# transport planning practice

# **Richmond Education and Enterprise Campus**

# A316/Langhorn Drive Signal Controlled Junction Proposals – Justification of Traffic Signals

#### Introduction

- 1. The note sets out the justification for the proposals to implement changes to the existing A316/Langhorn Drive junction, converting it from a left-in / left-out priority junction to a signal controlled junction which accommodates a right turn out from Langhorn Drive on to the A316.
- 2. The proposals for the junction form part of the wider redevelopment of the Richmond College site. This redevelopment of the site will provide a new educational facilities referred to as the Richmond Education and Enterprise Campus (REEC) together with an enabling residential development. The REEC will incorporate:
  - Replacement college (catering for a similar number of students as the existing college, 3,000 daytime students)
  - Secondary school (750 students)
  - Special educational needs school (115 students)
  - Tech hub for Haymarket Media (1,000sq.m of B1 use)
- 3. The residential element of the scheme will provide up to 180 dwellings.
- 4. The proposals to signal control the A316/Langhorn Drive junction, incorporating a right turn onto the A316, has the support of the LB Richmond upon Thames in respect of highway officers and local ward councillors.

## **Existing situation**

5. Langhorn Drive is a private cul-de-sac road with direct access onto Chertsey Road (A316). It is owned and maintained by Harlequins RFC. It provides access to various uses including the Stoop Stadium, Richmond College, Nuffield Health Centre, a vehicle depot for Richmond's commercial vehicle fleet (Central Depot), and residential apartment blocks. The route to and from the A316 is the sole means of access to the stadium and residential blocks. However, the college has additional access points on Egerton Road, staff and users of the Nuffield gym have exclusive use of a barrier controlled exit route which connects Langhorn Drive to Craneford Way, and the Central Depot has an emergency access on Craneford Way.

#### **Highway network**

6. The A316 is a key radial route into London which forms part of London's strategic highway network referred to as the Transport for London Route Network (TLRN), for which TfL are the highway authority. Within the vicinity of the site, Chertsey Road forms

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part of the A316. The road has a speed limit of 40mph and automatic traffic counter data surveys indicate that in the vicinity of the Langhorn Drive junction the  $85^{th}$  percentile speed is 44mph.

7. Whitton Road Roundabout is situated approx. 500m to the northeast of the junction of the A316 and Langhorn Drive, whilst the Hospital Bridge Roundabout is situated approx. 1.8km to the southwest of the junction. All roads which join the A316 between these two signal controlled roundabouts operate as left-in/left-out priority junctions. There five pedestrian crossing points on the A316 between the two roundabouts. The crossings include three footbridges, one subway and one at-grade pelican crossing. The stepped ramp footbridge adjacent to the Langhorn Drive junction connects with north-south pedestrian routes running south past the college site and north into the residential areas and on towards Hounslow. The next crossing to the east is a pelican crossing which is approx. 350m from the junction. To the west the next crossing is a subway which is approx. 800m from the junction. The key junction and pedestrian crossing points are shown in Figure 1 (attached).

#### Surveys

- 8. As part of the transport study for the REEC proposals turning counts were undertaken at the A316/Langhorn Drive junction during a weekday morning and evening peak hour periods on Thursday 9<sup>th</sup> October 2014. ATC data was also collected for vehicle speeds and flow on the A316 and Langhorn Drive for a week long period in October 2014.
- 9. This data was supplemented with the results from questionnaire interview surveys undertaken in March 2015. An interview survey of drivers joining the A316 from Langhorn Drive and drivers entering Langhorn Drive from the A316 was undertaken to determine whether they would have used a right turn facility at the junction when making the journey they were about to start (i.e. exiting from Langhorn Drive) or just about to complete (i.e. arriving from the A316). The surveys were undertaken between 7am and 10am, and between 4pm and 7pm during one weekday.
- 10. The survey company used the questionnaire answers to determine the likely directional split of traffic arriving from the A316 and those joining the A316, if right turn facilities were provided at the junction. The results of the directional split assessment are provided in Figure 2.



