# Oxfordshire County Council

SCOTS Stage 1 Working Document

June 2007

## Halcrow Group Limited

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## Contents Amendment Record

This report has been issued and amended as follows:

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| 1 | 0 | Working Draft | Mar 07 | COB |
| 1 | 1 | Final Stage 1 Report | Jun 07 | COB |

# Contents

# 1 Introduction

*1.1* ***Purpose of report***

*1.1.1* The overall aim of this work is to deliver an improved transport network for the study area from the following key origins of Wantage and Grove (the subject of this first Phase of work, Didcot will be added during a later Phase). The key destinations are Oxford (as a regional hub), employment sites at Milton Park and Harwell IBC and Didcot (including the railway station).

*1.1.2* This phase of work has considered the whole journey, from origin to destination. The work has looked at the opportunities and constraints represented by the:

- origin;
- transport network characteristics encountered on the journey; and
- destination.

*1.2* ***Rational***

*1.2.1* The basic premise of the work undertaken is to investigate the impact of additional trips on the highway network for both car users and public transport passengers, establish any problems and assess and propose means of mitigating against any adverse impacts. The Strategy for the area has five key objectives, which are based on the LTP Shared Priorities of tackling congestion, delivering accessibility, safer roads, better air quality and improving the street environment. The following table sets out in more detail the context for these objectives for the SCOTS area.

**Table 1.1: Objectives for SCOTS**

| Objective | Interpretation for the SCOTS area |
|---|---|
| Tackling congestion | Where possible and appropriate, to relieve congestion 'hot spots' where they impact on overall accessibility and journey experience and /or where it encourages inappropriate re-routeing. Where there is limited option to effect all modes, particular emphasis will be given to improving journey time reliability for public transport. That is it will be important to address congestion issues where it impacts on the existing and medium/longer term strategy for public transport. |

| | |
|---|---|
| Delivering accessibility | To maintain effective and reliable transport links to key services and service centres through a balanced strategy of public transport and highway improvements. |
| Safer roads | Where the analysis of future trip making patterns indicates a potential safety concern, these will be highlighted as issues to be addressed through the strategy. |
| Better air quality | Where the analysis of future trip making patterns indicates a potential air quality concern, these will be highlighted and addressed through the strategy development. |
| Improving the street environment | Where the analysis for future trip making patterns indicates that the street environment is 'worsened' as a result of changes in traffic volumes and routeing this will be highlighted. |

*1.3* ***Context***

*1.3.1* This first Report focuses on the need to move people around the area, and provides an assessment for the morning peak hour. As development in the study area has and continues to increase, the road network has become more heavily used, particularly in the peak hours. This has been a result of the attractiveness of locations in the SCOTS area for living, and the growth in employment opportunities in Oxford and the major employment sites around Didcot. Also, during recent years, healthcare facilities have become increasingly focussed on Oxford, and there has been some centralisation of education facilities. Finally, Oxford has become a focal point of retail and leisure facilities in the County, a trend that will continue with the opening of the expanded Westgate centre.

*1.3.2* It is known that there are current highway capacity problems in the SCOTS area. These have been identified through the Didcot ITS and Wantage and Grove Strategic ITS studies. With additional development, congestion will get worse if nothing is done to address the capacity issues. However, when addressing capacity issues, there is little to gain from increasing the capacity on a short section of road. Hence, when adding new highway capacity, consideration will be given to not creating excess capacity that would be used and would lead to additional queues at other locations in the network.

*1.4* ***This Report has five main sections:***

- Public transport strategy;
- Highway issues;
- Appraisal of highway issues;
- Initial Scheme testing; and
- Next steps.

# 2 Public transport strategy

*2.1* ***Introduction***

*2.1.1* The chapter of the report consider the options to develop a public transport strategy for the western part of the SCOTS area. In doing so, reference has been made to existing commercial circumstances within which public transport services are operating.

*2.1.2* The starting point was to identify public transport route options and broad-brush costs associated with the provision of services linking the Grove and Wantage with Oxford and Didcot, with the principal employment centres at Harwell Chilton Campus and Milton Park, and having regard to the optimum route network designed to serve the existing village of Grove and the proposed development on the former airfield site. (This information is contained in Appendix 1)

*2.1.3* Discussions with County Council officers' at a meeting on 7 February 2007 enabled Halcrow to refine the route options (contained in this chapter) and associated costs associated with the provision of bus services in the SCOTS area. It was agreed that Halcrow should test a shortlist of scenarios for the short- to medium-term period up to 2016 and, separately, test potential options for the long-term period between 2016 and 2026.

*2.2* ***Methodology***

*2.2.1* The following methodology was adopted to provide an initial indication of the viability of different bus service options for providing bus services along the key corridors in the study area:

*2.2.2* Cross-reference was made to mapping and timetables to obtain and corroborate information on the existing bus network in the study area, service frequencies and journey times in the morning peak period (07.00-09.00), inter-peak and late evening (19.00-22.00) on weekdays, on Saturdays and on Sundays;

*2.2.3* Weekday patronage data for bus route sectors within the study area was sourced from ticketing records supplied by operators;

*2.2.4* Liaison took place with County Council's Bus Services Manager to obtain information on current levels of subsidy paid to operators to secure the operation of services in the study area;

*2.2.5* Alternative route options were defined for the Wantage-Oxford, Wantage-Didcot and Wantage-Grove axes, taking account of the existing road network and potential construction or reinstatement of highway links;

*2.2.6* Separate matrices were created for each axis, enabling comparison of each route option against the following key criteria:

- Route length;
- Estimated journey time;
- Speed;
- Total time en route including layover;
- Peak Vehicle Requirement;
- Indicative operating cost;
- Principal locations en route where delays are likely to occur;
- Perceived benefits of route option;
- Perceived disbenefits of route option and associated risks.

*2.2.7* The matrix table relating to the Wantage-Didcot axis was adapted to incorporate different scenarios for service frequency; and the analysis culminated in subjective assessment of each route option on each axis, drawing on the comparison against the key criteria and enabling generation of a summary table incorporating an overall rating for each option on each axis. The objective of this stage was to highlight options deemed to be unrealistic that could potentially be excluded from further consideration, in addition to options warranting detailed assessment.

*2.2.8* Cross-reference was made to census data to obtain an indication of the overall pattern of movement across the study area for work-related purposes and the proportion of people travelling by public transport. It was not considered appropriate to carry out detailed demand forecasting, given low bus patronage levels in the study area at present, from which realistic extrapolation of future patronage - for a network that may benefit from significant service frequency and quality enhancements - cannot be obtained. The ability to carry out detailed demand forecasting was also constrained by the limited timescale available.

*2.3* ***Options considered***

*2.3.1* The results of the initial analysis are contained in Appendix 1 and were discussed with client officers. The meeting culminated in agreement on a shortlist of options deemed realistic for implementation in the period up to 2016 and in the longer-term period from 2016-2026 that warranted further analysis. This analysis of options is detailed in the following sections.

*2.4* ***Preferred option for routeing Wantage/Grove to Oxford to 2016***

*2.4.1* Option (1) would encompass four journeys per hour in the core period 07.00-19.00 operating from Wantage via A338, Mably Way, the new Grove (Grovelands) district centre, Denchworth Road, Oxford Lane (where there would be the potential to develop a high-quality on-street 'bus port' to serve the established settlement), A338 and A420, complemented by an hourly-frequency service broadly following route option B, operating from Wantage via Belmont, Denchworth Road, Cane Lane, Brereton Drive, Oxford Lane, A338, East Hanney, A415 and Abingdon. High-quality facilities could be developed at Mably Way, opposite and adjacent to the Health Centre and at Wantage Market Place, to improve conditions for intending customers and make it more conducive to interchange between services.

*2.4.2* The deviation to serve the new development would see the route length in a single direction increase to 26.7 kilometres. Delays en route would still be experienced at Frilford Lights. In Oxford, delays would still be encountered on Botley Road and Frideswide Square, although these could potentially be offset by traffic management measures implemented as part of the Oxford West End initiative. Services would operate over this core corridor at 15-minute frequency in the core operating period 07.00-19.00 on weekdays and Saturdays, in line with the Premium Route concept. A 30-minute frequency service would operate between 06.00 and 07.00 and between 19.00 and 22.00 on weekdays, 19.00-22.00 on Saturdays and 07.00-21.00 on Sundays.

*2.4.3* Services on the core corridor would be complemented by an hourly service following the existing service 32/33 route between 07.00-19.00 on Mondays through Saturdays connecting Wantage town centre with the residential district of Belmont west of Wantage town centre, the proposed and established settlements at Grove, the villages of East Hanney and Marcham, employment and education opportunities in Abingdon and extending to Oxford. There would be interchange opportunities between the two routes at Wantage Market Place, Grove Green and on A338 between Grove and Frilford.

*2.4.4* Allowing for a deviation of an assumed 6 minutes to serve the proposed new development and assuming no additional priority measures, the single journey time on the core corridor inbound to Oxford in the morning peak is estimated to be around 53 minutes. Given the lower incidence of congestion in the outbound direction, the round trip journey time is estimated to be 98 minutes. With a 10-minute layover allowance in each hour of operation, the Peak Vehicle Requirement (PVR) for the Premium Route has been calculated to be 7 vehicles. This is comparable with the current PVR.

*2.4.5* The comparative inbound single journey time for the hourly service via Abingdon could be reduced from the current time of 71 minutes in the morning peak to an average of 60 minutes, subject to the implementation of priority measures on A415 on the western approach to and through, Abingdon town centre. Total time en route for a round trip including 10 minutes' layover is calculated to be 125 minutes, resulting in a PVR of 2 vehicles.

*2.4.6* The total vehicle hours for Option (1), encompassing services on the core corridor and complementary route via Abingdon, would be around 35,200 per annum. Indicative operating costs per annum are calculated to be £1.41 million. Assuming an average single fare for the route of £3.50, reflecting the customer benefits accruing from upgrading of the corridor, an average of 1,211 trips would be required each weekday to achieve a break-even.

*2.4.7* Option (2) would be as Option 1 but with three journeys per hour in the core period 07.00-19.00 as opposed to the four services per hour envisaged under Option (1). These journeys would be augmented by an hourly service via Abingdon, meaning that four journeys would operate each hour between Wantage/Grove and Oxford, albeit not all via the same route.

*2.4.8* The reduction in frequency on the principal corridor to 20 minutes during the core operating period of 07.00-19.00 would see an attendant reduction in the total vehicle hours to 29,100 per annum, compared with 35,200 under Option (1). Operating costs are estimated to be £1.16 million, requiring an average of 983 trips to be made each weekday at an average fare of £3.50 to achieve break-even.

*2.4.9* It is concluded that Option (2) represents the optimum operational scenario for the period up to 2016 because of:

- the comparatively lower operating costs of £1.16 million as opposed to £1.41 million;
- fewer trips required each weekday to achieve break-even;
- the fact that the Option would still enable the operation of four services per hour between Wantage/Grove and Oxford;
- the scope to retain an hourly service not only linking Wantage and Grove with Abingdon but also serving the residential area of Belmont in Wantage and Brereton Drive in Grove; and
- the interchange opportunities available en route.

*2.5* ***Preferred option for routeing Wantage/Grove to Oxford to 2026***

*2.5.1* Option (1) in this time period to 2026 envisages the principal route continuing to operate from Wantage via Mably Way, the new Grove district centre, Denchworth Road and Oxford Lane eastbound, before deviating from A338 to utilise a proposed new alignment constructed north of the Great Western Main Line between A338 and Steventon village. The alignment would replace the existing Hanney/Steventon Road in the event of it being submerged by the Upper Thames Reservoir. The route would then follow B4017 northbound before joining A34 via the reinstated Drayton Slips – intended for bus-only use - and following A423 and Abingdon Road between Hinksey Hill and central Oxford.

*2.5.2* Route length and journey times would be contingent upon the nature of the new alignment between A338 and Steventon; this could either be a direct replacement for the existing secondary road or be constructed specifically as a strategic link between A338 and the Didcot area. For modelling purposes, the new alignment is envisaged as fulfilling a strategic role and being open to general traffic. Additional priority measures would be provided at Hinksey Hill and on the Abingdon Road corridor into the city centre as part of the Access to Oxford initiative, with traffic management measures also being implemented to reduce journey times on A34.

*2.5.3* In the inbound direction, the route would be 29.7 kilometres long, compared to 26.7km for the principal route if operated via A338, A420, Cumnor and Botley. However, the route revision, if coupled with bus priority measures on A34 entry and exit slips and traffic management measures on this trunk route would address delays that could remain at Frilford, on Botley Road and Frideswide Square.

*2.5.4* As in Option (1) for year 2016, services would operate over the principal route corridor at 15-minute frequency in the core operating period 07.00-19.00 on weekdays and Saturdays. A 30-minute frequency service would operate between

06.00 and 07.00 and between 19.00 and 22.00 on weekdays, 19.00-22.00 on Saturdays and 07.00-21.00 on Sundays.

*2.5.5* Again, services on the core corridor would be complemented by an hourly service between 07.00-19.00 on Mondays through Saturdays connecting Wantage with Oxford via East Hanney, Marcham and Abingdon. The precise route for this lower-frequency link would be as described above, with interchange opportunities in Wantage town centre and at The Green in Grove.

*2.5.6* The single journey time on the core corridor inbound to Oxford in the morning peak is estimated to be 47 minutes, compared with 53 minutes under Option 1 for the period to 2016. The round trip journey time is estimated to be 89 minutes. Again with a 15-minute frequency service and allowing for a 10-minute layover period, the PVR for the principal corridor during the core operating hours remains 7 vehicles. However in order to operate a 30-minute frequency service outside the core period, the PVR has been calculated to be 3 vehicles.

*2.5.7* For modelling purposes, the morning peak period single journey time on the complementary, hourly frequency service via East Hanney, Marcham and Abingdon has been kept at the 60 minutes envisaged under the 2016 scenarios. The round trip journey time including 10 minutes' layover would be 125 minutes and the PVR would remain 2 vehicles.

