

Project:	National Highways Spatial Planning Arrangement 2021-2024	Job No:	60659714 / Q11DDO009.003
Subject:	Land at M40 J11: Transport Assessment, TA Addendum and DMRB Review		
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Executive Summary

AECOM have conducted a review, on behalf of National Highways (NH), of the Transport Assessment (TA), and a TA addendum prepared by David Tucker Associates (DTA), on behalf of Greystoke, prepared in support of a planning application for a proposed B8 development located at Land at M40 Junction 11, Oxfordshire. The TN will also undertake a DMRB Review of the proposed mitigation proposals at M40 J11. Following this review, AECOM make the following recommendations.

Recommendations regarded as critical to the acceptability of this planning application:

1. The distribution workings and routing assignment for light vehicles should be clarified so AECOM are able to assess if the traffic impact assessments inputs are correct. (Para 6.8)
2. The 2025 opening year should be modelled and mitigation proposals should be based upon this impact. (Para 8.4)
3. The traffic flows input into the model should be clarified and the model should be re-run once the TA or TA addendum flow inputs align (para 8.5)
4. The reasoning behind HGV PCU factors should be provided. (Para 8.6)
5. With regard to the introduction of a short flare on the approach to the circulatory stop line on the westbound overbridge. The verge, earthworks and the 70m approach visibility to the signal heads should be clearly illustrated. The safety implications of felling mature trees so close to the edge of the Motorway should be taken into account in any construction management plan. (Para 11.16)

Recommendations regarded as important but not critical to the acceptability of this planning application:

6. A comparison between the data collected in March 2022 and a longer-term source of traffic data (pre-covid) should be carried out to understand whether the traffic data collected can be considered typical traffic. (Para 2.7)
7. The PIC data should include 5 years of data that is not impacted by the COVID pandemic. (Para 3.1)
8. Motorway TEMPRO factors should be used as traffic growth factors and the models re-run. (Para 7.1)
9. DTA should confirm that all merge/diverge assessments relate to M40 J11. (Para 9.1)
10. The vertical aspects of the proposed layouts presented in drawings provided and/or its successors in title should be provided. (Para 11.8)
11. Subsequent updates to the design layout should, as appropriate, be reflected in revised traffic modelling assessments of the predicted junction's operation. (Para 11.9)

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12. Further details should be provided with respect to whether or not third-party land outside of the existing highway boundary is required. This should include the full extent of the proposals that could influence land requirements including proposed revisions to verges, earthworks, areas required for visibility splays, drainage ditches etc and whether or not this land is currently within the control of either the scheme promoter or the highway authority. Details should also be provided of the land extents which would be transferred to National Highways and/or Oxfordshire County Council. (Para 11.11)
13. The visibility to the circulatory signal heads have not been illustrated on the drawing. There appears to be no reason why these visibility splays should not be achievable. It is recommended that these should be provided in accordance with CD 116 and illustrated on future revisions of the drawing. (Para 11.15)
14. With regard to the introduction of the short offside flare on the westbound overbridge. There is a concern that it may not be long enough to accommodate a full-sized HGV without the nearside rear corner of such a vehicle protruding into the middle lane and presenting a hazard to a car in the middle lane trying to get to the stop line. It is recommended this issue is addressed. (Para 11.17)
15. The proposed mitigation measures at M40 Junction 11 should be reviewed with regard to CD116, and illustrated/ annotated on an updated version of the drawing, to include:
 - Entry kerb radius;
 - Entry angle;
 - Lane Widths/ Entry width/ Exit width; and
 - Entry path radius/ deflection. (Para 11.18)
16. Advice should be sought from the Safety, Engineering & Standards (SES) group within National Highways as to whether a Departure from Standards application would be required in respect of these existing features, if any of them are found to be substandard. (Para 11.19)
17. Subsequent versions of the proposed layout drawings and/or its successors in title should illustrate relevant proposed traffic signs and road markings in accordance with the guidance contained in CD 116, TSM and TSRGD. (Para 11.20)
18. All primary signal heads should be shown to be located a minimum of 1m from the stop-line and the proposed locations for the secondary signal heads for the circulatory approach are illustrated on subsequent versions of the layout drawing and/or its successors in title. (Para 11.21)
19. The locations of the signal heads controlling the circulatory carriageway at the M40 northbound slip road entry should be illustrated on subsequent versions of the layout drawing and/or its successors in title and the visibility splay to the signal head shown. (Para 11.22)
20. The proposed locations for the traffic signal controller cabinets should be illustrated on subsequent versions of the layout drawing and/or its successors in title and that the controller cabinets are positioned accordance with TSM advice. (Para 11.23)
21. The intervisibility zone for the proposed signals should be illustrated on subsequent versions of the layout drawing and/or its successors in title. (Para 11.24)
22. Should the mitigation measures proceed, a Construction Management Plan and potential traffic management phases that would be introduced to allow the works to be constructed safely and with minimum disruption to traffic on the highway network should be provided. (Para 11.25)

