STERLING CAPITOL


i-Transport

Pell Frischmann

# M62 Junction 28 Cumulative Assessment

## Modelling Report

July 2021

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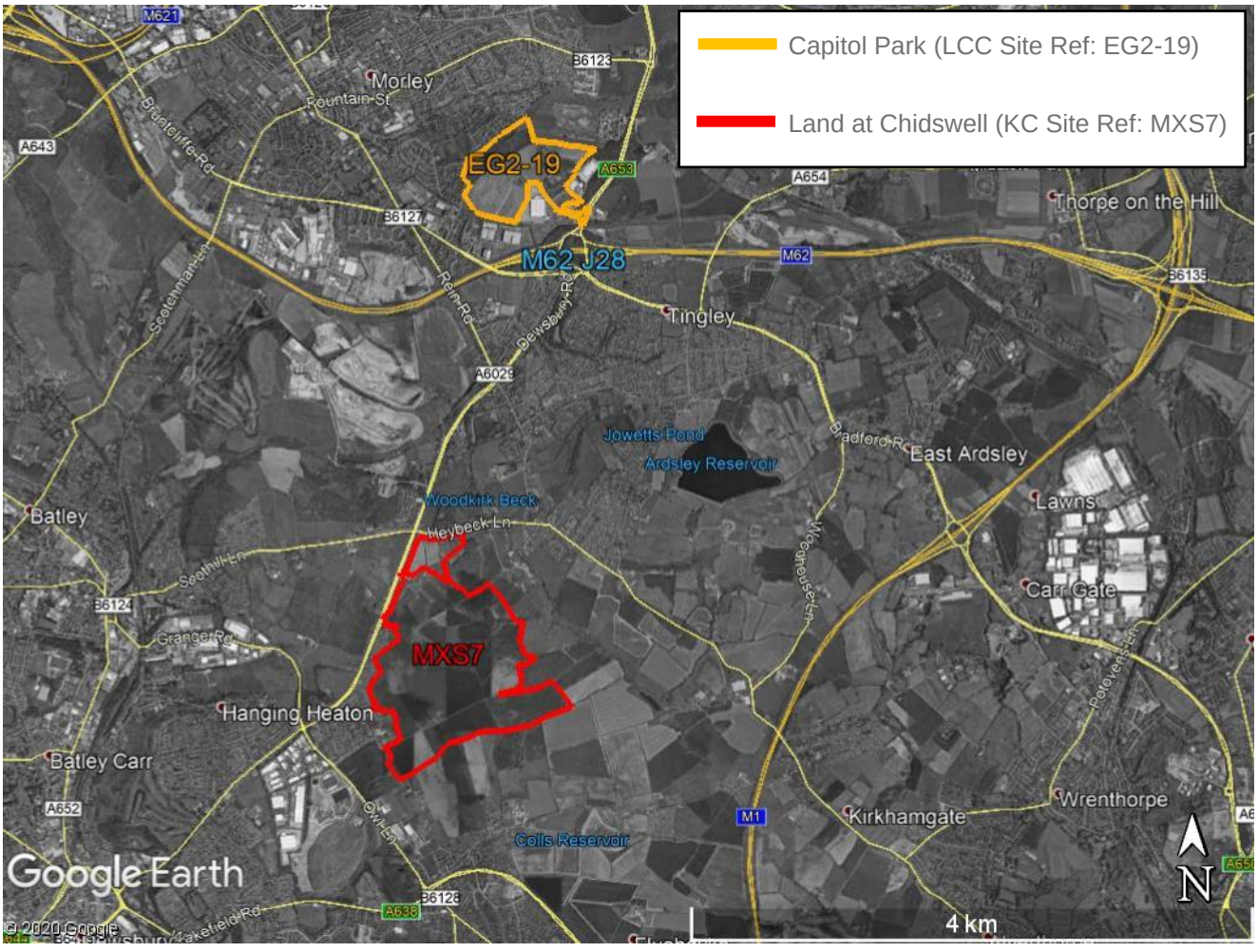
# 1 Introduction

## 1.1 Overview

1.1.1 Pell Frischmann is commissioned by C.C. Projects to provide transport planning and highways consultancy services in connection with the proposed mixed-use development of Land to the East of Leeds Road and Land at Heybeck Lane, Chidswell, Dewsbury. The Chidswell site is allocated for mixed-use development comprising residential, employment and ancillary land uses, and a new primary school, in the Kirklees Council (KC) adopted Local Plan (2019) (KC Local Plan site ID: MXS7). The location of the Chidswell site is shown in **Figure 1.1**.

1.1.2 i-Transport LLP ('i-Transport') is commissioned by Sterling Capitol PLC to assess the transport implications of the proposed strategic industrial development at Capitol Park, Leeds, to the north-west of the M62 Junction 28. The Capitol Park site is allocated for employment uses in the Leeds City Council (LCC) adopted Site Allocation Plan (2019) as a Key Employment Allocation (LCC allocation ref: EG2-19). The location of the Capitol Park site is also shown in **Figure 1.1**.

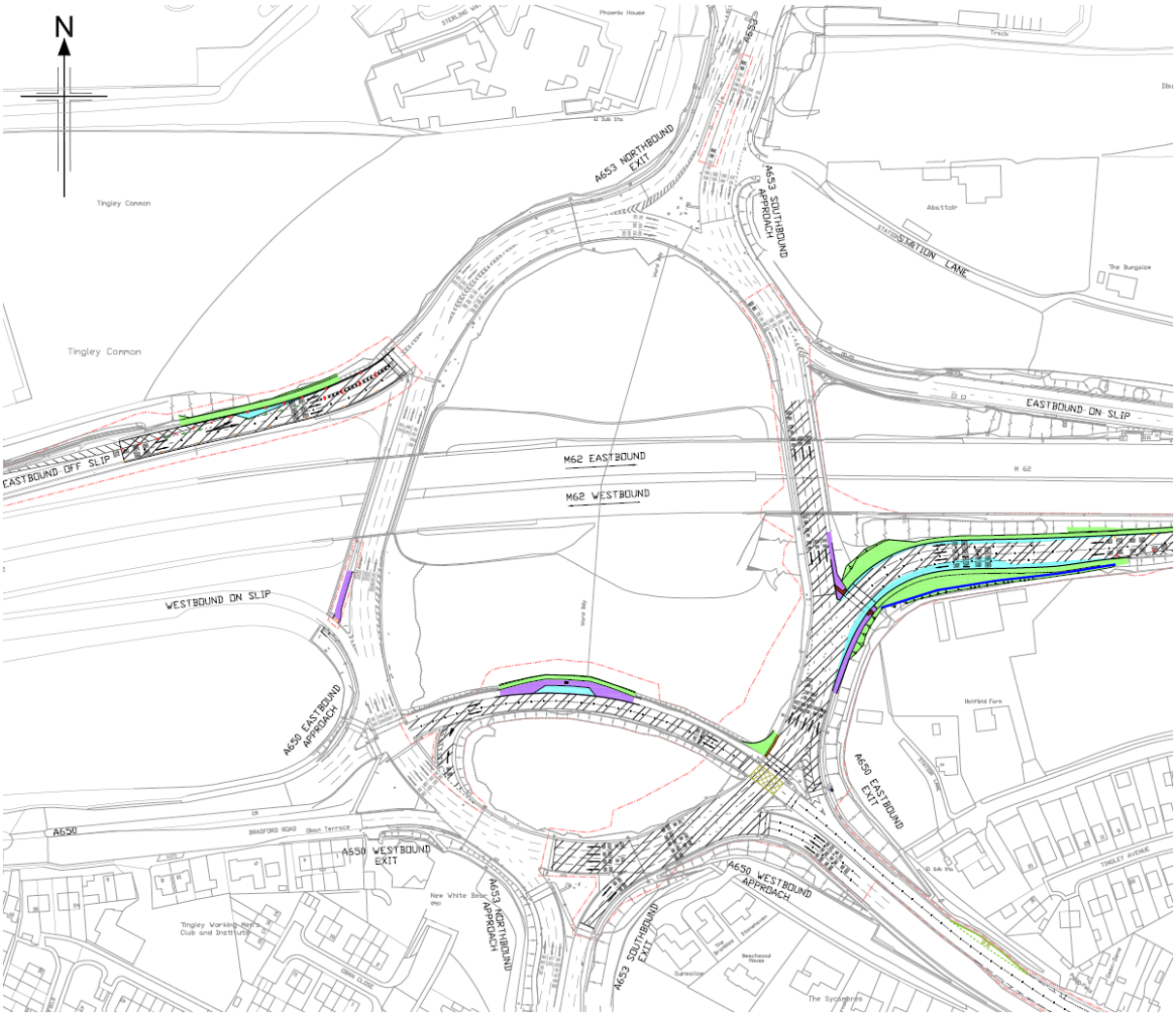
**Figure 1.1: Location of the Applicants' respective sites**




1.1.3 The M62 Junction 28 (otherwise known as the 'Tingley Interchange' and referred to herein as 'J28') is a motorway junction on the Strategic Road Network (SRN), located between Leeds and Dewsbury where the A653 (Dewsbury Road) crosses the M62. The majority of the junction, including its circulatory carriageway and northern and southern approach arms, are within the adopted public highway of LCC, whilst the slip roads leading to and from the M62 mainline carriageway above are the responsibility of Highways England (HE).

1.1.4 J28 is a six-arm signalised roundabout gyratory with a cut-through for the eastbound A650 in the southern part, and a closely located (approx. 100m) signal junction at Topcliffe Lane to the immediate north. These are shown in **Figure 1.2**.

**Figure 1.2: General arrangement of M62 J28 Tingley Interchange (WSP Reference: 70038464-WSP-HGN-J28-DR-CH-01_01.AB01)**




1.1.5 This document has been prepared by both Pell Frischmann (on behalf of C.C. Projects) and i-Transport (on behalf of Sterling Capitol PLC) as a single submission through collaborative working between the two applicants and their respective transport and highways consultants. C.C. Projects and Sterling Capitol PLC are herein referred to as the 'Applicants'.

## 1.2 Proposed Developments

### Capitol Park (LCC Allocation Reference EG2-19)

1.2.1 Sterling Capitol's hybrid planning application (LCC Planning Reference: 20/08521/OT) is for strategic industrial development comprising up to 102,890 square metres ($m^2$) (equal to approximately 1,107,500 square feet [sq ft]) of employment floorspace, falling within Land Use Classes B2 General Industrial and B8 Storage or Distribution, and with ancillary offices. Once operational, this Proposed Development will likely employ in the region of 1,300 full-time equivalent staff (incorporating part-time working opportunities) working in a range of shift patterns.

### Land at Heybeck Lane and Land to the East of Leeds Road (KC Site Reference MXS7)

1.2.2 C.C. Projects' Proposed Development is split into two development parcels, referred to as 'Land at Heybeck Lane' ('Site A') and 'Land to the East of Leeds Road' ('Site B') respectively, collectively 'Land at Chidswell'. Site A and Site B are the subject of separate outline planning applications that have been submitted in parallel to KC (in their position as the relevant Local Planning Authority) with planning references 2020/60/92350/E and 2020/60/92331/E, respectively.

1.2.3 Site A, to be accessed from Heybeck Lane, is proposed to comprise up to 181 residential dwellings (C3 Use Class) with associated access and landscaping.

1.2.4 Site B, to be accessed from Leeds Road, Chidswell Lane and a new access from Owl Lane (via the adjacent KC Local Plan site HS47 being promoted by Barratt David Wilson Homes), is proposed to comprise up to 35 hectares (ha) (equal to up to 122,500m$^2$) of employment space (mixed B1(a) / B1(c) / B2 / B8 Use Classes); up to 1,354 residential dwellings (C3 Use Class); a new two-form entry (2FE) primary school; a new local centre (including community facilities); and associated accesses and landscaping.

