1.0 Introduction

CH2M have been appointed by the Environment Agency to deliver the design, statutory Environmental Impact Assessment and planning elements of the Oxford Flood Alleviation Scheme (OFAS) (known as ‘The Scheme’).

The Scheme aims to:

• Reduce flood damages to at least 1000 homes and businesses currently at risk in Oxford;
• Reduce flood impacts on transport infrastructure and utilities in Oxford, particularly to Botley and Abingdon Roads, the railway line and the sewerage system;
• Safeguard Oxford’s reputation as a thriving centre of commerce that is open for business; and
• Create and maintain new recreational amenities, wildlife habitat, and naturalised watercourses accessible from the centre of Oxford.

The Scheme will consist of the construction of a two-stage channel. The first stage channel will replace some of the existing watercourses and ditches and will flow all year. When river levels are normal, or lower, the second stage of the channel will be mostly dry although when river levels are sufficiently high, water will flow along it.

The works involve the construction of various new defences such as bunds and walls together with many new culverts, bridges and other small structures that are required to maintain access routes.

As part of the planning application and consenting process, a Transport Assessment (TA) has been produced along with a Construction Traffic Management Plan (CTMP). These have been submitted to the Local Planning Authority.

During the consultation phase of the planning application several highway and transport related matters have been raised by the Local Highway Authority, Highways England and Oxford City Bus. Further detail is provided on these matters in a series of supplemental technical notes. This note considers concerns raised by Highways England which focus upon two main aspects outlined below.

1. The temporary closure of Old Abingdon Road and Kennington Road and any impacts associated with the reassignment of traffic at Hinksey Hill Interchange
2. The safe access to the highway at the South Hinksey Junction of the A34
2.0 Closure of Old Abingdon Road and Kennington Road

During the proposed scheme, Old Abingdon Road and/or Kennington Road will be closed for a total period of up to 15 months for bridge works, provisionally scheduled for the final quarter of 2020 and through to the end of 2021. It is intended that the roads will be closed sequentially such that one remains open whilst the other is closed however it should be noted that both roads may need to be closed concurrently for approximately two months to allow services to be diverted. The works will also involve the closure of the Old Abingdon Road and Kennington Road junction for approximately half of the period whilst the new bridge below Kennington Road is installed. During this time, the recommended diversion route for traffic will be via the A423 Southern By-Pass and the A4144 Abingdon Road.

2.1 The need for the closure of Old Abingdon Road and Kennington Road

The proposed closures of Old Abingdon Road and/or Kennington Road are required to construct new bridges beneath the carriageway. During the design period, several options for the bridges were considered though these were narrowed down to two options, which were consulted upon during the pre-planning stage. These were:

- Option 1 (dog-leg option): This requires the construction of culverts beneath both Old Abingdon Road and Kennington Road in a ‘dog-leg’ to avoid the Old Abingdon Road Norman Causeway, a nationally significant monument beneath the highway. As set out in the TA, this option will likely require the closure of Old Abingdon Road and/or Kennington Road for a period of up to 15 months. This option forms part of the proposed scheme, as included in our planning submission.

- Option 2 (straight through): This option would involve the installation of the culvert through the Old Abingdon Road Norman Causeway, which it is believed could be constructed without harm to the monument. This option would require a much-reduced highway closure of just seven months, less than half that of option 1.

During the pre-planning stage, advice provided by Historic England and the Planning Authority effectively eliminated option 2 considering the risk to the Causeway was too great. The Planning Authorities archaeologist noted that:

“the Norman Causeway at Old Abingdon Road which is an asset of national significance (and for which there are few continental parallels of comparable date and character). The line of the causeway may have Roman and or Saxon origins and the presence of earlier fabric or structures cannot be discounted”

Pre-planning advice also noted that

“Historic England have assessed the impact of the direct route through the causeway (in the Pre-application Statement option 1- the eastern option located within the Oxford City boundary) as constituting substantial harm to the asset and the western route (option 2- located within the Vale of the White Horse) as constituting less than substantial harm and therefore preferable.”