1. Introduction

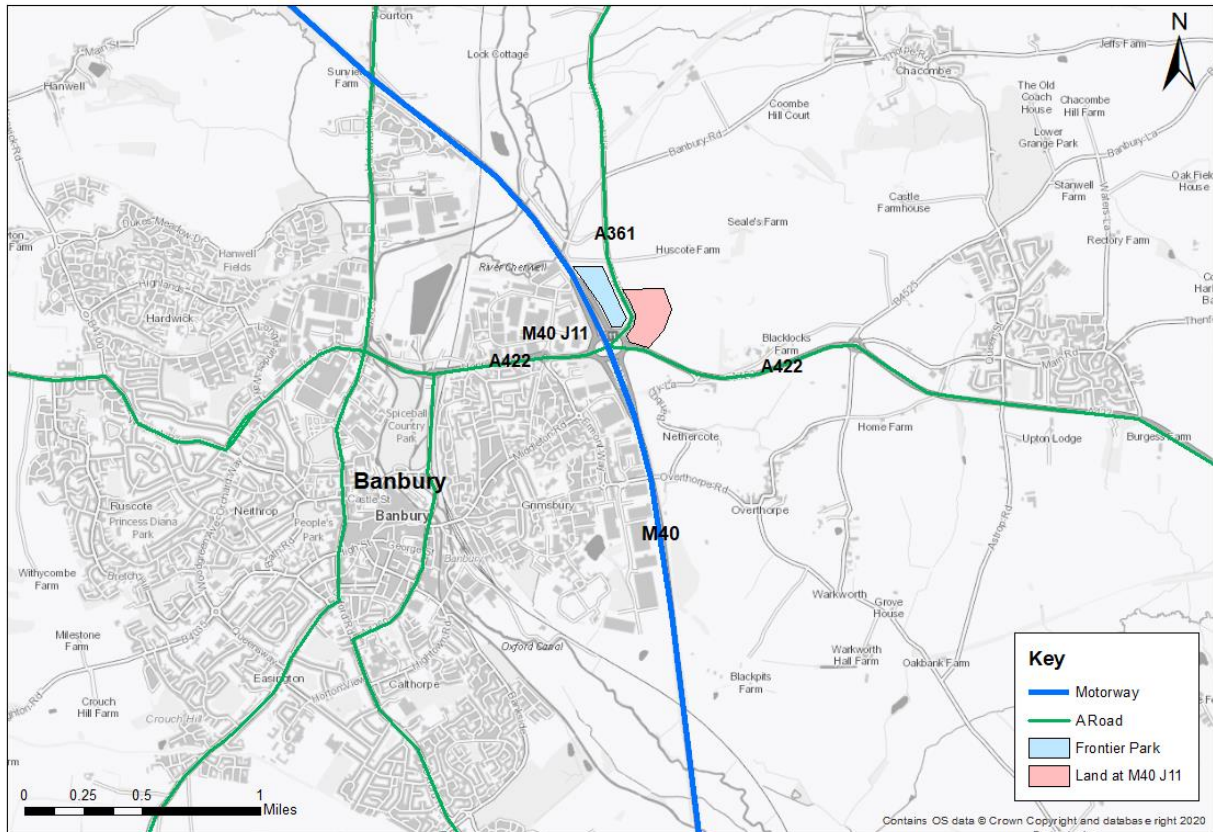
- 1.1. AECOM have prepared this Technical Note (TN) on behalf of National Highways (NH) to document a review of a Transport Assessment (TA), dated 16th May 2022, prepared by David Tucker Associates (DTA) on behalf of Greystoke. The TA has been prepared in support of a proposed industrial development, planning application reference 22/01488/OUT, comprising circa 140,000sqm of B8 use class, to be located on land to the east of the A361 in Oxfordshire. AECOM had begun undertaking a review of the TA, however, this review was paused as AECOM were aware that a TA addendum was being prepared. AECOM received the TA addendum and associated files on 26th October 2022.
- 1.2. The TA addendum included some information that will supersede information in the original TA including changes to trip generation, distribution, model re-runs and amendments to mitigation proposals, amongst others. It is proposed that this TN will now combine and review the material from both the original TA and the TA addendum.
- 1.3. The site is located to the north-east of Banbury, Oxfordshire, where the local planning authority is Cherwell District Council (CDC), with the local highway authority being Oxfordshire County Council (OCC).
- 1.4. The nearest part of the Strategic Road Network (SRN) to the proposed development site is M40 Junction 11, which is located immediately to the west of the site boundary.
- 1.5. The purpose of this TN is to conduct a review of the TA and TA Addendum to determine whether the potential impact of the proposed development on the SRN has been reasonably assessed. The TN will also include a DMRB review of the mitigation measures on the M40 J11 proposed by the developer.
- 1.6. It should be noted that neither a travel plan nor a proposed VISSIM modelling run have been prepared in time for this assessment. This TA and TA Addendum review will therefore only consider the content included within the TA and TA Addendum at this time. There is a possibility that the highway impact of the development in a VISSIM model run could vary to that of the LinSig model presented as part of this assessment and therefore conclusions outlined within this technical note will be limited to the inputs/outputs of the LinSig modelling.
- 1.7. For ease of reference, AECOM's main comments and recommendations are presented in bold and underlined text throughout the note. Recommendations regarded as critical to the acceptability of this planning application are coloured **red**. Recommendations that are regarded as important but not critical to the acceptability of this planning application are highlighted in **amber**.

2. Policy Review

- 2.1. The TA states that consideration has been given to the National Planning Policy Framework (NPPF). This is welcomed by AECOM. It is also noted that the previous recommendation has been satisfied, whereby reference to the DfT circular 02/2013 – ‘Strategic Road Network and the Delivery of Sustainable Development’ has been considered within the TA.
- 2.2. Further consideration has been made to the Transport Assessments and Statement – PGG as well as consideration to the Cherwell Local plan 2011-2031 and Oxfordshire Local Transport Plan 2015-2031.
- 2.3. It should be noted that the proposed site is not allocated for development in the Cherwell District Council Local Plan and therefore its impact has not been assessed at a strategic and local plan level.

Site Location

Figure 1: Site location map



Local Highway Network

- 2.4. The TA states that the site will be accessed from the A361, which is a single-carriageway road linking the M40 Junction 11 roundabout to the A45 on the south-western boundary of Daventry.
- 2.5. The M40, which is located to the west of the site, forms part of the Strategic Road Network (SRN), linking London to Birmingham. The M40 connects with the M25 at Junction 16, and the M42 at Junction 3A.
- 2.6. The A422 (east of the site) is a dual carriageway linking the M40 at Junction 11 to the A43 at Brackley. The A43 is part of the SRN, linking the M40, the A5, and the M1. To the west, the A422 is the main route into Banbury from the SRN.