### Relationship between the two Proposed Developments

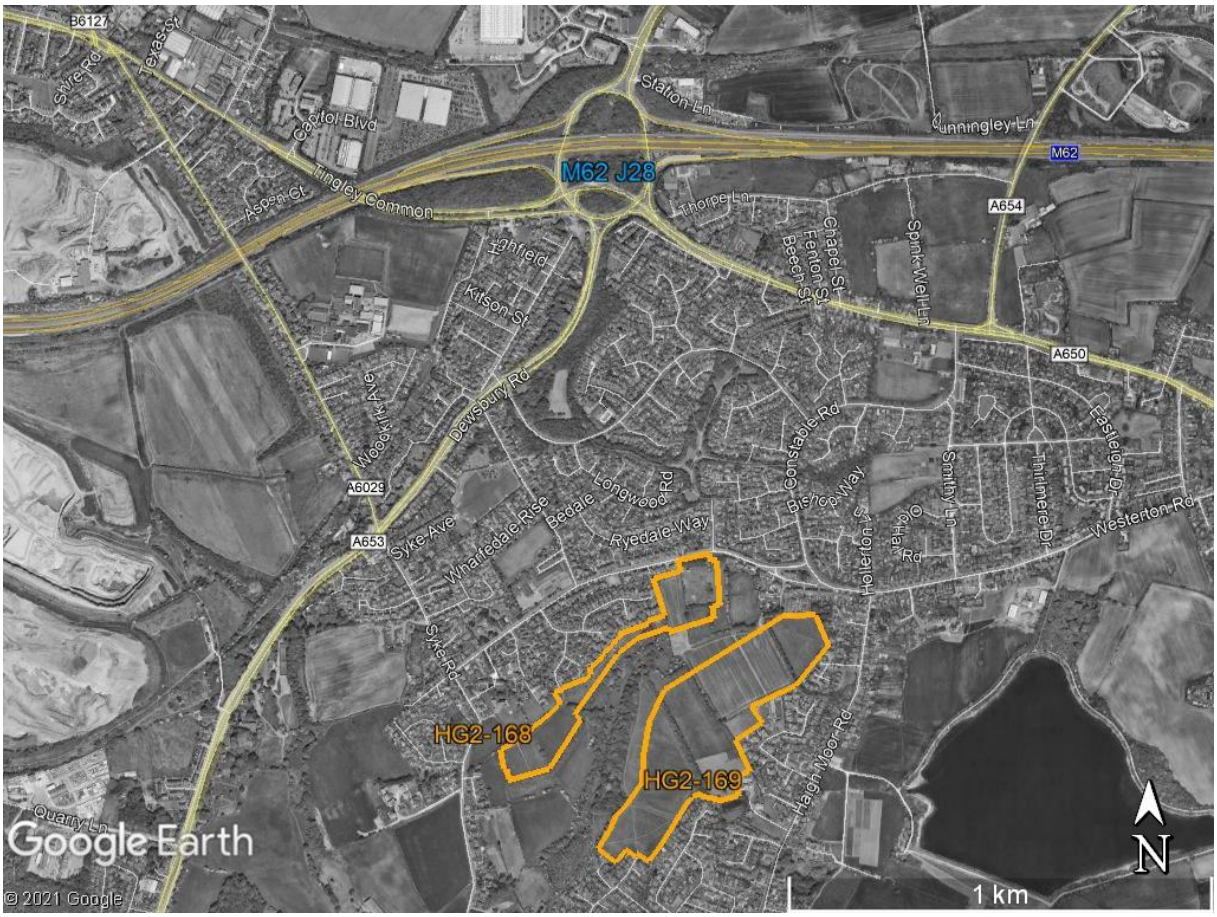
1.2.5 Both Applicants' planning submissions are (and remain) independent of one another, however both proposed developments are of a significant scale and importance to the respective Local Plan processes and are forecast to have a potential traffic impact on J28. i-Transport and Pell Frischmann each produced Transport Assessment (TA) documents for their Applicant's respective proposed developments which identified the quantitative scale of new vehicle trips that would be expected to use J28 to/from each proposed development, and identified the scale of mitigation that might be required.

1.2.6 As each Applicant's proposals would have the potential to impact on J28 (individually and in-combination), it has been requested by HE, and supported by the Applicants, that a single submission be made considering the combined potential impacts of the respective developments and proposing a combined mitigation scheme which is anticipated to mitigate the impacts of the proposed developments. It is expected that each Applicant would make a proportional contribution towards the combined scheme, to be determined through a methodology to be agreed.

### Land at Haigh Moor Road (LCC Allocation References HG2-168 and HG2-169)

1.2.7 Two additional, adjacent sites at Haigh Wood, collectively referred to as Land at Haigh Moor Road, are located approximately 1.3km to the south of J28 in Ardsley in the greenspace enclosed by Westerton Road, Baghill Road, Batley Road and Haigh Moor Road (**Figure 1.3**). The two allocations allow for a total of 370 residential dwellings.

**Figure 1.3: Location of the Land at Haigh Moor Road land allocations relative to J28**




1.2.8 These sites at Land at Haigh Moor Road have received planning approval (LCC Planning Ref: 17/08262/OT) for 299 dwellings and have (among other items) agreed a "M62 Junction Highway Works" planning contribution of £898,212 (Index Linked), or a proportionate contribution of 20%, whichever is lower. This developer contribution is not associated with a defined mitigation solution (and/or drawings), it having been agreed that the contribution will be held in a 'collective pot'. It is expected that the combined scheme proposed in this document constitutes appropriate highway works under that agreement and therefore the Owner of these sites would form part of the funding basis for the proposed scheme. This principle has been agreed with LCC.

1.2.9 To ensure that proportional impacts are properly identified, the Haigh Moor Road sites are included in the analysis in this document alongside the Applicants' proposed developments, as agreed with HE, LCC and KC.

## 1.3 Project Timeline

1.3.1 This Report represents the culmination of two parallel transport planning and assessment streams. Following discussions in early 2021, it was agreed that the Applicants (and their respective transport and highways consultants) would present a combined assessment for mitigation proposals at J28. These timelines, as they relate to J28, are summarised in **Table 1.1**.

**Table 1.1: Summary timeline of Applicants' planning process relating to J28**

| Time | Capitol Park | Land at Chidswell |
|---|---|---|
| July 2020 | | Planning submission (2020/60/92350/E and 2020/60/92331/E) supported by various transport planning information including: Transport Assessment and Framework Travel Plan |
| July to December 2020 | | Scoping Report for extended assessment of J28 submitted to stakeholders, receipt (and responses to) scoping responses. |
| | Exchange of traffic information with Pell Frischmann | Exchange of traffic information with i-Transport |
| December 2020 | Planning submission (20/08521/OT) supported by various transport planning information: Transport Assessment and Framework Travel Plan, and including detailed assessment of J28. | |
| February 2021 | | Detailed assessment of J28 submitted to stakeholders |
| March 2021 | Joint meeting with HE, LCC and KC. Minutes attached at **Appendix A**; also see below. | |
| April 2021 | HE agreement of testing scenario(s), flow matrices and matrix build-ups, and committed development list for inclusion/exclusion. | |
| May 2021 | LCC comments on acceptability of committed development list for inclusion/exclusion. | |
| June to July 2021 | Joint working between i-Transport and Pell Frischmann in the modelling and production of this Report | |

## 1.4 Scope of this Report

1.4.1 This Report presents the summary results and supporting information resulting from the assessment of the junction. It summarises the inputs to the assessment process which were agreed through a series of scoping discussions and reports, and presents a set of scenarios to inform further decision making. It also presents mitigation/design options for each scenario where appropriate with supporting traffic modelling.

# 2 Scenarios and Flows

## 2.1 Scenarios

2.1.1 Through discussions with HE, LCC and KC, it was agreed that the overriding objective is that scheme proposals seek to mitigate the direct impact of the proposed developments in light of longer term uncertainty regards background growth (see **Section 2.2**). It has been confirmed by HE, LCC and KC that the two Applicants are not expected to mitigate the effects of theoretical background growth to the end of the LCC and KC Local Plan periods. In further discussion with HE (and its consultants C2HM), HE confirmed that they seek for the Applicants to make improvements to the roundabout itself; changes to the merge/diverge provision and/or the mainline are not needed.

2.1.2 HE also seek to understand how the junction could be expected to operate in a future year coincident with full build-out of the LCC and KC Local Plans. It was agreed that a future year would be assessed to sensitivity test the junction.

2.1.3 LCC have also produced a series of proposals for sustainable and active travel (i.e. bus priority, cycle and walking) schemes in the area around J28 as a part of the Mirfield to Dewsbury to Leeds corridor programme ('M2D2L'). It was requested that these be included in the assessment where appropriate.

2.1.4 A total of 4 core scenarios were therefore defined, with variants as required. These are:

| Scenario: | 1 | 2 | 2a | 3 | 3a | 4 | 4a | 4b |
|---|---|---|---|---|---|---|---|---|
| Observed flows (2019 surveyed flows) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Base: 2019 Observed with Committed Development flows (LCC adjusted list, plus Barratt David Wilson Homes site HS47) | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2019 Observed with Committed and Cumulative Developments (Applicants' and Land at Haigh Moor Road flows, and Capitol Park access scheme) | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| i-Transport and Pell Frischmann Mitigation Works (highway capacity improvement scheme) | | | | | | ✓ | ✓ | ✓ |
| LCC sustainable and active travel (bus, cycle and walking) schemes | | | ✓ | | ✓ | | ✓ | |
| LCC bus schemes with i-Transport and Pell Frischmann suggested alternative active travel (cycle and walking) scheme (as a suggested alternative to the LCC active travel (cycle and walking schemes) | | | | | | | | ✓ |

2.1.5 A breakdown of the relevant components follows in **Section 2.2 through Section 2.5**.

## 2.2 Flows and Component Matrices: Observed and Future Flows

### Observed Flows 2019

2.2.1 The use of 2019 observed traffic flows was agreed. These were collected by survey on behalf of HE on 7th November 2019 and provided in the J28 TRANSYT model issued by HE and are summarised in **Table 2.1** and **Table 2.2** for the AM (07:30 to 08:30) and PM (16:30 to 17:30) peak hours respectively.

**Table 2.1: 2019 Observed AM flows (pcu)**

| | | A | B | C | D | E | F | G | Total |
|---|---|---|---|---|---|---|---|---|---|
| M62 (E) | A | 0 | 46 | 278 | 2 | 432 | 64 | 797 | 1619 |
| A650 (SE) | B | 34 | 0 | 73 | 252 | 536 | 23 | 452 | 1370 |
| A653 (S) | C | 477 | 28 | 0 | 206 | 159 | 21 | 822 | 1713 |
| M62 (W) | D | 3 | 201 | 135 | 0 | 38 | 42 | 219 | 638 |
| A650 (W) | E | 469 | 449 | 74 | 50 | 0 | 29 | 183 | 1254 |
| Topcliffe Lane | F | 8 | 7 | 3 | 6 | 4 | 0 | 13 | 41 |
| A653 (N) | G | 318 | 114 | 224 | 114 | 198 | 26 | 0 | 994 |
| Total | | 1309 | 845 | 787 | 630 | 1367 | 205 | 2486 | 7629 |

**Table 2.2: 2019 Observed PM flows (pcu)**

| | | A | B | C | D | E | F | G | Total |
|---|---|---|---|---|---|---|---|---|---|
| M62 (E) | A | 3 | 48 | 319 | 12 | 409 | 7 | 393 | 1191 |
| A650 (SE) | B | 17 | 0 | 83 | 157 | 446 | 5 | 222 | 930 |
| A653 (S) | C | 260 | 26 | 0 | 162 | 91 | 6 | 341 | 886 |
| M62 (W) | D | 5 | 338 | 230 | 0 | 15 | 7 | 157 | 752 |
| A650 (W) | E | 433 | 538 | 82 | 99 | 1 | 4 | 145 | 1302 |
| Topcliffe Lane | F | 60 | 14 | 39 | 40 | 15 | 0 | 37 | 205 |
| A653 (N) | G | 729 | 279 | 777 | 129 | 227 | 5 | 0 | 2146 |
| Total | | 1507 | 1243 | 1530 | 599 | 1204 | 34 | 1295 | 7412 |

## Uncertainty in future growth: Relation to historic trends

2.2.2 Future traffic flow forecasts traditionally forecast significant increases in traffic due primarily to economic growth and other changing economic factors. In recent years it has been observed that this relationship has become more complex. TRICS is a UK and Ireland database of recent and historic traffic and multi-modal trip generation surveys of existing developments and which is commonly used as a basis for forecast future trips likely to arise from new developments. TRICS data was used by both i-Transport and Pell Frischmann in the production of their respective TAs.

2.2.3 The recently published TRICS 'Guidance Note on the Practical Implementation of the Decide & Provide Approach' (February 2021) – published subsequent to the submission of the Applicants' planning applications and respective TAs for the proposed developments – brings to the fore and discusses the paradigm shift from 'predict and provide' to 'decide and provide', that is to decide on the preferred future scenario and *"…provide the means to work towards that…"*, rather than simply to predict continued traffic growth based on ageing historical trends. There is an increasing strong evidence base supporting the notion that traffic growth is no longer occurring and, in many areas, there have already been significant declines in traffic numbers, even prior to COVID-19 and major traffic changes so associated.