*2.5.8* The total vehicle hours for Option (1), encompassing services on the principal corridor and on the complementary route via Abingdon, would be 33,300 per annum. Indicative operating costs per annum, allowing for an increase over the ten year period from 2016 to 2026 in operational costs from £40 to £50 per hour of operation, are calculated to be £1.67 million. Assuming an average single fare for the route of £3.50, reflecting the customer benefits accruing from upgrading of the corridor, an average of 1,457 trips would be required each weekday to achieve break-even.

*2.5.9* Option (2) in this time period to 2026 envisages construction of the proposed new alignment replacing the submerged Hanney/Steventon Road south of the Great Western Main Line, as opposed to north of the railway under Option (1). From Wantage town centre, services would operate via A338, Mably Way, the proposed new district centre, Denchworth Road and Oxford Lane through the existing Grove village, before deviating from A338 onto the new alignment in the vicinity of the Williams F1 factory.

*2.5.10* At its eastern end, the new alignment would ascend to join A4130 at Milton Hill. Premium Route services from Wantage and Grove would continue east on A4130 to join the northbound A34 at Milton Interchange. Space exists to provide an eastbound bus lane on A4130 between the B4017 junction and Milton Interchange; it is suggested that the A4130/B4017 junction could be reconfigured to provide bus priority and pre-signals could be provided on the approach to Milton Interchange.

*2.5.11* As with Option (1), services to Oxford would operate via A34 exiting via the proposed bus lane at Hinksey Hill Interchange and benefiting from priority measures on Abingdon Road northbound into Oxford city centre.

*2.5.12* At 31.6km the route would be longer that envisaged under Option (1). Again, journey times would be contingent upon the nature of the new alignment – whether it would be designated as a strategic link or retained as a secondary road. For consistency with Option (1), the new alignment is assumed to fulfil a strategic role and be available for use by general traffic. With priority measures being provided on the western approach to Milton Interchange, at Hinksey Hill and on the Abingdon Road corridor into Oxford, coupled with traffic management measures on A34 – and potentially a nationwide congestion charging strategy - the morning peak single journey time is estimated at 50 minutes.

*2.5.13* The operating hours would be consistent with Option (1) i.e. a 15-minute frequency service over the principal route corridor between 07.00 and 19.00 on weekdays and Saturdays, augmented by a 30-minute frequency service in the periods 06.00-07.00 and 19.00-22.00 on weekdays, 19.00-22.00 on Saturdays and 07.00-21.00 on Sundays. The services on the core corridor would continue to be bolstered by an hourly service between 07.00-19.00 on Mondays through Saturdays connecting Wantage with Oxford via East Hanney, Marcham and Abingdon and affording interchange opportunities with services on the principal route corridor in Wantage town centre and at The Green in Grove.

*2.5.14* The estimated round-trip journey time of 95 minutes on the principal corridor is higher than the 89 minutes envisaged under Option (1) and with a 15-minute frequency service during the core operating hours, the PVR remains 7 vehicles, declining to 3 vehicles outside this core period. Total time en route and PVR for the complementary route linking Wantage and Grove with Abingdon are the same as for Option (1), at 125 minutes allowing for 10 minutes' layover, with PVR of 2 vehicles.

*2.5.15* The total vehicle hours for Option (2), encompassing services on the principal corridor and on the complementary route via Abingdon, would be 35,200 per annum. Indicative operating costs per annum, again allowing for an increase in operational costs from £40 in 2016 to £50 per hour of operation in 2026, are calculated to be £1.76 million, almost £100,000 higher than for Option (1). Assuming an average single fare for the route of £3.50, reflecting the customer benefits accruing from upgrading of the corridor, an average of 1,514 trips would be required each weekday to achieve break-even.

*2.5.16* It is concluded that Option (1) represents the optimum operational scenario for the period up to 2026 because of:

- the slightly lower operating costs of £1.67 million as opposed to £1.76 million;
- an average of 1,457 trips being required each weekday to achieve break-even;
- the fact that the Option would still enable the operation of four services per hour between Wantage/Grove and Oxford;
- the scope to retain an hourly service not only linking Wantage and Grove with Abingdon but also serving the residential area of Belmont in Wantage and Brereton Drive in Grove; and
- the interchange opportunities available en route.

*2.6* ***Preferred option for routeing Wantage/Grove to Didcot to 2016***

*2.6.1* Option (1) would witness adaptation of the existing secondary 'Interlink' Route to operate from Wantage via A338 and Mably Way westbound, before serving the proposed new district centre. It would rejoin the established route on Denchworth Road, before returning to Wantage via Mayfield Avenue, Main Street and A338. Interchange with the Wantage-Oxford Premium Route and with the hourly frequency service via Abingdon could be made easier by the development of high-quality interchanges in Wantage Market Place and at the confluence of Oxford Lane and Main Street in Grove village. Interchange with Premium Route services to Oxford could also be affected at stops on the common sector of route between Wantage Market Place and Oxford Lane/Main Street.

*2.6.2* In line with Option B3 considered in the initial phase of this work (see Appendix 1), the route would extend eastwards from Wantage via A417, Rowstock Roundabout and A4130 to connect Wantage and Grove with the employment centre at Milton Park, continuing from Milton Park via B4493 North Road to the

rail interchange at Didcot Parkway Station and the Orchard Centre. The route length in a single direction would be 25 kilometres.

*2.6.3* Delays would still be experienced en route in Wantage town centre, on the approaches to Rowstock roundabout and at Milton Interchange, pending any future signalisation and provision of bus priority measures.

*2.6.4* Concept 1 for this scenario envisages services operating over this core corridor at 60-minute frequency in the core operating period 07.00-22.00 on weekdays and Saturdays, tallying with the Council's adopted 'Interlink' concept for secondary routes.

*2.6.5* Services on the core corridor would be complemented by a peak-period only variation linking Wantage and Grove with Harwell Chilton Campus at hourly frequency between 0600 and 0800 on Mondays through Fridays, with equivalent westbound journeys between 0630 and 0900 also designed to provide a service for students travelling to school and college in Wantage. Return journeys would also be provided in the evening peak between Harwell Chilton Campus and Grove from 1600 to 1900 on Mondays through Fridays.

*2.6.6* In the event that additional peak period bus services are provided to link Didcot town centre with Harwell Chilton Campus in conjunction with the Great Western Park residential development, it would also be possible to promote interchange between the core Wantage-Milton Park-Didcot corridor and the Didcot-Great Western Park-Harwell Chilton Campus route in the vicinity of Rowstock Roundabout. This would further increase the public transport options available to those wishing to travel between Grove, Wantage and the Campus. Ideally a clearly demarcated, suitably configured facility would be developed on the roundabout to permit interchange between services with a minimum of walking and waiting time.

*2.6.7* Scope has also been discerned to provide a socially-necessary service at 2-hourly frequency, using one of the two buses used to operate the main Wantage/Grove-Didcot corridor, that will connect the villages south of A417 with Wantage and Didcot, augmenting the more direct journeys following the core corridor.

*2.6.8* The single journey time on the core corridor from Wantage via Grove and Milton Park to Didcot in the morning peak is estimated to be 40 minutes. With a 14-minute layover allowance in each hour of operation and allowing for the

complementary peak-period and lower frequency village link services, the Peak Vehicle Requirement is calculated to be 2 vehicles.

*2.6.9* The total vehicle hours for Option (1), on the basis of Concept 1 with a 60-minute frequency service on the core corridor via A417, complementary peak-period services to Harwell Chilton Campus and 2-hourly village-link services, would be 133 per annum. Indicative operating costs per annum are calculated to be £533,500. Assuming an average single fare for the route of £3.50, an average of 514 trips would be required each weekday, including 366 on the core corridor, to achieve break-even.

*2.6.10* Concept 2 devised for Option (1) envisages enhancement of the core corridor to provide a 30-minute frequency service linking Wantage with Didcot via Grove, A417, Milton Interchange and Milton Park between 0700 and 1900 on Mondays through Saturdays. The increased frequency would contribute to making the bus a more attractive mode for Wantage and Grove residents travelling to work at Milton Park, in Didcot and to more distant destinations via Didcot Parkway. Again, a peak-period variation to Harwell Chilton Campus and a 2-hourly frequency village-link variation would operate. Between 1900 and 2200 on Mondays through Saturdays, the frequency would reduce to 60 minutes. An hourly frequency service connecting Wantage and Grove with Great Western Main Line rail services at Didcot Parkway would also operate on Sundays between 0700 and 2100.

*2.6.11* The total vehicle hours for Option (1), Concept 2, with an enhanced 30-minute frequency service on the core corridor via A417, would be 22,194 per annum. The Peak Vehicle Requirement would rise to 4 buses. Indicative operating costs per annum are calculated to be £887,760. On the basis of an average single fare of £3.50, an average of 789 trips would be required each weekday to achieve break-even.

*2.6.12* The routing envisaged for the core Wantage/Grove-Didcot services under Option (2) is similar to that for Option (1), albeit with re-routing via Featherbed Lane between East Hendred and Milton Hill to avoid delays at Rowstock Roundabout. This is in line with route option B4) considered in the phase 1 work. Consideration would have to be given to reconstruction of sections of Featherbed Lane as this road, which incorporates a significant S-bend, is not currently suitable for regular bus operations and poses a safety hazard. The cost implications of this would be significant.

*2.6.13* Core Wantage/Grove-Didcot services would again be augmented by hourly-frequency services in the peak period on Mondays through Fridays linking Wantage and Grove with Harwell Chilton Campus. An off-peak, 2-hourly frequency service would continue to connect Ardington, East and West Hendred with Wantage and Didcot.

*2.6.14* Concept 1 for Option (2) would see the core Wantage/Grove-Didcot services via A417 and Featherbed Lane operating hourly Monday-Saturday between 0700 and 2200. Allowing for the complementary, lower-frequency Harwell connection and village link services, the Peak Vehicle Requirement (2 buses), total vehicle hours (13,338) and estimated operating costs of £533,520 would be the same as for Concept 1 under Option (1). An average of 514 trips would need to be made each weekday at an average fare of £3.50 to achieve break-even.

*2.6.15* Concept 2 for Option (2) would involve enhancement of the core Wantage/Grove-Didcot service to operate at 30-minute frequency Monday-Saturday between 0700 and 1900, at 60-minute frequency between 1900 and 2200 on Mondays through Saturdays and at 60-minute frequency between 0700 and 2100 on Sundays, affording a 7-day service over the west-east axis to and from the railhead at Didcot Parkway.

*2.6.16* Allowing for the complementary, lower-frequency Harwell connection and village link services, the Peak Vehicle Requirement (4 buses), total vehicle hours (22,320) and estimated operating costs of £887,760 would be the same as for Concept 2 under Option (1). An average of 789 trips would need to be made each weekday at an average fare of £3.50 to achieve break-even.

*2.6.17* It is concluded that Concept 1 under Option (1) represents the optimum operational scenario for the period up to 2016 because of:

- the fact that the Wantage/Grove-Didcot axis is identified in the County Council's adopted Bus Strategy as a secondary 'Interlink' route warranting a 60-minute frequency service;
- comparatively lower operating costs of £533,520 for a 60-minute frequency core service as opposed to £887,760 for a 30-minute frequency core service;
- comparatively fewer trips – 514 - required each weekday to achieve break-even;

- the scope to reduce journey times between Wantage/Grove, Milton Park and Didcot – particularly if additional bus priority measures were to be implemented at Rowstock Roundabout, at the A4130/B4017 Steventon junction and on the approach to Milton Interchange - thereby making bus a more attractive mode option;
- the scope to provide complementary peak-period services to and from Harwell Chilton Campus and a two-hourly village-link service using existing resources; and
- the interchange opportunities available at the western end of the route between the Wantage/Grove-Didcot and Wantage/Grove-Oxford/Abingdon corridors and – subject to the introduction of additional Didcot-Harwell services, funded through the Great Western Park development – at Rowstock Roundabout.

*2.7* ***Preferred option for routeing Wantage/Grove to Didcot to 2026***

*2.7.1* Considering the time period from 2016 to 2026, Option (1) is derived from route option D that was identified in the first phase of this study. The route at the western end of the corridor would be adapted with buses operating from Wantage via Mably Way, the new Grove district centre, Denchworth Road and Oxford Lane eastbound. Rather than returning from Grove to Wantage and using A417, as envisaged under the shorter-term scenarios, buses would travel north from Grove on A338 before deviating to use the proposed new alignment paralleling the Great Western Main Line between A338 and Steventon village. The route would then follow B4017 south, A4130 and Milton Road east to serve Milton Park, Didcot Parkway station and Didcot town centre. A significant proportion of the route, between Wantage and Steventon, could be shared with Wantage-Oxford services assuming adoption of Option (1) for this axis, as outlined above.

*2.7.2* As stated previously, the exact route length and journey times would be contingent upon the nature of the new alignment between A338 and Steventon; this could either be a direct replacement for the existing secondary road or be constructed specifically as a strategic link between A338 and the Didcot area. For modelling purposes, the new alignment is envisaged as fulfilling a strategic role and being open to general traffic. Additional priority measures would be provided at the B4017/A4130 Steventon junction and on the approaches to Milton Interchange.

*2.7.3* In the inbound direction from Wantage via Grove and Milton Park to Didcot, the route would be only 18.9 kilometres in length, compared to 29.3km for the current, sinuous route via the villages south of A417. Providing that the new

alignment was created in conjunction with proposed construction of the Upper Thames Reservoir, adoption of this route for Wantage/Grove-Didcot services as well as Wantage-Oxford services could lead to significant reductions in end-to-end journey times at relatively low cost.

*2.7.4* Assuming the continued designation of the Wantage-Didcot axis as a secondary Interlink route, Option (1) would see services would operate over the core corridor at 60-minute frequency between 07.00 and 22.00 on weekdays and Saturdays. A relict peak-period service between Grove, Wantage and Harwell Chilton Campus via A417 and Rowstock Roundabout would be retained, together with a two-hourly village link service as envisaged in the pre-2016 scenarios.

*2.7.5* The single journey time on the core corridor inbound to Didcot in the morning peak post-2016 is estimated to be 35 minutes, compared with 40 minutes under Option 1 for the period to 2016. The round trip journey time is estimated to be 70 minutes. With a 60-minute frequency service and allowing for a 14-minute layover period, the PVR for the core corridor is 2 vehicles.