Existing Traffic Flows

- 2.7. The TA states that an Automatic Traffic Count (ATC) was undertaken on the A361 between 3 and 9 December 2021 to determine existing traffic flows. It should be noted that December is not considered a neutral month within Department for Transport TAG unit M1.2. However, the TA makes the point that the December data was only used to obtain speed data for design purposes. Following on from this ATC's were also undertaken along Hennef Way, North Bar Street and the A422 between 28th February and 6th of March 2022, and classified turning movement and queue length counts at M40 J11 on 1st March 2022. February and March are neutral months. However, it should be noted that data collected between September 2021 and August 2022 were subject to special guidance from National Highways on their use, as a result of the gradual emergence of a 'post-Covid norm' for traffic flows. **It is therefore recommended that a comparison between the data collected in March 2022 and a longer-term source of traffic data (pre-covid) is carried out to understand whether the traffic data collected can be considered typical traffic.**

Walking and Cycling

- 2.8. The proposed development site is not currently accessible to pedestrians and cyclists as there are no footways on the A361, nor is it considered safe for cyclists to be expected to use the M40 Junction 11 roundabout to access the site. There is an existing underpass under the M40, which

connects the Banbury Gateway Shopping Park to the consented Frontier Park development located to the west of the A361.

- 2.9. The TA states that following the development of the Frontier Park (a partially built out committed site adjacent to the proposed development), a 2m wide footway leading from the northern side of the access and along the western side of the A361, tactile crossing with pedestrian refuge island leading to a 2m wide footway on the eastern side between the crossing and a new bus layby will be provided.
- 2.10. The TA states that a pedestrian/cycle link to Banbury Gateway Shopping Park is provided via the motorway underpass. AECOM note that a shared use footway/cycleway along Wildmere Road between the existing cycle facility at Banbury Gateway Shopping Park and Hennef Way is to be provided. These combinations of facilities will provide an effective, if rather indirect link, between the built-up area to the west of the M40, and the development site. It is also noted that National Cycle route (NCR) 5 is approximately 5km south-west of the proposed site.

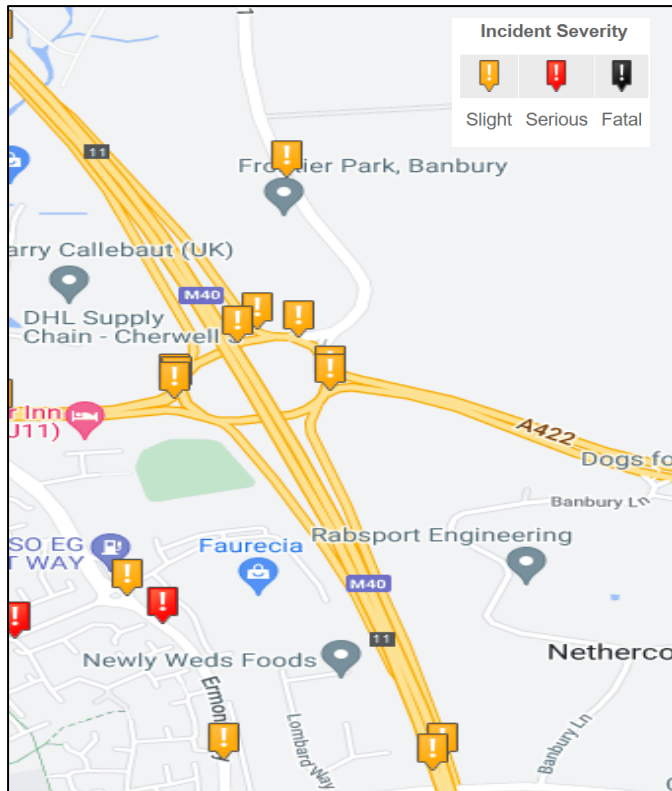
Public Transport

- 2.11. The TA states that there are currently no bus stops within the vicinity of the site; however, bus stops are proposed to be installed as part of the adjacent Frontier Park site. The TA appears to suggest that many of the walking/cycling routes and bus stop provision are currently being delivered as part of the Frontier Park site, and the proposed development will utilise these services. The TA states that bus route numbers 200, 132, 500 and B9 run through the nearest existing bus stop which is approximately 1.3km south on Ermont way. The TA also states that just one bus service (route 200) will serve the proposed Frontier Park bus stops. This will provide an hourly service to both Banbury and Daventry throughout the working day on Mondays to Saturdays. The summary of bus services is provided in Table 2 within the TA with its service, route, and frequency.
- 2.12. The TA states that the nearest railway station to the proposed development site is Banbury Station, located approximately 2.7km south-west of the site. It should be noted that the TA states that the railway station is to the north-east of the site as opposed to the south-west.

3. Personal Injury Collisions

- 3.1. The TA states that personal injury collision (PIC) data has been obtained from Oxfordshire County Council (OCC) for a five-year period. The data provided covers the period January 2016 to November 2021 which includes time during the COVID pandemic where travel restrictions were in place. This period may not be representative of typical traffic levels. **It is recommended that PIC data includes 5 years of data that is not impacted by the COVID pandemic, i.e. it should exclude the period 1st March 2020 to 31st August 2021.**
- 3.2. Figure 2 demonstrates the last 5 years data for incidents on M40 Junction 11 through Crashmap data. Although there appears to be a small cluster of collisions on the A422 West approach onto the junction, these are all 'slight' incidents and therefore not considered a significant safety concern. There was a total of 9 "slight" incidents on both the junction and M40 J11 slip roads over the previous 5 years which is not considered significant.