2.2.4 With reference therein to Department for Transport ('DfT') report 'All Change? The future of travel demand and the implications for policy and planning: The First Report of the Commission on Travel Demand' (May 2018), the following points are noted:

- On average, there are 16% fewer trips made now than in 1996. People use motorised transport for almost 14% fewer trips per year than in 2002. Person miles are 10% less than in 2002 and people are spending 22 hours less time travelling than in 2005, and less than at the start of the 1990s.
- Rail travel has increased by 56% since the 1990s.

- Younger generations are travelling less – 20% less for 17-34 year olds and 10% less for 35-64 year olds.
- Fewer adults hold driving licences – in 1993, 55% of 17-20 year old males and 42% of 17-20 year old females held driving licences, whereas now this is 33% for males and 29% for females, respectively.
- There has been a decline in disposable income, which has affected travel choice and has meant fewer people (particularly among younger age groups) are travelling by car.
- The DfT's "substantive review of travel to work trends in 2017" revealed there had been a "substantial" decrease in commuting trips between 1988/1992 and 2013/2014, from 7.1 journeys per worker per week, down to 5.7. This represents an approximately 20% reduction in commuting journeys. The TRICS report also states: "Even prior to Covid-19, work patterns were changing, for example, working from home has been growing on both an occasional and usual basis and there has been a growth in the number of workers who don't have a fixed usual place of work. The Covid-19 pandemic has further accelerated and normalised working from home".

2.2.5 The above applies to existing developments and the Applicants' proposed developments and confirms that an assumption of unconstrained growth along ageing historic trends is no longer appropriate.

2.2.6 Indeed, in a meeting between Pell Frischmann and KC (with others) on 24th June 2021, it was noted that in the period 2000-2019, the local 'A' Road network in Kirklees LHA has experienced only a 1.9% increase in average daily traffic flow levels through that 19 year period, effectively around 0.1% per year on average. However, by contrast in the equivalent period, traffic on the M62 mainline (a major strategic route across Yorkshire) has been observed to have increased by 22%. Though within, and a part of, the Leeds LHA area, J28 is located close to the boundary of the KC LHA and is likely to have demonstrated growth more typical of local levels than those of strategic through traffic on the mainline of the M62.

2.2.7 LCC's own background paper on Transport which forms part of the evidence base for the emerging Site Allocations Plan1 (SAP Evidence Base document ref: EB9/3) notes, at Paragraph 6.29, that:

*'Historically, traffic growth forecasts at both a national and local level have tended to significantly over estimate growth. For example the previous version of the NTEM (NTEM 6.2) suggested that weekday car traffic in Leeds rose by 26% between 2001-15, when in fact that Leeds Monitoring Cordon around the city centre shows only a 2.5% increase in all day traffic since 2000 (data is not available for 2001). Data from DfT surveys covering A roads across the District shows a similar 2.6% growth in total traffic between 2001-13, and although growth since then has been more significant (11% for 2001-15) the increase nevertheless is less than half of the NTEM forecast. These forecasts therefore need to be viewed with some caution. It is considered that both the model and NTEM forecasts represent very much a worst case in terms of traffic growth, in particular with regards to radial peak hour traffic.'*

2.2.8 We have also reviewed historic growth on the network surrounding the site using traffic data managed by the DfT (http://www.dft.gov.uk/traffic-counts). The data collected by DfT are Annual Average Daily Flows (AADF). The data demonstrate that AADF on the local road network surrounding J28 have not increased materially (or have reduced) since the year 2000. The analysis is summarised below.

| DfT Counter Ref | Location | Change in AADF between 2000 - 2017 |
|---|---|---|
| 47446 | A653 Dewsbury Road south of M62 J28 | 5.43% |
| 47443 | A650 Bradford Road east of M62 J28 | -4.33%* |

*Change in AADF at DfT Counter shown for period 2001 – 2017 as 2000 data at that location is estimated and its use would show a much greater reduction.

Source: http://www.dft.gov.uk/traffic-counts

[1] Leeds Site Allocations Plan Submission Draft Infrastructure Background Paper (February 2017)

### Uncertainty in future growth: Anticipated future trends

2.2.9 Whilst the long-term travel behavioural impacts of the ongoing COVID-19 pandemic are not yet fully understood, trends are emerging. This applies to how and where people may choose to work, and how and when or indeed if they travel at all. A reduction in commuter trips (due to increased flexible and remote working) for example, is likely to be most substantive in the peak periods, with even a relatively small drop in flow volumes having the potential to outweigh forecast growth. Substantive drops in flow volumes have been observed on a national basis in 2020[2], but it is as yet unclear that all these trips could be expected to return to the network once the effects of the ongoing COVID-19 pandemic begin to subside.

2.2.10 Additionally, the decline of the traditional 'high street' and the physical retail sector and the rapid growth of the online retail sector (sharply accelerated but not initially caused by COVID-19) are expected to contribute to fewer car trips. This may be offset by (relative) increases in traffic to out-of-town retail premises, such as the White Rose Shopping Centre located to the north of J28, but those trips might also reasonably be expected to take place out of peak periods.

2.2.11 More locally, following the successful legal challenge against Leeds City Council's (LCC's) Site Allocation Plan (SAP) in June 2020 [3], the consequential reduction in the potential level of housing growth expected in LCC over the SAP period could be expected to manifest in a reduction in trips on J28 than might have been previously forecast.

### Future Growth Rate

2.2.12 The foregoing notwithstanding, the TEMPRO traffic growth estimation tool was used to determine an appropriate growth rate to a future year for the purpose of sensitivity testing the impact of potential growth on the junction.

2.2.13 The LCC Local Plan is scheduled to be delivered to 2033 and the KC Local Plan is scheduled to be delivered to 2031. As the junction is located in the LCC LHA, and to ensure a robust assessment, a future year of 2033 was agreed purely for the purpose of sensitivity testing (see **Section 11**)

2.2.14 Growth factors have been derived from the NTM within TEMPRO for the Leeds Local Authority Area, applying alternative assumptions whereby households and jobs remain constant at 2019 levels. **Table 2.3** presents the growth factors, which have already been accepted by HE and LCC as these were applied in the original TA for Capitol Park prepared by i-Transport (with the full derivation set out at Appendix 7.D of that report).

**Table 2.3: TEMPRO factors used to determine future flows**

| | TEMPRO Growth Factor |
|---|---|
| 2019-2033 NTM-adjusted AM peak (Leeds LHA) | 1.0841 |
| 2019-2033 NTM-adjusted PM peak (Leeds LHA) | 1.0797 |

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/981967/road-traffic-estimates-in-great-britain-2020.pdf
[3] http://www.landmarkchambers.co.uk/wp-content/uploads/2020/06/Airborough-Approved-Judgment.pdf

### Future Flows 2033

2.2.15 The above TEMPRO factors (**Table 2.3**) were applied to the 2019 observed flow matrices to produce 2033 future year matrices for the AM and PM peaks (**Table 2.4** and **Table 2.5** respectively). These are used exclusively for the purpose of sensitivity testing (see **Section 11**).

**Table 2.4: 2033 Future AM flows (pcu)**

| | | A | B | C | D | E | F | G | Total |
|---|---|---|---|---|---|---|---|---|---|
| M62 (E) | A | 0 | 50 | 301 | 2 | 468 | 69 | 864 | 1755 |
| A650 (SE) | B | 37 | 0 | 79 | 273 | 581 | 25 | 490 | 1485 |
| A653 (S) | C | 517 | 30 | 0 | 223 | 172 | 23 | 891 | 1857 |
| M62 (W) | D | 3 | 218 | 146 | 0 | 41 | 46 | 237 | 692 |
| A650 (W) | E | 508 | 487 | 80 | 54 | 0 | 31 | 198 | 1360 |
| Topcliffe Lane | F | 9 | 8 | 3 | 7 | 4 | 0 | 14 | 44 |
| A653 (N) | G | 345 | 124 | 243 | 124 | 215 | 28 | 0 | 1078 |
| Total | | 1419 | 916 | 853 | 683 | 1482 | 222 | 2695 | 8271 |

**Table 2.5: 2033 Future PM flows (pcu)**

| | | A | B | C | D | E | F | G | Total |
|---|---|---|---|---|---|---|---|---|---|
| M62 (E) | A | 3 | 52 | 344 | 13 | 442 | 8 | 424 | 1286 |
| A650 (SE) | B | 18 | 0 | 90 | 170 | 482 | 5 | 240 | 1004 |
| A653 (S) | C | 281 | 28 | 0 | 175 | 98 | 6 | 368 | 957 |
| M62 (W) | D | 5 | 365 | 248 | 0 | 16 | 8 | 170 | 812 |
| A650 (W) | E | 467 | 581 | 89 | 107 | 1 | 4 | 157 | 1406 |
| Topcliffe Lane | F | 65 | 15 | 42 | 43 | 16 | 0 | 40 | 221 |
| A653 (N) | G | 787 | 301 | 839 | 139 | 245 | 5 | 0 | 2317 |
| Total | | 1627 | 1342 | 1652 | 647 | 1300 | 37 | 1398 | 8003 |

## 2.3 Committed Developments

2.3.1 A specific list of local committed developments expected to impact on J28 was produced by LCC to consider within the assessment.

2.3.2 A number of the sites specified had been either fully or in part delivered prior to November 2019 and so could reasonably have been expected to have been captured as a part of the traffic surveys which inform the assessment which follows. An exercise was therefore undertaken to establish the timescale of delivery for each site from historic aerial photography. The intent being to retain a list of sites for which planning permission has been secured, but for which delivery has yet to take place. A summary of the sites considered, their current status and whether or not they were included as a committed development, is presented in **Table 2.6**. This list of sites has been agreed by LCC and HE.

**Table 2.6: Summary of Committed Developments**

| Planning Ref and Site Name | Quantum of Development | Included in Committed Developments | Notes/Rationale |
|---|---|---|---|
| LCC Ref: 06/04892/FU<br>Capitol Park West | 2,260sqm B1 | Included | Site remains clear as at April 2020. |
| LCC Ref: 13/05761/EXT<br>Land at Capitol Park East | 11,535 sqm B1 | Included | Site clear (save some temporary construction accommodation), as at April 2020 |
| LCC Ref: 14/01886/RM<br>Land to rear of Owler's Farm, Tingley | 114 residential dwellings | Excluded | Development completed mid-2018. |
| LCC Ref: 16/04733/RM<br>Low Moor Farm | 200 residential dwellings | Partial (90%) | Approximately 10% of site built out as at May 2019. |
| LCC Ref: 16/03861/FU<br>Towcester Ave, Middleton | 93 residential dwellings | Excluded | Google Street View shows construction ongoing in Aug 2019 but appears to be almost full built out. Assumed completed 2016 through 2019. |
| LCC Ref: 15/04256/FU<br>Garden Ctr on A654 Thorpe La | | Included | Site still cleared absent extant use of driving range and farm, as at April 2020. |
| LCC Refs: 13/01640/OT, 15/00363/OT<br>Extn to White Rose SC | Extn, cinema, more A* etc | Excluded | Phase 1, visually complete by April 2018.<br>Phase 2 (Primark extension) and Phase 3 (Debenhams extension) not yet commenced. In any case, unlikely to generate a non-negligible number of new trips. |
| LCC Ref: 18/01725/FU<br>Bruntcliffe La, Morley | 210 residential dwellings | Partial (80%) | Approximately 20% built out as at May 2019. |
| LCC Ref: 12/01332/OT<br>Bruntcliffe La, Morley | 173 residential dwellings | Excluded | Appears complete by May 2019. |
| LCC Ref: 16/02988/OT<br>Lane Side Farm, Churwell | 550 residential dwellings | Included | No apparent start of works, as at April 2020. |
| LCC Ref: 16/00865/FU<br>Albert Road, Morley | 62 residential dwellings | Excluded | Appears complete by May 2019. |
| LCC Ref: 13/05423/OT<br>Bradford Road, East Ardsley | 299 residential dwellings, +2FE primary school | Included | Construction observed to start between May 2019 and April 2020. |
| LCC Ref: 15/05356/FU<br>Woodkirk Quarries, Morley | B8 parcel 4,884 sq m | Excluded | Buildout appears complete by April 2018. |
| LCC Ref: 12/02470/OT<br>Gelderd Rd / Asquith Ave | B* 96,148 sqm | Included | Appears a single building became operational (consisting Units 3 and 4 per 18/06554/COND, total 27,000 sq ft ≈ 2,508m$^2$) between May 2019 and April 2020. Very small component of overall development, so full extent included. |
| KC Ref: 2018/94189<br>Soothill La, Batley | 309 residential dwellings + 60 care units | Included | No start of works observed as at April 2020. |
| LCC Ref: 17/08262/OT<br>Haigh Moor Road | 299 residential dwellings | Excluded | This is captured separately as a cumulative development, see **Section 2.4**. |
| KC Ref: 2019/92787<br>HS47 - BDWH Homes - Land off Owl La | 275 residential dwellings | Included | Permission granted by KC, 24th June 2021. |

2.3.3 The relevant planning documentation for each of these committed developments was reviewed and traffic flows relating to J28 were collated. A full breakdown of each development is included at **Appendix B**. Site Allocation HS47 (BDWH Homes site adjacent to MXS7 for 275 homes), which KC resolved to grant permission during this process was also added to the list of committed developments.