#### Figure 2: Traffic directional split at A316 / Langhorn Drive junction



## Impact of development proposals

- 11. As a result of the development proposals, movements at the A316/Langhorn Drive junction will change. The trip generation assessment within the Transport Assessment for the development indicates that vehicle trips on Langhorn Drive will increase from 100 to 273 vehicle movements per hour (two-way) in the AM peak hour, and from 110 to 287 vehicle movements per hour (two-way) in the PM peak hour. Although the existing left-in / left-out priority junction could accommodate the increases, the main negative implication of the increase in vehicle movements would be the increase in the number of eastbound vehicles from the site having to U-turn at the Hospital Bridge Roundabout (to the west). These vehicles unnecessarily add to congestion at the roundabout and are forced to undertake additional mileage i.e. 1.8km to the roundabout and the 1.8km trip back to the junction, before making progress towards their destination. The increased congestion and additional mileage creates unnecessary CO2 emissions.
- 12. The intensification of development at the site will also result in additional pedestrian and cycle movements at the A316/Langhorn Drive junction. The assessment of these movements set out in the Transport Assessment shows the increase in pedestrian cycle movements passing through the junction as summarised in Table 1. The bulk of the pedestrian and cycle movements are crossing the A316.

Time period	Existing College movements		Future REEC and residential development movements		
	Pedestrian	Cycle	Pedestrian	Cycle	
08.00-09.00	54	10	292	45	
16.00-17.00	14	3	81	16	

Table 1: Existing and proposed pedestrian and cycle movements generated by thedevelopment site which passing through the A316/Langhorn Drive junction

- 13. The Marsh Farm Lane footpath, which is currently narrow (1.5m) and overgrown, will be improved as part of the development proposals. This will mainly involve widening the path to 3m, but it will also benefit from being overlooked in places by the redeveloped site and being regularly used by students (during weekdays at term times).
- 14. As a result of the improvement the path is expected to attract greater use from residents in the surrounding area who may well have used alternative north-south routes because the condition of the existing Marsh Farm Lane route makes it unattractive for many potential users.

## Junction options

15. To take into account the intensification in movements and facilitate right turn movements at the junction various options were considered, as follows:

#### Priority junction options

16. A priority junction arrangement was considered and ruled-out early due to several reasons, with the key reasons being as follows:



- The 85<sup>th</sup> percentile speed of the A316 in the vicinity of the junction is 44mph. Such a high speed could give rise to road safety concerns for vehicles attempting to turn right at the junction with a give-way arrangement.
- The provision of the right turn facility would result in the removal of a section of the pedestrian barrier in the central reserve. This could give rise to pedestrians attempting to cross the A316 at-grade where no pedestrian crossing facilities exist and hence road safety concerns.
- The A316 would need to be widened substantially in order to provide a holding area where a right turning vehicle could wait in the central reserve area before joining the eastbound traffic lane, without affecting the outside traffic lanes in either the eastbound or westbound directions.

#### Signal controlled junction options

- 17. Two signal controlled junction arrangements were considered as part of the feasibility study. Both options incorporate an at-grade crossing on the A316, with the footbridge removed. The crossing is provided on safety grounds since it would be difficult to prevent pedestrians attempting to cross at-grade if a formal crossing is not provided, since the existing pedestrian barriers will be removed (to create junction) and the traffic signals will create breaks in the traffic flows providing the opportunity for pedestrians to take risks. Therefore, it is appropriate to accommodate the pedestrian desire line with a crossing facility.
- 18. Both options involve land take to accommodate the widening of Langhorn Drive on the approach to the junction with the A316. One junction option allowed for all movements i.e. left-in, left-out, right-in & right-out. However, this option was ruled out since to accommodate the additional right turn lane on the A316, whilst maintaining the other lanes would result in extensive widening along the A316. The widening would result in potentially extensive utility costs and works to the culvert under the A316 (carrying the Duke of Northumberland's River). There would also be land take involving third parties which significantly adds to the project risks.
- 19. The options investigated were discussed with TfL at the feasibility stage and the preferred option identified and agreed. The junction option taken forward shown in dwg no. 30713/AC/038 rev C provides a signal controlled junction arrangement which allows for left-in & left-out movements and also right-out movements from Langhorn Drive. The right turn movement to Langhorn Drive is not accommodated in the junction proposal. The main advantage of this option is that no widening is required to the A316, hence minimising the impact on buried utilities and the culvert. There would also be no requirement to use third party land.