Figure 2: Crash Map of M40 Junction 11



4. Development Proposals

- 4.1. The TA states that the proposed development will comprise 140,000sqm for employment class B8 with ancillary offices and facilities split across 10 different units.
- 4.2. The primary access to the site is proposed to be via a newly constructed three-arm roundabout on the A361 (south) roughly 100m north of the A422/A361/M40 Junction 11 roundabout, with a standard priority junction also constructed further to the north, with a turning lane to prevent blocking of through traffic on the A361. The proximity of the proposed roundabout to Junction 11 is potentially of concern with regards to the possibility of interaction between the two junctions. It is understood a VISSIM model assessment is being prepared that would be best placed to understand whether queuing from this development would impact M40 J11.

5. Committed Developments

- 5.1. At the TSR stage, AECOM recommended that committed development close to the site should be included within future year development scenarios. Of particular note, Frontier Park is directly opposite the proposed Huscote Farm site. It is acknowledged that these traffic flows have been included within the future traffic flows and modelled scenarios which AECOM welcome.

6. Trip Rates, Trip Generation and Distribution

Trip Rates and Trip Generation

6.1. The TA states that the TRICS database (version 7.8.4) has been used to derive trip rates for the proposed development. The TA originally included traffic generation figures for TRICS Category F – Warehousing but included an appendix showing a Category D - Industrial Estate TRICS report. This was addressed in the TA addendum and new TRICS reports, consistent with the proposed development category were included within Appendix C. These are displayed in Table 1 below.

Table 1: Weekday peak hour vehicle and HGV trip rates from TA Addendum - Appendix C

Peak Hour	Vehicle Trip Rates			HGV Trip Rates		
	Arrivals	Departures	Total	Arrivals	Departures	Total
AM Peak 0800-0900	0.161	0.093	0.254	0.051	0.056	0.107
PM Peak 1700-1800	0.068	0.155	0.223	0.042	0.030	0.072

6.2. AECOM have undertaken their own analysis using TRICS v 7.9.3 and consider the trip generation figures reasonable. Although not included within the TA Addendum, AECOM have produced the resultant trip generation figures based on DTA's trip rates above for the 140,000sqm B8 allocation in Table 2 below.

Table 2: Calculated Total Trip generation figures based on DTA trip rates

Peak Hour	Vehicle Trip Generation			HGV Trip Generation		
	Arrivals	Departures	Total	Arrivals	Departures	Total
AM Peak 0800-0900	225	130	356	71	78	150
PM Peak 1700-1800	95	217	312	59	42	101

6.3. The TA also included a sensitivity test using a 20% allocation of the site as a parcel distribution centre for robustness as this type of development typically generates more trips. The trip rates and consequent total trip generation figures for the sensitivity test are included in Table 3 and Table 4 below respectively.

Table 3: Parcel Distribution Centre Trip Rates

Time	Total Vehicle Generation			HGV Vehicle Generation		
	In	Out	Total	In	Out	Total
08:00-09:00	0.067	0.378	0.445	0.022	0.111	0.133
17:00-18:00	0.378	0.378	0.756	0.044	0	0.044

Table 4: Total Sensitivity test trip generation (80% B8 / 20% B2 Parcel Distribution Centre)

Time	Total Vehicle Generation			HGV Vehicle Generation		
	In	Out	Total	In	Out	Total
08:00-09:00	199	210	409	63	94	157
17:00-18:00	182	279	461	59	34	93

6.4. AECOM have undertaken their own analysis using TRICs v7.9.3 and consider the parcel distribution trip rate and total trip generation figures are reasonable.

Trip Distribution

6.5. The TA originally outlined its vehicle distribution for light vehicle traffic using data from the 2011 Census 'Journey to Work', using the Middle Super Output Area (MSOA) of Cherwell 004 as the destination. The use of Census Journey to Work data is considered by AECOM to be a reasonable method to determine the distribution of light vehicle traffic. The vehicle distribution percentages used was previously considered reasonable by AECOM at the Transport Strategy Report stage, however, it is unclear how the routing has been assigned for "other". AECOM have undertaken their

own analysis and found some discrepancies between these datasets, and this is discussed later in this section. .

Table 5: 2011 Census Journey to Work data for Cherwell 004 MSOA

Residence	Percentage
Cherwell	52.70%
South Northamptonshire	13.90%
Stratford-upon-Avon	5.20%
Daventry	4.00%
West Oxfordshire	3.10%
Warwick	2.70%
Aylesbury Vale	1.70%
Coventry	1.00%
Other	15.70%
Total	100.00%

6.6. The distribution for heavy vehicles on the wider highway network has been derived using data included within the Base Year Freight Matrices (BYFM) published by the Department for Transport (DFT). The BYFM consist of the number of vehicles per average day between a set of origin-destination zone pairs for a 2006 base year. These zones are based on all 408 local authority districts, unitary authorities and London Boroughs and point zones for the 88 largest ports, 5 main freight airports and 56 major concentrations of distribution centres. This approach for HGV distribution is considered reasonable.

Table 6: Base Year Freight Matrix vehicle distribution

Region	Percentage	Routeing
East of England	11.40%	A422 E
East Midlands	10.80%	A361 N
North West of England	3.50%	M40 N
Scotland	0.60%	M40 N
South East of England	57.00%	M40 S - 48.1% A422 E - 7.3% A422W - 1.7%
South West of England	5.50%	M40 N - 3.0% M40 S - 2.5%
Wales	0.30%	M40 N
West Midlands	7.50%	M40 N
Yorkshire and the Humber	3.40%	M40 N

6.7. Further to a discrepancy identified by OCC in the routing totals, Table 2 in the TA Addendum presented an updated summary of the proposed development traffic assignment (Sensitivity Test Flows). AECOM have replicated this table and have included summary totals below.