The conclusion of the pre planning advice, and thus the driver of the decision to pursue option 1 stated that:

“should the applicant wish to proceed with option 1 (as set out in the Pre- application Statement) they would need to demonstrate that that this option would produce a substantial public benefit in comparison to option 2 that would outweigh the substantial harm to the asset and the “great weight“ to be given to the conservation of the asset in the decision process”

Although option 1 presented the most cost effective and least disruptive alternative it could not be proven that it provided a “substantial benefit” over option 2. Therefore, the design team had no alternative other than to pursue the currently proposed, dog-leg option requiring lengthier temporary road closures.
The original proposal was for a single skewed culvert crossing below the junction, this would have resulted in the whole junction and both roads being closed for the duration of the 15 months. By changing the design to two separate bridges the closures can be split between the roads to reduce the overall impact to the traveling public and keep the junction open for longer.

2.2 Main impacts of closures identified by the TA

During the closure, access along Old Abingdon Road for local residents, including the Redbridge Traveller site and local businesses will be maintained during the works. This will be achieved from either end of Old Abingdon Road. During the works, it is likely that the new HWRC at Redbridge Park and Ride site will be open and access is likely to be via Old Abingdon Road.

Also, as part of the TA, an assessment which redistributed traffic around the network as a result of this closure was undertaken. This spreadsheet analysis suggested the main changes are likely to be:

• The largest variation in volume will be in the eastbound direction along the A423 Southern By-Pass Road and northbound along the A4144 Abingdon Road near Redbridge Park and Ride. This reflects that Old Abingdon Road is used as a ‘rat run’ between the Hinksey Hill Interchange and Abingdon Road. It also forms the main route from Kennington towards Oxford City Centre. Traffic is likely to use Old Abingdon Road west of the bridge and then loop along the A423 Southern By-Pass Road;

• There will be less change in westbound traffic flows along the A423 Southern By-Pass and southbound along the A4144 Abingdon Road. This is the currently the most direct route from traffic heading south of Oxford City Centre along Abingdon Road towards the A34 southbound; and

• There will be an increase in movements along A423 Southern By-Pass Road in the direction of Kennington as a result of the bridge closure.

It should be noted that this assessment did not show the very localised movements along Old Abingdon Road associated with access to side streets, local businesses and services. There may be increased journey times for these trips as vehicles will be required to ‘loop’ around via the A34 Hinksey Interchange, the Kennington Roundabout and the A423 Southern By-Pass. However, such movements form only a small portion of those along Old Abingdon Road. Figure 2.1 overleaf shows the changes in flows around the network as a result of the road closures with traffic growth applied.
Figure 2.1 – 2018 AADT traffic flows during Old Abingdon Road Closure
3.0 South Hinksey Access

The main works area, known as Area 3 in the TA, is located to the east of the A34 and will host the main compound and site office. It will be accessed via an existing field gate along Parker Road 30m south of the roundabout of the A34 slip roads and Parker Road. This access will be connected to the internal haul road and will thus take a large portion of site traffic from Areas 2, 3 and part of 4. For ease of reference the access drawings included in the TA, numbers IMSE500177-CH2-LAT-A4A-VS-PL-0006 and IMSE500177-CH2-LAT-A4A-VS-PL-0007 are included in Appendix A of this note.

The access has been used by the OFAS team to enter and exit the site for preparatory works such as surveys and detailed ground investigations. This entrance/exit benefits from providing easy access to the A34 for the distribution of excavated material while avoiding the need for HGV movements through South Hinksey or North Hinksey villages.

The TA included a significant amount of information relating to this access. This included vehicle tracking which demonstrated that, following the minor relocation of a field access gate, vehicles will be able to enter and exit the access unhindered, although in single file. This generated the need for access controls to ensure conflicts do not arise. This will involve holding vehicles within the site compound until such a time where a sufficient window is available to exit onto the public highway.

The TA also provided a Stage One Road Safety Audit (RSA) and a companion designers response, which were completed in accordance with HD 19/15.

Furthermore, the TA identified that there is potential for issues with traffic merging with the A34 at South Hinksey Interchange due to the short merge lengths. It is noted that during busy periods, the delays can be caused for merging traffic. While it is recognised that the merge lengths are below modern standards set out in DMRB 6.2.1 TD 22/06, the temporary impacts associated with the scheme are unlikely to justify lengthening works. However, it did note that any impacts by the works would be identified via the Transport Management Working Group as defined by the Outline CTMP proposed in section 7.2.4 of the TA.