#### **Junction Capacity Assessment**

20. The operation of the signal junction arrangement was tested using the Department of Transport junction capacity modelling program Linsig for the morning and evening peak hour periods in the future year of 2036, which takes into account traffic growth and committed development. The trip generation assessment, committed development assumptions and junction capacity assessments are set out in the Transport Assessment. The results of the junction capacity analysis are provided in Table 2.



- 21. The degree of saturation (DoS) in Table 2 is a measure of the road capacity at the junction, whereby 100% is theoretical capacity. It is typical for highway authorities to seek that the modelled DoS does not exceed 90% for new junctions in order for them to be acceptable.
- 22. The results in Table 2 demonstrate that the proposed junction will operate satisfactorily with sufficient spare capacity during typical weekday morning and evening peak hour periods, where the peak DoS does not exceed 80%.

	AM peak		PM peak	
Approach arm	Degree of saturation	Mean max queue	Degree of saturation	Mean max queue
A316 (westbound) - ahead & left	72%	15	80%	20
A316 (westbound) - ahead	70%	17	80%	22
Langhorn Drive – left	22%	1	54%	3
Langhorn Drive – right	44%	2	63%	3
A316 (eastbound) - ahead	76%	19	73%	17
A316 (eastbound) - ahead	77%	21	73%	19

 Table 2: Linsig results for proposed A316/Langhorn Drive junction

#### Future intensification of the use of Langhorn Drive

23. At present there are no published plans for redevelopment of any of the other sites served by Langhorn Drive. However, it is important to note that the Council's Central Depot site appears in the Site Allocations DPD, in addition to the Richmond College site. The Council's preferred use and justification are as follows:

#### "Proposal

*Council Depot facilities and continued waste management. Use of part of the site for, sports hall/leisure or other ancillary education facilities or limited residential, including affordable units or small business units* 

#### Justification

To improve and rationalise the Council's existing depot facilities, and repositioning, intensification and improvement of the waste and recycling facilities. Possible development if surplus space of leisure /sports facilities or other ancillary education facilities to be used in conjunction with nearby educational facilities. In the event that sports hall/leisure uses are not proposed, limited residential use, including affordable or small business units, may be considered. Any new uses to be subject to compatibility with ongoing waste treatment. Pump house to be retained in any new scheme and improvement and extension of the public open space adjoining the Duke of Northumberland River and the backdrop to the Craneford Way playing fields.

Any intensification of uses is likely to require the provision of a signalised junction between Langhorn Drive and the A316, subject to TfL approval. Vehicular access from Craneford Way should be kept to a minimum. "

24. The Stoop Stadium site also appears in the Site Allocations DPD. The policy document indicates that the Council would support intensification of this site with uses complementing the stadium use.



- 25. There are no submitted planning applications for redevelopment/intensification of the stadium or depot sites. However, the Council envisages that plans will come forward in the future.
- 26. The proposed signal controlled junction has spare capacity in both the AM and PM peak hour periods which could facilitate intensification of the stadium and depot sites. Albeit proposals for these sites may in fact increase trips outside of the normal weekday morning and evening peak periods.
- 27. At this stage it is not feasible to assess whether proposals brought forward will significantly increase movements at the junction. However, it is highly likely that there will be an increase in vehicle, cycle and pedestrian activity which would benefit from the main access junction on the A316 being signal controlled.