*2.7.6* The total vehicle hours for Option (1), encompassing services on the core corridor and on the complementary lower-frequency variations via A417 to serve Harwell and the outlying villages, would be 13,680 per annum. Indicative operating costs per annum, allowing for an increase over the ten year period from 2016 to 2026 in operational costs from £40 to £50 per hour of operation, are calculated to be £684,000. Assuming an average single fare for the route of £3.50, an average of 600 trips would be required each weekday, with the majority (400) being made on the core corridor, to achieve break-even.

*2.7.7* Option (2) envisages construction of the proposed new alignment replacing the submerged Hanney/Steventon Road south of the Great Western Main Line, as opposed to north of the railway under Option (1). This would be in accordance with Option E) tested in Stage 1 of this study. From Wantage town centre, services would operate via A338, Mably Way, the proposed new district centre, Denchworth Road and Oxford Lane through the existing Grove village, before deviating from A338 onto the new alignment in the vicinity of the Williams F1 factory.

*2.7.8* At its eastern end, the new alignment would ascend to join A4130 at Milton Hill. Core services from Wantage and Grove would continue east on A4130 through Milton Interchange, ideally benefiting from priority measures on approach to this

identified congestion hotspot. Such measures could also benefit Wantage-Oxford services if these were also routed via Milton Interchange before joining A34 northbound, as detailed above.

*2.7.9* At an estimated 18.4km the core corridor would be significantly shorter than the route currently followed and marginally shorter than that for Option 1. Again, journey times would be contingent upon the nature of the new alignment – whether it would be designated as a strategic link or retained as a secondary road. For consistency with Option (1), the new alignment is assumed to fulfil a strategic role and be available for use by general traffic. With priority measures being provided on the western approach to Milton Interchange, the morning peak single journey time from Wantage to Didcot Parkway is estimated at 32 minutes.

*2.7.10* The operating hours would be consistent with Option (1) i.e. a 60-minute frequency service over the core Interlink route corridor between 07.00 and 22.00 on weekdays and Saturdays, augmented by a 60-minute frequency between 07.00-21.00 on Sundays. The services on the core corridor would continue to be bolstered by a peak period service via A417 and Rowstock Roundabout to Harwell Chilton Campus and a two-hourly village-link service connecting Ardington and the Hendreds with Wantage and Didcot.

*2.7.11* The estimated round-trip journey time of 64 minutes on the core corridor is lower than the 70 minutes envisaged under Option (1). The PVR remains as 2 vehicles.

*2.7.12* The total vehicle hours for Option (2), comprising services on the core corridor augmented by peak period Harwell connections and off-peak village link variations, would be the same as for Option (1), at 13,680 per annum. Indicative operating costs per annum, again allowing for an increase in operational costs from £40 in 2016 to £50 per hour of operation in 2026, are the same as for Option (1) at £684,000, requiring an average of 586 trips to be made each weekday, with the majority (400) being made on the core corridor, to achieve break-even.

*2.7.13* It is concluded that it is feasible to consider either Option (1) or Option (2) for the longer term period 2016-2026, for journeys over the east-west axis to and from Wantage and Grove. This is because of:

- the comparable operating costs of £684,000 per annum for each Option, on the basis of a 60-minute frequency over the core corridor;

- a comparable average of 586 trips being required each weekday to achieve break-even;
- the scope to retain a complementary peak-period service to Harwell Chilton Campus, coupled with a low-frequency off-peak village link / school service for Ardington and the Hendreds; and
- the scope to realise synergies by operating both the Wantage/Grove-Oxford and Wantage/Grove-Didcot services over the new alignment.

*2.7.14* It should be emphasised that both options are contingent upon construction of the new road alignment in lieu of the existing Hanney/Steventon Road to an appropriate standard to enable it to provide a strategic east-west link. The reliance upon construction of the reservoir and attendant new road alignment, which may not happen in a comparable timescale, represents a significant risk to implementation of this scenario. On the basis that it is proposed to construct the reservoir to the north of the Great Western Main Line, that the existing Hanney/Steventon Road also runs north of the railway and that land ownership issues are likely to prove more difficult to address, it is suggested that an alignment north of the railway, in line with Option (1), may be more realistic.

# 3 Highway network

*3.1* ***Introduction***

*3.1.1* The transport implications associated with future housing growth have been assessed through the use of the Didcot-Wantage SATURN Model, reporting on the am peak hour model analysis. This chapter of the report notes the assumptions made and then the results of the 2005, 2016 and 2026 model year analysis. The 2016 and 2026 model assessments have been undertaken without and with the proposed housing development at Grove.

*3.2* ***Model assumptions***

*3.2.1* For the purpose of this work the 'base year', our starting point for the modelling work is the 2016 future year scenario, developed as part of the original model. This 2016 'base year' model is as the existing situation at 2005, with additional housing growth, employment growth, and highway development as detailed in Table 3.1 and as previously agreed with the County Council. Tests are also undertaken at 2026 to assess the impact of further development at Wantage/Grove and at Didcot and Table 3.1 details the assumptions agreed with the County Council for the 2026 base year.

**Table 3.1: Assumptions in the 2016and 2026 Base SATURN Networks**

| | **Highway Infrastructure Implemented** | **Development** | **Employment** |
|---|---|---|---|
| **2011** | Milton Interchange Improvements<br>Rowstock Roundabout Improvements<br>Power Station Roundabout Improvements<br>Manor Bridge Roundabout Improvements<br>A4130 / B4016 Junction Improvements | Ladygrove East 670 houses<br>Great Western Park 1600 houses<br>Grove Airfield 500 houses | Increases by 28,096 jobs across Oxfordshire<br>4484 job increase in Vale of White Horse<br>4422 job increase in South Oxfordshire |

| | | | |
|---|---|---|---|
| | Didcot Northern Perimeter Road Stage 3 (NPR3) | | |
| **2016** | As 2011 with:<br>Link Road north of Grove to join A338 south of Bellingers Garage | As above and…<br>Great Western Park 1700 houses<br>Grove Airfield<br>1000 houses | Increases by 14,956 jobs across Oxfordshire<br>5980 job increase in Vale of White Horse<br>4112 job increase in South Oxfordshire |
| **2026** | Enlarged Rowstock traffic signals<br>Harwell Bypass and northern extension (as part of Site 5 development) | 4000 Didcot South East Plan allocations split 2000 at site 5 and 2000 at site 7<br>Full Grove Airfield (2500) and 900 South East Plan | Increases by 8144 jobs across Oxfordshire<br>1992 job increase in Vale of White Horse<br>3206 job increase in South Oxfordshire |

*3.3* ***Analysis undertaken***

*3.3.1* Table 3.2 presents the SATURN tests that have been undertaken to understand the routeing and performance of the local and strategic transport network between 2016 and 2026.

**Table 3.2: Assumptions in the 2016and 2026 Base SATURN Networks**

| **Tests at 2016** |
|---|
| 2016 without Development at Grove |
| 2016 with phase 1 development at Grove with proposed Northern Link Road (referred to as the 'Base year 2016' for all other tests at 2016) – see Table2.1 |
| Base year 2016 without proposed Northern Link Road |
| Base Year 2016 and eastern Wantage relief road |
| Base Year 2016 and western Wantage relief road |
| Base Year 2016 and full Wantage relief road |
| Base Year 2016 and full Wantage relief road and closure of Market Square |
| Base Year 2016 and eastern Wantage relief road and restraint to Charlton Village Road |
| |

| **Tests at 2026** |
|---|
| Base Year 2026 (as per Table 2.2) BUT without Grove development |
| Base Year 2026 (as per Table 2.2) |
| Base Year 2026 BUT without Northern Link Road |
| Base Year 2026 with eastern Wantage relief road |
| Base Year 2026 with eastern Wantage relief road and restraint to Charlton Village Road. |
| Base Year 2026 with western Wantage relief road |
| Base Year 2026 with full Wantage relief road |
| Base Year 2026 and full Wantage relief road and closure of Market Square |
| |
| **Tests with potential Steventon Link** |
| Base Year 2026 with 'rural link (50kph)' to north of railway |
| Base Year 2026 with 'strategic link (80kph)' to north of railway |
| Base Year 2026 with 'rural link (50kph)' to south of railway |
| Base Year 2026 with 'strategic link (80kph)' to south of railway |
| Base Year 2026 with 'rural link (50kph)' to north of railway without Northern Link Road |
| Base Year 2026 with 'strategic link (80kph)' to north of railway without Northern Link Road |
| Base Year 2026 with 'rural link (50kph)' to south of railway without Northern Link Road |
| Base Year 2026 with 'strategic link (80kph)' to south of railway without Northern Link Road |

*3.3.2* A series of east-west and north-south screenlines has been established as a means of ensuring all changes in traffic flows across the area of study are included in the analysis. This will ensure that all changes to routeing patterns are picked up and understood. The screenlines are presented on Figure 3.1 and Table 3.3 provides a list of all the locations highlighted on the Plan for which traffic flow data is being extracted for analysis.

**Table 3.3: List of locations analysed for each of the network tests**

| Screenline reference | Location |
|---|---|
| A1 | A415 east of Marcham Interchange |
| A2 | B4107 East of A34 |
| A3 | Milton Park arm at Milton Interchange |
| A4 | A4130 East of Milton Interchange |

| | |
|---|---|
| A5 | B4493 East of Harwell |
| A6 | A417 east of A34 |
| A7 | Chilton Road |
| B1 | A415 west of Marcham |
| B2 | Steventon Road |
| B3 | Steventon Road (north alignment) |
| B4 | Grove Park Drive (E-W) |
| B5 | Steventon Road (south alignment) |
| B6 | Eastern relief road |
| B7 | Charlton village road |
| B8 | Wallingford street A417 |
| B9 | Ormond Road B4507 |
| C1 | A415 west of Frilford junction |
| C2 | Mill Orchard, East Hanney |
| C3 | Northern Link Road, Grove |
| C4 | Oxford Lane, Grove |
| C5 | Main Street, Grove |
| C6 | Mably Way |
| C7 | Mill Street |
| C8 | B4507 Portway |
| D1 | Western Relief Road (E-W) |
| D2 | Challow Road (A417) |
| D3 | Ickleton Road (B4507) |
| D4 | Court Hill Road, Letcombe Regis |
| E1 | Western Relief Road (N-S) |
| E2 | Denchworth Road (N-S) |
| E3 | Grove Street, A338 |
| E4 | Eastern Relief Road |
| E5 | Grove Park Drive (N-S) |
| F1 | Western Relief Road (N-S) |
| F2 | Winchester Way |
| F3 | Denchworth Road (N-S) |
| F4 | Seeson Way |

| | |
|---|---|
| F5 | Garston Lane |
| F6 | Charlton Village Road |
| F8 | Grove Park Drive |
| F9 | Featherbed Lane |
| F10 | A4130 North of Rowstock |
| F11 | Wantage Road, Harwell, B4493 |
| F12 | A34 between Milton and Chilton |
| F13 | Harwell Bypass |
| F14 | Main Street, West Hagbourne |
| F15 | B4016, Bessels Way |
| F16 | Spring Lane |
| F17 | Chalk Hill |
| F18 | Westfield Way |
| F19 | Halfpenny Lane |
| FR | All arms (Frilford junction) |
| RW | All arms Rowstock junction |
| SV1 | Hanney Road, Steventon |
| SV2 | B4017 High Street, Steventon |
| SV3 | B4017 Abingdon Road, Steventon |
| CL | Chilton Slips – all movements |

*3.4* ***Model results***

*3.4.1* The model results are presented as a series of screenlines. For each screenline, the following data is presented:

- 2005 Base Year;
- 2016 without the proposed development at Grove;
- 2016 with the proposed development at Grove;
- 2026 without the proposed development at Grove but with development at Didcot; and
- 2026 with the proposed development at Grove and with development at Didcot.

*3.4.2* The tables show two way 'demand' flows. As the Didcot, Wantage and Grove model is a strategic model, and for the purpose of the assessment of major housing

sites and their overall impact, the demand flows show how much traffic is demanding to travel within the modelled hour. However, as SATURN is a congested assignment model, it also produces 'actual' flows. These 'actual' flows show, for each link in the network, the actual flow on that part of the network taking account of traffic that has been caught (delayed) 'up-stream'. That is, the model predicts that within the modelled hour, all the traffic demanding to pass through a junction will not be able to and hence some of the traffic does not make it to its destination. In reality, this traffic would travel at either side of the peak – hence the concept of peak spreading.

*3.5* ***Screenline A***

*3.5.1* The results for Screenline A are shown on Table 3.4.

**Table 3.4: Screenline A – A34 East (two way 'demand' flows)**

| Location | 2005 | 2016 | 2016D | 2026 | 2026D |
|---|---|---|---|---|---|
| **A415 east of Marcham Interchange** | 2610 | 2810 | 2850 | 2850 | 2900 |
| **B4107 East of A34** | 1030 | 1500 | 1550 | 1990 | 2160 |
| **Milton Park arm at Milton Interchange** | 1870 | 2490 | 2500 | 2870 | 2890 |
| **A4130 East of Milton Interchange** | 2080 | 2690 | 2670 | 3110 | 3130 |
| **B4493 East of Harwell** | 740 | 800 | 810 | 910 | 930 |
| **A417 east of A34** | 420 | 620 | 620 | 750 | 760 |
| **Chilton Road** | 560 | 1120 | 1130 | 1370 | 1370 |

*3.5.2* Table 3.4 shows that even to the east of the A34(T) there is an impact on the local road network caused by the proposed development at Grove. This raises a number of issues. It is accepted that where additional traffic has been shown on links it may not be traffic directly arising form the Grove development site. It could be knock on effects of junctions reaching capacity and squeezing other traffic on to other routes. That having been said, it is also important to note that all trips have an origin and a destination, and thus increases in trips shown for the 'D – with development' analysis are more a reflection of trips 'enroute' or nearing their destination, such as Didcot, Milton Park and trips from the Grove development taking capacity at Rowstock junction (which is signalised in 2016 and 2026).

*3.5.3* Though still relatively modest, the increase in trips on the B4017 shows that the remainder of the strategic road network in this area, including Harwell Bypass, is reaching capacity and without measures in Harwell (which there would most likely be) this route starts to become attractive again. Consideration of the 'actual' flows shows that the two Milton Interchange junction arms that cross this screenline are shown to have trips held up elsewhere in the network. Issues surrounding the current and future potential capacity of Milton Interchange are well documented and whilst the Harwell Bypass and other associated schemes go someway to addressing some of these issues, they do not provide alternative access/egress arrangements for the A34(T).