2.3.4 The total committed development flow matrices for the AM and PM peaks (**Table 2.7** and **Table 2.8** respectively). These flows are used directly in both 2019 and 2033 scenarios, independent of any growth applied to other flow matrices.

**Table 2.7: Total committed development AM flows (pcu)**

| | | A | B | C | D | E | F | G | Total |
|---|---|---|---|---|---|---|---|---|---|
| M62 (E) | A | 0 | 0 | 4 | 0 | 11 | 43 | 5 | 63 |
| A650 (SE) | B | 0 | 0 | 4 | 12 | 44 | 14 | 15 | 89 |
| A653 (S) | C | 10 | 2 | 0 | 11 | 3 | 17 | 37 | 80 |
| M62 (W) | D | 0 | 7 | 4 | 0 | 9 | 45 | 1 | 66 |
| A650 (W) | E | 5 | 22 | 1 | 1 | 0 | 14 | 7 | 50 |
| Topcliffe Lane | F | 6 | 2 | 2 | 6 | 2 | 0 | 5 | 23 |
| A653 (N) | G | 12 | 18 | 16 | 4 | 8 | 40 | 0 | 98 |
| Total | | 33 | 51 | 31 | 34 | 77 | 173 | 70 | 469 |

**Table 2.8: Total committed development PM flows (pcu)**

| | | A | B | C | D | E | F | G | Total |
|---|---|---|---|---|---|---|---|---|---|
| M62 (E) | A | 0 | 0 | 9 | 0 | 4 | 6 | 10 | 29 |
| A650 (SE) | B | 0 | 0 | 8 | 7 | 31 | 2 | 15 | 63 |
| A653 (S) | C | 5 | 5 | 0 | 6 | 1 | 2 | 20 | 39 |
| M62 (W) | D | 0 | 11 | 8 | 0 | 1 | 6 | 3 | 29 |
| A650 (W) | E | 10 | 46 | 3 | 7 | 0 | 2 | 7 | 75 |
| Topcliffe Lane | F | 39 | 12 | 15 | 38 | 12 | 0 | 35 | 151 |
| A653 (N) | G | 6 | 14 | 31 | 2 | 7 | 5 | 0 | 65 |
| Total | | 60 | 88 | 74 | 60 | 56 | 23 | 90 | 451 |

## 2.4 Cumulative Developments

2.4.1 For the purpose of the assessment of J28, and in line with the scoping discussions noted above, the cumulative developments that are expected to propose and contribute towards a mitigation scheme at J28 are:

- Capitol Park (LCC Ref: 20/08521/OT)
- Land at Chidswell (KC Refs: 2020/60/92350/E and 2020/60/92331/E)
- Land at Haigh Moor Road (LCC Ref: 17/08262/OT)

2.4.2 Flows for each of these proposed developments have been thoroughly assessed through each Applicant's scoping and submission review process. These are all considered acceptable both in scale, distribution and assignment by the respective planning authorities. **Table 2.9** summarises the key totals and their proportions of all the cumulative developments.

**Table 2.9: Summary totals and proportions of cumulative development trip generation**

| Cumulative Development | Total AM Trips through J28 | Total PM Trips Through J28 | Total Peak Trips Through J28 | % of Total Peak Trips |
|---|---|---|---|---|
| Capitol Park (LCC Ref: 20/08521/OT) | 333 | 294 | 627 | 31.5% |
| Land at Chidswell (KC Refs: 2020/60/92350/E and 2020/60/92331/E) | 594 | 555 | 1149 | 57.7% |
| Land at Haigh Moor Road (Haigh Wood; LCC Ref: 17/08262/OT) | 113 | 104 | 217 | 10.9% |
| Total of all Cumulative Development | 1040 | 953 | 1993 | 100.0% |

2.4.3 Summary trip matrices for each proposed development are included at **Appendix C**. Total committed development flow matrices for the AM and PM peaks (**Table 2.10** and **Table 2.11** respectively) are included below. These flows are used directly in both 2019 and 2033 scenarios, independent of any growth applied to other flow matrices.

**Table 2.10: Total cumulative development AM flows (pcu)**

| | | A | B | C | D | E | F | G | Total |
|---|---|---|---|---|---|---|---|---|---|
| M62 (E) | A | 0 | 1 | 91 | 0 | 0 | 58 | 0 | 150 |
| A650 (SE) | B | 1 | 0 | 14 | 2 | 0 | 12 | 2 | 31 |
| A653 (S) | C | 74 | 6 | 0 | 129 | 1 | 21 | 161 | 392 |
| M62 (W) | D | 0 | 1 | 123 | 0 | 0 | 61 | 0 | 185 |
| A650 (W) | E | 0 | 0 | 1 | 0 | 0 | 7 | 0 | 8 |
| Topcliffe Lane | F | 58 | 7 | 15 | 56 | 4 | 0 | 22 | 162 |
| A653 (N) | G | 0 | 1 | 99 | 0 | 0 | 34 | 0 | 134 |
| Total | | 133 | 16 | 343 | 187 | 5 | 193 | 185 | 1062 |

**Table 2.11: Total cumulative development PM flows (pcu)**

| | | A | B | C | D | E | F | G | Total |
|---|---|---|---|---|---|---|---|---|---|
| M62 (E) | A | 0 | 1 | 58 | 0 | 0 | 46 | 0 | 105 |
| A650 (SE) | B | 1 | 0 | 5 | 1 | 0 | 6 | 1 | 14 |
| A653 (S) | C | 95 | 14 | 0 | 132 | 1 | 13 | 118 | 373 |
| M62 (W) | D | 0 | 2 | 102 | 0 | 0 | 46 | 0 | 150 |
| A650 (W) | E | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 5 |
| Topcliffe Lane | F | 58 | 13 | 22 | 7 | 60 | 0 | 35 | 195 |
| A653 (N) | G | 0 | 2 | 125 | 0 | 0 | 19 | 0 | 146 |
| Total | | 154 | 32 | 313 | 140 | 61 | 134 | 154 | 988 |

2.4.4 Those scenarios which include the cumulative developments also include the Capitol Park access scheme proposed to enable access to/from the new Capitol Park development via Topcliffe Lane. These proposals have been submitted to LCC (and are detailed on i-Transport Drawing Reference: ITM10127-GA-007B) and are exclusively within the existing highway boundary. They involve:

- Widening of the Topcliffe Lane egress to provide a new second right turn lane.
- Reshaping of the northernmost splitter island on Topcliffe Lane and realignment of the pedestrian controlled areas to enable same.
- Removal of a current splitter island in the centre of the junction, with relocation of the signals thereupon.

- A reduction in the extent of the southern central reservation island to provide for a smoother and safer vehicle route for traffic turning right from Topcliffe Lane.

### Uncertainty in trip rates

2.4.5 **Section 2.2** includes an extensive discussion with regard to relevant factors relating to the uncertainty in future growth trends. Many of these, such as those with regard to downwards trends in trip rates, or uncertainty in post-COVID-19 working practices (and thus commuter patterns) will apply to the cumulative proposed developments. As such, it is likely that the forecast trip generation is a robust case.

2.4.6 However, in addition to these more general issues, there are specific issues relevant to each proposed development which have emerged through the scoping and planning process.

2.4.7 With specific relevance to the Land at Chidswell proposed development:

- The trip generation rates originally proposed and agreed with KC were in line with those used in the 2016 'Interim TA' submitted in support of the site being allocated for development in the (then emerging) KC Local Plan. These were considered acceptable to KC.
- An exercise undertaken by PF in 2019 (as part of the preparation of the TA to support the two outline planning applications) found more recent TRICS rates (by the same site selection criteria) to be lower. However, the higher 2016 rates were retained as these would form the basis of a more robust assessment (as requested by HE).
- HE subsequently reviewed the proposed trip rates as a part of their pre-application process and considered the employment trip rates to be lower than that which they considered acceptable. Alternative site selection parameters (combined with a newer version of TRICS) were proposed which resulted in an approximate doubling of overall daily trip rates for B8 uses with a significantly 'peakier' in-day distribution (peaks increased by an order of magnitude). These rates were adopted into the trip generation process to ensure a robust and worst-case assessment that was acceptable to both HE and KC as the Local Planning and Highways Authorities. HE indicated that these rates were considered acceptable.
- Following planning submission, KC and HE have each reviewed the Pell Frischmann TA work undertaken, and through their consultants, verified the methodology undertaken and trip generation rates used. KC/AECOM undertook a trip generation verification exercise from first principles through two separate methodologies (presented in their TA Review of 1 November 2020) and found the trip rates used in the PF analysis to be approximately double those from the AECOM exercise (due to the demanding HE requirements) and so potentially a substantial overestimate of potential trip generation from the Proposed Development.
- On that basis, it can be assumed that the trip generation for the Proposed Development is likely to be a substantive overestimate based on current (pre-COVID-19) trends.

2.4.8 With regard to the Capitol Park proposed development:

- As articulated in the original i-Transport TA (at Paragraph 7.6.3) and based on prevailing market conditions, it is likely that the future occupiers of the Proposed Development will be modern distribution enterprises. Whilst the developer accepts that traditional parcel distribution is permissible under Land Use Class B8, the developer does not anticipate more than a single building of this nature being located on the site (if any).
- Two traffic generation scenarios were presented in the original Capitol Park TA, with the more onerous scenario (Scenario B), which included an allowance for traditional parcel distribution on the site, used to assess the impacts of the Proposed Development.
- That scenario is c.10-18% more traffic intense in the weekday network peak hours than is the alternative scenario (Scenario A) identified in the original TA.

- For robustness the same traffic generation scenario (Scenario B) – which has been accepted by LCC and HE – has been carried through in the assessment which follows.
- As a consequence, the assessment which follows is considered to be robust and likely an over-estimate of the actual traffic generation of the Proposed Development.

2.4.9 With regard to the Haigh Moor Road cumulative scheme (consented development):

- The TA for this development (Document Ref: 12-199-001.03, Section 6 therein) presents the result of a trip generation exercise based on a local survey and of an equivalent TRICS exercise.
- The survey identified a trip rate for nearby local dwellings of approximately 50% higher than that derived from a conventional TRICS exercise in the AM peak and approximately 27% higher in the PM peak. The TA therefore used the higher of the two rates to ensure a robust assessment.
- A TRICS assessment is conventional practice and whilst lower than that assessment's survey in this particular case, represents a blend of multiple sites, reducing the influence of site-specific factors.
- The surveyed residential rates used in that assessment are around 70% (assuming privately-owned dwellings) of the rates agreed for the Land at Chidswell application.

## 2.5 LCC Scheme Proposals

2.5.1 LCC have proposed a number of bus priority, walking and cycle schemes around J28 which it is understood they wish to see included in proposals for works to J28. These are as follows:

- Widening of the southbound A653 north of Topcliffe Lane to provide a new southbound nearside bus lane approximately 280m in length. At the junction with Topcliffe Lane, the bus lane ends with a new separately staged bus gate signal to allow priority for bus movements to bypass traffic on the A653 and towards the approach to the main roundabout part of J28. This scheme is summarised on LCC Drawing Reference: -LCC-HWT-2B-DR-CH-0001.P01.1 and is attached at **Appendix D**.
- Widening of the northbound A653 south of J28 to provide a new northbound bus and cycle lane to the nearside and approximately 280m in length and terminating approximately 90m before the northbound A653 Dewsbury Road (S) stop line. The proposed bus (and cycle) lane would terminate with a new signalised bus gate to prioritise bus movement past queueing traffic. This scheme is summarised on LCC Drawing Reference: -LCC-HWT-2A-DR-CH-0001-P01.1 and is attached at **Appendix D**.
- Completion of the existing pedestrian and cycle routes around the periphery of the J28 roundabout by the provision of combined pedestrian/cycle crossings on both the M62 east and west bound on slips. The detail of these has not been proposed by LCC but they have been included in the relevant scenarios in the form of a toucan signal arrangement in place of the current uncontrolled crossing. This scheme is summarised on LCC Drawing Reference: 'Tingley Interchange - Outline Proposals, 07/04/2021' and is attached at **Appendix D**.

