- No specific modelling of high occupancy vehicles: this means that the impact of HOV lanes cannot be fully understood

Three option scenarios have been assessed, with Option 1 referred to as the reference case, reflecting the minimum specification of schemes that would be included within the Integrated Transport Strategy (ITS). Options 2 and 3 have been assessed against Option 1.

Option 2

The headline Visum outputs for Option 2, in comparison to Option 1 are as follows:

- 5% reduction in AM peak hour car trips and 8% reduction in PM peak hour car trips
- 5% reduction in AM peak hour car trips travelling into the Core Town Centre
- Increased travel times in the AM and PM peaks across all key routes into and out from the town centre
- Reduced network congestion on parts of the A229 southern gyratory and around Junction 5 M20, but increased congestion on A229 Royal Engineers Road
- Increased vehicle flows on a number of the key routes leading into and out from the town centre

One of the issues with the Visum model is that the trip distribution module appeared to be created some anomalous results within this option. As a result, a fixed percentage change to bus, rail and car trips were universally applied to all zones, whilst changes were made to park & ride to reduce the likelihood of multiple interchanges. Whilst this produced more predictable distributions of trips, the downside was that the total number of trips to each area of Maidstone now differs between Option 2 and Option 1. The most extreme example of this is for the core town centre.

A universal increase of 25% was applied to bus trips to this sector, along with a universal reduction of 23% and 5% to rail and car, respectively. Whilst a universal factor was not applied to park & ride, the change in interchange penalties resulted in the Core Town Centre becoming, effectively, the singe destination point, and hence overall demand increased by 314%. Since the underlying levels of demand by each mode were completely different in Option 1, the universal increases/decreases had substantially different impacts with overall trips to the Core Town Centre increasing by 1,500 or 14%. This would obviously be unlikely to occur in actual reality and will affect the way the TUBA model operates.

The TUBA modelling work, that utilises the Visum model output matrices, produces the following headline results:

- Significant journey time savings for businesses, commuters and other travellers across the borough resulting from the measures, although a large proportion of these are associated with the PM peak
- Neutral revenue impact resulting from increased parking tariffs and reduced town centre car parking
- A financial operating surplus from park & ride scheme

The results from the modelling exercises raise a number of questions:

a) Why do the Option 2 measures appear to create additional town centre congestion and not encourage greater switching of trips from car to other modes?

b) Why are overall journey time savings forecast to be generated across the whole network by TUBA, when the Visum model outputs suggest town centre network congestion remains?

c) Is it legitimate to assume that MBC town centre car parking revenues will be broadly neutral?

d) Is it legitimate to assume that the park & ride services will operate with a financial surplus?

Response to question a)

Jacobs have indicated that the additional bus priority measures that have been introduced along all of the park & ride corridors leading into the town centre have the effect of reducing network capacity for other road users, namely private car and freight trips. In addition, the re-allocation of one lane of the A229 southern gyratory to a bus/HOV lane also has the impact of reducing vehicle capacity for private car and freight.

The fact that these increases in journey times, alongside the increase in MBC town centre car parking charges, is not resulting in a significant reduction in car trips indicates that the public transport alternatives still remain uncompetitive for many trips across the borough.

The results certainly suggest that the impact of the MBC car parking tariff increases may not be having the scale of impact as predicted. This might simply be because of the models assumptions relating to private car parking availability in the town centre. There are only around 1,275 long-stay MBC car parking spaces in the town centre but the model predicts that around 8,000 person trips to the Core Town centre in the single AM peak hour will be undertaken by private car in Option 1. This suggests that a maximum of 20% of vehicle trips into the town centre will be affected by the tariff increase and potentially much less, given that the 8,000 is just vehicle trips for a single hour.

There is also the question as to whether the distribution of trips in the Visum outputs is correct. A highlighted above, the outputs were manipulate to increase the park & ride trips to the Core Town Centre; however, there was not an equal and responsive reduction in car trips to the same zone. In practice, therefore, they may be much larger reduction in car trips across the town centre.

Response to question b)

The TUBA assessment of journey time benefits examines changes in journey times for all origin – destination pairs including trips originating and terminating both outside Maidstone Town but also in the rest of Kent and beyond. In comparison to some of the aggregate outputs from the Visum model (e.g. the network congestion maps) or the specific journey time measurements, the TUBA results will pick up ever single change across the network, large or small, positive or negative. In addition, these benefits are assessed across 60 years so will tend to appear a magnitude higher.

As highlighted above, the majority of the journey time benefits for Option 2 are associated with the PM peak. Since, we don't have a PM peak network congestion map is it difficult to ascertain if there appears to be more congestion relief benefits presented by the Visum model, although the journey time analysis still reports increases along the key corridors.

The impact of the trip distribution issue, discussed above, could also be having an impact upon the TUBA calculations, although there is no specific presumption that this would increase or decrease journey time benefits.