*3.6* ***Screenline B***

*3.6.1* The results for Screenline B are shown in Table 3.5.

**Table 3.5: Screenline B - A338 East (two way 'demand' flows)**

| Location | 2005 | 2016 | 2016D | 2026 | 2026D |
|---|---|---|---|---|---|
| **A415 west of Marcham** | 1790 | 1960 | 2080 | 2140 | 2280 |
| **Steventon Road** | 480 | 590 | 660 | 780 | 920 |
| **Grove Park Drive (E-W)** | 110 | 210 | 190 | 240 | 360 |
| **Charlton Village Road** | 400 | 450 | 560 | 620 | 760 |
| **Wallingford Street A417** | 1210 | 1380 | 1420 | 1390 | 1400 |
| **Ormond Road B4507** | 620 | 720 | 730 | 780 | 820 |

*3.6.2* Table 3.5 shows variations of traffic flow immediately to the east of the A338. The data shows a 6% increase on the A415 and a 17% increase in 2016 and a 12% increase in 2026 on Steventon Road. Steventon Road is thus becoming more popular as more strategic routes, such as the A415 and A417 become more congested.

*3.6.3* Grove Park Drive shows a small reduction in traffic as a result of the introduction of traffic from the proposed Grove development in 2016, but shows a 50% increase in 2026. This finding demonstrates clearly the increasing use of less appropriate roads as the main routes become more congested.

*3.6.4* Charlton Village Road also shows an increase in traffic volumes, 25% in 2016 and 23% in 2026. Whilst, geometrically, this route has the capacity to take additional

traffic, it is noted that some modest traffic calming has already been put on this route, outside a school, and it passes through a predominantly residential area.

*3.6.5* Wallingford Street and Ormond Road show small increases as a result of new development at Grove.

*3.7* ***Screenline C***

*3.7.1* The results for Screenline C are shown in Table 3.6.

**Table 3.6: Screenline C - A338 West (two way 'demand' flows)**

| Location | 2005 | 2016 | 2016D | 2026 | 2026D |
|---|---|---|---|---|---|
| **A415 west of Frilford junction** | 1290 | 1470 | 1460 | 1520 | 1530 |
| **Mill Orchard, East Hanney** | 360 | 430 | 420 | 560 | 560 |
| **Northern Link Road,** | n/a | 380 | 590 | 620 | 760 |
| **Oxford Lane, Grove** | 790 | 560 | 550 | 440 | 450 |
| **Main Street, Grove** | 420 | 390 | 400 | 610 | 670 |
| **Mably Way, Grove** | 710 | 790 | 980 | 720 | 1260 |
| **Mill Street, Grove** | 1040 | 1190 | 1280 | 1320 | 1610 |
| **B4507 Portway, Grove** | 500 | 550 | 550 | 580 | 610 |

*3.7.2* Table 3.6 shows that routes crossing the screenline to the north of Grove are not impacted upon by the proposed development at Grove. The proposed 'Northern Link Road' carries both a proportion of existing traffic from Grove and traffic generated by the development. The data shows that, for a link road to be provided to serve a development, it carries about 200 new trips as a result of the proposed development in 2016 and about 150 trips in 2026. Oxford Lane, Grove, shows a decrease in traffic carried, the traffic having transferred to the Northern Link Road.

*3.7.3* Mably Way shows a significant increase in traffic as a result of the development at Grove. The model predicts a 25% increase in flow at 2016 and a 75% increase in flow at 2026. The latter increase is as a result of general congestion in the town centre and trips finding an alternative route as well as a result of the proposed development. Results for Mill Street also show the 'searching' for routes that is going on in the 2026 scenario, with a 22% increase in traffic as a result of the proposed development.

*3.8* ***Screenline D***

*3.8.1* The results for Screenline D are shown in Table 3.7.

**Table 3.7: Screenline D – Wantage west (two way 'demand' flows)**

| Location | 2005 | 2016 | 2016D | 2026 | 2026D |
|---|---|---|---|---|---|
| **Challow Road (A417)** | 890 | 1030 | 1070 | 1090 | 1170 |
| **Ickleton Road (B4507)** | 460 | 510 | 510 | 520 | 480 |
| **Court Hill Road, Letcombe Regis** | 210 | 230 | 240 | 260 | 280 |

*3.8.2* Table 3.7 shows that there is an increase in traffic on the A417 as a result of the proposed development at Grove. There are lesser increases on the two roads to the south of the A417.

*3.9* ***Screenline E***

*3.9.1* The results for Screenline E are shown in Table 3.8.

**Table 3.8: Screenline E – Grove - Wantage (two-way 'demand' flows)**

| Location | 2005 | 2016 | 2016D | 2026 | 2026D |
|---|---|---|---|---|---|
| **Denchworth Road (N-S)** | 960 | 1080 | 1230 | 1280 | 1830 |
| **Grove Street, A338** | 940 | 1090 | 1270 | 1210 | 1220 |
| **Grove Park Drive (N-S)** | 110 | 210 | 190 | 240 | 360 |

*3.9.2* Denchworth Road and Grove Street provide the two major links between Grove and Wantage to the south of Mably Way. The model predicts that there will be almost a doubling of traffic between 2005 and 2026 (with the proposed Grove development on Denchworth Road which will have a significant impact on buses as well). The without and with the proposed Grove development on Denchworth Road results for 2026 show a 43% increase. The increases in traffic are less marked on Grove Street, notably in 2026.

*3.9.3* However, and importantly, further investigation of the model shows that whilst there has been the expected growth in the southbound direction resulting in a 320 vehicles increase as a result of the proposed Grove development, there has been a reduction in flow of 190 vehicles in the northbound direction as a result of the

proposed Grove development. The model shows that there has been a transfer, in the north bound direction to Grove Park Drive to avoid congestion in Wantage.

*3.10* ***Screenline F***

*3.10.1* The results for Screenline F are shown in Table 3.9.

**Table 3.9: Screenline F – A417 north (two way 'demand' flows)**

| Location | 2005 | 2016 | 2016D | 2026 | 2026D |
|---|---|---|---|---|---|
| **Winchester Way, Wantage** | 20 | 20 | 20 | 20 | 350 |
| **Denchworth Road (N-S), Wantage** | 940 | 1030 | 1180 | 1220 | 1770 |
| **Seeson Way, Wantage** | 650 | 760 | 820 | 700 | 620 |
| **Garston Lane, Wantage** | 50 | 60 | 60 | 70 | 70 |
| **Charlton Village Road, Wantage** | 360 | 400 | 490 | 610 | 660 |
| **Grove Park Drive** | 110 | 210 | 190 | 240 | 360 |
| **Featherbed Lane** | 650 | 820 | 840 | 850 | 910 |
| **A4130 North of Rowstock** | 1250 | 1750 | 1770 | 2230 | 2270 |
| **Wantage Road, Harwell, B4493** | 650 | 730 | 730 | 590 | 600 |
| **A34 between Milton and Chilton** | 4310 | 4980 | 4980 | 5430 | 5440 |
| **Main Street, West Hagbourne** | 540 | 940 | 940 | 910 | 910 |
| **B4016, Bessels Way, Blewbury** | 280 | 340 | 340 | 340 | 340 |
| **Spring Lane, Aston Tirrold** | 180 | 220 | 220 | 270 | 270 |
| **Chalk Hill, Aston Tirrold** | 190 | 250 | 250 | 290 | 290 |
| **Westfield Way, Moulsford** | 30 | 30 | 30 | 50 | 50 |
| **Halfpenny Lane, Moulsford** | 150 | 230 | 230 | 290 | 290 |

*3.10.2* Screenline F runs just to the north of the A417. Starting from the western most link on the screenline, it is notable that Winchester Way is shown to have a very low flow until the 'maximum development scenario' where, as a result of the implementation of the full proposed development at Grove, there is a significant increase in traffic diverting away from the southern section of Denchworth Road.

That is, congestion at the junctions on Denchworth Road and Challow Road has reached such a level that traffic is predicted to take the alternative route through the estate.

*3.10.3* Denchworth Road itself shows an increase of traffic due to the proposed Grove development of 15% in 2016 and 45% in 2026. The Seeson Way results are consistent with those reported under Screenline E in that they show an increase in flow under 2016 but a decrease in 2026. This is due to the transfer of traffic to Grove Park Drive. Traffic flows on Charlton Village Road increase significantly between 2005 and the predicted 2026 volumes with the proposed Grove development in place. The additional traffic from Grove adds to the total, but as noted previously, in this area of the model, it clear that overall traffic volumes are resulting in diversion to more minor routes.

*3.10.4* It is noted that traffic volumes on Featherbed Lane increase significantly between 2005 and 2016 (without Grove), but then seems to plateau. This is due to the limitations on capacity of Featherbed Lane and the model predicts that the spare capacity that exists is used up quickly. The model also predicts, as a result of the implementation of the proposed Grove development, increases in the volume of trips on the northern arm of the Rowstock junction (currently a roundabout). This junction is considered in more detail below.

*3.10.5* Further east than Rowstock changes are minimal as the impact of the proposed Grove development becomes more diluted into the overall traffic circulation.

*3.11* ***Junction cordons***

*3.11.1* Two junctions have been specifically considered in this analysis. They are the Frilford Lights (effectively two junctions, but acting as one) and Rowstock Roundabout which is programmed to become a signal interchange as a result of measures to mitigate against the additional traffic generated by Great Western Park. The results for the Junction cordons are shown in Table 3.10 and 3.11.

**Table 3.10: Frilford signal junction(s) (two way 'demand' flows)**

| Location | 2005 | 2016 | 2016D | 2026 | 2026D |
|---|---|---|---|---|---|
| **Frilford – north approach** | 740 | 740 | 760 | 820 | 910 |
| **Frilford – east approach** | 1790 | 1960 | 2080 | 2140 | 2280 |
| **Frilford – south approach** | 1220 | 1290 | 1400 | 1520 | 1710 |

| | | | | | |
|---|---|---|---|---|---|
| **Frilford – west approach** | 1290 | 1470 | 1460 | 1520 | 1530 |

*3.11.2* Table 3.10 highlights the increasing demand for travel through the junction in each of the test years. The greatest increase in demand is on the approach from the south travelling north indicating that development at Grove over the period is a major contributory factor (this will impact on bus journey times). Indeed the model shows the southern approach is nearing capacity in 2016 and is over capacity in 2026 with the full Grove development. The model shows some traffic is starting to use the East Hanney to Steventon rural link to avoid Frilford junction.

**Table 3.11: Rowstock roundabout/signal junction (two way 'demand' flows)**

| Location | 2005 | 2016 | 2016D | 2026 | 2026D |
|---|---|---|---|---|---|
| **Rowstock – north approach** | 1250 | 1750 | 1770 | 2230 | 2270 |
| **Rowstock – east approach** | 1070 | 1140 | 1150 | 1250 | 1280 |
| **Rowstock – south approach** | 1670 | 2320 | 2350 | 2630 | 2710 |
| **Rowstock – west approach** | 1100 | 1200 | 1240 | 1410 | 1530 |

*3.11.3* Table 3.11 highlights the increasing demand for travel through the junction. It should be noted that in the test periods there are two junction capacity enhancement schemes, one at 2016 and one at 2026 to cater for the increased demand through an already congested junction. The model shows that with regards to two way flows south of Rowstock, in 2005, only 38 vehicles who demand to make the trip in the peak hour do not manage to do so. By 2016, 550 vehicles (without the proposed development at Grove) are unable to complete their journey in the peak hour, 580 with the proposed development at Grove. In 2026 this increases to 840 without the proposed development at Grove and 930 with the proposed development at Grove. This is a significant issue for bus movements through the junction and as outlined in Chapter 2, bus priority would be needed through the junction to protect the services running.

*3.11.4* It should also be noted that as well as the high numbers of vehicles not able to make their journey in the peak hour, additional traffic is choosing to route via Featherbed Lane. In 2026, without the proposed development in Grove, 70 vehicles divert along Featherbed Lane and this increases to 130 with the development at Grove. If Featherbed Lane was not a routeing option, the issues

highlighted at the Rowstock junction would be significantly worse. Other routeing options are also being taken due to congestion at Rowstock. The model shows a considerable increase in traffic using the East Hanney to Steventon route and onward via Drayton and Sutton Courtenay to access Milton Park and Didcot.

**Key consideration**

The SATURN model output takes a snap shot of a future year. It assumes that all the traffic which currently travels during the modelled time period will continue to travel at this time. Then new trips, assessed from data which is effectively unconstrained by 'congestion,' are added to the network. That is, the new trips that are added are the predicted demand.

*3.11.5* In reality, over time, and this can be seen in towns and cities around the country, people make allowances for increased traffic growth. Due to congestion, resulting in longer journey times and loss of quality of life (i.e. sat in a queue), some people decide to not make the journey at all – and will change their destination. For most however, there will be no alternative than to make the trip, and hence the decision will be "what mode?" or "when to make the trip?"

*3.11.6* Where a viable alternative is available, and is seen to have an advantage over "sitting in the queue", the traveller may change mode. In terms of the network, this will reduce the number of vehicles travelling and hence increase the overall ability of the transport network to move people.

*3.11.7* However, for the majority, and notwithstanding initiatives to encourage a change in mode, the most likely reaction will be to travel at a different time. "Peak spreading" is a trend that has happened throughout the transport network. At its simplest, the traveller (usually) leaves earlier in order to avoid the congestion of the peak travel time. Individual's tolerances of congestion are different, as are individual's ability to travel at different times.

*3.11.8* Hence, a balancing effect occurs and as the demand for travel grows on an incremental basis, as opposed to the snap shot of the SATURN model, the transport network continues to work. If a peak hour becomes a peak two hours, it could be argued that the network is being used more efficiently as a greater number of people are travelling. However, there are environmental, health and economic (to businesses and individuals) costs incurred as a result of more congestion resulting in "peak spreading". It is down to society to balance these

costs against the costs of maintaining the ability to travel when we want and where we want – that is, the quality of life we demand.