Table 5.3 of the TA identifies that 44.8% of vehicles associated with the construction of the scheme will use this access. It also presents this in terms of HGV movements, which are expected to total 100 per day, or 17 per hour assuming HGV traffic movements are restricted to hours between 10am and 4pm.

4.0 Concerns Raised by Highways England

This section discusses in detail the concerns raised by Highways England providing further detail beyond that included in the TA.

4.1 Matter 1 – Closure of Old Abingdon Road

Highways England are concerned that the closure of Old Abingdon Road will result in an increase in traffic movements through Hinksey Hill Interchange with a resultant detrimental impact upon the safety and efficiency of the Strategic Road Network (SRN).

4.1.1 General

The need for such an extensive and lengthy closure has been driven by Historic England due to the nationally significant Old Abingdon Road Norman Causeway (Scheduled Monument) located beneath the highway rather than a design solution decision, as discussed in section 2.1. As such, there is nothing further which can be done to the final solution and associated need to close Old Abingdon Road and Kennington Road for such a lengthy but temporary period whilst still meeting the scheme objectives.
Also, it should be noted that the TA, as is typical for this type of document, presents a worst-case scenario when considering the duration of the closure. The 15 months suggested in the TA is the very longest Old Abingdon and Kennington Roads are likely to be closed. Following discussions with contractors during the ongoing tender period, it is likely this will be reduced by half to approximately seven months with the overlap during which both are closed to be kept to a minimum. Therefore, any impact on Hinksey Hill Interchange is likely to occur over a shorter period than identified in the TA.

4.1.2 Traffic Flows

Considering the movements through Hinksey Hill Interchange in detail the TA presents the traffic flows during construction following the road closure. The following section provides more context surrounding these flows. Note that the following section does not include traffic growth although, as construction is planned to begin in 2019, pending planning approval, the impact of its inclusion will be minimal.

Isolating Hinksey Hill Interchange the base turning count data used to inform the TA is shown in figure 4.1 below. This was provided by Oxfordshire County Council.

Figure 4.1 Hinksey Hill Interchange turning count data

Figure 4.2 below provides the turning count data for the junction of the A423 and Kennington Road.
Figure 4.3 below simplifies the information provided in figures 4.1 and 4.2 providing AADT movements associated with Hinksey Hill Interchange, the junction of the A423 and Old Abingdon Road and the A423 with Kennington Road in a single visual.
Figure 4.3 Combined Hinksey Hill Interchange and Old Abingdon Road flows
During the works there will be a maximum of three combinations of road closures, those being

- Closure of Old Abingdon Road only
- Closure of Old Abingdon Road and Kennington Road
- Closure of Kennington Road only.

This note considers the most disruptive situation, the short period during which Old Abingdon Road and Kennington Road are closed concurrently. Figure 4.4 overleaf indicates the changes in local AADT flows because of this scenario. It should also be noted that the note assumes that all trips occur as prior to the closures.
Figure 4.4 Traffic flows during closure of Old Abingdon Road and Kennington Road
Comparing the number of u-turning vehicles at Hinksey Hill Interchange in the existing scenario (633) with that of the ‘closures’ scenario (3,815) shows an increase of 3,182 vehicles over a full day. Using the general 11% proportion discussed earlier this will lead to an increase of approximately 350 u-turners during the peak periods equating to one vehicle every 10 seconds.

Placing this increase in context, there will be a total of 49,561 movements through the junction on an average day. Thus, the increase of 3,182 represents only 6.4% of the total traffic. Therefore, we do not believe that such a proportionally small, temporary increase can be considered severe when set against the wider benefits of the scheme.

4.1.3 The Need for Further Work

When considering the need for further work, along with the traffic flow analysis above, it should be borne in mind that Oxfordshire County Council who, as the Local Highway Authority, will bear much of the consequence of construction related disruption, is of the opinion that “it would appear that without significant works to either Kennington Junction or Hinksey Hill Interchange, we cannot achieve any additional capacity for the duration of the OFAS works. Therefore, we have concluded that given the effects of OFAS will be temporary there would be no merit in pursuing the modelling work. “

Despite this, and the supplemental information set out above, Highways England are of the opinion that capacity modelling of Hinksey Hill Interchange is necessary to determine the impact of the scheme. Discussions have been held to resolve this issue, Oxfordshire County Council have offered the use of a recently validated microsimulation model of the Interchange, operated on their behalf by Atkins. We are currently agreeing the scope of the modelling with the relevant parties. During discussions Highways England and Oxfordshire County Council Transport Planners have agreed that there are mitigation solutions that can be applied to reduce the impact of the temporary road closures. Mitigation solutions discussed have included the traffic light sequencing/timings; provision of temporary signage before, during and after the disruption; and extending the speed restrictions on the A34. These mitigation options would need to be agreed with Oxfordshire County Council, Highways England and the Police, as appropriate.