The conclusion that must be reached is that many of the journey time benefits are either small in nature but aggregated up across the whole network create significant benefits, or that they are associated with longer distance trips. This is logical in that park & ride will target longer distance trips from outside of Maidstone. The Visum model outputs also present congestion relief benefits at some of the M20 junctions, especially junction 5, as well as along certain sections of the M20.

Response to question c)

The assessment of the impact of the Option 2 measures upon MBC car parking revenues has taken into account:

- November 2011 surveys of car park utilisation by 9.30am = ~ 800 parked vehicles
- The number of vehicles parking in the AM peak hour = ~ 640 parked vehicles
- The increase in trips to 2026 (~50%) = 960 parked vehicles
- The proportion of long car parking (63%) = 600 parked vehicles

The analysis has then simply assumed that the forecast AM peak hour reduction in car trips to the Core Town Centre (370) translates to a reduction in long-stay MBC car parking.

It is therefore straightforward to calculate that the loss in revenue from reduced parking (370 * £4.50 = £1,665) is almost off-set by the increase in parking charge for the remaining long-stay car park users ((600 - 370) * ((£4.50 * 150%) - £4.50) = £1,552). If you also take into account the increase in short-stay tariffs by 20% then it is perfectly reasonable to assume that approach could be revenue neutral.

The main question that remains is whether or not the increased long-stay tariff will only result in a reduction in town centre car parking 370 vehicles. This represents a 62% reduction in MBC long-stay car parking, which in proportional terms is substantial. If 100% MBC long-stay car parking were to be abstracted then the loss of revenue would be £1.7million relating to the AM peak period across a whole year.

It is recommended that further investigation of both the distribution of car trips within the Visum outputs, as well as the way the town centre car park charges and private car parking are modelled within Visum is carried out in order to verify the forecast reduction in town centre car parking.

Response to question d)

The Option Appraisal Report has presented the operational performance of each park & ride site in Option 2. This clearly identifies that not all of the sites are forecast to breakeven, but that Newnham Court and, to a lesser degree, Linton Corner are forecast to generate significant operating surpluses.

The operating cost element of the assessment is considered to be robust and has been benchmarked against the existing park & ride operating contract.

The key factor in the revenue assessment is the underlying forecast of AM peak hour demand produced by the Visum model. Since peak period fares are higher than inter-peak and OAP concessionary fares, the volume of trips in the peak period is a key component in ensuring that farebox revenue covers operational costs.

The AM peak forecasts for Newnham Court and Linton Corner are considered to be high and it would be prudent to conduct sensitivity tests on these to determine the impact upon the financial operation of the park & ride service.

Option 3

The headline Visum outputs for Option 3, in comparison to Option 1 are as follows:

- 6% reduction in AM peak hour car trips and 8% reduction in PM peak hour car trips
- 6% reduction in AM peak hour car trips travelling into the Core Town Centre
- Reduced travel times on inbound flows in the AM peak across all key routes into the town centre, but increases in journey times in the PM peak
- Reduced network congestion on parts of the A229 southern gyratory and around Junction 5 M20, but increased congestion on A229 Royal Engineers Road and A20 Ashford Road
- Increased vehicle flows on a number of the key routes leading into and out from the town centre

The same issues with the trip distribution module apply to Option 3; however the universal increases / decreases have less impact on overall trips to the Core Town Centre than Option 2 with an increase of 670 trips or 6%, reflecting the lower park & ride trips and larger reduction in car trips. This does still remains an issue and will affect the way the TUBA model operates.

The TUBA modelling work, that utilises the Visum model output matrices, produces the following headline results:

- Significant journey time savings (double the size of Option 2) for businesses, commuters and other travellers across the borough of Maidstone resulting from the measures. These benefits occur in both the AM and PM peaks.
- Negative revenue impact resulting from increased parking tariffs and reduced town centre car parking
- A financial operating surplus from park & ride scheme
- A financial operating loss from the NorthWest Express Loop bus service

The results from the modelling exercises raise a number of questions:

e) Since the Option 3 measures appear to reduce AM peak journey times why does the network congestion still remain high, or worsen on corridors such as the A229 and A20?

f) Is there consistency between the journey time savings forecast to be generated across the whole network by TUBA and the Visum model outputs?

g) Is the forecast MBC car parking revenue loss robust?

h) Is it legitimate to assume that the park & ride services will operate with a financial surplus?

Response to question e)

Jacobs have indicated that there are significantly fewer additional bus priority measures than are included in the Option 2 model. The loss of network capacity for cars and freight is, therefore, less significant. The additional A229 Royal Engineers Road bus/HOV lanes also add capacity. This provides some explanation as to why journey times reduce in the AM peak model. It does not, however, explain the increased journey times in the PM peak.

It is also difficult to reconcile the increased network congestion on the A229 Royal Engineers Road presented in the Option 3 network congestion map against the reduced journey times.

As with Option 2, there are also underlying questions about the modelling of the town centre car parking and the effect of the trips distribution process, discussed previously.

Response to question f)

There appears to be greater consistency between the forecast journey time savings in TUBA and the Visum model journey time outputs, although the magnitude of the TUBA benefits is significant.