# 4 Appraisal of key highway issues

*4.1* ***Introduction***

*4.1.1* This chapter of the report draws upon the analysis undertaken in chapters two and three. It provides a summary of the issues highlighted and then considers comments on how whether these issues may or may not impact on the delivery of the public transport strategy preferred options set out in Chapter 2 and as part of this, the SCOTS objectives , as set out in Chapter 1, Table 1.1.

*4.2* ***Highway issues in Wantage and Grove in 2016 (including development)***

*4.2.1* There are three main locations in 2016 where the existing highway arrangement is unable to meet demand for some of the movements. These three locations are:

- Junction of Charlton Village Road/Seeson Way which is nearing capacity without development but with development is at capacity;
- B4507 junction with the A338 which is at capacity with and without development at 2016; and
- The length of A417 from Seeson Way, Wallingford Street through to Charlton Village Road junction.

*4.3* ***Highway issues in Wantage and Grove in 2026 (including development)***

*4.3.1* The highway network in 2026 is considerably more congested and the model has shown the following locations to be at capacity:

- Junction of Mably Way/Denchworth Road (the key arm from the proposed Grove development site is at capacity);
- Denchworth Road / A417 junction;
- Charlton Village Road/Seeson Way junction;
- Charlton Village Road access onto A417;
- The length of A417 from Seeson Way, Wallingford Street through to Charlton Village Road junction.
- B4507 junction with the A338; and
- A338 approach to the Oxford Lane junction.

*4.3.2* The situation in 2026 suggests that buses will be significantly affected on the main routes and thus there will be an increasing need over time to 'protect' bus routes to

ensure that the bus can maintain an attractive level of service and frequency at affordable costs.

*4.4* ***West-East issues***

*4.4.1* The model has shown that by 2026 the three key junctions on the network that cater for west-east movements are at capacity. This means that a significant number of trips cannot complete their demanded journey in the morning peak hour. The consequence is that the trip will either not be made at that time or people will travel longer distances on inappropriate roads to avoid the queues. The three key junctions are:

- Rowstock junction – which has exceeded capacity in 2016 with its improvements and with improvements to capacity in 2026 the junction is still unable to meet demanded trips;
- Frilford junction – which is (just) still functioning in 2016 but over capacity in 2026; and
- Steventon Road junction with the rural East Hanney to Steventon link – which is at capacity in 2026 due to the increased number of vehicles seeking to avoid Rowstock junction and Frilford.

*4.4.2* It is important to recognise that for bus services to Didcot and the main employment sites, Rowstock junction poses a significant problem. If the capacity issues at Rowstock are not solved through engineering solutions, it will be imperative to consider how buses might either bypass or receive priority at the junction.

*4.5* ***Inappropriate re-routeing***

*4.5.1* As the network becomes more congested both within Wantage and Grove and in the immediate environs, the model shows that significant numbers of vehicles are choosing to travel on routes which were arguably never intended to form part of the 'main' highway network. As detailed in the preceding chapter the roads for which a significant change in traffic volumes has been identified is set out below. It is also outlined why the increased use of these routes is 'inappropriate.'

- Featherbed Lane – this rat-run is being used heavily in 2016 to avoid Rowstock junction and is considered inappropriate on safety grounds. The present physical condition of the link is not considered to be to a standard to safely carry the level of traffic demanded of it;

- Grove Park Drive – by 2026 this rural link is being used to avoid Seeson Way and other routes within Wantage as an alternative route to access the A417. The present physical condition of the link is not considered to be to a standard to safely carry the level of traffic demanded of it;
- Charlton Village Road – in 2016 the model shows an additional 100 vehicles using the route in the morning peak hour and by 2026 this has increased to an additional 300 vehicles to avoid the increasing congestion on the main network through Wantage and to the east on the A417. It is suggested that this routeing is inappropriate due to the fact that this is a residential road with a school which has already been calmed. It is not intended to form part of the main road network.
- Winchester Way – similar to the reasons above, by 2026 there is a significant increase in traffic travelling southbound to avoid congestion on the main route through the town. As a residential road the increase is considered inappropriate for its character.

*4.6* ***SCOTS objectives***

*4.6.1* As detailed in Chapter 1 the SCOTS objectives are based on the County Council's five shared priorities for transport. The County Council's longer term strategy for the County is to ensure that it has a balanced transport strategy that supports the delivery of all five shared priorities. In achieving this, the County Council recognises that more emphasis will need to be placed on protecting public transport service routes (both existing and planned) to ensure that reliable and attractive services are maintained and ultimately that they can compete on a more even playing field and increase accessibility for all.

*4.6.2* The following appraisal has therefore been undertaken to establish the relationship between highway network issues outlined in the preceding sections and in Chapter 3 with the proposed public transport strategy detailed in Chapter 2. It also provides a means of considering which issues the County Council may wish to prioritise for remedial action and thus funding.

**Table 4.1 Appraisal of issues in 2016**

| Capacity Issues highlighted | Tackling congestion | Delivering accessibility | Safer roads | Better air quality | Improving street environment |
|---|---|---|---|---|---|
| Charlton Village Road / Seeson Way, Wantage | ✓ | ✓ | | | |
| B4507 / A338, Wantage | ✓ | | | | |
| A417 between Seeson Way, Wallingford Street and to junction with Charlton Village Road | ✓ | ✓ | | | |
| Rowstock Junction | ✓ | ✓ | | | |
| Featherbed Lane | | | ✓ | | |

**Table 4.2 Appraisal of issues in 2026**

| Capacity Issues highlighted | Tackling congestion | Delivering accessibility | Safer roads | Better air quality | Improving street environment |
|---|---|---|---|---|---|
| Mably Way/ Denchworth Road, Wantage | ✓ | ✓ | | | |
| Denchworth Road / A417 | ✓ | ✓ | | | |
| Charlton Village Road / A417 | ✓ | | | | |
| A338 to Oxford lane junction | ✓ | ✓ | | | |
| Frilford Junction | ✓ | ✓ | | | |
| Steventon junction at link with East Hanney to Steventon rural route | ✓ | ✓ | | | |
| Grove Park Drive | | | ✓ | | |
| Winchester Way | | | | | ✓ |
| Charlton Village Road | | | ✓ | | ✓ |

# 5 Initial scheme testing

*5.1* ***Introduction***

*5.1.1* Various strategy documents such as the Structure Plan and Local Plan as well as the more recent ITS studies have identified potential initial schemes to address the highway constraints likely with future growth in the area. The list of initial 'potential' schemes is assessed below through the use of the SATURN model to establish the relative benefits that these schemes could have on addressing issues highlighted. Analysis has also borne in mind whether introducing any of these initial scheme ideas creates 'new problems' on the network.

*5.2* ***Eastern relief road***

*5.2.1* This scheme takes traffic from Charlton Village Road, Northern Link Road/A338/Grove Park Road and there is a switch of traffic from Denchworth Road/Market Place/A417 to Denchworth Road/Mably Way. It is also noted that a small amount of traffic has been taken from the A338 and put on the A417. Table 5.1 summarises the extent to which the scheme mitigates the network issues highlighted for 2016.

**Table 5.1 Impact of Eastern Relief Road on mitigating issues 2016**

| Capacity Issues highlighted in 2016 | Scheme impact |
|---|---|
| Charlton Village Road / Seeson Way, Wantage | Junction now performing well |
| B4507 / A338, Wantage | No significant impact |
| A417 between Seeson Way, Wallingford Street and to junction with Charlton Village Road | Section of route now within capacity |
| Rowstock Junction | No significant impact |
| Featherbed Lane | No significant impact |

*5.2.2* In 2026, the changing patterns of traffic routeing are magnified and also there is now a significant reduction in traffic travelling southbound on Denchworth Road and Winchester Way. The other key difference by 2026 is that the Eastern Relief Road offers some relief to the B4507. Table 5.2 summarises the extent to which the scheme mitigates the network issues highlighted for 2026.

**Table 5.2 Impact of Eastern Relief Road on mitigating issues 2026**

| Capacity Issues highlighted | Scheme impact |
|---|---|
| Mably Way/ Denchworth Road, Wantage | No significant change to junction performance |
| Denchworth Road / A417 | Marginal benefit but junction still at capacity |
| Charlton Village Road / A417 | Junction now performing well |
| A338 to Oxford Lane junction | No significant impact |
| Frilford Junction | No significant impact |
| Steventon junction at link with East Hanney to Steventon rural route | No significant impact |
| Grove Park Drive | Situation improved |
| Winchester Way | Situation improved |
| Charlton Village Road | Situation improved |

*5.3* ***Western Relief Road***

*5.3.1* The model shows that this scheme provides very little change to routeing other than at Denchworth Road/A417 which sees a significant reduction in traffic. Table 5.3 summarises the extent to which the scheme mitigates the network issues highlighted for 2016.

**Table 5.3 Impact of Western Relief Road on mitigating issues 2016**

| Capacity Issues highlighted in 2016 | Scheme impact |
|---|---|
| Charlton Village Road / Seeson Way, | No significant impact |
| B4507 / A338, Wantage | No significant impact |
| A417 between Seeson Way, Wallingford Street and to junction with Charlton Village Road | No significant impact |
| Rowstock Junction | No significant impact |
| Featherbed Lane | No significant impact |

*5.3.2* The model shows that in 2026 this scheme provides very little change to routeing other than at Denchworth Road/A417 but also now to Winchester Way as well.

Table 5.4 summarises the extent to which the scheme mitigates the network issues highlighted for 2026.

**Table 5.4 Impact of Western Relief Road on mitigating issues 2026**

| Capacity Issues highlighted | Scheme impact |
|---|---|
| Mably Way/ Denchworth Road, | No significant impact |
| Denchworth Road / A417 | Junction now performing |
| Charlton Village Road / A417 | No significant impact |
| A338 to Oxford lane junction | No significant impact |
| Frilford Junction | No significant impact |
| Steventon junction at link with East Hanney to Steventon rural route | No significant impact |
| Grove Park Drive | No significant impact |
| Winchester Way | Significant improvement |
| Charlton Village Road | No significant impact |

*5.4* ***Full relief road***

*5.4.1* The changing patterns of movement noted from just introducing either the Eastern or Western Relief Road are replicated with the two links in place. The only key difference shown from the modelled results is that there is a transfer of trips from Market Square to Mably Way of the through traffic. This suggests that the benefits of the full relief road are very localised. The Northern Link Road and A338/Grove Park Road sees a significant reduction in traffic routeing. Table 5.5 summarises the extent to which the scheme mitigates the network issues highlighted for 2016.

**Table 5.5 Impact of Full Relief Road on mitigating issues 2016**

| Capacity Issues highlighted in 2016 | Scheme impact |
|---|---|
| Charlton Village Road / Seeson Way, | Junction now performing well |
| B4507 / A338, Wantage | No significant impact |
| A417 between Seeson Way, Wallingford Street and to junction with Charlton Village Road | Route now performing well |
| Rowstock Junction | No change |
| Featherbed Lane | No change |

*5.4.2* Table 5.6 summarises the extent to which the scheme mitigates the network issues highlighted for 2026. The B4507 also sees some relief in 2026 with the Full Relief Road in place.

**Table 5.6 Impact of Full Relief Road on mitigating issues 2026**

| Capacity Issues highlighted | Scheme impact |
|---|---|
| Mably Way/ Denchworth Road, | No significant impact |
| Denchworth Road / A417 | Junction now performing |
| Charlton Village Road / A417 | Junction now performing |
| A338 to Oxford lane junction | No significant impact |
| Frilford Junction | No significant impact |
| Steventon junction at link with East Hanney to Steventon rural route | Marginal improvement |
| Grove Park Drive | No significant impact |
| Winchester Way | Significant improvement |
| Charlton Village Road | Significant improvement |

**Key consideration**

The model has not shown a significant transfer from traffic from the Market Place to Mably Way as a result of the introduction of the east and west relief roads. It is therefore concluded that at present there are not a significant number of trips passing through Wantage (as opposed to originating or destinating in Wantage) on an east-west movement. It should be noted that the trips contained in the model are based on surveyed movements in 2005. The introduction of the relief roads would change the perception of the ease of east-west movement through Wantage such that, if constructed, it is likely that more movement would happen 'through' Wantage using the new relief road. This 'generated' traffic is not included in the analysis, but history has shown that people make journey decisions, particularly commuting decisions, based on journey time, not distance. Hence a reduction in journey time (and increased journey reliability) will encourage commuting over a greater distance. That having been said, the key constraints of Rostock Roundabout and Milton Interchange remain and if these are not addressed, total journey time on the corridor may not change enough to encourage a change in commuting patterns.

*5.5* ***Removal of Northern Link Road***

*5.5.1* The model shows that in 2016 the removal of this scheme increases the traffic using Oxford Lane/A338, Mably Way, Seeson Way, Charlton Village Road and the A417. It should be noted that there is a reduction in traffic using Grove Park Drive to access the A417. Table 5.7 summarises the extent to which the removal of the scheme impacts on the network issues highlighted for 2016.

**Table 5.7 Impact of removing the Northern Link Road on issues 2016**

| Capacity Issues highlighted in 2016 | Removal of Scheme impact |
|---|---|
| Charlton Village Road / Seeson Way, | Junction performance worsens |
| B4507 / A338, Wantage | No significant change |
| A417 between Seeson Way, Wallingford Street and to junction with Charlton Village Road | Route worsens |
| Rowstock Junction | No significant change |
| Featherbed Lane | No significant change |

*5.5.2* In 2026 as the overall network congestion effects worsen, the removal of the Northern Link Road appears to have an impact on the wider network than in 2016. That is, there is now a change to routeing patterns to the north and west of Grove. Table 5.8 summarises the extent to which the removal of the scheme impacts on the network issues highlighted for 2026.