4.2 Matter 2 – A34 South Hinksey Junction

Highways England appear to have two general concerns relating to the operation of the main construction access described in section 3.0 of this note. The first surrounds the proximity of the proposed access to South Hinksey junction and the potential for any entry queues to extend and block the junction. The second is associated with the increase in HGV traffic merging with the A34 and the impact this may have upon its operation.

4.2.1 Area 3 Access

As the site access is capable of only single file movements into and out of the access, Highways England are concerned that, due to vehicles exiting, approaching HGV traffic may be forced to wait along Parker Road. They believe this presents a risk that queuing traffic may block back to the A34 South Hinksey junction preventing its efficient operation. This in turn may prevent vehicles entering the junction from the A34 southbound off slip eventually leading to the back of the queue reaching the A34 mainline.

As discussed above, and in the TA, the predicted flows for this access total 100 per day, or 17 per HGV operational hour. Given this extremely low flow, it is very unlikely that more than one HGV will arrive at the access at any one time. Thus, the risk of any queuing traffic outside the access, waiting to enter is also very low. In the unlikely event that more than one vehicle arrives at any one time, the length of
highway between South Hinksey junction and the site can accommodate two HGVs prior to blocking back occurring. Based upon a frequency of 17 per hour, one every 3.5 minutes, this provides a window of 7 minutes to enable vehicles to enter the site before queues extend to South Hinksey junction. This window is more than sufficient to ensure that blocking back of the A34 does not occur.

To further reduce the risk of such an occurrence, as set out in the outline Construction Traffic Management Plan (CTMP) section 7.2 of the TA supporting the application a delivery management system offering positive control of site traffic will be in place for the life of the construction programme. Further detail of this type of system is provided below although it should be recognised that the chosen contractor may operate a different methodology to achieve the same goal. A delivery or vehicle management system, such as that provided by Datascope, is proposed to be used to monitor construction vehicle movements and ensure timely arrival and departure of vehicles. Such a system allows the active management of site traffic to ensure vehicles only approach or leave the site at specific times. Clearly such specific control over site traffic will assist in ensuring that the site access is clear of vehicles in the knowledge that a HGV is approaching along the highway, allowing the vehicle to enter the site immediately or following a very short wait. Should any on site activity prevent the vehicle from entering, particularly should any emergencies occur, the positive control of site traffic would enable direct communication with drivers and the diversion of HGVs to alternative access points. This removes the risk that short notice closure of the access may result in a queue of site vehicles along the highway.

4.2.2 A34 Merge and Diverge

In the context of the A34 merge and diverge, Highways England have raised concerns relating to the potential increase in HGV traffic using the short slip roads leading to an increase in safety risk. The merge and diverge lengths of this junction with the A34 have been identified as potential issues during construction. The southbound on slip has a merge length of 90m while the northbound on slip has a merge length of 95m. Diverge lengths are 145m southbound and 95m northbound respectively. This is of particular concern should HGV traffic ‘platoon’ onto the highway.

As outlined above, the number of HGVs predicted to use the access off Parker Road, thus using South Hinksey junction, are expected to total 100 HGVs per day, or 17 per hour. This is two-way traffic, thus a maximum of 9 per hour will use either a merge or diverge. Therefore, the risk of platooning of HGV traffic onto the A34 slip roads is considered very low. Furthermore, the active delivery and HGV management facility discussed in section 4.2.1 above would operate to prevent this type of platooning by controlling movements into and out of the site at the point of access.

Thus, it is believed that the low flows, allied with the active elimination of HGV platoons will not detrimentally impact upon either the efficiency or safety of the A34. This is supported by the collision analysis provided in the TA, which did not identify any collision history at South Hinksey junction that would be exacerbated by the development.