Table 7: Proposed traffic assignment (sensitivity test flows)

Link	Light Vehicles			HGVs		
	Assignment	AM	PM	Assignment	AM	PM
M40 N	12.50%	32	46	18.30%	29	17
M40 S	8.50%	22	31	50.60%	79	47
A422 E	18.00%	45	66	18.70%	29	17
A422 W	52.50%	135	197	1.70%	3	2
A361 N	7.50%	19	28	10.80%	17	10
Total	99%	253	368	100%	157	93

6.8. It is unclear from this updated table or the other information provided in the TA, how the distribution and routing has been assigned to light vehicles, particularly the use of “other” from the journey to work data. **It is therefore recommended that the distribution workings and routing assignment are clarified so AECOM are able to assess if the traffic impact assessments inputs are correct.**

7. Traffic Growth and Assessment Scenarios

7.1. Discrepancies between the TEMPro growth factors were identified by OCC, in their review of the TA, in relation to the A361 local road network and DTA appear to have addressed this issue in the TA Addendum. The TEMPro factors used by DTA are included within table 3 of the TA and this is replicated in the table below.

Table 8: TEMPro Growth Factors Applied

Road Type	Years	AM	PM
Principal	2022-2025	1.0315	1.0307
	2022-2032	1.0917	1.09
Motorway	2022-2025	1.0437	1.0428
	2022-2032	1.13	1.1282

7.1. AECOM have undertaken checks on the TEMPro factors used and have been able to replicate the figures for the years shown. An updated spreadsheet of the traffic flows used for the LinSig modelling was also provided by DTA with the Addendum material, however, it appears that only the Principal road growth factors have been applied. **It is recommended that Motorway TEMPro factors are applied and the models re-run.**

Assessment Scenarios

7.2. AECOM previously recommended that a suitable base year be selected, alongside the expected opening year, and a future ‘review period’ year to be considered in any junction impact analyses. The future ‘review period’ year should be either the end year of the current Local Plan or 10 years after the submission of the planning application, whichever is the later, as per DfT Circular 02/2013. DTA have outlined an opening year of 2025 and a review period (labelled as design year within TA) of 2032; it is noted that a future assessment year of 2032 also aligns well with the end of the current Local Plan in 2031. However, the opening year does not appear to have been modelled which is addressed in the following section.

7.3. AECOM previously recommended at the TSR stage that “‘base’, ‘base + growth + committed development’ and ‘base + growth + committed development + development’ scenarios are included in any junction capacity assessments to determine the impact of the proposed development on the SRN. Flow diagrams should also be provided individually for base flows, base + growth flows, committed development flows, proposed development flows and total flows.” AECOM consider this has been addressed, however these flow diagrams may need to change based on the recommendations in this note.

8. Junction Modelling Review

8.1. LinSig models have been built to test the mitigation proposals at M40 Junction 11. DTA have prepared a base model of the existing junction layout and an additional model of the proposed mitigation proposals.

- 8.2. AECOM have undertaken a review of the models and their inputs. AECOM consider that both the existing base and the proposed LinSig models have been reasonably coded throughout. The models fairly reflect the existing and proposed layouts.
- 8.3. Intergreens, signal stage sequences and lane connectors also fairly reflect the existing and proposed mitigation proposals. AECOM recognise that default give way coefficients have been used for lanes operating a give way, RR67 calculations have been used to calculate saturation flows and consistent lane connector speeds have been used across both models.
- 8.4. The LinSig model scenarios appear to present 2022 and 2032 base and design scenarios. A 2025 opening year does not appear to have been modelled. The DfT Circular 02/2013 recommends that *“any mitigation needs will be assessed based on the opening of the final phase”*. **It is therefore recommended that the 2025 opening year is modelled and that mitigation proposals should be based upon this impact.**
- 8.5. AECOM have undertaken some checks on the traffic flow inputs and consider that they do not correlate with either the “Junction Matrices Rev C” spreadsheet provided by DTA for the TA addendum or Appendix H of the original TA. **It is therefore recommended that the traffic flows input into the model are clarified and that the model is re-run once the TA or TA addendum flow inputs align.**
- 8.6. The “Junction Matrices Rev C” spreadsheet analysis also appears to apply a 1.3 PCU factor to HGV’s in the committed and development trips. It is considered this is too low a factor to apply for HGVs. **It is therefore recommended that the reasoning behind HGV PCU factors is provided.**
- 8.7. AECOM note that through the LinSig model presented it appears that the proposed junction mitigation could alleviate the congestion at the junction on most arms but AECOM cannot provide further analysis until the flow inputs are clarified and the other recommendations within this note are addressed.

9. Merge Diverge Assessment

- 9.1. The following assessment is in line with the CD 122 - Geometric design of grade separated junctions’ guidance. This assessment has been completed using the information from the initial TA and uses the merge diverge plot diagrams included within Appendix K. It should be noted that the final diagram in Appendix K is labelled as ‘M40 Junction 10 Northbound merge PM (2025)’. AECOM have assumed this to be a typo and is in fact Junction 11. **It is recommended that DTA confirm that all merge/diverge assessments relate to M40 J11.**
- 9.2. Both existing northbound and southbound diverges are a Layout A – Option 1 Taper Diverge. The existing northbound and southbound merges are a Layout C – Ghost Island merge. The mainline currently has 3 lanes throughout the entire junction both upstream and downstream of each merge or diverge.
- 9.3. Section 7.3 of the TA provides the methodology and commentary of the Merge and Diverge assessments, and these have been plotted on the relevant CD 122 motorway graphs contained in Appendix K. However, it is unclear from the TA or other information provided where the baseline mainline flows have been derived from and the TA does not outline the TEMPro growth factors used for the motorway through traffic. The “plus development” scenario figures have been assumed to have been taken from the trip development trip generation and distribution calculations and the baseline slip road counts from the traffic surveys undertaken, but this methodology or workings are not outlined within the TA or TA Addendum.
- 9.4. In the absence of this information, AECOM have undertaken their own merge/diverge analysis using National Highways WebTRIS data for the month of March 2022 and have applied TEMPro growth factors (Cherwell MSOA 004 – Motorway) to uplift from the base to the future years. The results of these are summarised in Table 9 and Table 10 below.