**Table 5.8 Impact of removing the Northern Link Road on issues 2026**

| Capacity Issues highlighted | Removal of Scheme impact |
|---|---|
| Mably Way/ Denchworth Road | Significantly worsened |
| Denchworth Road / A417 | No significant change |
| Charlton Village Road / A417 | No significant change |
| A338 to Oxford lane junction | No overall significant change |
| Frilford Junction | No significant change |
| Steventon junction at link with East Hanney to Steventon rural route | No significant change |
| Grove Park Drive | No significant change |

| | |
|---|---|
| Winchester Way | Significant improvement |
| Charlton Village Road | No significant change |

*5.6* ***Chilton slips***

*5.6.1* Introducing Chilton Slips offers new routeing opportunities on the wider network, particularly in the Didcot area. More traffic is choosing to use the A34 southbound and as a result there is a reduction of traffic in the Steventon / Drayton area as well as the routes south of Didcot. However, it should be noted that the additional flow on the A34 is some 200 vehicles and the reductions in flows on the surrounding network are less than 100 per route option. The situation at Rowstock junction and featherbed Lane has not materially altered and performance at Frilford has remained unchanged also. Thus it is difficult to ascertain any significant benefits of introducing the slips for the costs involved.

*5.6.2* Neither of the northern options has a material impact on the issues highlighted for remedial action.

*5.7* ***East Hanney / Steventon Northern Link (rural link verses strategic route) 2026***

*5.7.1* The introduction of a rural link to the north of the railway line to replace the existing East Hanney to Steventon link has a marginal diversion of traffic away from the A338/A415 route.

*5.7.2* The introduction of a strategic route to the north of the railway line to replace the existing East Hanney to Steventon link has a significant impact on routeing patterns between East Hanney and Abingdon. Traffic is diverted away from the A338/A415 to the new link and the B4017 to Abingdon, through Drayton. Frilford junction receives considerable relief but whilst there is a small reduction in traffic using Featherbed Lane and Rowstock junction there is no material change to the capacity.

*5.7.3* Neither of the northern options has a material impact on the issues highlighted for remedial action.

**Table 5.9 Impact of rural or strategic northern link to Steventon 2026**

| Capacity Issues highlighted | Rural Scheme impact | Strategic Scheme impact |
|---|---|---|
| Charlton Village Road / Seeson Way, | No change | No change |

| | | |
|---|---|---|
| B4507 / A338, Wantage | No change | No change |
| A417 between Seeson Way, Wallingford Street and to junction with Charlton Village Road | No change | No change |
| Rowstock Junction | No change | No change |
| Featherbed Lane | No change | No change |
| Mably Way/ Denchworth Road | No change | No change |
| Denchworth Road / A417 | No change | No change |
| Charlton Village Road / A417 | No change | No change |
| A338 to Oxford lane junction | No change | No change |
| Frilford Junction | Junction performs better | Junction performs better |
| Steventon junction at link with East Hanney to Steventon rural route | Situation deteriorated | Situation deteriorated |
| Grove Park Drive | No change | No change |
| Winchester Way | No change | No change |
| Charlton Village Road | No change | No change |

*5.8* ***East Hanney / Steventon Southern Link (rural link verses strategic route) 2026***

*5.8.1* The introduction of a rural link to the south of the railway line feeds directly into the proposed Northern Link Road at its western end and between Steventon lights and Featherbed Lane on the A4130. Table 5.10 illustrates that regardless of the character of the southern link, the benefits of the scheme to relieve the issues highlighted throughout this report are significant.

**Table 5.10 Impact of rural or strategic southern link to Steventon 2026**

| **Capacity Issues highlighted** | **Rural Scheme impact** | **Strategic Scheme impact** |
|---|---|---|
| Charlton Village Road / Seeson Way | Significant improvement | Significant improvement |
| B4507 / A338, Wantage | No significant change | No significant change |
| A417 between Seeson Way, Wallingford Street and to junction with Charlton Village Road | Significant improvement | Significant improvement |

| | | |
|---|---|---|
| Rowstock Junction | No material improvement | No material improvement |
| Featherbed Lane | No material improvement | No material improvement |
| Mably Way/ Denchworth Road | Significant improvement | Significant improvement |
| Denchworth Road / A417 | No significant change | No significant change |
| Charlton Village Road / A417 | Marginal improvement | Marginal improvement |
| A338 to Oxford lane junction | No significant change | No significant change |
| Frilford Junction | No material improvement | No material improvement |
| Steventon junction at link with East Hanney to Steventon rural route | n/a | n/a |
| Grove Park Drive | Significant improvement | Significant improvement |
| Winchester Way | Significant improvement | Significant improvement |
| Charlton Village Road | Significant improvement | Significant improvement |

# 6 Next steps

*6.1* ***Introduction***

*6.1.1* A meeting was held between the County Council, District Councils and Halcrow on 26 March 2007 to discuss the initial findings from this working document and to clarify the next stages of work required to develop and finalise the strategy for the Wantage/Grove area of SCOTS. This chapter summarises the key actions agreed to be taken forward for further work.

*6.2* ***Policy / Strategy context***

*6.2.1* It was recognised that there was a need for more clarity on the wider policy objectives being sought for SCOTS and its relationship with the Structure Plan, the Access to Oxford project and the original work completed for the Didcot area ITS and for the Wantage and Grove Area Strategic Transport Study (WAGASTS).

*6.3* ***Route Hierarchy***

*6.3.1* It was agreed in light of the recognition of 'inappropriate re-routeing of traffic' as a result of capacity on the network that a defined road hierarchy would assist the appraisal of routes requiring mitigation measures. The actions agreed were for the County Council to:

- Subdivide local routes into (e.g.) main/principal, distributor, access (residential), access (rural); and
- Agree levels of constraint/growth appropriate for each defined route type.

*6.4* ***Public Transport***

*6.4.1* It was also agreed that Chapter 2 should be summarised to highlight the key proposals more clearly in respect of:

- Focussing bus service provision on the North/South axis (to/from Oxford), complemented by East / West services that operate at an enhanced frequency during peak periods, with a view to maximising patronage potential;
- The idea of Drayton Slips for bus only was supported and should be discussed with the Access to Oxford team at the County Council as a potential scheme to be taken forward for the Major Scheme Bid (OCC to

gain an informal view from the HA at a meeting being held on 4 April; and

- OCC to provide a position statement on Grove/Wantage Railway Station.

*6.5* ***Further modelling tests***

*6.5.1* It was agreed that following approval of a defined route hierarchy and growth assumptions further option testing should take place to reflect any network constraints related to the new road hierarchy. It was also agreed that there should be a re-examination of the assumptions for employment development trips and the agreed District position on parking standards / provision. Once this has been undertaken a limited number of agreed scheme options will be re-tested over the relevant time periods.

# 7 APPENDIX 1: INITIAL ANALYSIS TO INFORM PUBLIC TRANSPORT STRATEGY

*7.1* ***Initial analysis***

*7.1.1* The Stage 1 analysis discerned the following options for public transport provision.

*7.2* ***Wantage/Grove to Oxford***

*7.2.1* Route option (a) via A338, A420 and Cumnor, followed by existing service X30, represents the shortest route and benefits from the shortest journey time of 47 minutes between Wantage and Oxford when compared with the other route options. Although delays may be experienced at Frilford Lights and on Botley Road in the vicinity of Oxford Station, the route is comparably less prone to delays.

*7.2.2* The Peak Vehicle Requirement, assuming a 15-minute frequency service in the core operating period 07.00-19.00 to tally with the Premium Route concept, has been calculated to be 8 vehicles compared to 11 vehicles under route option (b) and 9 vehicles for route options (c), (d) and (e). As a consequence, the total vehicle hours are lower - at 32,200 per annum compared with 45,200 for option (b) and 37,200 for options (c), (d) and (e) – as is the break-even level. Assuming a slight increase in the current single fare from Wantage to Oxford from £3.40 to an average for the route of £3.50, reflecting the customer benefits accruing from upgrading of the corridor, an average of 929 trips is required each weekday to achieve break-even.

*7.2.3* Route option (b) via A338, A415 and Abingdon town centre, followed by existing service 31, is subject to considerable variations in journey time over the full route from Wantage to Oxford – ranging from 71 minutes in the weekday morning peak to 55 minutes at weekends. The route passes through a known bottleneck at Marcham and is subject to more delays occasioned by boarding and alighting at bus stops through the Abingdon urban area. With a comparatively high PVR of 11 vehicles to achieve a 15-minute frequency, operating costs are accordingly higher at £1.8 million per annum, requiring average daily patronage of 1,300 people at an average fare of £3.50 in order to break even.

*7.2.4* The route does however allow residents of Wantage and Grove to travel to and from education and employment opportunities in Abingdon. Cross-reference to 2001 census data indicates that circa 690 Wantage and Grove residents work in Abingdon. The mode share for public transport for movements between Grove and Abingdon is 11% while for trips between Wantage and Abingdon it is 7%. Taking the average mode share across the two settlements to be 9%, and assuming that 65% of the total 690 work-related movements to and from Abingdon are actually made on an average weekday, this means that 40 people would make the journey for work purposes by bus. In view of the investment made by the County Council and bus operators in enhancements on the Abingdon-Oxford corridor – including introduction of new single deck buses to core route X3, the recent cascading of high-quality double deck vehicles to route 35 and provision of Real Time Information displays at key stops in Abingdon – and to the direct Wantage/Grove-Cumnor-Oxford corridor, consideration could be given to truncating the Wantage/Grove-Abingdon-Oxford route and promoting Abingdon town centre as an interchange between a revised Wantage/Grove-Abingdon service and Abingdon-Kennington/Bagley Wood-Oxford services for the small number of customers making through trips via Abingdon.

*7.2.5* Route option (c) envisages buses operating from Grove northbound on the A338 then east via the existing Steventon Road/Hanney Road, B4017 north of Steventon and via the reinstated Drayton slips to access A34 which would be followed as far as Hinksey Hill Interchange. Although this route would bypass bottlenecks at Frilford, Marcham and through Abingdon, buses would have to make a hazardous turn across A338 to enter Steventon Road. The Steventon Road/Hanney Road, although of good quality, is sinuous and passes through a sparsely populated area, meaning that little or no revenue would be earned on this sector. In the medium- to long-term, the road may be submerged as part of the proposed Upper Thames Reservoir scheme, requiring re-routing. Further, the option would require re-instatement of the north-facing slip roads that formerly linked B4017 to A34 south of Drayton to allow bus access. This proposal may not be favourably received by the Highways Agency, given the Agency's current reluctance to see additional traffic movements on A34. Further, buses would be subject to congestion on A34 west and north of Abingdon. Pending the proposed provision of a bus lane at Hinksey Hill Interchange, services would encounter delays when leaving the trunk route at this location. Consequently it is not recommended that this option is considered further.

*7.2.6* Route option (d) assumes the construction of a new alignment to replace the Steventon Road/Hanney Road if the Upper Thames Reservoir project proceeds. The new alignment would be less-sinuous. The principal risk associated with this option is that it is reliant upon the Reservoir scheme being progressed. The timescale for this is unconfirmed. As a consequence, this should be viewed as a longer-term option; the longer timeframe would also enable consideration of schemes to alleviate delays on the A34 corridor and reappraisal of current views in respect of reinstating the Drayton slips.

*7.2.7* It should be considered that public transport services may have to share any new alignment with general traffic, notwithstanding the potential impact on the A34 of providing a more direct west-east route for general traffic.

*7.2.8* Route option (e) envisages construction of the new alignment in lieu of the Steventon Road/Hanney Road being to the south of the Great Western Main Line, joining A4130 at Milton Hill, with buses joining the northbound A34 at Milton Interchange. Again this option is reliant upon the Reservoir scheme being progressed. It could be politically-sensitive, given that the alignment would cross privately-owned land and could potentially sever Church Lane in Steventon. Following this alignment would mean that services would travel approximately 6.5km east before joining the northbound A34, instead of following a more direct northbound alignment. This could confuse and deter customers wishing to make through journeys to Oxford. Although again the longer timeframe could enable a reappraisal of schemes to minimise delays on the A34 and its approaches, this route option would result in buses travelling an additional 2.2km northbound on A34 between Milton Interchange and Drayton slips, when compared with option (d).

*7.2.9* The comparable length of route options (c), (d) and (e) means that the Peak Vehicle Requirement and hence the overall operating costs of £1.5 million per annum are similar. In order to break-even, it is estimated that 1,066 trips at an average fare of £3.50 would be required each weekday for each of these route options.

*7.2.10* On the basis of this initial analysis, it is recommended that:

- Subject to further detailed assessment to establish robust patronage estimates, operating costs and longer-term commercial viability, route

option (a) via A338, A420 and Cumnor should be retained and further developed as the Premium Route linking Wantage with Oxford;

- Comparative detailed assessment should be carried out to confirm likely patronage and costs for route option (d), as a longer-term option that is contingent upon construction and reinstatement of highway links; and
- Consideration be given to simplification and truncation of the Wantage-Abingdon-Oxford routes, to provide a Wantage-Abingdon service with an interchange in Abingdon to the established core Abingdon-Oxford services.

*7.3* ***Wantage/Grove to Didcot (encompassing Harwell Chilton Campus and Milton Park)***

*7.3.1* Route option (a) would see services linking Wantage and Grove with Didcot following the existing route, deviating via the villages of Ardington, West and East Hendred that lie to the south of the A417 corridor. This represents one of the longest route options, at 29.3km, with the second longest single journey time of 62 minutes in the morning peak between Wantage and Didcot Parkway when compared with the other route options. In addition to identified delays in Wantage Market Place – which may be alleviated through the traffic management schemes currently under consideration – the Wantage and Grove Area Strategic Transport Study also highlighted delays on A417 east of Wantage and at the crucial node at Rowstock Roundabout, 1.5km north of the Harwell Chilton Campus business and research centre. Analysis of outputs from the Didcot-Wantage SATURN traffic model has confirmed that there are significant issues currently with congestion at this location, which will be exacerbated by additional movements on the network.

*7.3.2* While route option (a) connects Grove, Wantage and the heart of the Vale District with Harwell Chilton Campus, Harwell village, Didcot town centre and the railhead at Didcot Parkway and Milton Park, the lengthy and tortuous nature of the route is a deterrent to customers wishing to make through trips, particularly to and from work in peak periods.

*7.3.3* Under Concept 1 – maintenance of a second-tier Interlink route, operating at 60-minute frequency - the Peak Vehicle Requirement for operation between Wantage and Milton Park would be three buses. The total vehicle hours are comparatively high at almost 16,800 per annum compared with 11,200 for the majority of other options – as is the break-even level. Assuming an average fare for the route of £2.00, an average of 819 trips would be required each weekday to achieve break-even. The current mode share for bus is just 8%, equating to 82 work-related trips

per day between Wantage and Grove combined and Harwell Chilton Campus, Didcot and Milton Park based on 2001 Census data. Hence a significant subsidy would be required to bridge the gap between revenue and operating costs. Current operator Stagecoach receives £112,370 in subsidy from the County Council to secure the operation of existing services 32 and 33 over the section of route between Abingdon and Grove via Didcot and Wantage.