2.5.2 Scenarios were assessed which include the LCC proposals, as specified. These scenarios are those with an 'a' suffix.

## 2.6 TRANSYT Models

2.6.1 Validated baseline TRANSYT models for the AM and PM peak periods were provided to both i-Transport and Pell Frischmann by HE. These models were prepared by HE's consultants in consultation with LCC Urban Traffic Management Control (UTMC) and represent the current configuration of J28 following completion of the 2018/19 Congestion Relief Fund (CRF) scheme. These have been used as the basis for all modelling undertaken in this assessment with changes made as required to reflect the configuration of the relevant scenario.

2.6.2 A single set of models is submitted as a part of this assessment which represents the result of the combined work of i-Transport and Pell Frischmann. These are attached at **Appendices F through N inclusive**.

# 3 TRANSYT Modelling: 2019 Scenario 1

## 3.1 Scenario Details

3.1.1 Scenario 1 represents the current junction configuration as post-completion of the 2018/19 Congestion Relief Fund improvements.

3.1.2 The layout is detailed on Drawing Reference **A13398-T-040** and is included at **Appendix E**.

## 3.2 Flow Details

3.2.1 Flows in Scenario 1 are comprised solely of the 2019 observed survey flows (see **Section 2.2**).

## 3.3 TRANSYT Results

3.3.1 TRANSYT models for Scenario 1 were run with the relevant flow matrices. A copy of the model is included at **Appendix F**. **Table 3.1** summarises the key outputs from the models.

**Table 3.1: Summary TRANSYT statistics for J28 in Scenario 1**

| Scenario | Performance Index (£/hr) | Total Delay (pcuhr/hr) | Total Flow (pcu) | Avg delay per pcu (s) | Maximum DoS (%) | Worst Performing Arm |
|---|---|---|---|---|---|---|
| 2019 AM | 2592 | 146 | 7629 | 69 | 99% | Dewsbury Rd NB |
| 2019 PM | 2313 | 129 | 7412 | 63 | 96% | Bradford Rd EB exit |

3.3.2 The following key information emerges from the modelling undertaken:

- The junction already operates at the limit of theoretical capacity (maximum DoS close to 100%) and substantially beyond the threshold at which the junction will experience and onset of substantive congestion (signals operate most effectively at a DoS of less than 90%). There is therefore no realistic capacity to accommodate any flow increase in the future.
- In the AM peak, the worst performing arm is the A653 Dewsbury Road northbound approach. In the PM peak, the worst performing part of the junction is the A650 Bradford Road eastbound exit. Queueing from downstream (from the south-east) is observed to extend back to this area and likely imposes a constraint on this exit arm's operation/capacity.
- Average delay per pcu is a little over a minute in both peaks, at 69s per pcu in the AM peak and 63s per pcu in the PM peak.

# 4 TRANSYT Modelling: 2019 Scenario 2

## 4.1 Scenario Details

4.1.1 Scenario 2 represents the current junction configuration as post-completion of the 2018/19 Congestion Relief Fund improvements.

4.1.2 The layout is detailed on Drawing Reference **A13398-T-040** and is included at **Appendix E**.

## 4.2 Flow Details

4.2.1 Flows in Scenario 2 are comprised of the 2019 observed survey flows (see **Section 2.2**) with the addition of committed development flows (see **Section 2.3**).

## 4.3 TRANSYT Results

4.3.1 TRANSYT models for Scenario 2 were run with the relevant flow matrices. A copy of the model is included at **Appendix G**. **Table 4.1** summarises the key outputs from the models.

**Table 4.1: Summary TRANSYT statistics for J28 in Scenario 2**

| Scenario | Performance Index (£/hr) | Total Delay (pcuhr/hr) | Total Flow (pcu) | Avg delay per pcu (s) | Maximum DoS (%) | Worst Performing Arm |
|---|---|---|---|---|---|---|
| Base: 2019 + Committed AM | 4277 | 256 | 8098 | 114 | 104% | Dewsbury Rd NB |
| Base: 2019 + Committed PM | 3793 | 226 | 7863 | 104 | 110% | Bradford Road EB ahead |

4.3.2 The following key information emerges from the modelling undertaken:

- With the addition of committed development traffic (i.e. the situation that has already been accepted by the highway authorities) (as versus Scenario 1), the junction now experiences Degrees of Saturation beyond the theoretical capacity of the junction in both the AM and PM peak.
- In the AM peak, the worst performing arm is the A653 Dewsbury Road northbound approach. In the PM peak, the worst performing part of the junction is the A650 Bradford Road eastbound entry.
- Average delay per pcu is approaching two minutes in both peaks, at 114s (1m54s) per pcu in the AM peak and 104s (1m44s) per pcu in the PM peak.
- Total delay increases by approximately 65% as versus Scenario 1, though forecast flows have increased by only around 6%. This demonstrates the high sensitivity of the junction to flow increases.

4.3.3 As Scenario 2 includes committed developments which have received planning approval by the relevant Local Planning Authority and have been reviewed by the Highway Authorities, this scenario demonstrates that the Authorities have accepted that there will be a substantive deterioration in the operation of J28 into the future absent of any mitigation scheme and prior to the consideration of the Applicants' proposed developments. This is also the first time when the junction is forecast to operate with a DoS of greater than 100% and, as noted, this has been accepted by the Highway Authorities.

# 5 TRANSYT Modelling: 2019 Scenario 2a

## 5.1 Scenario Details

5.1.1 Scenario 2a represents the current junction configuration as post-completion of the 2018/19 Congestion Relief Fund improvements but includes the sustainable and active travel (bus, cycle and walk) schemes as proposed by LCC (see **Section 2.5**).

5.1.2 The layout is detailed on Drawing Reference **A13398-T-041** and is included at **Appendix E**.

## 5.2 Flow Details

5.2.1 Flows in Scenario 2a are comprised of the 2019 surveyed based flows (see **Section 2.2**) with the addition of committed development flows (see **Section 2.3**).

## 5.3 TRANSYT Results

5.3.1 TRANSYT models for Scenario 2a were run with the relevant flow matrices. A copy of the model and is included at **Appendix H**. **Table 5.1** summarises the key outputs from the models.

**Table 5.1: Summary TRANSYT statistics for J28 in Scenario 2a**

| Scenario | Performance Index (£/hr) | Total Delay (pcuhr/hr) | Total Flow (pcu) | Avg delay per pcu (s) | Maximum DoS (%) | Worst Performing Arm |
|---|---|---|---|---|---|---|
| 2019 + Committed AM | 4995 | 307 | 8098 | 137 | 109% | Dewsbury Rd NB |
| 2019 + Committed PM | 5741 | 357 | 7863 | 163 | 113% | M62 EB on slip crossing |

5.3.2 The following key information emerges from the modelling undertaken:

- With the addition of the LCC walking/cycling/bus M2D2L schemes (as versus Scenario 2), the junction DoSs increase marginally in the AM peak and in the PM peak.
- In the AM peak, the worst performing arm is the A653 Dewsbury Road northbound approach to the roundabout. This is however a part of the already congested situation on this arm as noted in the previous scenarios. The purpose of the bus gate on this arm is to prioritise bus movement past otherwise queueing traffic (which it would still do) but numerically this would always be subject to the presence of any queueing beyond the bus gate. In the PM peak, the worst performing part of the junction is the proposed eastbound on-slip crossing.
- Average delay per pcu is between two to three minutes in the peak hours at 137s (2m17s) per pcu in the AM peak and 163s (2m43s) per pcu in the PM peak.
- Total delay increases by approximately 20% in the AM peak and approximately 55% in the PM peak as versus Scenario 2 through directly implementing the LCC schemes, though total flows are unchanged. Clearly however, the distribution of that delay would reduce for bus users at the expense of private car drivers.

5.3.3 Scenario 2a (in common will all ‘a’ scenarios) is affected in two ways with regards the inclusion of LCC schemes:

- Bus gates added to each A653 Dewsbury Road approach have a negligible impact on the operation of J28:
  - The northern bus lane/gate is incorporated in the Topcliffe Lane signals and whilst its use by buses requires a change to the staging of this part of the junction to enable it, the

frequency of use and its timing in the wider signal cycling means that this gate can be included at negligible effect.
    - The southern bus lane/gate operates some 90m upstream of the entry to the southern circulatory carriageway. These signals can operate semi-independently of the main junction and as they are concerned with prioritising bus movement into the queueing space ahead of the entry to the roundabout, they do not reduce the capacity of that part of the signal system.
    - The inclusion of the bus gates within the TRANYST model has been included once every 120 sec cycle in the AM peak and once every 60sec cycle in the PM peak, which is considered a robust, as mentioned above the frequency of use is likely to be significantly lower than assessed.
- Pedestrian crossings included on the M62 entry slips have a considerable adverse effect and are primarily responsible for the substantive degradation in junction operation observed when comparing Scenarios 2 and 2a:
    - The queueing which occurs from the eastbound M62 on-slip crossing (when called) extends into the circulatory area of the junction once greater than approximately 4pcu in length. In peak times, mean maximum queues of 14pcu can be expected when the crossing is called in the AM peak and 111pcu in the PM peak. A queue of approximately 10pcu extends to the previous entry arm (A653 Dewsbury Road (S)) so it is clear this crossing would cause substantive problems to the junction's wider operation.
    - The queueing which occurs from the westbound M62 on-slip crossing (when called) extends into the circulatory area of the junction once greater than approximately 3pcu in length. In peak times, mean maximum queues of 6pcu can be expected when the crossing is called. A queue of approximately 7pcu extends to the previous entry arm (A650 Bradford Road (W)).
    - In both cases, queues extend into junction conflict zones and are likely to cause substantive operational/congestion issues in peak hours.
    - As per the bus gates, the pedestrian crossings across the on-slips are called included once every 120 sec cycle in the AM peak and once every 60sec cycle in the PM peak. This is likely to be an overestimate of the likely number of times the crossing are to be called. However, as demonstrated above they would have a significant impact once called.

5.3.4 In summary, it is clear, as versus Scenario 2, that the inclusion of the LCC schemes has the potential to have a detrimental impact on private vehicle traffic operations. The schemes would however have some benefit for bus users and for pedestrians/cyclists. Any consideration of the value of these schemes, if pursued, therefore needs to be framed in terms of those wider non-traffic benefits.

# 6 TRANSYT Modelling: 2019 Scenario 3

## 6.1 Scenario Details

6.1.1 Scenario 3 represents the current junction configuration as post-completion of the 2018/19 Congestion Relief Fund improvements with the inclusion of the enabling works for access to Capitol Park (see **Section 2.4**).

6.1.2 The layout is detailed on Drawing Reference A13398-T-042 and is included at **Appendix E**.

## 6.2 Flow Details

6.2.1 Flows in Scenario 3 are comprised of the 2019 observed survey flows (see **Section 2.2**) with the addition of committed development flows (see **Section 2.3**) and the cumulative development flows (see **Section 2.4**).

## 6.3 TRANSYT Results

6.3.1 TRANSYT models for Scenario 3 were run with the relevant flow matrices. A copy of the model is included at **Appendix I**. **Table 6.1** summarises the key outputs from the models.

**Table 6.1: Summary TRANSYT statistics for J28 in Scenario 3**

| Scenario | Performance Index (£/hr) | Total Delay (pcuhr/hr) | Total Flow (pcu) | Avg delay per pcu (s) | Maximum DoS (%) | Worst Performing Arm |
|---|---|---|---|---|---|---|
| 2019 + Committed + Cumulative AM | 7908 | 504 | 9160 | 198 | 139% | Dewsbury Rd NB |
| 2019 + Committed + Cumulative PM | 5298 | 319 | 8851 | 130 | 105% | Bradford Road cut through |

6.3.2 The following key information emerges from the modelling undertaken:

- With the addition of cumulative development traffic (as versus Scenario 2), the junction now experiences increased Degrees of Saturation in the AM peak and similar in the PM peak.
- In the AM peak, the worst performing arm is the A653 Dewsbury Road northbound approach. In the PM peak, the worst performing part of the junction is the A650 Bradford Road circulatory island cut through.
- Average delay per pcu is between two and a little over three minutes in both peaks, at 198s (3m18s) per pcu in the AM peak and 130s (2m10s) per pcu in the PM peak.
- Average delay per pcu increases to a little over three minutes as versus a little under two minutes in the AM peak versus Scenario 2. In the PM peak the average delay per pcu increases by less than 30 seconds versus Scenario 2. Total delay increases by approximately 75% as versus Scenario 2 in the AM peak, though forecast flows have increased by only around 13%. This further demonstrates the high sensitivity of the junction to modest flow increases.