Table 9: Merge/Diverge assessment for Existing and 2025 AM and PM peaks.

M40 J11 Slip road	2022 Base			2025 without Development		2025 with Development	
	Current layout	Required layout AM Mainline (Lanes upstream/downstream)	Required layout AM Mainline (Lanes upstream/downstream)	Required layout AM Mainline (Lanes upstream/downstream)	Required layout AM Mainline (Lanes upstream/downstream)	Required layout AM Mainline (Lanes upstream/downstream)	Required layout AM Mainline (Lanes upstream/downstream)
Northbound Diverge	A (3/3)	A (2/2)	C (2/2)	A (2/2)	C (2/2)	A (2/2)	C (2/2)
Southbound Diverge	A (3/3)	A (2/2)	A (2/2)	A (2/2)	A (2/2)	A (2/2)	A (2/2)
Northbound Merge	C (3/3)	A (2/2)	B (2/2)	A (2/2)	B (2/2)	A (2/2)	B (2/2)
Southbound Merge	C (3/3)	A (2/2)	A (2/2)	A (2/2)	A (2/2)	A (2/2)	A (2/2)

Table 10: Summary of slip road cross section requirements

M40 J11 Slip road	2022 Base			2025 without Development		2025 with Development	
	Current lanes	Required layout AM	Required layout PM	Required layout AM	Required layout PM	Required layout AM	Required layout PM
Northbound Diverge	2	(DG2A)	(DG2A)	(DG2A)	(DG2A)	(DG2A)	(DG2A)
Southbound Diverge	2	(DG2A)	(DG2A)	(DG2A)	(DG2A)	(DG2A)	(DG2A)
Northbound Merge	2	(MG1A)	(MG1A)	(MG1A)	(MG1A)	(MG1A)	(MG1A)
Southbound Merge	2	(MG1A)	(MG1A)	(MG1A)	(MG1A)	(MG1A)	(MG1A)

9.5. Similar to DTA analysis, the tables above demonstrate that the existing merge and diverge layouts on M40 Junction 11 are sufficient to cover the capacity of the proposed development trips. The current layout of 3 upstream and 3 downstream mainline lanes is sufficient to cover the mainline capacity required. It should be noted that once the recommendations within this note are addressed, this analysis may need to be reconsidered.

10. DMRB Review - Proposed Mitigation

- 10.1. AECOM have undertaken a review of Drawing 23459-06-02-GA, Revision A, dated 04.10.22, produced by DTA, which shows the mitigation proposed at M40 J11 to support the development.
- 10.2. AECOM understand the proposed improvement to the layout of M40 J11 is mitigation associated with the proposed industrial development located at Land at M40 Junction 11, Oxfordshire. It forms part of a larger improvement scheme, including measures on the A361 to the NE of M40 J11, shown on drawing 23459-06-01-GA. However, this review will confine itself to the measures that affect the SRN junction at M40 J11.
- 10.3. This section of TN02 comprises a review of the proposed mitigation measures at M40 J11 with respect to the design standards and guidance contained within the Design Manual for Roads and Bridges (DMRB).
- 10.4. The following drawings illustrate the Scheme which is the subject of this review:
 - Drawing 23459-06-02-GA, Rev A, dated 04.10.22; and
 - Drawing 23459-06-04-TRK, Rev A, dated 04.10.22.
- 10.5. This section of TN02 provides an overview of the proposed mitigation measures as presented in the above drawings, with a view to determining whether or not the proposed layout is likely to be compliant with the requirements of the DMRB as they relate to the Strategic Road Network (SRN).

Background

M40 Junction 11

- 10.6. National Highways is the highway authority with respect to the SRN, comprising, in the context of this technical review, the M40 mainline carriageway and its slip roads with M40 Junction 11. The site is located to the north-east of Banbury, Oxfordshire, where the local planning authority is Cherwell District Council (CDC), with the local highway authority being Oxfordshire County Council (OCC).
- 10.7. M40 Junction 11 is a grade separated junction. With regard to M40 Junction 11, National Highways primary interests will be:
 - The impact of the mitigation measures on the safe and free flow of traffic using M40 Junction 11, associated slip roads and M40 Mainline carriageway.
- 10.8. The junction is currently subject to the National Speed Limit. However, the slip roads would have an implied Design Speed of 70 km/h, in accordance with Table 5.4 of CD122.
- 10.9. The proposed mitigation scheme is described below.

11. DMRB Technical Review

Introduction

- 11.1. A high-level technical review of the drawing provided by DTA has been undertaken. This encompassed a preliminary high-level overview of the proposed mitigation measures and their compliance with the guidance contained within the DMRB together with the identification of potential operational and/or safety concerns. The review does not constitute a detailed design check of all aspects of the proposals but is intended to identify aspects of the designs which are potential 'showstoppers' and/ or aspects which if revised, could have an impact upon the predicted operation of the junction.
- 11.2. The proposed layout appears not to have been subject to a Stage 1 Road Safety Audit (RSA). This review does not constitute a Road Safety Audit.
- 11.3. This section provides a technical review of the proposed layout with reference to the DMRB guidance set out in:
 - CD 116 – Geometric design of roundabouts (DMRB Volume 6 Section 2 Part 3); and

- CD 122 – Geometric design of grade separated junctions (DMRB Volume 6 Section 2 Part 1).
- 11.4. AECOM has not appointed a Principal Designer or considered the associated aspects that would apply within this role. It is recommended that should this scheme proceed; a Principal Designer is appointed by the client in accordance with CDM Regulations.
- 11.5. In the context of capacity assessments, a review of the predicted operation of the layout has been undertaken. Details are provided in Section 8 of this report.