*7.3.4* Concept 2 would see frequency enhancements to provide journeys at 30-minute intervals between 07.00 and 19.00 on Mondays through Saturdays, reducing to hourly frequency between 19.00 and 23.00 and assuming the introduction of a 60-minute frequency service on Sundays between 09.00 and 19.00. In the context of route option (a), this would see the PVR increase to 5 in the weekday core period, with attendant increases in vehicle hours to 24,100 per annum and estimated operating costs to £965,000. It is suggested that the subsidy requirement to achieve this, in light of the small size of the current travel market and the disincentives to through travel, would be prohibitive.

*7.3.5* A further enhancement to create a Premium Route, under Concept 3, operating at 15 minute frequency between 07.00 and 19.00 on Mondays through Saturdays and at 30-minute frequency outside these core hours and on Sundays, would markedly increase costs and subsidy requirement to unrealistic levels. Given the indirect nature of the route, this Concept is not considered feasible for route option (a).

*7.3.6* A number of variations or sub-options have been identified for route option (b) which would see services operating direct via A417 between Wantage and Didcot, instead of deviating to serve the villages to the south.

*7.3.7* Option (b1) would see buses using A417, operating via A4185 between Rowstock Roundabout and Harwell Chilton Campus, then via A4130, Milton Interchange and Milton Park before serving Didcot Parkway and the Orchard Centre. The perceived advantages of this option are that:

- it is 5km shorter than option (a);
- the concept of operating via A417 direct, A4185 and A4130 is already proven, as Stagecoach operate one peak-period journey as service 34 over this route on a commercial basis, without subsidy;
- it would alleviate passenger discomfort and road safety issues associated with joining and leaving the A417 when serving the villages to the south;

- the route would serve Harwell Chilton Campus and Milton Park before Didcot, making the bus a more attractive alternative for work-related journeys bound for these key employment destinations.

*7.3.8* The principal disadvantages of this option are:

- It would be necessary to develop and promote interchange facilities in Wantage to allow for through movements between Grove and destinations to the east, unless the corridor was extended from Wantage to Grove;
- Congestion issues at Rowstock Roundabout could be compounded by delays on the approach to Milton Interchange, unless appropriate bus priority measures were implemented;
- Customers bound for the railhead at Didcot Parkway would have to endure deviations to serve Harwell Chilton Campus and Milton Park en route.

*7.3.9* On the basis of Concept 1 – retention of the corridor as a second-tier 'Interlink' route in line with the County Council's established bus strategy, and assuming a 60-minute frequency in the core (07.00-19.00) and non-core (19.00-22.00) operating periods on Mondays through Saturdays, with an enhancement to provide an hourly service between 07.00 and 21.00 on Sundays, the Peak Vehicle Requirement would be 2 buses. Indicative operating costs are estimated at £448,000 per annum. Assuming an average fare for the route of £2.00, an average of 546 trips would be required each weekday to achieve break-even.

*7.3.10* Option (b2) would see buses using A417 then operating via A4130 between Rowstock Roundabout, Didcot Parkway and the Orchard Centre, without directly serving either Milton Park or Harwell Chilton Campus. The perceived advantages of this option are that:

- it is 5km shorter than option (a);
- it would alleviate passenger discomfort and road safety issues associated with joining and leaving the A417 when serving the villages to the south;
- the route would provide a direct link between Wantage and Didcot Parkway, making it easier to interchange from bus to rail for journeys to more distant destinations.

*7.3.11* The principal disadvantages of this option are:

- It would be necessary to develop and promote interchange facilities in Wantage to allow for through movements between Grove and destinations to the east, unless the corridor was extended from Wantage to Grove;
- Consideration needs to be given to alternative means of serving the villages south of A417 – either via interchange facilities on A417 or a supplementary service;
- Congestion issues at Rowstock Roundabout could be compounded by delays on the approach to Milton Interchange, unless appropriate bus priority measures were implemented;
- The route does not directly serve either Harwell Chilton Campus or Milton Park, requiring Harwell-bound customers to interchange to the existing, 2-hourly frequency Newbury Buses service 6/9 in Didcot and those bound for Milton Park to transfer to the MEPC-funded shuttle bus or to Oxford Bus Company service 35A. This would result in longer journey times for customers bound for these destinations. This could however be alleviated by the introduction or adaptation of a service to provide a high-quality, peak period, complementary link on the sector Milton Hill-Harwell, either originating from Abingdon to reflect the pattern of peak period movement via B4017 discerned from interview surveys associated with the SATURN model development, or from Didcot – potentially as an extension of the Milton Park shuttle service;
- Re-routing of the service is likely to result in the withdrawal of, or reduction in, the subsidy paid by UKAEA to secure bus services to and from Harwell Chilton Campus.

*7.3.12* As with option (b1), on the basis of Concept 1 – retention of the corridor as a second-tier 'Interlink' route in line with the County Council's established bus strategy, and assuming a 60-minute frequency in the core (07.00-19.00) and non-core (19.00-22.00) operating periods on Mondays through Saturdays, with an enhancement to provide an hourly service between 07.00 and 21.00 on Sundays, the Peak Vehicle Requirement would be 2 buses. Indicative operating costs are estimated at £448,000 per annum. Assuming an average fare for the route of £2.00, an average of 546 trips would be required each weekday to achieve break-even.

*7.3.13* Option (b3) would see buses using A417 then operating via A4130 between Rowstock Roundabout and Milton Park, continuing to Didcot Parkway and the

Orchard Centre, without serving Harwell Chilton Campus. The perceived advantages of this option are that:

- it is almost 12km shorter than the existing route;
- it would alleviate passenger discomfort and road safety issues associated with joining and leaving the A417 when serving the villages to the south;
- the route would provide a direct link between Wantage and Didcot Parkway, making it easier to interchange from bus to rail for journeys to more distant destinations.

*7.3.14* The principal disadvantages of this option are:

- It would be necessary to develop and promote interchange facilities in Wantage to allow for through movements between Grove and destinations to the east, unless the corridor was extended from Wantage to Grove;
- Consideration needs to be given to alternative means of serving the villages south of A417 – either via interchange facilities on A417 or a supplementary service;
- Congestion issues at Rowstock Roundabout could be compounded by delays on the approach to Milton Interchange, unless appropriate bus priority measures were implemented;
- The route does not directly serve Harwell Chilton Campus, requiring customers to interchange to the existing, 2-hourly frequency Newbury Buses service 6/9 in Didcot. This would result in longer journey times. This could however be alleviated by the introduction or adaptation of a service to provide a high-quality, peak period, complementary link on the sector Milton Park-Harwell, either originating from Abingdon to reflect the pattern of peak period movement via B4017 discerned from interview surveys associated with the SATURN model development, or from Didcot – potentially as an extension of the Milton Park shuttle service;
- Re-routing of the service is likely to result in the withdrawal of, or reduction in, the subsidy paid by UKAEA to secure bus services to and from Harwell Chilton Campus.

*7.3.15* The Peak Vehicle Requirement, estimated operating costs and break-even figures are the same as for the preceding option (b2).

*7.3.16* Option (b4) envisages services using A417 between Wantage and East Hendred, then using Featherbed Lane to circumvent the identified congestion hotspot at Rowstock Roundabout, joining A4130 at Milton Hill before serving Milton Park, Didcot Parkway and Didcot town centre. The perceived advantages of this option are that:

- at 16.4km, it is almost 13km shorter than the existing route and represents the shortest route option under consideration;
- it would alleviate passenger discomfort and road safety issues associated with joining and leaving the A417 when serving the villages to the south;
- the route avoids the known congestion hotspot at Rowstock Roundabout

*7.3.17* The principal disadvantages of this option are:

- It would be necessary to develop and promote interchange facilities in Wantage to allow for through movements between Grove and destinations to the east, unless the corridor was extended from Wantage to Grove;
- Consideration needs to be given to alternative means of serving the villages south of A417 – either via interchange facilities on A417 or a supplementary service;
- Featherbed Lane is narrow, incorporates two significant bends and is not ideally suited to bus operations;
- Delays could still be experienced on the approach to Milton Interchange, unless appropriate bus priority measures were implemented.

*7.3.18* The route does not directly serve Harwell Chilton Campus, requiring customers to interchange to the existing, 2-hourly frequency Newbury Buses service 6/9 in Didcot. This would result in longer journey times. This could however be alleviated by the introduction or adaptation of a service to provide a high-quality, peak period, complementary link on the sector Milton Park-Harwell, either originating from Abingdon to reflect the pattern of peak period movement via B4017 discerned from interview surveys associated with the SATURN model development, or from Didcot – potentially as an extension of the Milton Park shuttle service;

*7.3.19* Re-routing of the service is likely to result in the withdrawal of, or reduction in, the subsidy paid by UKAEA to secure bus services to and from Harwell Chilton Campus.

*7.3.20* The Peak Vehicle Requirement, estimated operating costs and break-even figures are the same as for the preceding options (b2) and b3).

*7.3.21* A number of variations or sub-options have been identified for route option (c) which would see services operating via the existing Steventon Road/Hanney Road, B4017 and A4130 between Wantage and Didcot, instead of via the A417 corridor.

*7.3.22* Option (c1) would see buses using A338, Steventon Road/Hanney Road, B4017, then operating via A4130 between Milton Hill, Didcot Parkway and the Orchard Centre, without directly serving either Milton Park or Harwell Chilton Campus. The perceived advantages of this option are that:

- It could serve Grove en route from Wantage;
- It links Wantage with Didcot Parkway and Didcot town centre, using existing roads; and
- It avoids Rowstock Roundabout.

*7.3.23* The principal disadvantages of this option are:

- It does not serve Harwell Chilton Campus or Milton Park, requiring interchange to other services;
- Re-routing of the service is likely to result in the withdrawal of, or reduction in, the subsidy paid by UKAEA to secure bus services to and from Harwell Chilton Campus
- It does not serve the A417 axis or villages to the south, requiring additional service(s) to be provided; and
- In the absence of bus priority measures, services will be affected by congestion issues in Steventon, at Milton Hill and Milton Interchange.

*7.3.24* On the basis of Concept 1 – retention of the corridor as a second-tier 'Interlink' route in line with the County Council's established bus strategy, and assuming a 60-minute frequency in the core (07.00-19.00) and non-core (19.00-22.00) operating periods on Mondays through Saturdays, with an enhancement to provide an hourly service between 07.00 and 21.00 on Sundays, the Peak Vehicle Requirement would be 2 buses. Indicative operating costs are estimated at £448,000 per annum. Assuming an average fare for the route of £2.00, an average of 546 trips would be required each weekday to achieve break-even.

*7.3.25* Option (c2) would see buses using A338, Steventon Road/Hanney Road, B4017, then operating via A4130 between Milton Hill and Milton Park, continuing to Didcot Parkway and the Orchard Centre. The perceived advantages of this option are that:

- It could serve Grove en route from Wantage;
- It links Wantage with Milton Park, Didcot Parkway and Didcot town centre, using existing roads; and
- It avoids Rowstock Roundabout.

*7.3.26* The principal disadvantages of this option are:

- It is 1km longer than the existing, sinuous route;
- The route does not directly serve Harwell Chilton Campus, requiring customers to interchange to the existing, 2-hourly frequency Newbury Buses service 6/9 in Didcot. This would result in longer journey times. This could however be alleviated by the introduction or adaptation of a service to provide a high-quality, peak period, complementary link on the sector Milton Park-Harwell, either originating from Abingdon to reflect the pattern of peak period movement via B4017 discerned from interview surveys associated with the SATURN model development, or from Didcot – potentially as an extension of the Milton Park shuttle service;
- Re-routing of the service is likely to result in the withdrawal of, or reduction in, the subsidy paid by UKAEA to secure bus services to and from Harwell Chilton Campus;
- It does not serve the A417 axis or villages to the south, requiring additional service(s) to be provided; and
- In the absence of bus priority measures, services will be affected by congestion issues in Steventon, at Milton Hill and Milton Interchange.

*7.3.27* The Peak Vehicle Requirement, estimated operating costs and break-even figures are the same as for the preceding option.

*7.3.28* Option (c3) would see buses using A338, Steventon Road/Hanney Road, B4017, deviating south on A4130/A4185 to serve Harwell Chilton Campus, before following A417 and B4493 via Harwell village to Didcot. The perceived advantages of this option are that:

- It could serve Grove en route from Wantage; and

- It links Wantage with Harwell Chilton Campus, Harwell village and, ultimately, Didcot Parkway and Didcot town centre, using existing roads.

*7.3.29* The principal disadvantages of this option are:

- It is 1km longer than the existing, sinuous route;
- It does not serve Milton Park, requiring interchange to other services;
- Customers bound for Didcot Parkway will be deterred by the significant southbound deviation required;
- It does not serve the A417 axis or villages to the south, requiring additional service(s) to be provided; and
- In the absence of bus priority measures, services will be affected by congestion issues in Steventon, at Milton Hill, at Rowstock Roundabout northbound and southbound, and at Milton Interchange.

*7.3.30* The Peak Vehicle Requirement for this longer route is higher, with 3 vehicles being required in order to operate a 60-minute frequency second-tier service. The estimated operating costs are higher, at over £670,000 compared to £448,000 for the preceding options, as is the break-even figure of an average 819 journeys each weekday assuming an average single journey fare of £2.00.

*7.3.31* Option (c4) is a further variation that would see buses using A338, Steventon Road/Hanney Road, B4017, deviating south on A4130/A4185 to serve Harwell Chilton Campus, returning north and east on A4130 to serve Milton Park en route to Didcot. The perceived advantages of this option are that:

- It could serve Grove en route from Wantage; and
- It links Wantage with Harwell Chilton Campus, Milton Park and, ultimately, Didcot Parkway and Didcot town centre, using existing roads.