6.3.3 In summary, as versus Scenario 2 which does not include the Applicants' cumulative developments (and Land at Haigh Moor Road), overall junction operation is more congested with the existing issues, such as those relating to A653 Dewsbury Road northbound approach, being further exacerbated by modest traffic increases in the context of a highly sensitive junction with existing issues.

6.3.4 Though the impact of the cumulative developments would increase the forecast levels of delay, the average pcu in the AM peak would experience an increase in delay from nearly two minutes to a little over three minutes. The junction is large and with current configuration (Scenario 1), drivers would expect to experience over a minute's delay. As noted with regard to Scenario 2, it is accepted that delay levels will increase due to committed developments in any case and whilst an average user may notice some increased delay in the future when such developments emerge, it is unlikely they would, on average, notice a fundamental difference between being delayed by a little under two minutes as opposed to a little over three minutes on their journey through the junction in the AM peak (which represents the greatest increase in delay at the junction). This is especially true in light of prevailing congestion levels elsewhere on the network and could potential only increase an overall journey time by a small proportion, particularly on longer journey through the junction.

# 7 TRANSYT Modelling: 2019 Scenario 3a

## 7.1 Scenario Details

7.1.1 Scenario 3a represents the current junction configuration as post-completion of the 2018/19 Congestion Relief Fund improvements with the inclusion of the enabling works for access to Capitol Park (see **Section 2.4**) and the bus, cycle and walk schemes as proposed by LCC (see **Section 2.5**).

7.1.2 The layout is detailed on Drawing Reference A13398T-043 and is included at **Appendix E**.

## 7.2 Flow Details

7.2.1 Flows in Scenario 3a are comprised of the 2019 observed survey flows (see **Section 2.2**) with the addition of committed development flows (see **Section 2.3**) and the cumulative development flows (see **Section 2.4**).

## 7.3 TRANSYT Results

7.3.1 TRANSYT models for Scenario 3a were run with the relevant flow matrices. A copy of the model is included at **Appendix J**. **Table 7.1** summarises the key outputs from the models.

**Table 7.1: Summary TRANSYT statistics for J28 in Scenario 3a**

| Scenario | Performance Index (£/hr) | Total Delay (pcuhr/hr) | Total Flow (pcu) | Avg delay per pcu (s) | Maximum DoS (%) | Worst Performing Arm |
|---|---|---|---|---|---|---|
| 2019 + Committed + Cumulative AM | 8999 | 575 | 9160 | 226 | 133% | Dewsbury Rd NB |
| 2019 + Committed + Cumulative PM | 8306 | 527 | 8851 | 214 | 122% | M62 EB on slip crossing |

7.3.2 The following key information emerges from the modelling undertaken:

- With the addition of the LCC walking/cycling/bus M2D2L schemes (as versus Scenario 3), the junction now experiences marginally decreased Degree of Saturation in the AM peak and somewhat higher saturation in the PM peak.
- In the AM peak, the worst performing arm is the A653 Dewsbury Road northbound approach. In the PM peak, the worst performing part of the junction is the new M62 eastbound on-slip crossing.
- Average delay per pcu is under four minutes in the AM peak (226s, 3m46s) and around three and a half minutes in the PM peak (214s, 3m34s). This is somewhat longer of an average delay in the AM peak, compared to Scenario 3, but an approximate 65% increase in delay per pcu in the PM peak.
- As previously noted, the junction is highly sensitivity to even small changes. In this particular case, the extensive queueing due to the new slip road crossing, combined with the higher levels of traffic as compared to Scenario 2a (which excludes the cumulative developments) causes substantive forecast delay increases despite no change in flow relative to Scenario 3.

7.3.3 In a similar manner to the inclusion of the LCC schemes in Scenario 2a as versus 2, their inclusion in Scenario 3a results in a significant degradation in the capabilities of J28 as versus Scenario 3. In line with the discussion in Scenario 2a, this is almost exclusively the result of the new crossings proposed on the M62 on-slips blocking back into the circulatory part of the junction and beyond.

7.3.4 It should be reiterated that the inclusion of pedestrian/cycle crossings does have benefits not captured here for those users and their safety, and notwithstanding the issues in peak periods, when traffic pressure is out of peak, the crossings would still provide benefits to pedestrians and cyclists by their presence.

# 8 TRANSYT Modelling: 2019 Scenario 4

## 8.1 Scenario Details

8.1.1 Scenario 4 represents the combined i-Transport and Pell Frischmann mitigation scheme (highway capacity improvement scheme). This scheme also includes the enabling works for access to Capitol Park (see **Section 2.4**).

8.1.2 As noted in **Section 1.3**, both i-Transport and Pell Frischmann undertook a detailed assessment of the potential for a mitigation scheme at M62 J28 as part of prior technical submissions. i-Transport's scheme was proposed as a part of the planning submission for Capitol Park (i-Transport's TA, document reference: GJ/JO/UK/dc/ITM10127-010B.R) and Pell Frischmann's as a part of a separate exercise undertaken concurrently (Pell Frischmann's J28 Assessment Report A13398 F1 2021-02-01). Though determined independently, both assessments reach similar conclusions and as a result propose schemes with a substantive level of similarity.

8.1.3 As a part of this combined assessment exercise, working together, i-Transport and Pell Frischmann reconsidered the current and potential future issues at the junction from first principles. Opportunities and constraints were identified and these informed the potential proposals which have emerged. The previous submissions were collectively critiqued to consider their strengths and weaknesses, and where there could be synergies from incorporating component parts of the proposals into a wider collective scheme.

8.1.4 Alternative/additional schemes put forward by others were also critically assessed (e.g. the FORE scheme for Sir Robert Ogden/Tingley Station, and the M2D2L schemes proposed by LCC) to consider if they could provide aspects that could be incorporated in the emerging proposals, if appropriate.

8.1.5 Design consideration focussed on incorporating works which would address the most critical bottleneck parts of the junction whilst being mindful of the wider constraints such as land ownership, structural interaction with the M62, and current and potential safety issues. Works were sought and identified which would be achievable and realistic, whilst also having a material beneficial effect. Various scheme options were identified in this manner and were tested iteratively through TRANSYT modelling and geometric design.

8.1.6 The combined i-Transport and Pell Frischmann team also liaised with an independent Road Safety Auditor on a number of occasions to gain informal feedback on the proposals, as they emerged.

8.1.7 The result of the above process is the following proposed mitigation works:

- A reconfiguration of the existing lane markings at the end of the M62 eastbound off-slip and on the areas of circulatory carriageway adjacent to allow traffic from Lane 2 of the slip road to travel to Lane 2 of the circulatory carriageway and onwards north to Leeds. This involves changes to markings only.
- A widening of the circulatory carriageway between the M62 westbound off-slip and the A650 Bradford Road exit to six lanes with five lanes continuing past the A650 arm. Reconfiguration of lane markings and destinations to take advantage of this increased carriageway space.
- A widening of the circulatory carriageway between the A650 Bradford Road entry and A653 Dewsbury Rd (S) exit to six lanes with four lanes (as existing) past the A653 arm and two lanes exiting to the A653. Reconfiguration of lane markings and destinations to take advantage of this new carriageway space.
- A widening of the A653 Dewsbury Road (S) arm northbound approach to four lanes with a commensurate increase in queueing space.

- A minor change in kerbline on the circulatory carriageway between the A653 Dewsbury Road (S) entry and the A650 Bradford Road (W) exit to ensure smooth vehicle paths and a two lane exit to the A650.

8.1.8 The layout is detailed on Drawing Reference A13398-T-044 and is included at **Appendix E**. All proposals occur within existing highway boundary on land either under LCC or HE control.

## 8.2 Flow Details

8.2.1 Flows in Scenario 4 are comprised of the 2019 observed survey flows (see **Section 2.2**) with the addition of committed development flows (see **Section 2.3**) and the cumulative development flows (see **Section 2.4**).

## 8.3 TRANSYT Results

8.3.1 TRANSYT models for Scenario 4 were run with the relevant flow matrices. A copy of the model is included at **Appendix K**. **Table 8.1** summarises the key outputs from the models.

**Table 8.1: Summary TRANSYT statistics for J28 in Scenario 4**

| Scenario | Performance Index (£/hr) | Total Delay (pcuhr/hr) | Total Flow (pcu) | Avg delay per pcu (s) | Maximum DoS (%) | Worst Performing Arm |
|---|---|---|---|---|---|---|
| 2019 + Committed + Cumulative AM | 4491 | 267 | 9160 | 105 | 104% | Dewsbury Rd NB |
| 2019 + Committed + Cumulative PM | 6109 | 376 | 8851 | 153 | 110% | M62 WB off slip |

8.3.2 The following key information emerges from the modelling undertaken:

- With the implementation of the combined mitigation scheme (as versus Scenario 3), the junction now experiences substantially reduced Degrees of Saturation in the AM peak and similar in the PM peak.
- Comparing this scenario to the absence of both the cumulative developments and the combined mitigation scheme, i.e. Scenario 2, it can be seen that the impact of the cumulative developments is entirely mitigated in the AM and PM peaks with a comparable maximum DoS in both peak hours of 104% and 110%).
- In the AM peak, the worst performing arm remains the A653 Dewsbury Road northbound approach. In the PM peak, the worst performing part of the junction is the M62 westbound off-slip.
- Average delay per pcu is under two minutes (105s, 1m45s) in the AM peak (and reduced by 9s as versus Scenario 2) and about two and a half minutes in the PM peak, though this is an increase of less than one minute versus Scenario 2 at 153s (2m33s) per pcu.
- Total delay in the AM peak reduces slightly (8%) versus the no cumulative development or mitigation scenario (Scenario 2), despite an overall flow increase of over 13%. PM peak delay increase is more substantial. As noted above, the junction still operates over its theoretical capacity, even with the mitigation scheme in place, and the junction has a high sensitivity to flow changes.

# 9 TRANSYT Modelling: 2019 Scenario 4a

## 9.1 Scenario Details

9.1.1 Scenario 4a represents the combined i-Transport and Pell Frischmann mitigation scheme (highway capacity improvement scheme) with the addition of the bus, cycle and walk schemes as proposed by LCC (see **Section 2.5**). This scheme also includes the enabling works for access to Capitol Park (see **Section 2.4**).

9.1.2 The changes introduced (versus Scenario 4) do not geometrically affect those proposals made as a part of the proposed combined mitigation scheme with the exception of some minor kerb realignment on A653 Dewsbury Road (S) where the proposed bus gate arrangement would now lead to a four lane carriageway queueing area, rather than the existing three lanes.

9.1.3 The layout is detailed on Drawing Reference **A13398-T-045** and is included at **Appendix E**. All proposals occur within existing highway boundary on land either under LCC or HE control.

## 9.2 Flow Details

9.2.1 Flows in Scenario 4a are comprised of the 2019 observed survey flows (see **Section 2.2**) with the addition of committed development flows (see **Section 2.3**) and the cumulative development flows (see **Section 2.4**).

## 9.3 TRANSYT Results

9.3.1 TRANSYT models for Scenario 4a were run with the relevant flow matrices. A copy of the model and a full report of outputs are included at **Appendix L**. **Table 9.1** summarises the key outputs from the models.

**Table 9.1: Summary TRANSYT statistics for J28 in Scenario 4a**

| Scenario | Performance Index (£/hr) | Total Delay (pcuhr/hr) | Total Flow (pcu) | Avg delay per pcu (s) | Maximum DoS (%) | Worst Performing Arm |
|---|---|---|---|---|---|---|
| 2019 + Committed + Cumulative AM | 4745 | 283 | 9160 | 111 | 107% | Dewsbury Rd NB |
| 2019 + Committed + Cumulative PM | 10886 | 700 | 8851 | 285 | 127% | M62 EB on-slip crossing |

9.3.2 The following key information emerges from the modelling undertaken:

- With the addition of the LCC walking/cycling/bus M2D2L schemes (as versus Scenario 4), the junction now experiences marginally increased Degrees of Saturation in the AM peak. In the PM peak, the maximum degree of saturation is somewhat higher and comparable to Scenario 3a as it is similarly related to the M62 eastbound on-slip crossing.
- In the AM peak, the worst performing arm is the A653 Dewsbury Road northbound approach. In the PM peak, the worst performing part of the junction is the new M62 eastbound on-slip crossing.
- Average delay per pcu is almost two minutes in the AM peak (111s, 1m51s) and approaching five minutes in the PM peak (285s, 4m45s). This is still comparable to Scenario 4 in the AM peak but an almost doubling in delay on average per pcu in the PM peak.
- As previously noted, the junction is highly sensitivity to even small changes. In this particular case, the extensive queueing due to the new slip road crossing, causes substantive forecast delay

increases despite no change in flow relative to Scenario 4, but comparable delay to Scenario 3a illustrating that the increased delay due to the new crossing on the M62 eastbound on-slip is essentially independent of the mitigation proposals.