The same conclusions must be drawn from Option 2 that the TUBA benefits are as a result of small benefits derived across the whole network, as well as from the longer distance trips.

Response to question g)

As discussed with Option 3, the forecast MBC car park revenue impact is very dependent upon the forecast reduction in AM peak car trips to the Core Town Centre from the Visum model, so it is important to re-assess the way this has been modelled, and the impact of the trip distribution process.

Response to question h)

The same comments apply as for Option 2, with sensitivity testing recommended.

Option 4

The assessment of option 4 was necessarily less technically robust as a result of the absence of up-to-date modelling outputs. The assessment indicated that the scheme would potentially attract a significant proportion of trips across the network; however, it was much less conclusive as to whether the overall scheme would offer good value for money.

One of the issues with this scheme is that it does not directly support the Core Strategy development proposals as specified. Having moved away from a development distribution that takes into account the provision of this highway infrastructure, there appears to be less policy reasons to pursue the scheme. Questions would remain as to whether the inclusion of this scheme within the strategy would end up distorting the development profile.

It is acknowledged; however, that it is more difficult to categorically rule out this scheme without an equal and unbiased appraisal against the other options.

Recommendations for further analysis

Based upon the points raised above, along with previously highlighted issues, the following recommendations are made in relation to potential further work:

- Re-examine the underlying trip generation in light of recent industry commentary upon forecast levels of growth. The inclusion of underlying TEMPRO growth and Core Strategy growth could be considered to be double counting.
- Re-examine the approach to the trip distribution in order to ensure total trips to each sector remain broadly constant across the options
- Re-consider the implications of the detail of the External Zones given their importance generating park & ride demand and ensure robustness in the park & ride forecasts. Undertake sensitivity testing of all park & ride demand.
- Re-examine the approach to town centre car parking charges and reduced supply and undertake sensitivity testing of town centre car park demand
- Re-examine the implications of the way the HOV lanes have been modelled to try and determine if these provide benefit.

- Re-examine the approach to applying capacity constraints on park & ride demand within the model, particularly in the context of a longer peak period e.g. demand will be generated pre-8am. Agree capacity restrictions for Newnham Court and Linton Corner and assess implications for demand generation. This could also include restrictions on bus capacities.

In terms of further modelling work, it is understood that there have been requests for an assessment of a do-minimum option that includes the closure of all existing park & ride sites. This would obviously represent the worst-case scenario, in terms of transport network provision against future demand. It would make sense to treat this option as a do-nothing scenario against which to appraise the introduction of various additional measures; however, it is appreciated that resource restriction may not allow Options 1 to 3 to be re-based against an new reference case.

On approach would be to assess Option 3, as the best performing option, against the new reference case and then assess a further hybrid scheme, and the SEMSL scheme if deemed necessary, against the reference case.

In terms of modelling a hybrid scheme the analysis would rule out the following options:

- London Road park & ride
- Willington Street park & ride
- Bluebell Hill park & ride
- Northwest Express Loop Bus with associated Coldharbour Roundabout infrastructure

It is recommended that improvements to bus services to the development areas of Junction 5 are incorporated within existing bus services and as part of KCC plans to enhance bus provision along the A20 London Road corridor.

The analysis would dictate that of the other northern park & ride sites, Newnham Court would appear to be the more attractive site in terms of geography. It appears that much of the demand generated originates from the east along the M20 corridor or from the northeast along the A249 corridor. Even the assessment of the distribution of trips for the Cobtree site indicates that this is the case. The downside to the Newnham Court, and Sittingbourne, sites is the inability to provide significant bus priority measures along the route into the town centre. Even so, the Option 2 results appear to indicate that there is enough advantage to travellers to use this site. What cannot be ascertained from the Option 2 results is whether the Newnham Court site would create the same issues for the M20 if it were the only site in the north as the Cobtree site appears to create.

The level of demand forecast at Newnham Court would appear to justify (or indeed require) much higher frequencies than every 10 minutes. At present there would be an average of 200 passengers per bus.

Of the southern park & ride sites, the analysis demonstrates that Sutton Road would be operationally viable and has a clearly identified site. The forecasts, however, suggest that Linton Corner is again the better geographically located site, even without bus priority measures along the A229. Clearly an appropriate site would need to be identified on this corridor to take this option forward.

Given the scale of development in the South East sector of Maidstone there appear to remain strong reasons to support bus priority measures along the A274/A229 corridor travelling into the town. Both the Option 2 and 3 results suggest that network congestion is reduced with the bus/HOV lane. Even without park & ride buses travelling to Sutton Road, there are frequent bus services along the corridor.

The justification for expenditure on bus / HOV lanes on the A229 Royal Engineers Road appears more dependent upon the choice of park & ride site. There is less specific development along this corridor to support the investment, although bus priority at junctions could still be provided.

The impact of the 150% increase in MBC parking tariffs need to be further examined in the model before a recommendation upon their inclusion, revision or removal be made.

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