*7.3.32* The principal disadvantages of this option are:

- It is 2km longer than the existing, sinuous route;
- Customers bound for Didcot Parkway will be deterred by the significant southbound deviation required;
- It does not serve the A417 axis or villages to the south, requiring additional service(s) to be provided; and

- In the absence of bus priority measures, services will be affected by congestion issues in Steventon, at Milton Hill and at Rowstock Roundabout northbound and southbound, and at Milton Interchange.

*7.3.33* The Peak Vehicle Requirement, estimated operating costs and break-even figures are the same as for the preceding option.

*7.3.34* Route option (d) assumes the construction of a new alignment to replace the Steventon Road/Hanney Road if the Upper Thames Reservoir project proceeds. Bus services could use this new alignment between A338 north of Grove and Steventon village, joining B4017 at the eastern end of The Causeway and routing via Milton Hill, A4130 and Milton Interchange to serve Milton Park before Didcot.

*7.3.35* The perceived advantages of this option are that:

- It would be 11km shorter than the existing Wantage-Didcot route; and
- It would use a new, more direct west-east road alignment that could further assist in reducing journey times.
- It could serve Grove en route from Wantage; and
- It links Wantage with Milton Park, Didcot Parkway and Didcot town centre.
- The principal risk associated with this option is that it is reliant upon the Reservoir scheme being progressed. The timescale for this is unconfirmed. As a consequence, this should be viewed as a longer-term option; the longer timeframe would also enable consideration of schemes to alleviate delays at Milton Hill and on the approach to Milton Interchange.

*7.3.36* Other potential disadvantages of this option are:

- Public transport services may have to share the new alignment with general traffic, notwithstanding the potential impact on the A34 of providing a more direct west-east route for general traffic;
- The route does not directly serve Harwell Chilton Campus, requiring customers to interchange to the existing, 2-hourly frequency Newbury Buses service 6/9 in Didcot. This would result in longer journey times. This could however be alleviated by the introduction or adaptation of a service to provide a high-quality, peak period, complementary link on the sector Milton Park-Harwell, either originating from Abingdon to reflect the pattern of peak period movement via B4017 discerned from interview

surveys associated with the SATURN model development, or from Didcot – potentially as an extension of the Milton Park shuttle service;

- Re-routing of the service is likely to result in the withdrawal of, or reduction in, the subsidy paid by UKAEA to secure bus services to and from Harwell Chilton Campus; and
- It does not serve the A417 axis or villages to the south, requiring additional service(s) to be provided.

*7.3.37* In order to operate a 60-minute frequency service daytime and early evening service, seven days a week, the Peak Vehicle Requirement for operations over this more direct alignment has been calculated to be 2 vehicles. The attendant operating costs are estimated to be similar to those for other options under consideration, at £448,000 per annum, with break-even relying on patronage from 546 users each weekday, paying an average single fare of £2.00.

*7.3.38* Given the broadly straight alignment of the proposed route, paralleling the Great Western Main Line, and the opportunity to provide rapid, direct services linking Grove and Wantage with Milton Park and the railhead at Didcot Parkway, consideration could be given to designating the corridor as a Premium Route. Customers would benefit from a 15-minute frequency service during the core operating hours 07.00-19.00 on Mondays through Saturdays, supplemented by a 30-minute frequency service in the early morning (06.00-07.00), in the late evening to 22.00 and on Sundays. This could be scheduled to connect with train departures and arrivals at Didcot Parkway.

*7.3.39* Route option (e) envisages construction of the new alignment in lieu of the Steventon Road/Hanney Road being to the south of the Great Western Main Line, joining A4130 at Milton Hill, with buses operating through Milton Interchange to serve Milton Park before reaching Didcot. The perceived benefits and disbenefits are similar to those for option (d) above. Again, the principal risk is that construction of a new alignment is reliant upon the Reservoir scheme being progressed. Adoption of a southern alignment could be politically-sensitive, given that the alignment would cross privately-owned land and could potentially sever Church Lane in Steventon.

*7.3.40* The Peak Vehicle Requirement, estimated operating costs and break-even figures are the same as for the preceding option.

*7.3.41* On the basis of this initial analysis, it is recommended that:

- Further detailed assessment be carried out to establish robust patronage estimates, operating costs and the comparative subsidy requirements for the following short- to medium-term route options:
    - b1), involving adaptation of the existing Wantage-Harwell-Didcot service to operate direct via A417 between Wantage and Rowstock Roundabout, then via A4185 to Harwell Chilton Campus, A4130 to Milton Park and Didcot;
    - b3) with services operating via A417, A4130 and Milton Park, complemented by a connecting service to Harwell Chilton Campus with an interchange opportunity in the sector from Rowstock Roundabout to Milton Park Central;
    - b4) as per option b3) but involving a deviation via Featherbed Lane to avoid Rowstock Roundabout; and
    - c2), involving re-routing from Wantage via Grove, A338, Steventon Road/Hanney Road, B4017, A4130 and Milton Park to Didcot, complemented by a connecting service to Harwell Chilton Campus with an interchange opportunity in the sector from Steventon to Milton Park Central.
- Comparative detailed assessments should be carried out to confirm likely patronage and costs for route options (d) and (e), as longer-term options that are contingent upon construction of new highway links.

*7.4* ***Existing and proposed development at Grove***

*7.4.1* Eight possible route options for serving Grove have been identified and these are described below, together with the results of a subjective assessment against the following criteria:

- Coverage of existing Grove village (subtotal: 3 marks);
- Connectivity for centre of proposed new Grove Airfield development (subtotal: 2 marks);
- Connectivity to established facilities - Grove centre shops and Mably Way Health Centre (subtotal: 2 marks);
- Connectivity for work-related travel - to/from Grove Technology Park and light industry in Wantage (subtotal: 2 marks); and
- Dependencies and inter-related issues – this assumes construction of highway alignments as per the Grove Airfield Masterplan (subtotal: 3 marks, with full 3 marks denoting no major dependencies or adverse issues).

*7.4.2* It should be noted that the overall objective is to identify the most efficient route through Grove for core Wantage-Oxford bus services; it is not feasible to serve all parts of the existing and proposed settlements with this core service. It is envisaged that the core corridor will be complemented by other local service(s) and potentially an extended east-west corridor providing a link to Didcot and the employment centres at Milton Park and Harwell Chilton Campus.

*7.4.3* Route option (a) envisages the core Wantage-Oxford bus route continuing to operate via Main Street and Oxford Lane through the existing Grove village. However, this route option would not serve the proposed new development, which would run contrary to current aspirations for Premium Route corridors to connect major development sites with employment, education and other facilities in Wantage and Oxford. The subjective assessment resulted in a rating of 5 out 12 for this route option.

*7.4.4* Route option (b) would see the core route deviating west to operate via Newlands Drive, which forms the western boundary of the existing Grove village and the eastern perimeter of the Grove Airfield site. Although this route option would enable Premium Route services to operate along the edge of the proposed new development, they would not penetrate the new settlement which would restrict the scope to secure new trips generated by development for public transport from the outset. The subjective assessment resulted in a rating of 5 out 12 for this route option.

*7.4.5* Route option (c) is a variation on option b), utilising the proposed road network shown on the Grove Airfield site Masterplans, with buses entering the site via an access at the confluence of Newlands Drive and Cane Lane and serving the proposed new district centre before rejoining the existing road network at the junction of Newlands Drive and Denchworth Road. While this option would enable the perimeter of the existing Grove village and the proposed new district centre to be served, the option does not serve Mably Way Health Centre and involves negotiating the junctions of A338 with Main Street and Main Street with Cane Lane, both of which will be subject to additional traffic movements. The subjective assessment resulted in a rating of 6 out 12 for this route option.

*7.4.6* Route option (d) would see the Premium Route deviating west via Mably Way, enabling the Health Centre to be served, north via Denchworth Road, entering the Grove Airfield site via the access at Newlands Drive/Cane Lane. As with option c) the route would serve the proposed new district centre before rejoining the

existing road network at the junction of Newlands Drive and Denchworth Road. The scope exists to develop high quality 'bus port' interchange facilities – complemented by walking routes and potentially cycle parking to enable and encourage short-distance trips by sustainable modes to the Premium Route boarding point - on Mably Way, at the junction of Cane Lane and Denchworth Road to serve the south-western part of the existing Grove village, at the proposed new district centre, close to the junction of Brereton Drive and Denchworth Road and at the northern end of Main Street (Grove Green). The subjective assessment resulted in a rating of 7 out 12 for this route option.

*7.4.7* Route option (e) envisages services operating via Mably Way, the potential new southern access to the Grove Airfield site, then east via Newlands Avenue, Cane Lane to rejoin the established route northbound at Main Street. This route option is reliant on agreement on the construction of a new southern access to the Grove Airfield site through an area that is earmarked to be retained as an open space. The route would be sinuous in nature, seeking to serve not only the existing development but also the main street within the existing Grove settlement. In addition, the north-western sector of Grove village would not be served. The subjective assessment resulted in a rating of 5 out 12 for this route option.

*7.4.8* Route option (f) represents a variation on option e), with services being routed via Brereton Drive instead of via Main Street. This would mean that, although the newer part of the existing Grove village would be served by the Premium Route, Main Street with its retail and community facilities and the eastern portion of the settlement in the vicinity of Mayfield Avenue would not be served. As with option d), there is scope to serve employment opportunities in the Downsview Road area, although the route will not penetrate further into Grove Technology Park, that is located on the western edge of the Airfield site. The subjective assessment resulted in a rating of 6 out 12 for this route option.

*7.4.9* Route option (g) would involve re-orientation of the Premium Route to run via Mill Street and Denchworth Road on leaving Wantage Market Place, instead of via A338. It would serve the proposed new Grovelands district centre, emerging to run via Denchworth Road and Oxford Lane on the northern periphery of the existing Grove village. Its implementation would mean that the identified Premium Route section via A338 immediately north of Wantage would be abandoned. Mably Way and the Health Centre would not be served and it would be necessary to define access arrangements for the southern end of the Grove Airfield site. Again, this Concept offers potential to develop interchange stops on Denchworth

Road and Oxford Lane, to offset the disadvantage to those living in the vicinity of Main Street and the south-eastern sector of the existing Grove village. The subjective assessment resulted in a rating of 4 out 12 for this route option.

*7.4.10* Route option (h) is a variation on option (f), with services running via A338 on departure from Wantage, then via Mably Way, the new district centre but then following the proposed northern link road to rejoin A338 at Bellingers Garage. This option has the major disadvantage of not serving the existing Grove village. The subjective assessment resulted in a rating of 4 out 12 for this route option.

*7.4.11* In conclusion, it should be emphasised that all eight options represent a compromise in terms of route efficiency and coverage. In order to meet accessibility criteria, it will be necessary to complement the core Wantage-Oxford corridor with a local service that penetrates further into the residential areas in Grove village and on the Grove Airfield site. This could be a variation on the existing Wantage Town service that extends to Grove and Childrey.

*7.4.12* The option deemed to be the most efficient, in the context of the Wantage-Oxford corridor, is option (d) as this would serve the Health Centre on Mably Way and the proposed new district centre, the northern part of the existing Grove village. As stated above, this offers the potential to develop high quality 'bus port' interchange facilities en route – in particular on Denchworth Road close to its junction with Brereton Drive and at Grove Green (the confluence of Main Street, Oxford Lane and Denchworth Road), augmented by walking and cycling routes and cycle parking to enable and encourage short-distance trips by sustainable modes to these Premium Route boarding points.

# 8 APPENDIX 2: ACCESSIBILITY INFORMATION

*8.1.1* A series of 'existing situation' assessments of accessibility from the Wantage and Grove area has been carried out to illustrate the current ability of residents of the area to gain access to some key employment locations.

*8.1.2* Assessments have considered journey opportunities from a study area broadly encompassing Wantage and Grove to the west and Didcot to the east, with Chilton at the southern edge and Abingdon to the north.

*8.1.3* Destinations representing key employment locations included:

- Abingdon (centre);
- Didcot (centre);
- Harwell IBC;
- Milton Park; and
- Oxford (city centre).

*8.1.4* The assessments were carried out using Accession ™, with a set of Traveline bus timetable information for Oxfordshire from 24th November 2006 (in ATCO.CIF format). Accession ™ runs considered the weekday morning peak travel period, using Tuesday 07:00-09:00 as the modelled period.

*8.1.5* An additional test was carried out for Oxford city centre with both bus and rail services, using rail timetable information from the 2006 snapshot in the National Public Transport Data Repository (week of 9th-15th October 2006.

*8.2* ***Results***

*8.2.1* Figures 4.1 to 4.5 show plots of journey contours for accessibility by bus (including origin and destination walking times) to Abingdon, Didcot, Harwell, Milton Park and Oxford city centre respectively. Figure 6 shows a similar contour for Oxford city centre with the addition of rail services.

*8.2.2* Figure 4.1 indicates that the whole of Grove and Wantage are within 30-60 minutes travel time of the centre of Abingdon, whereas Figure 2 shows that bus

services to Didcot are slower, with only some of Wantage being within 30-60 minutes, with the remainder of (western areas of) Wantage and the whole of Grove being over 1hour travelling time to central Didcot.

*8.2.3* Journey times to the key employment centres of Harwell IBC and Milton Park show mixed accessibility results, as shown in Figures 3 and 4. Journey times from (a small) part of Wantage to Harwell IBC are under 30 minutes, with Grove and the remainder of Wantage and all less than 1 hour. However, journey times to Milton Park from Wantage are over 1 hour long, though between 30 and 60 minutes from Grove (which suggests that Accession ™ is routeing people from this area via an interchange in Abingdon).

*8.2.4* Current bus services between Wantage and Grove and Oxford are currently good, and as such the journey times to Oxford city centre from both Wantage and Grove are reasonable, between 30 and 60 minutes for all except the eastern and western fringes of Wantage (Figure 5).

*8.2.5* Adding rail services to this assessment (Figure 6) makes no difference to journey times from Wantage and Grove to Oxford city centre. Rail services are faster than buses between Didcot and Oxford, which manifests in improved accessibility journey times from Didcot to Oxford city centre with the rail services included. However, while the assessment in Figure 6 has focused on accessing Oxford city centre, it is worth noting, as indicated in Figure 2, that access to central Didcot (and hence the Didcot Parkway rail station) is relatively poor. This effectively makes access by bus for interchange with rail at Didcot unattractive from Wantage and Grove.