M40 Junction 11 Proposed Revisions

- 11.6. The proposed mitigation measures at M40 Junction 11 include:
- The dualling and realignment of the A361 immediately to the north-east of M40 Junction 11, resulting in geometric modifications to the A361 roundabout entry and exit arms;
 - The signalisation of the A361 arm of M40 Junction 11 and signalisation of the associated circulatory carriageway at the north-eastern corner of the junction; and
 - Additional flaring on the southern side of the circulatory to provide a short off-side lane for M40 north (bridge structure unaffected).

General Principles

- 11.7. Geometric measurements referenced within this technical note with regard to the layout (Drawing 23459-06-02-GA) dated 04.10.22 has been taken from AutoCAD drawing '23457-06a'.dwg (issued to AECOM on 17.11.22).
- 11.8. A 2D plan has been provided and it appears that the vertical profile of the external approach to the signals is relatively flat; therefore it is not considered likely that there will be implications from changes in carriageway level in terms of the perceived visibility available. However the roundabout appears to sit above the natural level of the ground, with the motorway passing beneath. There may be a requirement to provide earthworks. **Therefore, the vertical aspects of the proposed layouts presented in drawings provided and/or its successors in title should be provided.**
- 11.9. It should be noted that any revisions to the proposed layout which arise from the issues raised in this TN may impact upon the modelling assessments undertaken / to be undertaken and hence **subsequent updates to the design layout should, as appropriate, be reflected in revised traffic modelling assessments of the predicted junction's operation.**
- 11.10. AECOM assesses each element of the layout where changes are made to the existing junction geometry against the appropriate design guidance. Where approach or exit arms are not specifically referenced below, it has been assumed that no changes are proposed relative to the existing junction layout and this review has not covered these areas.

M40 Junction 11 DMRB Review

- 11.11. The full extent of the earthworks/ drainage works required is not shown at this stage. The proposed widening and signalisation of the A361 arm and additional flaring to provide a short off-side lane for M40 North, may require the associated drainage/earthworks/signage to extend outside of the existing highway boundary. There is also a requirement to provide a verge on these sections of widened carriageway, which is not currently illustrated and which may influence the extent of the earthworks required. **AECOM recommends that further details are provided with respect to whether or not third-party land outside of the existing highway boundary is required. This should include the full extent of the proposals that could influence land requirements including proposed revisions to verges, earthworks, areas required for visibility splays, drainage ditches etc and whether or not this land is currently within the control of either the scheme promoter or the highway authority. Details should also be provided of the land extents which would be transferred to National Highways and/or Oxfordshire County Council.**
- 11.12. Swept paths have been provided to support the proposed mitigation proposals showing an articulated vehicle manoeuvring through the junction without overhanging/ overrunning any adjacent traffic lanes or kerb lines; this is welcomed.
- 11.13. AECOM note that the forward visibility splays to the signal heads have been shown at the A361 arm. With regards to the requirements for visibility to signal heads, paragraph 4.7 of CD 116 states 'on an external approach to a signal-controlled roundabout, each traffic lane shall have clear visibility of at least one primary traffic signal associated with its particular movement, from a distance

equivalent to the desirable minimum SSD of the approach road.' CD116 Paragraph 4.7 Note 1 states 'Requirements and advice for visibility on the circulatory carriageway are provided in Section 3, "Circulatory visibility".'

- 11.14. The speed limit on the A361 approach is 40mph. This equates to a 70kph design speed and therefore the desirable minimum SSD according to CD109 is 90m; 90m splays have been shown. AECOM note that the visibility splay to the nearside signal head from the nearside lane runs through what appears to be a currently heavily vegetated area; however given that CD 116 only requires clear visibility to at least one signal head, and users in the nearside lane will have clear visibility to the offside signal head, this does not appear to be a cause for concern with regards to DMRB compliance.
- 11.15. With regards to the circulatory signal heads at the A361 entry, the required visibility to the signal heads is defined within CD116 Table 3.43. For a roundabout of this size, forward visibility of 70m is required. AECOM note the visibility to the circulatory signal heads have not been illustrated on the drawing. There appears to be no reason why these visibility splays should not be achievable. However, **AECOM recommend that these should be provided in accordance with CD 116 and illustrated on future revisions of the drawing.**
- 11.16. The introduction of a short flare on the approach to the circulatory stop line on the westbound overbridge will result in the relocation of the offside signal head to the right, where approach visibility to the signal heads may be affected by features in the offside verge. The verge itself will need to be repositioned and the widening appears to result in the need for earthworks within a heavily wooded area to the offside of the circulatory carriageway. Neither the verge nor the earthworks are illustrated on the drawing. **These should be shown and the 70m approach visibility to the signal heads clearly illustrated. The safety implications of felling mature trees so close to the edge of the Motorway should be taken into account in any construction management plan.**
- 11.17. AECOM note a possible concern with the introduction of the short offside flare. There is a concern that it may not be long enough to accommodate a full-sized HGV without the nearside rear corner of such a vehicle protruding into the middle lane and presenting a hazard to a car in the middle lane trying to get to the stop line. **This issue should be addressed.**
- 11.18. There are a number of other roundabout geometric parameters which need to be considered in light of the proposed amendments, as alterations to kerb lines and lane markings appear to be required as part of the scheme, particularly on the A361 approach and entry to the roundabout. These are not annotated on the drawing. **AECOM recommend that the proposed mitigation measures at M40 Junction 11 are reviewed with regard to CD116, and illustrated/ annotated on an updated version of the drawing, to include:**
- Entry kerb radius;
 - Entry angle;
 - Lane Widths/ Entry width/ Exit width; and
 - Entry path radius/ deflection.
- 11.19. It is to be noted that recent practice in National Highways has required a Departure from Standard to be sought in respect of an existing substandard feature which is retained at a modified junction. This has included (for example) substandard entry path deflection at a roundabout approach being converted to traffic signal control. **It is recommended that advice should be sought from the Safety, Engineering & Standards (SES) group within National Highways as to whether a Departure from Standards application would be required in respect of these existing features, if any of them are found to be substandard.**
- 11.20. CD 116 identifies that guidance for the appropriate use of traffic signs and road markings at roundabouts is contained in the Traffic Signs Manual (TSM) and the Traffic Signs Regulations and General Directions (TSRGD). Details of the traffic signs proposed are not shown on the drawings, however issues such as the relationship between the proposed additional or relocated signage/ existing signage and the visibility available for vehicles approaching the roundabout will need to be addressed. **AECOM recommend that subsequent versions of the proposed layout drawings and/or its successors in title illustrate relevant proposed traffic signs and road markings in accordance with the guidance contained in CD 116, TSM and TSRGD.**
- 11.21. Primary signal heads should be located a minimum of 1m beyond the stop-line and in advance of crossing studs or marks if pedestrian facilities are provided. It is noted that on the external approach