9.3.3 As in all the scenarios that include the additional pedestrian crossings, it has been assumed that the pedestrian stage is called on every cycle. The reality is that whilst a single call would clearly be disruptive, this would only occur on those cycles in which the pedestrian stage were called, and given low pedestrian/cycle flows, this would not be every cycle.

# 10 TRANSYT Modelling: 2019 Scenario 4b

## 10.1 Scenario Details

10.1.1 Scenario 4b represents the combined i-Transport and Pell Frischmann mitigation scheme (highway capacity improvement scheme) with the addition of the bus schemes as proposed by LCC (see **Section 2.5**). This scheme also includes the enabling works for access to Capitol Park (see **Section 2.4**).

10.1.2 As identified in **Section 9** above and elsewhere, the incorporation of controlled pedestrian (and cycle) crossings on the M62 on-slips has the potential for significant adverse impacts on the operation of J28 with queueing extending significantly through the circulatory carriageway and onto/past other arms.

10.1.3 Averting these impacts by moving the crossing point further downstream on the on-slip arm is unlikely to be acceptable as it would require significant diversions to pedestrian desire lines (and likely poor compliance) to keep queueing off the circulatory carriageway, and would also significantly reduce the acceleration length available on the on-slips to the M62 mainline.

10.1.4 An alternative measure to reduce queue extent by increasing the number of lanes held at the stop lines at the respective crossing points is unlikely to be effective as it requires longer crossing times for pedestrians, and thus red signal time for vehicles, further increasing the vehicle queue volumes. In this case the extent of the static queueing is still likely to extend into the circulatory carriageway.

10.1.5 Consequently, an alternative scheme to provide equivalent connectivity is required. Full grade separation of pedestrian and cycle movements as could be implied by the speed limits and classes of routes approaching the junction would be of a prohibitive scale/dimension given the configuration of the existing routes through and above the junction. A solution that can work well for the incorporation of pedestrian and cycle facilities at-grade on a signalised roundabout is to move pedestrian routes to the central island and use the existing signal configuration to provide pedestrian/cycle crossing time in a ‘walk with traffic’ configuration which can reduce the impact on junction capacity. Furthermore in such a configuration, pedestrian facilities would have no net impact if not called. Observed pedestrian/bicycle flows are low and so it would be expected that the pedestrian stages would be called on a relatively low proportion of cycles in the peak hours. This type of configuration has been accepted by HE elsewhere; examples including M62 J11 as part of a recent planning application submission and Canford Bottom on the A31. Such a change has been investigated further in this situation and has resulted in the proposals in Scenario 4b.

10.1.6 A former proposal for a comparable scheme (though the development at Tingley Station which would have delivered the works was dismissed at appeal, thus the J28 scheme did not come forward) has also been consulted as a part of the feasibility design for this scenario. It is noted that those proposals were subject to a Stage 1 Road Safety Audit and this did not raise any issues that relate to the equivalent part of the proposals in Scenario 4b. This Audit Report and associated general arrangement drawings are included for information at **Appendix O**. It is however noted that any proposals taken forwards in this case would themselves be subject to the Road Safety Audit process in line with prevailing policy.

10.1.7 In addition to the combined mitigation scheme proposals, and the LCC bus lane proposals, the following pedestrian/cycle aspects are included:

- Transfer of the western section of pedestrian/cycle route between the A650 (W) and M62 eastbound off-slip arms to the central island. Removal of peripheral route provision.
- New pedestrian/cycle crossing point and phase to circulatory carriageway at M62 eastbound off-slip arm to connect to central island.

- New pedestrian/cycle shared footway on central island to connect existing northern edge of A650 cut-through, under motorway to new crossing point at M62 eastbound off-slip arm.
- Break-out and build-up of existing service area to offside of the carriageway under western mainline overbridge to provide the shared pedestrian and cycle facility under the existing structure.
- Transfer of the eastern section of pedestrian/cycle route between the A650 (E) and M62 eastbound on-slip arms to the central island. Removal of peripheral route provision including removal of the existing crossing point and phase at M62 westbound off-slip.
- New pedestrian/cycle crossing points and phases to A653 Dewsbury Road (N) entry arm and circulatory carriageway at same arm.
- New pedestrian/cycle shared footway on central island to connect existing northern edge of A650 cut-through, under motorway, to new crossing points at A653 Dewsbury Road (N) entry arm.
- Break-out and build-up of existing service area to offside of the carriageway under eastern mainline overbridge to provide the shared pedestrian and cycle facility under the existing structure.

10.1.8 The layout is detailed on Drawing Reference A13398-T-046 and is included at **Appendix E**. All proposals occur within existing highway boundary on land either under LCC or HE control.

## 10.2 Flow Details

10.2.1 Flows in Scenario 4b are comprised of the 2019 observed survey flows (see **Section 2.2**) with the addition of committed development flows (see **Section 2.3**) and the cumulative development flows (see **Section 2.4**).

## 10.3 TRANSYT Results

10.3.1 TRANSYT models for Scenario 4b were run with the relevant flow matrices. A copy of the model is included at **Appendix M**. **Table 10.1** summarises the key outputs from the models.

**Table 10.1: Summary TRANSYT statistics for J28 in Scenario 4b**

| Scenario | Performance Index (£/hr) | Total Delay (pcuhr/hr) | Total Flow (pcu) | Avg delay per pcu (s) | Maximum DoS (%) | Worst Performing Arm |
|---|---|---|---|---|---|---|
| 2019 + Committed + Cumulative AM | 8421 | 528 | 9160 | 208 | 111% | M62 WB off slip |
| 2019 + Committed + Cumulative PM | 9815 | 626 | 8851 | 255 | 118% | A653 Dewsbury (N) – at Topcliffe Lane junction |

10.3.2 The following key information emerges from the modelling undertaken:

- With the implementation of the combined mitigation scheme, with LCC's bus lane/gate proposals and with alternative pedestrian provision, and when comparing to Scenario 4 (the combined mitigation scheme alone) the junction experiences an increased maximum degree of saturation in both peak periods. However, notably when compared to Scenario 4a – i.e. isolating the effect of the pedestrian changes – maximum DoS reduces in the PM peak scenarios, where the impact of the crossing on the M62 eastbound off-slip is at its greatest.
- Comparing this scenario to the absence of both the cumulative developments and the combined mitigation scheme, i.e. Scenario 2, it can be seen that the impact of the cumulative developments is still broadly mitigated in the AM peak with a small increase to 111% from 104% in Scenario 4. DoS in the PM peak also increases a small amount, to 118% from 110% as compared to Scenario 4. This is attributable to the introduction of the pedestrian facilities but in the PM peak, is notably lower than in Scenario 4a which included new crossings on the M62 on-slips.

- In the AM peak, the worst performing arm is at the M62 westbound off-slip approach to the junction. In the PM peak, the worst performing part of the junction is A653 Dewsbury Road (N) on the approach to the Topcliffe Lane junction.
- Average delay per pcu is over three minutes (208s, 3m28s) in the AM peak and approximately four minutes in the PM peak, Though these are increases in peak hour pcu delay as compared to Scenario 2, they represent a substantial improvement in provisions for pedestrians and cyclists both during peak times and throughout the day. Also, such delay would be unlikely to occur on those cycles in which the pedestrian/bicycle facilities do not experience a demand call (i.e. most cycles).

# 11 TRANSYT Modelling: 2033 Sensitivity Test

## 11.1 Scenario Details

11.1.1 Sensitivity testing was undertaken for the junction on a without prejudice basis, for information only, and at the request of HE. All scenarios, as individually detailed above, were so tested.

## 11.2 Flow Details

11.2.1 Future flow forecasts for 2033 were determined as detailed in **Section 2.2** above. Where relevant for the scenario, committed development flows (see **Section 2.3**) and cumulative development flows (see **Section 2.4**) were also added. These additional components were added without further growth factors applied.

## 11.3 TRANSYT Results

11.3.1 TRANSYT models for all scenarios were run with the relevant 2033 flow matrices. Copies of the models are included at **Appendix N**. **Table 11.1** summarises the key outputs from the models. These models have not been subjected to a detailed optimisation.

**Table 11.1: Summary TRANSYT sensitivity test statistics for J28 in 2033 flow scenarios**

| Scenario | Performance Index (£/hr) | Total Delay (pcuhr/hr) | Total Flow (pcu) | Avg delay per pcu (s) | Maximum DoS (%) | Worst Performing Arm |
|---|---|---|---|---|---|---|
| 1: 2033 AM | 6293 | 392 | 8271 | 171 | 107% | Dewsbury Rd NB |
| 1: 2033 PM | 4463 | 270 | 8003 | 121 | 111% | Bradford Road EB approach |
| 2: 2033 + Committed AM | 13977 | 920 | 8740 | 379 | 249% | M62 EB off-slip |
| 2: 2033 + Committed PM | 6186 | 383 | 8454 | 163 | 127% | Bradford Road EB approach |
| 2a: 2033 + Committed AM | 9140 | 587 | 8740 | 242 | 125% | Dewsbury Rd NB Bus Gate |
| 2a: 2033 + Committed PM | 9613 | 614 | 8454 | 261 | 120% | A653 Dewsbury Road SB approach to Topcliffe Lane junction |
| 3: 2033 + Committed + Cumulative AM | 20597 | 1378 | 9802 | 506 | 389% | M62 EB off-slip |
| 3: 2033 + Committed + Cumulative PM | 11794 | 757 | 9442 | 289 | 141% | Bradford Road EB approach |
| 3a: 2033 + Committed + Cumulative AM | 23638 | 1584 | 9802 | 582 | 600% | M62 EB off-slip |
| 3a: 2033 + Committed + Cumulative PM | 14960 | 972 | 9442 | 371 | 129% | M62 WB off slip |
| 4: 2033 + Committed + Cumulative AM | 10990 | 707 | 9802 | 260 | 132% | M62 WB off slip |
| 4: 2033 + Committed + Cumulative PM | 13010 | 854 | 9442 | 326 | 198% | M62 WB off slip |
| 4a: 2033 + Committed + Cumulative AM | 11712 | 752 | 9802 | 276 | 128% | M62 WB off slip |
| 4a: 2033 + Committed + Cumulative PM | 16001 | 1055 | 9442 | 402 | 168% | M62 WB off slip |
| 4b: 2033 + Committed + Cumulative AM | 12767 | 826 | 9802 | 303 | 142% | M62 WB off slip |
| 4b: 2033 + Committed + Cumulative PM | 12468 | 807 | 9442 | 308 | 124% | A653 Dewsbury Road SB approach to Topcliffe Lane junction |

# 12 Summary and Conclusions

## 12.1 Project Background

12.1.1 Pell Frischmann is commissioned by C.C. Projects to provide transport planning and highways consultancy services in connection with the proposed mixed-use development of Land to the East of Leeds Road and Land at Heybeck Lane, Chidswell, Dewsbury, and south of the M62 Junction 28 ('J28'). i Transport LLP is commissioned by Sterling Capitol PLC to assess the transport implications of the proposed strategic industrial development at Capitol Park, Leeds to the north-west of J28.

12.1.2 Both Applicants' planning submissions are (and remain) independent of one another, however both proposed developments are of a significant scale and importance to the respective Local Plan processes and are forecast to have a potential impact on J28. This document has therefore been produced as a single submission through collaborative working between i Transport and Pell Frischmann in the representation of both Sterling Capitol and C.C. Projects (collectively, 'the Applicants'). It presents summary results and supporting information as a result of that collaborative working process which sought to produce a single combined mitigation scheme to mitigate the impact of the Applicants' respective proposed developments, and additionally of the approved development of 299 residential dwellings at Land at Haigh Moor Road.