Nevertheless, to address any perceived safety issues, it is proposed to temporarily extend the existing 50 mph current in place in the vicinity of the Botley Interchange, southwards to cover South Hinksey. This will have a twofold effect of improving both the safety and efficiency of the A34 in the area. The reduced speed of mainline vehicles will ease pressures on merging and diverging traffic at South Hinksey by limiting the necessary acceleration and deceleration need to either match the speed of traffic or give way at the end of the off slips. The lower vehicle speeds will also reduce stopping distances on the A34 mainline. Aside from these direct benefits to scheme traffic there would also be ancillary benefits to the SRN in general such as an increase in the efficiency of the highway and an improvement in air quality.

The precise limits of the temporary extension will be agreed with the Police and Highways England prior to the commencement of works.

Any further mitigation works at South Hinksey beyond that identified either above or in the TA would likely require significant construction works. This would add considerable cost resulting in the wider
scheme becoming unviable leading to its cancellation. As discussed above in relation to Hinksey Hill Interchange, this would not only be contrary to the NPPF but also leave Oxford and the surrounding area, including the highway network, at risk of continued flooding for the foreseeable future.

5.0 Conclusion

This technical note provides further detail above that presented in the TA in relation to the concerns raised by Highway England. Work to satisfy concerns surrounding the impacts at Hinksey Hill Interchange are ongoing and the parties involved have agreed that there are possible solutions for mitigation. The supplemental information submitted in respect of South Hinksey Interchange demonstrates that the impacts on the SRN will be minimal at this location and could not be deemed ‘severe’ in terms of NPPF. Thus, as NPPF states that “Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe”, aspects relating to South Hinksey Interchange should not result in an objection to the application.
1. All dimensions are in millimetres unless otherwise stated. All levels are in metres above Ordnance Datum (mAOED) Newlyn.

2. Proposed haul route/working areas

3. Vehicle tracking wheel tracks

4. Vehicle tracking body outline

5. Proposed compound areas

6. Existing gate to be removed. Part of the area is designated as the working area.

7. Approximate new location shown in red.

Insert 1 - FTA Design Articulated Vehicle (1998) entering access from Parker Road

Inset 2 - FTA Design Articulated Vehicle (1998) exiting access from Parker Road

1. Proposals and details shown are preliminary and indicative.

2. Based on OS base mapping

3. Do not scale from drawing

4. Designs may be amended during detailed design phase on contractor appointment

5. HGVs associated with the OFAS will only approach and leave the site to the north.

Traffic held with compound should inbound vehicle approach

A34

Parker Road

2.4m x 43m visibility splay based on 30mph (MfS)

Temporary chicane required and will be part of the work. This zone is to be extended to meet the design criteria between the roundabout and this location.

Diagram Scale 1:250 AT A1

Traffic held with compound should inbound vehicle approach

A34

Parker Road

3. Existing gate to be removed. Part of the area is designated as the working area.

Approximate new location shown in red.

Existing gate to be removed. Part of the area is designated as the working area.

Approximate new location shown in red.

Traffic held with compound should inbound vehicle approach

A34

Parker Road

2.4m x 43m visibility splay based on 30mph (MfS)

Temporary chicane required and will be part of the work. This zone is to be extended to meet the design criteria between the roundabout and this location.
1. All dimensions are in millimetres unless otherwise stated. All levels are in metres above Ordnance Datum (mO.D). Newlyn.

2. Proposed haul route/working areas.

3. Vehicle tracking wheel tracks.

4. Vehicle tracking body outline.

5. Key:

   - Proposed haul route/working areas
   - Vehicle tracking wheel tracks
   - Vehicle tracking body outline
   - Proposed compound areas

Notes:

1. Proposals and details shown are preliminary and all drawings are indicative.
2. Based on OS base mapping.
3. Site data to be updated.
4. Designs may be amended during detailed design phase on contractor appointment.
5. HGVs associated with the OFAS will only approach and leave the site via the south.

General notes:

1. All distances are in kilometres unless otherwise stated. All levels are in metres above Ordnance Datum (mO.D). Newlyn.

Scale: 1:250 at A1

Traffic held with compound should inbound vehicle approach A34.

Inset 1 - Large tipper entering access from Parker Road

Inset 2 - Large tipper exiting access from Parker Road

Traffic held with compound should inbound vehicle approach A34.

Inlet 1 - Large tipper entering access from Parker Road

Inlet 2 - Large tipper exiting access from Parker Road