#### Benefit of the proposed changes to the A316 / Langhorn Drive Junction

- 28. The key benefits of the proposed signal controlled proposals at the A316/Langhorn Drive junction are as follows:
  - Right turn facility from Langhorn Drive will reduce abortive mileage (3.6km) by eastbound drivers having to U-turn at the Hospital Bridge Roundabout. This will save on CO2 emissions and reduce delays at the roundabout.
  - When matches are taking place at the Stoop Stadium the traffic flows on Langhorn Drive significantly increases, as does traffic flows on the A316. As a result, the benefit of the right turn facility from Langhorn Drive to the A316 becomes more prominent.
  - The provision of an at-grade crossing on the A316 avoids the need to use the stepped ramp footbridge which is not ideal for people with wheelchairs, pushchairs and mobility impairments.
  - The at-grade crossing on the A316 provides a more user friendly crossing facility for cyclists, instead of the stepped ramp footbridge.
- 29. The north-south Marsh Farm Lane shared footway/cycleway will be significantly upgraded as part of the development proposals. The route will be widened from 1.5m to 3m, it will become less secluded and greater use of the path will arise due to its direct relationship to the new residential homes and the new college site. Marsh Farm Lane will also be extended through to the Twickenham Station with new footpath links across the former Twickenham Sorting Office site and land known as the Twickenham Rough. As a result of these factors the number of people wanting to cross the A316 at this location is likely to increase, and the provision of an at-grade signal controlled facility is the most ideal arrangement to accommodate the crossing movements.

#### TfL Management System Document – Justification for Traffic Signals

30. TfL provides guidelines to set out an objective justification for the introduction of new signal installations in London in order to try and provide consistency in their approach. Notwithstanding this, each site needs to be considered on their own merits since there are a wide variety of constraints and factors which can influence the type and form of junctions.



- 31. The TfL guidance documents states that for a new junction, the justification is based on the following criteria:
  - a) That the proposed site has an accident rate equal to or greater than the average signal junction on the roads in the boroughs area – Inner London or Outer London (see Appendix A<sup>1</sup>) and it achieves a positive First Year Rate of Return (FYRR – taking into account positive and negative scheme impacts); and
  - a) That the traffic flows meet the relevant criteria (see Appendix B<sup>1</sup>);

Or

- b) That the traffic flows or pedestrian flows meet those shown in Appendix  $C^1$ .
- c) For a new development, where modelling evidence provides sufficient information.
- 32. In respect of criteria a) a review of the accident data available to us at the time of preparing the Transport Assessments reveals that during the 36 months to 31<sup>st</sup> July 2014 there were no reported accidents at the A316/Langhorn Drive junction. Therefore, the junction does not meet this criteria based on current accident rates. However, the redevelopment proposals will result in a large increase in traffic flows on Langhorn Drive which may affect accident rates at the junction.
- 33. In respect of criteria b) the junction proposals would not meet the criteria related to 'interruption for side road traffic' or 'reduction in traffic conflicts and delay' based on flows. Although the total flow into the junction is consistently high given the strategic nature of the A316, the flow on the side road is not sufficiently high for four one hour periods, although the threshold is achieved for a couple of hours.
- 34. In respect of criteria c) we have predicted that the flow of pedestrians across the A316 would be up to 189 movements generated by the development. There would also be non-development related crossing trips. However, in total the flow is unlikely to reach 300 trips per hour as an average of the four busiest hours during a typical day.
- 35. In respect of criteria d) the modelling work undertaken shows that the junction will operate satisfactorily with adequate reserve capacity. The LINSIG junction capacity models have been reviewed by TfL RSM Outcomes and are considered to be fit for purpose and so adequately reflect the potential operation of the junction.

#### Conclusions

- 36. The vehicle and pedestrian movements at the junction do not satisfy the criteria in TfL's guidance document for the justification for new traffic signal junctions. However, there is strong justification for the existing left-in/left-out priority junction to be signalised. This relates to:
  - the proposed intensification of the site will increase pedestrian, cycle and vehicle movements;
  - the benefits resulting from the provision of at-grade signal controlled crossing facilities, benefiting pedestrians and cyclists;

 $<sup>^1</sup>$  Reference to appendices A, B & C are those within the TfL document "Justification for Traffic Signals"

- the provision of a right turn facility which will avoid the need for U-turning at the Hospital Bridge Roundabout and subsequently reduce vehicle mileage and congestions.
- 37. The proposals to signal control the A316/Langhorn Drive junction, incorporating a right turn onto the A316, has the support of the LB Richmond upon Thames in respect of highway officers and local ward councillors.
- 38. The proposals are an important mitigation measure to facilitate the intensification of the Richmond College site. It is also noted that both the Stoop Stadium and the Council's Central Depot sites are identified in the Sites Allocation DPD as being suitable for intensification and so the signalisation of the junction will assist in accommodating potential future proposals.







Site location



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	70 Cowcross Street London, EC1M 6EL				
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