12.1.3 As the scale of necessary mitigation is significant, and as each Applicant's proposals would have the potential to impact upon the other, the combined mitigation scheme is anticipated to mitigate the impacts of the collective proposed developments. It is expected that each Applicant would make a proportional contribution towards the combined scheme.

12.1.4 It is understood that the Owner of the Land at Haigh Moor Road approved development sites is also required (through planning obligation) to make a contribution towards mitigation, though this is not associated with any defined solution. Funds are held in a 'collective pot' pending emergence of a mitigation scheme and it is expected that the combined scheme proposed in this document constitutes appropriate highway works under that agreement, and forming part of the funding basis for the proposed scheme. This principle has been agreed with LCC as Local Planning Authority and the assessment in this document has treated the Land at Haigh Moor Road sites alongside the Applicants' proposed developments as a cumulative development.

## 12.2 Modelling Outcomes and Scheme Proposals

### Mitigating the Impact of the Applicants' Proposed Developments

12.2.1 Modelling undertaken as a part of this assessment shows that the junction, in its current configuration (following the 2018/19 Congestion Relief Fund scheme; Scenario 1; **Section 3**), already operates at almost the limit of theoretical capacity and above the usual operational threshold of 90% degree of saturation in both peak periods (99% and 96% in the AM and PM peak respectively).

12.2.2 Consented committed developments in the local area under the planning authority of both Leeds and Kirklees councils are expected to add a volume of traffic to the junction which would increase forecast maximum degrees of saturation (Scenario 2; **Section 4**) beyond 100%, up to 104% in the AM peak and 110% in the PM peak. Delays to motor vehicle users increase commensurately. As this scenario has been accepted through the planning process, it represents the base against which the impact of the Applicants' proposed developments, and the proportional impact of the Land at Haigh Moor Road development, are assessed. In combination, the committed developments have the effect of pushing the junction over the theoretical capacity threshold, but it is understood that no specific mitigation contributions have been secured by LCC or KC from these developments.

12.2.3 The proposed developments for the Applicants are assessed (in the absence of mitigation) in Scenario 3 (**Section 6**). This modelling showed that the degree of saturation of the junction would increase substantially, more so in the AM peak as a result of the increased traffic pressures due to the proposed developments, with delays also increasing. Delays are however not serious in practical terms, given they are, per average pcu, expected to be in the range of two to three and a half minutes. In the context of journeys that would realistically travel through J28, such as between Dewsbury and Leeds, or between Morley and Wakefield, such an increase (about a minute and a half in the AM peak and about a half minute in the PM) represents a small fraction of such a journey; either of which could typically be expected to be in the range of 20 to 35 minutes, depending on conditions elsewhere on the network. Such a delay increase would likely fall within the range of daily variation for a user of J28.

12.2.4 As discussed above, the Applicants (through i-Transport and Pell Frischmann) have worked together to produce a mitigation scheme which aims to mitigate the impact of their proposed developments. This scheme is detailed in Scenario 4 (**Section 8**) but in summary makes small adjustments to existing road markings to maximise road space usage, and provides new additional capacity on the south-eastern parts of the roundabout, and on the A653 Dewsbury Road northbound approach. These areas are those that exhibit the most acute capacity pressures within the overall junction complex.

12.2.5 The proposed scheme fully mitigates the impact of the proposed developments by bringing maximum degrees of saturation in Scenario 4 (with development and with the capacity improvement) down to the same level as in the Scenario 2 base. As noted, though over 100% in both peaks, this is a level of demand versus capacity which has already been accepted by LCC, KC and HE through the planning process as reflected in the base Scenario 2. Despite the substantial increase in flow, average delay per pcu falls in the AM peak as a result of the mitigation scheme with average delay per pcu being forecast at 1m45s. Average delay in the PM peak is forecast to be a little higher but still only 2m33s, which is 49s greater than in Scenario 2, and in the context of the longer journeys that pass through J28, not substantial, unlikely to be noticeable to the average road user and certainly within the range of daily variation of an average users' journey. The residual impact is certainly not severe – which remains the test against which the proposed developments must be judged.

### Additional Proposals: Walking, cycling and bus use

12.2.6 The above represents the outcome of the primary assessment exercise undertaken, which aims to mitigate the impact of the Applicants' proposed developments (and of the consented development at Land at Haigh Moor Road). In each of Scenarios 2, 3 and 4, an 'a' variant has been tested (**Sections 5, 7 and 9**) which represents the relevant scenario with the inclusion of a series of schemes which LCC have proposed. Such proposals have been included primarily for information as versus the scope of this assessment, but it is reasonable that if there are schemes which can be included with LCC (as a further co-sponsor) that improve the value of the proposals and increase their contribution towards LCC policy objectives, this is a good opportunity to do so.

12.2.7 The LCC bus schemes are generally shown to be able to be incorporated in the proposals with a minimal impact on junction operations. The pedestrian/cycle elements (which involve new crossings on the M62 on-slips) however have substantial impacts on the operation of the junction with queuing extending substantially into the circulatory area and in the case of the crossing on the eastbound on-slip, significant distances around and through the junction. Though the impacts on motor vehicle traffic are not the sole concern of such a scheme – this is a significant improvement for pedestrians and cyclists – the impacts of the proposed crossings would be substantial.

12.2.8 A variant 'b' of the proposed combined mitigation scheme has also been produced. This document presents Scenarios 4, 4a and 4b alongside one another to demonstrate the potential for alternative schemes and to further the discussion of the potential for the proposals which have been produced. To attempt to address the main issues with the LCC proposals, an alternative pedestrian configuration was included at Scenario 4b (**Section 10**) which transfers the peripheral pedestrian routes from the outside

of the circulatory carriageway to the central island. This avoids the need to cross the M62 on-slips and can generally accommodate pedestrian stages in a 'walk with traffic' configuration, minimising the impact on the operation of the junction for those occasions on which there would be a pedestrian/cycle demand call (though this would likely be infrequent given current levels of pedestrian and cycle flow through the junction). This configuration has a marginal impact in the AM peak but represents a substantial improvement on the LCC scheme (as proposed) in the PM peak and in which there are forecast to be significant issues due to blocking back from the M62 eastbound on-slip crossing.

## 12.3 Further Considerations

### Dynamic Signal Control

12.3.1 Modelling undertaken as a part of this assessment does not include dynamic controller/signal optimisation, such as MOVA or SCOOT. It is expected, as it may not already be the case, that a local traffic control upgrade such as MOVA could be installed at the junction. This would make dynamic changes to signal timings both during peaks when it would seek to maximise capacity and outside peaks when it would seek to minimise delay (where these are not equal).

12.3.2 The use of MOVA could reasonably be expected to result in a non-trivial reduction to the levels of delay forecast in this assessment, though the exact reduction would be a matter for the on-site circumstances in operation.

### Pedestrian/Cycle Facilities: Frequency of Use

12.3.3 The scenarios presented in this assessment that include new pedestrian facilities, have been assessed on the basis that the pedestrian/cycle facilities are called on every signal cycle. This represents a very worst and arguably overly robust case for operation of the junction in highway capacity terms but is relevant for understanding the maximum constraints within which the junction could operate.

12.3.4 In reality, the levels of pedestrian and cycle flow at J28 are very low. Video survey observations[4] counted a total of 16 pedestrians (and 7 cyclists) passing north/south through J28 through the 07:00-10:00 AM three-hour peak, and 11 pedestrians (and 11 cyclists) in the 16:00-19:00 PM three-hour peak. In some cases these were also small groups. In any case, with approximately 60 signal cycles per hour, on average only around 1 in 8 signal cycles would experience a pedestrian/cyclist demand call at current levels of demand.

### Financing of Proposals

12.3.5 As discussed in detail in **Section 1.2**, the Applicants have agreed in-principle that they would make a proportional contribution towards the mitigation required to enable their respective proposed developments. Planning contributions were also secured by LCC from the Owner of the Land at Haigh Moor Road sites for J28 mitigation which would form a part of the overall financing package for the junction.

12.3.6 However, a number of the scenarios include a range of pedestrian/cyclist and bus measures, initially proposed by LCC as a part of the West Yorkshire Combined Authority (WYCA) 'Mirfield to Dewsbury to Leeds Transport Scheme' ('M2D2L') programme, and further considered as a part of this assessment.

12.3.7 It is reasonable that a mitigation scheme, and the works this could require, seeks to include other nearby pending complementary schemes so as to minimise overall disruption and maximise benefits. It is however not reasonable that the Applicants finance the cost of such schemes where these do not relate to the impacts of the proposed developments. In the case of the LCC M2D2L proposals, these

[4] Survey undertaken by PF on 7th November 2019.

are primarily existing issues, as evidenced by the fact the proposals emerged from the existing M2D2L programme, and it is considered these should be financed as such. It is expected that LCC as Local Highway Authority, through the M2D2L programme or otherwise, would provide contribution towards the eventual mitigation scheme, where this includes such aspects.

## 12.4 Conclusions

12.4.1 This document presents a combined mitigation scheme which seeks to mitigate the impact of the collective proposed developments of the Applicants and of the development at Land at Haigh Moor Road which already benefits from planning consent.

12.4.2 The option presented as Scenario 4 represents a combined mitigation scheme which achieves nil-detriment in both peaks when the increased junction demand flows are considered against the resultant maximum degree of saturation forecast within the junction. This is as compared to the situation which has been deemed acceptable by LCC, HE and KC through the planning process for committed development approvals (Scenario 2). The proposed scheme reduces average per pcu user delay slightly in the AM peak but does not achieve the same level of mitigation in the PM peak, but does however represent the greatest practical mitigation that can be achieved, and reduces the impacts of development to a level which is unlikely to be perceptible to the average road user. Average per pcu delay is still around two minutes and the small forecast increase of less than one minute is unlikely to be noticeable in the context of daily variation and overall journey times[5].

12.4.3 The two variations of Scenario 4a and Scenario 4b, represent incorporation of walking, cycling and bus schemes to improve connectivity and safety across J28 for non-motorised users and reduce bus journey times. These scenarios show higher levels of delay to general traffic but are proposed as there is a policy trade-off between the full prioritisation of private road users, and the more balanced priorities that consider all road users. Ultimately, the appropriate balance between the different types of road users is a matter for the relevant highway authority.

12.4.4 In planning terms, Paragraph 111 of the National Planning Policy Framework (NPPF) (updated July 2021) (formerly Paragraph 109) states:

*"Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."*

12.4.5 The foregoing, in combination with the various planning submissions and supplementary information provided by the Applicants with respect to their individual proposed developments, demonstrates that, with appropriate mitigation, there would not be an unacceptable impact on highway safety. Furthermore, it has been demonstrated that the residual cumulative impact on the road network would not be significant and certainly not severe.

12.4.6 The proposed mitigation works represent either no practical change to highway safety or in the case of those that include new pedestrian facilities, represent an improvement to highway safety. Similarly, the effect of the proposed mitigation is to fully mitigate the impact of the proposed developments in both peaks in terms of peak degrees of saturation within the junction. In terms of delay, in the AM peak, the mitigated junction improves on the forecast situation absent the proposed developments and mitigation and, in the PM peak, mitigates increased delay to an acceptable degree such that the forecast increase in delay of less than a minute. It is reasonable to expect that this would be imperceptible to the average road user, and in any case, would certainly not be severe.

[5] A daytime off-peak trip from Dewsbury to Leeds though J28 takes approximately 35 minutes, and from Morley to Wakefield takes a little over 20 minutes. (Times based on Google Maps estimates, 15:30, 20 July 2021).

12.4.7 Consequently, it is considered that there are no justifiable reasons why the Highways England holding objections on the two Applicants' respective planning applications and site allocations should not be lifted.

# Appendix A: Meeting Minutes: Joint Meeting March 2021

# Appendix B: Committed Development Flow Matrices

# Appendix C: Proposed Development Flow Matrices

# Appendix D: LCC M2D2L Scheme Proposal Drawings

# Appendix E: Scenario General Arrangement Drawings

# Appendix F: TRANSYT Model: Scenario 1

# Appendix G: TRANSYT Model: Scenario 2

# Appendix H: TRANSYT Model: Scenario 2a

# Appendix I: TRANSYT Model: Scenario 3

# Appendix J: TRANSYT Model: Scenario 3a

# Appendix K: TRANSYT Model: Scenario 4

# Appendix L: TRANSYT Model: Scenario 4a

# Appendix M: TRANSYT Model: Scenario 4b

# Appendix N: TRANSYT Model: 2033 Sensitivity Testing

# Appendix O: Tingley Station J28 Pedestrian Scheme: Stage 1 Road Safety Audit