to the proposed signals, the offside primary signal head is located closer than 1m from the stop-line, as is the nearside signal head on the circulatory approach. In some circumstances it may not be possible to locate the secondary signal in the direct line of sight of the driver. For example, at junctions with angled approaches, the maximum angle that the secondary signal should be displaced is 30 degrees from the driver's line of forward sight. The distance between the stop-line and an associated secondary signal should not exceed 50m. It is noted that the secondary signals for the external approach have been shown, and are within 50m of the stop-line, however secondary signals for the circulatory approach do not appear to have been illustrated. **AECOM recommend that all primary signal heads are shown to be located a minimum of 1m from the stop-line and the proposed locations for the secondary signal heads for the circulatory approach are illustrated on subsequent versions of the layout drawing and/or its successors in title.**

- 11.22. In addition, it is noted that the offside signal on the widened circulatory (southern side of the circulatory) and the secondary signal controlling the M40 northbound off-slip will need to be relocated as part of the works; the relocated signal head is not shown on the plans provided. **AECOM recommend that the locations of these signal heads are illustrated on subsequent versions of the layout drawing and/or its successors in title and the visibility splay to the signal head shown.**
- 11.23. The controller cabinet(s) should be positioned so that it does not obstruct the view of the drivers on their approach. It is good practice to site controller cabinets so that the operation of the signals can be seen whilst standing in front of the controller. Further advice on the positioning of controller cabinets can be found in the TSM Chapter 6. **AECOM recommend that the proposed locations for the traffic signal controller cabinets are illustrated on subsequent versions of the layout drawing and/or its successors in title and that the controller cabinets are positioned accordance with TSM advice.**
- 11.24. All internal and external approaches on roundabouts which operate under signal control at any time should be provided with an intervisibility zone. This should extend across the full carriageway width of each arm from a distance of 2.5 metres back from each stop line to a point 2.5 metres beyond the secondary signal head on the circulatory carriageway downstream. No substantial fixed obstructions should be located within the intervisibility zone. The intervisibility zones have not been illustrated on the drawings provided. **AECOM recommend that the intervisibility zone for the proposed signals is illustrated on subsequent versions of the layout drawing and/or its successors in title.**
- 11.25. The construction of the mitigation scheme would have the potential to result in disruption to the M40 junction traffic flows (and possibly to M40 main line flows) during construction. **AECOM recommends that, should the mitigation measures proceed, a Construction Management Plan and potential traffic management phases that would be introduced to allow the works to be constructed safely and with minimum disruption to traffic on the highway network should be provided.**

12. Travel Plan

- 12.1. AECOM note that OCC outlined the following requirements for a travel plan:
 - encourage sustainable travel
 - reduce traffic
 - reduce carbon emissions and climate impacts
 - create accessible, connected, inclusive communities
 - improve health outcomes and quality of life
 - improve road safety
 - reduce the need for increasing existing road capacity or provide new roads.
- 12.2. As part of the commitment to travel plans, DTA are required to carry out monitoring for at least five years to track targets while ensuring that active and sustainable travel is encouraged. AECOM agree with this approach.
- 12.3. AECOM previously recommended that a travel plan was produced alongside the submission of a planning application. This appears to also have been addressed by OCC in the TA Addendum. The TA Addendum states the following:

“The Travel Plan which was submitted is a Framework for each unit to then base a subsidiary travel plan on once occupiers are known. The exact sizes of the units will not be known until the Reserved Matters stage. This is accepted by OCC.”

- 12.4. AECOM note that the Travel Plan will be produced at the reserved matters stage and therefore have not been able to review a Travel Plan at this stage.

13. Conclusion

- 13.1. AECOM have conducted a review, on behalf of National Highways (NH), of the Transport Assessment (TA), and a TA addendum prepared by David Tucker Associates (DTA), on behalf of Greystoke, prepared in support of a planning application for a proposed industrial development located at Land at M40 Junction 11, Oxfordshire. The TN also includes a DMRB Review of the proposed mitigation proposals at M40 J11. This TN has identified some recommendations which are summarised in the Executive Summary.
- 13.2. AECOM’s recommendations regarding these concerns are highlighted by the use of bold underlined text throughout this document. Recommendations regarded as critical to the acceptability of this planning application are coloured **red**. Recommendations that are regarded as important but not critical to the acceptability of this planning application are highlighted in **amber**.